OFFICE OF RESEARCH, INNOVATION AND COMMERCIALIZATION

THE SKYSCHOLAR

AU'S RESEARCH MAGAZINE

MAIN CAMPUS (ISLAMABAD)

2023

OFFICE OF RESEARCH, INNOVATION AND COMMERCIALIZATION

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AIR MARSHAL JAVAID AHMED HI(M)(R)
VICE CHANCELLOR,
AIR UNIVERSITY

Dear Esteemed Faculty, Researchers, and Students,

I am delighted to address you through the pages of "The Skyscholar," a testament to Air University's commitment to academic excellence and research innovation. As we reflect on the accomplishments of 2023, I am filled with immense pride in the strides we have made in advancing knowledge and contributing to societal progress.

I encourage our esteemed faculty to continue their research endeavors, as their contributions play a vital role in shaping our society's future. To facilitate this, the university is committed to providing the necessary resources to support research initiatives. We are proud of our international collaborations and national partnerships, which enrich our research environment and broaden our impact. Our collaborations with the corporate sector have also been instrumental in bridging the gap between academia and industry.

In 2023, Air University published a total of 280 research articles in renowned journals with significant impact factors, showcasing our commitment to quality research. These publications have contributed to advancing the Sustainable Development Goals (SDGs) in our country, aligning with our mission to create a sustainable and inclusive future.

I would like to extend my appreciation to the Office of Research, Innovation, and Commercialization (ORIC) for compiling this data and providing valuable insights into our research areas. ORIC's efforts are commendable in promoting a culture of research excellence at Air University. ORIC stands as the catalyst for transformative research endeavors at Air University, offering a robust ecosystem that empowers our faculty and students to delve into the frontiers of knowledge. The department is dedicated to facilitating an environment conducive to innovative thinking, collaboration, and the practical application of research findings.

The research showcased in this magazine represents the culmination of countless hours of dedication, passion, and perseverance. From groundbreaking discoveries to innovative solutions, each article is a testament to the intellectual curiosity and scholarly rigor of our faculty. This collection of research not only highlights the depth and breadth of expertise within our university but also underscores our commitment to addressing complex challenges and advancing knowledge for the betterment of society.

As you peruse the magazine, I encourage you to delve into the depth and breadth of research presented here. From innovative technological solutions to insightful policy analyses, each article reflects the passion and commitment of our academic community to make a meaningful impact through research.

I extend my heartfelt appreciation to all the faculty whose research is featured in this magazine. Your dedication to scholarship and your unwavering commitment to excellence are truly commendable. ORIC encourages all those who did not feature this year to keep striving towards bringing quality research forward. Together, let us celebrate the spirit of inquiry and collaboration that defines Air University, and let us continue to push the boundaries of knowledge for the betterment of society.



AIR CDR. (R) AFZAAL AHMED KHAN
DIRECTOR ORIC

In the dynamic realm of academia, the pursuit of knowledge is intrinsically tied to the opportunities available for exploration and inquiry. At Air University, our commitment to fostering a culture of research extends beyond rhetoric, as evidenced by the diverse and groundbreaking work featured in the 2023 Research Publication Magazine. As the Director of the Office of Research, Innovation, and Commercialization (ORIC), I am delighted to shed light on the pivotal role our department plays in providing avenues for research to both faculty and students. ORIC stands as the catalyst for transformative research endeavors at Air University, offering a robust infrastructure that empowers our faculty and students to delve into the frontiers of knowledge. The department is dedicated to facilitating an environment conducive to innovative thinking, collaboration, and the practical application of research findings.

For our esteemed faculty members, ORIC serves as a vital resource hub, offering grant opportunities, research development support, and avenues for collaboration with industry partners. The goal is to not only nurture individual scholarly pursuits but also to foster a collaborative ecosystem that amplifies the impact of our collective research endeavors. Likewise, ORIC is deeply invested in providing our students with meaningful research experiences. Through various initiatives and programs, we strive to engage students in hands-on research projects, mentorship opportunities, and exposure to cutting-edge developments in their respective fields. Our aim is to instill a passion for inquiry and innovation that extends beyond the classroom, shaping the next generation of thought leaders and problem solvers. The articles showcased in the 2023 Research Publication Magazine are a testament to the opportunities ORIC provides for our academic community. Whether you are a seasoned researcher or an aspiring student, we believe in creating an environment where curiosity knows no bounds and where the pursuit of knowledge is a shared journey. As you peruse the magazine, I encourage you to consider the role that ORIC plays in nurturing and facilitating the remarkable research achievements of Air University. Together, let us continue to embrace the spirit of inquiry and collaboration that defines our academic community.

Research Division

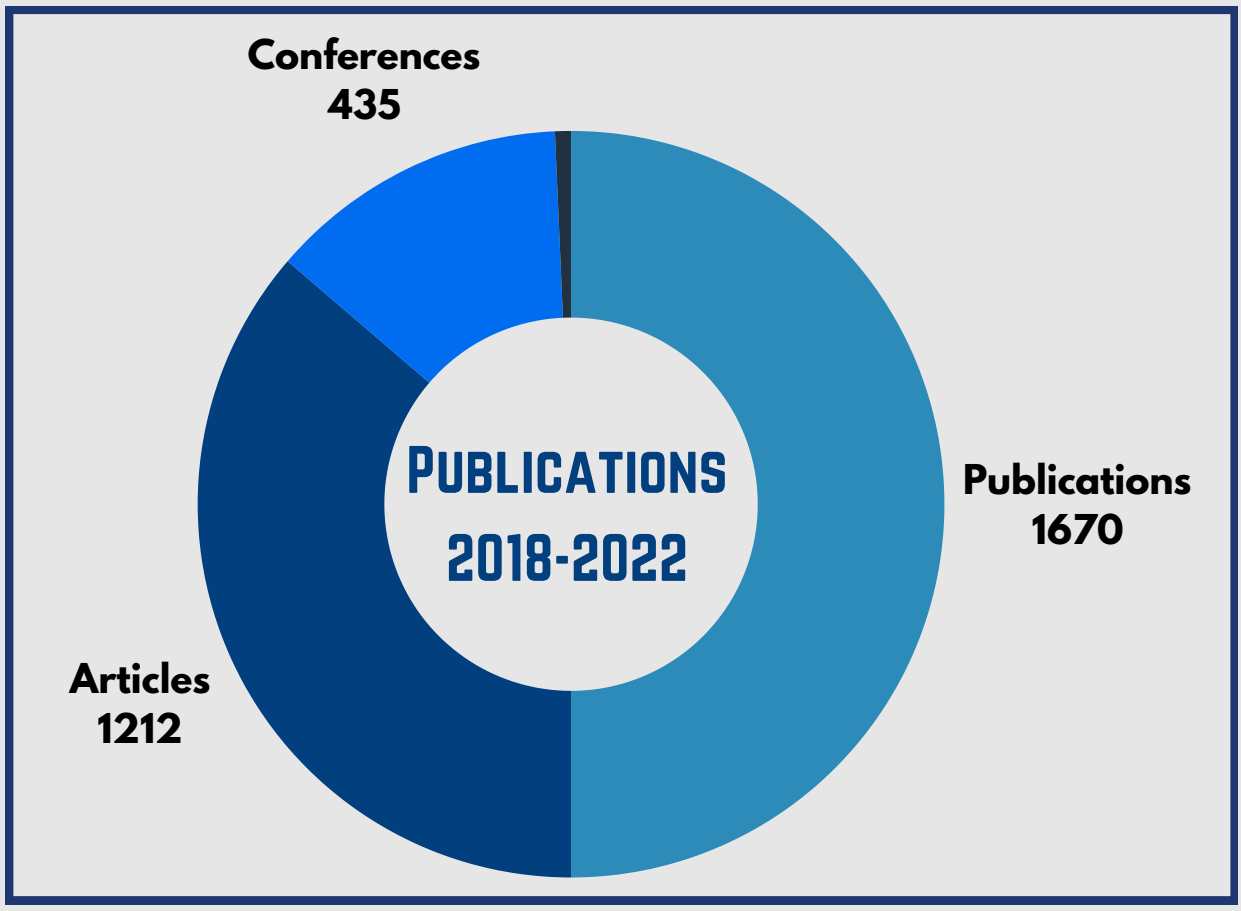


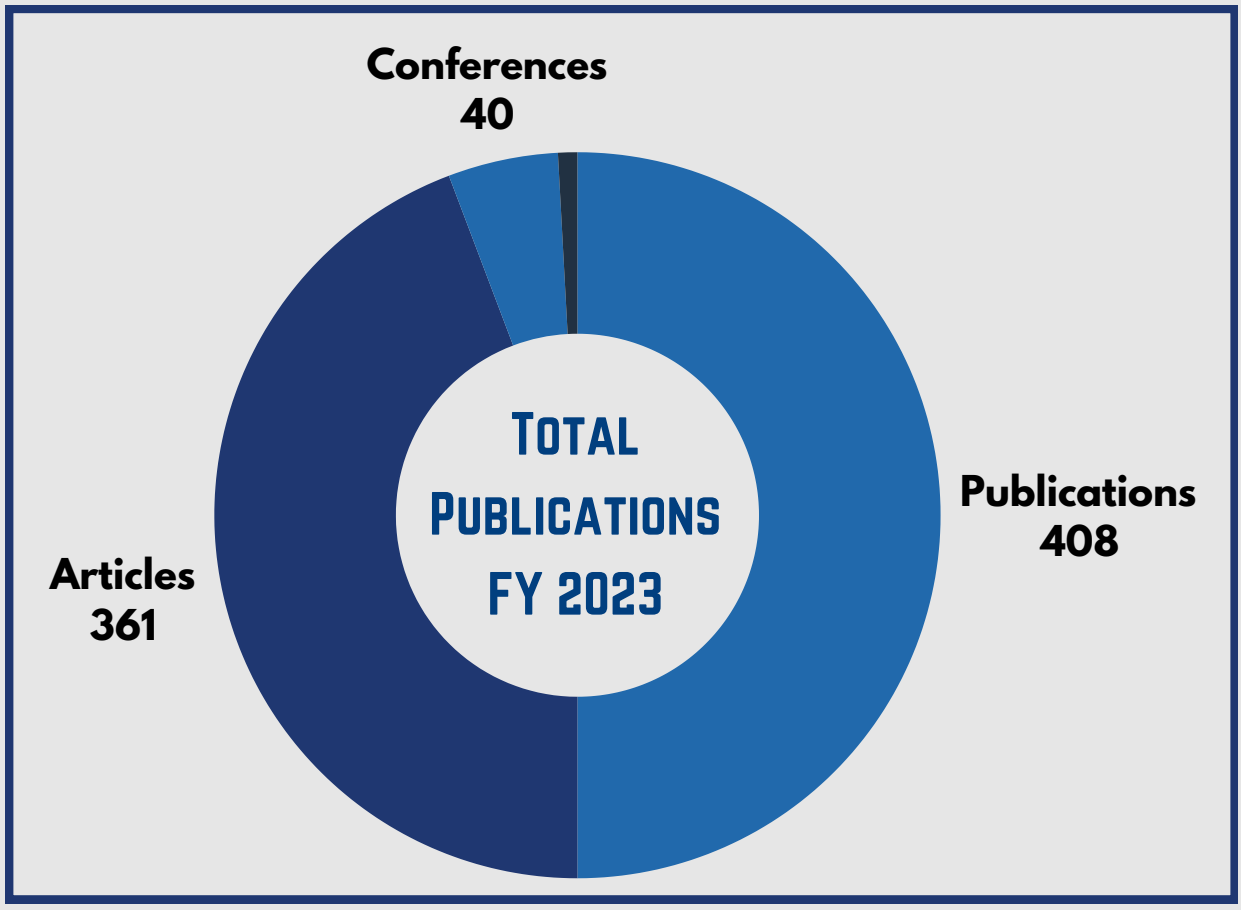
Manager Research
Mr. Wehaaj Ahmed Sulehri



Administrative Assistant
Ms. Kinza Ayaz

PUBLICATIONS SUMMARY





Faculty of Engineering

With over twenty graduating batches across three Electrical Engineering programs and Mechatronics Engineering, our Faculty of Engineering has successfully integrated professionals into industry and nurtured future academics. Despite facing typical challenges inherent in nascent institutions, we remain committed to faculty development and academic enrichment.

Our focus spans five specializations: electronics, telecommunications, power, mechatronics, and computer engineering. Additionally, a mechanical engineering undergraduate program, housed under the Institute of Avionics and Aeronautics, complements our offerings.

Our qualified faculty aligns seamlessly with the university's vision. Well-equipped engineering labs enhance students' skills, supporting cognitive knowledge gained in classrooms. Operating at undergraduate and graduate levels, including MS and PhD programs, our offerings are OBE accredited at level II by the Pakistan Engineering Council since 2018, reflecting our commitment to quality education.

Air University actively bridges the industry-academia gap through industrial advisory boards and robust linkages with national and international institutions. Graduates pursuing higher education globally attest to our foundation's strength, while our faculty's dedication ensures extraordinary performance. We assure students of quality education, experimental support, and a conducive environment, preparing them for a successful engineering career. With a focused approach and consistent hard work, time spent at Air University is a well-rewarded investment in a promising future.

FACULTY PUBLICATIONS (2023)

22

SDGS TARGETED



Department of Mechatronics Engineering

Departmental Overview

The Mechatronics Engineering Department, established in 2003 with B.E. and M.S. degree programs. The Department started PhD program in Mechatronics Engineering in 2015 with research emphasis in the areas of robotics, sensors & actuators, industrial automation and intelligent energy systems. The Department n has an academic staff with PhD faculty members and faculty members registered for, or nearing completion, of their Ph.D. degrees. There are well equipped laboratories including CNC machines, Robotics and industrial automation, Thermal sciences, Control, Mechatronic system design, Embedded systems and Mechanism theory & design Labs. In addition a MEMS research lab is established as a part of National Center of Robotics and Automation. Other common university facilities available to the department are computer labs, library and labs of digital electronics and microprocessors.

The Department of Mechatronics at is under the adept leadership of Dr. Noman Naseer, who holds the position of Chair Department. Dr. Rana Iqtidar Shako serves as a distinguished Professor, while the department boasts a cadre of accomplished faculty members including Dr. Neelum Yousaf, Dr. Hammad Nazeer, Ms. Samina Jamil, Mr. Imran Shabkhez, Dr. Hafiz Zia Ur Rehman, Dr. Atiq-Ur-Rehman, Dr. Shakil Rehman Sheikh, Mr. Syed Zahid Hussain, Dr. Tallal Saeed, and others in various capacities. Complementing this team are dedicated Lecturers, Lab Engineers, and Research Assistants, contributing collectively to the academic and research excellence in the dynamic field of mechatronics. The department, under the leadership of Dr. Noman Naseer, is a hub of knowledge, innovation, and practical application, fostering a rich learning environment for students and advancing the boundaries of mechatronics research.

DEPARMENTAL PUBLICATIONS IN 2023

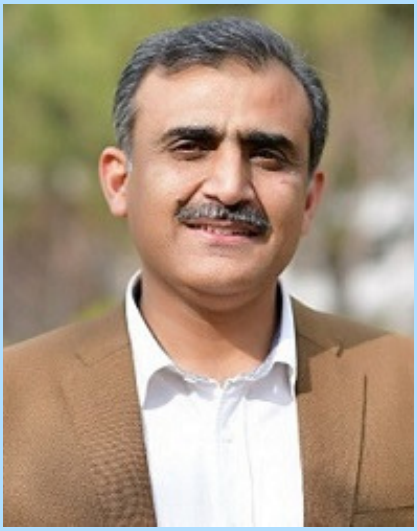
09

SDGS TARGETED IN 2023



Dr. Rana Iqtidar Shakoor

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Dr. Rana Iqtidar Shakoor is Professor at Mechatronics Engineering and currently holding the office of Dean Faculty of Engineering, Air University, Islamabad. Mechanical Engineer by profession, Dr Rana earned his PhD in 2010 in Microsystem Design and Development. He has been the visiting scholar at MEMS Lab, Queens University, Canada and Nanoscale System Integration Group, Southampton University, UK. As a PI of AU MEMS Sensors Design and Test Lab, developed under HEC Sponsored National Center from Robotics and Automation (NCRA) with a cost of PKR 106M, he is involved with many national and international organizations and executing projects of more than PKR 80M in the area of MEMS sensors design and development.

Research Areas

- Microaccelerometer
- Gyroscopes
- Remote Vibration Monitoring
- Mechanical amplifier
- Microgripper

	TOTAL	FY 2023
PUBLICATIONS	43	01
CITATIONS	498	94

SGDS TARGETED ---------- 02

DR. RANA IQTIDAR SHAKOOR

PROFESSOR

MECHATRONICS ENGINEERING

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TITLE OF PAPER

Design and Characterization of Three-Axis High-Range Inductive Tactile Force Sensor Utilizing Magnetorheological Elastomer for Robotic Surgical Applications

IEEE SENSORS

UNITED STATES

W

4.3 (2022)

2023-01-01

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10.1109/JSEN.2022.3222930

SCAN ME

ABSTRACT

This article presents a three-axis inductive tactile force sensor utilizing a magnetorheological elastomer (MRE) marker for inducing inductance change in square-shaped coils, in response to an input force. The sensor consists of copper coils on a printed circuit board (PCB) and a patterned elastomer layer between the marker and coils. The proposed configuration of the coils reduces the mechanical crosstalk between the applied three-axis forces, thus decoupling the force axes. Finite-element method (FEM)-based analyses are carried out to optimize the sensing gap between the coils and the marker. To observe the effect of the elastomer material on the sensor performance, two types of silicone rubbers, Ecoflex-30 and RTV-528, are used to make the patterned elastomer and the marker. The sensor with Ecoflex-30 elastomer can measure forces up to 25 N in normal and 2.5 N in shear directions, whereas the sensor with RTV-528 elastomer has a higher force range of up to 30 N for normal and 6 N for shear directions but has a lower sensitivity. A resolution of 12.71, 7.96, and 6.61 mN is achieved with Ecoflex-30, whereas for RTV-528, the force resolution is 76.52, 11.7, and 23.98 mN for normal, shear, and angular shear directions, respectively. The hysteresis error for the proposed sensors is 7.2% and 5.3% for Ecoflex-30 and RTV-528 elastomers, respectively. The proposed inductive tactile force sensor can be used in a wide range of robotic surgical applications for sensing multidirectional forces with better resolution and low hysteresis error.

KEYWORDS:

Tactile sensor | Magnetorheological elastomer (MRE) | Flexible Sensor | Inductance Measurement | Force Sensor

DR. NOMAN NASEER

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Dr. Noman Naseer is a Tenured Associate Professor in Mechatronics Engineering at Air University, Pakistan. As the Vice President of IEEE Robotics and Automation Society (Pakistan) and an Associate Editor for prestigious journals, their global impact extends to adjunct professorships at Ho Chi Minh City University of Technology (Vietnam) and the University of Brawijaya.

Research Areas

Robotics | fNIRS | Brain-computer Interfacing | Machine Learning | Artificial Intelligence

	TOTAL	FY 2023
PUBLICATIONS	122	01
CITATIONS	3961	582

SGDS TARGETED ---------- 02

DR. NOMAN NASEER
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TITLE OF PAPER

Accuracy Improvement of Non-Intrusive Load Monitoring Using Voting-Based Consensus Clustering

IEEE ACCESS

UNITED STATES

W

3.9 (2022)

2023-06-25

10.1109/ACCESS.2023.3279489

SCAN ME

ABSTRACT

Widespread inculcation of smart meter data in modern grid is motivating stakeholders to utilize it for demand response management and achieving energy sustainability goals. One of the methods being used in this regard is Non-Intrusive Load Monitoring (NILM); for disaggregating individual devices from a combined load profile. This study combines two spectral clustering strategies using voting-based consensus clustering technique in such a way as to achieve the benefits of both parent strategies. The voters in the consensus are taken to be the solutions proposed by Spectral Cluster-Mean (SC-M) and Spectral Cluster-Eigen Vector (SC-EV) algorithms with different window sizes to achieve diversity. Currently, Spectral Clustering for NILM has been used by few research works and so far, no one technique has achieved higher accuracy in detecting various kinds of devices. The proposed strategy was evaluated on real world data set (REFIT). The results have shown enhanced overall performance by up to 6%. An in-depth analysis of various tuning parameters of SC-M and SC-EV is also presented. These novel contributions increase the feasibility of using spectral clustering and voting based consensus clustering for NILM and may open further avenues of research in this direction.

KEYWORDS:

Spectral clustering | Smart Buildings | Voting based consensus clustering | Non-intrusive load monitoring | Energy Disaggregation

Dr. Shakil Rehman Sheikh

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Shakil R Sheikh currently works at the Department of Mechatronics, Air University of Islamabad. Shakil's research concentrates in Fluid Mechanics, Wind & Water Turbines, Assistive & Smart Buildings and Energy Conservation in Buildings. His current projects are 'Fabrication of a Vertical Axis Curtate Wind Turbine', and 'Energy Conservation in Buildings using Demand-side Response'.

Research Areas

Energy Management | CFD | Energy Conservation | Thermo-fluids | Intelligent Energy Systems

	TOTAL	FY 2023
PUBLICATIONS	50	02
CITATIONS	163	57

SGDS TARGETED ---------- 02

DR. SHAKIL REHMAN SHEIKH

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TITLE OF PAPER

Accuracy Improvement of Non-Intrusive Load Monitoring Using Voting-Based Consensus Clustering

IEEE ACCESS

UNITED STATES

W

3.9 (2022)

2023-06-25

7 AFFORDABLE AND CLEAN ENERGY

11 SUSTAINABLE CITIES AND COMMUNITIES

10.1109/ACCESS.2023.3279489

SCAN ME

ABSTRACT

Widespread inculcation of smart meter data in modern grid is motivating stakeholders to utilize it for demand response management and achieving energy sustainability goals. One of the methods being used in this regard is Non-Intrusive Load Monitoring (NILM); for disaggregating individual devices from a combined load profile. This study combines two spectral clustering strategies using voting-based consensus clustering technique in such a way as to achieve the benefits of both parent strategies. The voters in the consensus are taken to be the solutions proposed by Spectral Cluster-Mean (SC-M) and Spectral Cluster-Eigen Vector (SC-EV) algorithms with different window sizes to achieve diversity. Currently, Spectral Clustering for NILM has been used by few research works and so far, no one technique has achieved higher accuracy in detecting various kinds of devices. The proposed strategy was evaluated on real world data set (REFIT). The results have shown enhanced overall performance by up to 6%. An in-depth analysis of various tuning parameters of SC-M and SC-EV is also presented. These novel contributions increase the feasibility of using spectral clustering and voting based consensus clustering for NILM and may open further avenues of research in this direction.

KEYWORDS:

Spectral clustering | Smart Buildings | Voting based consensus clustering | Non-intrusive load monitoring | Energy Disaggregation

DR. SHAKIL REHMAN SHEIKH

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TITLE OF PAPER

A novel convolutional informer network for deterministic and probabilistic state-of-charge estimation of lithium-ion batteries.

JOURNAL OF ENERGY STORAGE

UNITED STATES

W

8.9 (2022)

2023-01-01

https://doi.org/10.1016/j.est.2022.106298.

SCAN ME

ABSTRACT

Accurate and real-time state-of-charge (SOC) estimation for lithium-ion batteries (LiB) is crucial for battery management system. However, the nonlinearity and complex dynamic properties of LiB pose a great challenge to the estimation of SOC. Some previous methods have undertaken high-precision SOC point estimation; however, the reliability of the estimated results has not been evaluated. These methods are too conservative and unreliable to describe the SOC sequence with random fluctuation characteristics by a certain number. In this study, a novel method for deterministic and probabilistic SOC estimation is proposed, called the Laplace distribution-based convolutional Informer network. The convolutional neural network (CNN) was used to extract spatial characteristics from the original input and enhance the ability of the model to capture sequential location information. An Informer network integrating the attention mechanism was used to learn the mapping relationship between these high-dimensional characteristics extracted by CNN and the SOC. This design makes the model suitable for fully extracting feature information from these data with complex temporal degradation properties. Considering the universality of measurement error and the importance of uncertainty estimation, the Laplace-based loss function was derived and used to train the proposed convolutional Informer network, reducing the influence of outliers on the estimated results and making the proposed model achieve uncertainty quantization. The effectiveness of the proposed model was evaluated on two public battery datasets. The results demonstrated that the proposed model produced accurate SOC point estimates and reliable interval estimates for different batteries under various operating conditions.

KEYWORDS: Lithium-ion batteries | Convolutional neural network (CNN) | Battery

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Hafiz Zia Ur Rehman received the B.Sc. and M.S. degrees in Mechatronics and Control Engineering from the University of Engineering and Technology, Lahore, Pakistan. He completed his Ph.D. degree in Mechatronics Engineering from Hanyang University, South Korea. He is currently working as an Assistant Professor with the Department of Mechatronic Engineering at Air University, Pakistan. His current research interests include medical image processing, machine learning, and computer vision.

Research Areas

Fuzzy Logic and Neural Network | Computer Vision and Control | Biomedical Image and Signal Processing | Mathematical Morphology

	TOTAL	FY 2023
PUBLICATIONS	16	01
CITATIONS	298	108

SGDS TARGETED ---------- 02

Dr. Hafiz Zia Ur Rehman

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TITLE OF PAPER

Satellite Imagery-Based Cloud Classification Using Deep Learning

REMOTE SENSING

SWITZERLAND

W

5.0 (2022)

2023-12-01

10.3390/RS15235597

SCAN ME

ABSTRACT

A significant amount of satellite imaging data is now easily available due to the continued development of remote sensing (RS) technology. Enabling the successful application of RS in real-world settings requires efficient and scalable solutions to extend their use in multidisciplinary areas. The goal of quick analysis and precise classification in Remote Sensing Imaging (RSI) is often accomplished by utilizing approaches based on deep Convolution Neural Networks (CNNs). This research offers a unique snapshot-based residual network (SnapResNet) that consists of fully connected layers (FC-1024), batch normalization (BN), L2 regularization, dropout layers, dense layer, and data augmentation. Architectural changes overcome the inter-class similarity problem while data augmentation resolves the problem of imbalanced classes. Moreover, the snapshot ensemble technique is utilized to prevent over-fitting, thereby further improving the network's performance. The proposed SnapResNet152 model employs the most challenging Large-Scale Cloud Images Dataset for Meteorology Research (LSCIDMR), having 10 classes with thousands of high-resolution images and classifying them into respective classes. The developed model outperforms the existing deep learning-based algorithms (e.g., AlexNet, VGG-19, ResNet101, and EfficientNet) and achieves an overall accuracy of 97.25%.

KEYWORDS:

Deep Learning | Prediction | Snap ResNet Model | Weather Forecasting | Satellite Image

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Dr. Syed Zahid Hussain is working as Assistant Professor in the Department of Mechatronics Engineering, Air University. His research areas are thermal systems modeling, Additive manufacturing, Control, Smart mechatronics systems and digital twin of industrial systems.

Research Areas

- Additive Manufacturing
- Modelling of thermal system
- Process Controlors

	TOTAL	FY 2023
PUBLICATIONS	13	01
CITATIONS	51	12
SGDS TARGETED ----------	01	

DR. SYED ZAHID HUSSAIN

ASSISTANT PROFESSOR
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TITLE OF PAPER

Linear Active Disturbance Rejection Control for a Laser Powder Bed Fusion Additive Manufacturing Process

ELECTRONICS MDPI

SWITZERLAND

W

2.9 (2022)

2023-01-16

https://doi.org/10.3390/electronics12020471

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

Functional metal parts with complicated geometry and internal features for the aerospace and automotive industries can be created using the laser powder bed fusion additive manufacturing (AM) technique. However, the lack of uniform quality of the produced parts in terms of strength limits its enormous potential for general adoption in industries. Most of the defects in selective laser melting (SLM) parts are associated with a nonuniform melt pool size. The melt pool area may fluctuate in spite of constant SLM processing parameters, like laser power, laser speed, hatching distance, and layer thickness. This is due to heat accumulation in the current track from previously scanned tracks in the current layer. The feedback control strategy is a promising tool for maintaining the melt pool dimensions. In this study, a dynamic model of the melt pool cross-sectional area is considered. The model is based on the energy balance of lumped melt pool parameters. Energy coming from previously scanned tracks is considered a source of disturbance for the current melt pool cross-section area in the control algorithm. To track the reference melt pool area and manage the disturbances and uncertainties, a linear active disturbance rejection control (LADRC) strategy is considered. The LADRC control technique is more successful in terms of rapid reference tracking and disturbance rejection when compared to the conventional PID controller. The simulation study shows that an LADRC control strategy presents a 65% faster time response than the PID, a 97% reduction in the steady state error, and a 98% reduction in overshoot. The integral time absolute error (ITAE) performance index shows 95% improvement for reference tracking of the melt pool area in SLM. In terms of reference tracking and robustness, LADRC outperforms the PID controller and ensures that the melt pool size remains constant.

KEYWORDS:

Additive manufacturing | Selective laser melting | Process Modelling | Disturbance Modelling

DR. IMRAN SHAH

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Dr. Imran Shah worked as an Assistant Professor in different Universities with about 4 years of Teaching experience since 2019. He got a Professor scholarship from South Korea in 2016 and completed his Ph.D. in Mechatronics Engineering from South Korea in 2019. He has full command of the outcome-based education (OBE) system. He was the Officer In Charge (OIC) for Labs during his stay at the National University of Technology (Nutech).

Research Areas

FSI | FEM/CFD | Micro-Fluidic Mixing | Batteries | Biosensors

	TOTAL	FY 2023
PUBLICATIONS	25	03
CITATIONS	719	200

SGDS TARGETED ---------- 03

Dr. Imran Shah
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TITLE OF PAPER

Experimental Stability Analysis of Vertical Takeoff and Landing System Based on Robust Control Strategy

APPLIED SCIENCES-BASEL

SWITZERLAND

W

3.10 (2022)

2023-10-01

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10.3390/APP132011209

SCAN ME

ABSTRACT

The Vertical Take-Off and Landing (VTOL) system is a multi-variable system subjected to harsh weather conditions, which creates challenges in proving the stability of the system before takeoff, which is essential for a flight dynamics system. The presented research work is based on the experimental results of the VTOL system to investigate and prove the stability using Lyapunov theory. This is achieved by tracking the pitch along the x-axis using cascaded control and integral super twisting sliding mode control (ISTSMC) algorithms. The motor current of the propeller assembly is regulated based on proportional integral (PI) and proportional integral derivative (PID) controllers. The cascaded control shows the maximum tracking error due to high-frequency fluctuations in the controller input signal, which lead to expensive mechanical losses for the actuators. The comparison of the results shows that ISTSMC outperforms the cascaded control strategy by reducing the tracking error to less than 1% percent and reducing the high-frequency fluctuations in the controller input signal. The hardware results show a minor delay in the transient response during vertical takeoff due to the inertia of the system and the tracking error due to air friction, etc., of the external environment, compared to the simulation results obtained in MATLAB.

KEYWORDS:

Proportional Integral Control | Proportional Integral Derivative Control | Unmanned Air Vehicle | LabVIEW | Integral Supertwisting Sliding Mode Control

DR. IMRAN SHAH
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TITLE OF PAPER

A Multiphysics-Multiscale Model for Particle-Binder Interactions in Electrode of Lithium-Ion Batteries

ENERGIES

SWITZERLAND

W

3.2 (2022)

2023-07-01

10.3390/EN16155823

SCAN ME

ABSTRACT

Understanding the electrochemical and mechanical degradations inside the electrodes of lithium-ion battery is crucial for the design of robust electrodes. A typical lithium-ion battery electrode consists of active particles enclosed with conductive binder and an electrolyte. During the charging and discharging process, these adjacent materials create a mechanical confinement which suppresses the expansion and contraction of the particles and affects overall performance. The electrochemical and mechanical response mutually affect each other. The particle level expansion/contraction alters the electrochemical response at the electrode level. In return, the electrode level kinetics affect the stress at the particle level. In this paper, we developed a multiphysics-multiscale model to analyze the electrochemical and mechanical responses at both the particle and cell level. The 1D Li-ion battery model is fully coupled with 2D representative volume element (RVE) model, where the particles are covered in binder layers and bridged through the binder. The simulation results show that when the binder constraint is incorporated, the particles achieve a lower surface state of charge during charging. Further, the cell charging time increases by 7.4% and the discharge capacity reduces by 1.4% for 1 C-rate charge/discharge. In addition, mechanical interaction creates inhomogeneous stress inside the particle, which results in particle fracture and particle-binder debonding. The developed model will provide insights into the mechanisms of battery degradation for improving the performance of Li-ion batteries.

KEYWORDS:

Lithium-ion Battery | Stress-Potential Coupling | Multiphysics-Multiscale Model | Binder Constraint | Charge Rates | Electrochemical Performance

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TITLE OF PAPER

Proposed optimized energy plan for the largest island of South Korea based on full renewable energy resources

PROCEEDINGS OF THE INSTITUTION OF MECHANICAL ENGINEERS, PART E: JOURNAL OF PROCESS MECHANICAL ENGINEERING

UNITED STATES

2.4 (2022)

X

7 AFFORDABLE AND CLEAN ENERGY

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

2023-12-01

10.1177/09544089231216934

SCAN ME

ABSTRACT

The current study's objective is to evaluate wind and solar energy and select the finest kind of energy systems having minimum levelized of energy systems by using Home Pro software for Jeju Island, the largest island in South Korea. Using Weibull and mean wind speed diagrams, the wind conditions in the initial section of this study are explained. To assess the wind potential of every area, size and form criteria are offered. It was found that two main wind directions were southeast or southwest, with southwest being more common. Finally, based on the wind conditions at each site and IEC recommendations, a set of five wind turbines that were best suited for each location were shortlisted. Each wind turbine's performance was assessed using technical criteria, that is, monthly energy production, annual energy production, and capacity factors. Similar to this, economic considerations such as the levelized cost of electricity, internal rate of return, payback period, and net present value were also made. A Hanjin model HJWT 87/2000 is best suitable for Jeju Island in the event of an off-shore wind farm, according to the findings. To explore the implications of modifying the hub height of the turbines on the economics of wind generating, a thorough economic sensitivity analysis is also included. The second section explains the solar potential of the Island. The average solar energy potential of Jeju Island is estimated to be 13.775 Mj·m2·day−1. To cover the energy demand and supply gap for Jaju Island, various types of local electricity generators and batteries have been studied for finding the optimal energy system for the island.

KEYWORDS:

Wind Farm | New Site | Economy | Off-Shore | Optimization

Department of Electrical & Computer Engineering

Departmental Overview

Department of Electrical Engineering is the largest constituent unit of Air University in its size and scope. All the graduated batches have Pakistan Engineering Council (PEC) accreditation.

The department has eleven modern laboratories which are equipped with the latest training aids to enhance the learning experience of the students. It has digital electronics, electronic systems, analog, digital, RF and optical communication, power electronics and electrical machines, control systems, embedded systems design, digital signal and image processing, telecommunication networks laboratory, power systems laboratory and projects laboratory. Students also have access to five computer laboratories with latest computer hardware and software for computer based courses and fast internet connection. For research purposes, students have access to IEEE digital library as well as other digital libraries with access provided by HEC.

The Department of Electrical and Computer Engineering is led by Dr. Hafiz Ashiq Hussain, with a distinguished faculty committed to academic excellence. Associate Professors Dr. Fiaz Ahmed, Dr. Hashim Bukhari, and Dr. Syed Ahmed Pasha provide valuable expertise. The team of Assistant Professors, including Dr. Muhammad Imran Farid, Dr. Sarah Saeed, and others, contributes to a dynamic learning environment. Lecturers such as Engr. Muhammad Ali Raza and Ms. Zoafshan enhance the educational journey. Together, this dedicated team, led by Dr. Hafiz Ashiq Hussain, shapes a vibrant academic community within the department.

DEPARMENTAL PUBLICATIONS (2023)

09

SDGS TARGETED IN 2023



DR. HAFIZ ASHIQ HUSSAIN

PROFESSOR

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Dr. Hafiz Ashiq Hussain, a Professor in the Department of Electrical & Computer Engineering, holds a PhD in Telecom Engineering (Physical Electronics) from Beijing University of Posts and Telecommunication, China. He completed his MSc in Telecom Engineering at UET Peshawar, and holds another MSc in Electrical Engineering (Power) from UET Taxila. Dr. Hussain's academic journey began with a BSc in Electrical Engineering from UET Taxila. With a diverse educational background spanning both telecom and electrical engineering, Dr. Hussain brings a wealth of expertise to his role as a professor. His research interests likely cover a broad spectrum within these fields, and his extensive academic experience undoubtedly enriches the learning environment for students in the department.

Research Areas

- Optical Fiber Communication
- Power Transmission Systems
- Internet of Things IoT

	TOTAL	FY 2023
PUBLICATIONS	54	02
CITATIONS	390	88

SGDS TARGETED ---------- 03

DR. HAFIZ ASHIQ HUSSAIN
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TITLE OF PAPER

Reliable and cost-efficient protection scheme for 5G fronthaul/backhaul network

HELIYON

NETHERLANDS

W

4 (2022)

2023-03-02

https://doi.org/10.1016/j.heliyon.2023.e14215

SCAN ME

ABSTRACT

One of the challenges for Mobile Network Operators (MNO) in 5G deployment is to ensure reliability in the various sections of the network as the new services and applications, for instance, video on demand, telemedicine, online learning, smart transportation and augmented reality require not only high bandwidth but also demand uninterrupted service. However, this reliability requires substantial investment. Therefore, MNO only deploys protection or backup resources in the network unless it is cost-effective. The study aims to present a reliable and low-cost protection scheme based on an Ultra-Dense Wavelength Division Multiplexing Passive Optical Network (UDWDM PON) for the transport layer of the 5G network, i.e., for the fronthaul/backhaul section. We have evaluated the Capital Expenditure (CAPEX) cost of UDWDM PON with and without protection in a dense urban area. We also measure the figure of merit between the cost and reliability of the system and, subsequently, confirm that the proposed protection scheme can achieve system reliability up to four nines with very low additional CAPEX investment. Finally, the efficacy of the proposed protection scheme is also demonstrated through simulation experiments.

KEYWORDS:

Centralized radio access network | Free space optics | Passive optical network | Fronthaul | UDWDM

DR. HAFIZ ASHIQ HUSSAIN
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TITLE OF PAPER

Optimization of different TDM techniques in DWDM optical networks for FWM suppression

OPTICAL AND QUANTUM ELECTRONICS

UNITED STATES

W

2.4 (2022)

2023-01-07

11 SUSTAINABLE CITIES AND COMMUNITIES

10.1088/1742-6596/1447/1/012033

SCAN ME

ABSTRACT

Next-generation optical communication systems demand more capacity, a large number of users, and high data rates this is solved by using dense wavelength division multiplexing (DWDM) systems with lower interchannel space and high input power. However, increasing power and decreasing space can cause nonlinear effects such as four wave mixing (FWM). Time-division multiplexing (TDM) can be used to decrease the power of FWM products. In this paper, the effect of TDM combined with DWDM is analysed to reduce FWM. The analysis is carried out and the system is evaluated based on FWM efficiency, bit error rate (BER), quality factor (Q-factor), and the received power. Simulations are carried out at 2.5, 3.5, and 5 Gbps at a transmission length of 100 km. The simulation procedure includes the use of 2-TDM, 4-TDM and 8-TDM at different data rates aiming to enhance the system performance. The obtained average FWM efficiency is −68.2, −70.6, and −74.8, respectively. While, 2-TDM, 4-TDM, and 8-TDM provide average Q-factor of 33.9, 19.2, and 12.7, respectively, clearly illustrating the surge in system quality. A trade-off between the system quality and FWM efficiency is done using different data rates.

KEYWORDS:

Four-wave mixing | Time Division Multiplexing | Wavelength Division Multiplexing | Dense Wavelength Division Multiplexing | Bit error rate

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Syed Hashim Raza Bukhari is currently a Senior Member IEEE and an Associate Professor in Department of Electrical & Computer Engineering, Air University, Islamabad, Pakistan. Earlier he has served in COMSATS University Islamabad and Wah Engineering College, University of Wah. He did his PhD in 2017 from COMSATS University Islamabad, Pakistan. He is currently editor of IEEE Future Directions Newsletter: Technology, Policy & Ethics and guest editor of Springer Journal of Network and Systems Management (JNSM). He is also reviewer of several prestigious journals including IEEE Communication Surveys & Tutorials, IEEE Communication Magazine and many others

Research Areas

- Cognitive Radio Sensor Networks
- Internet of Vehicles
- Internet of Things
- Wireless Sensor Networks

	TOTAL	FY 2023
PUBLICATIONS	22	02
CITATIONS	514	139

SGDS TARGETED ---------- 02

DR. SYED HASHIM RAZA BUKHARI
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TITLE OF PAPER

COVICT: an IoT based architecture for COVID-19 detection and contact tracing

JOURNAL OF AMBIENT INTELLIGENCE AND HUMANIZED COMPUTING

GERMANY

X

6.16 (2022)

2023-06-01

3 GOOD HEALTH AND WELL-BEING

10.1007/s12652-022-04446-z

SCAN ME

ABSTRACT

The world we live in has been taken quite surprisingly by the outbreak of a novel virus namely SARS-CoV-2. COVID-19 i.e. the disease associated with the virus, has not only shaken the world economy due to enforced lockdown but has also saturated the public health care systems of even most advanced countries due to its exponential spread. The fight against COVID-19 pandemic will continue until majority of world's population get vaccinated or herd immunity is achieved. Many researchers have exploited the Artificial intelligence (AI) knacks based IoT architecture for early detection and monitoring of potential COVID-19 cases to control the transmission of the virus. However, the main cause of the spread is that people infected with COVID-19 do not show any symptoms and are asymptomatic but can still transmit virus to the masses. Researcher have introduced contact tracing applications to automatically detect contacts that can be infected by the index case. However, these fully automated contact tracing apps have not been accepted due to issues like privacy and cross-app compatibility. In the current study, an IoT based COVID-19 detection and monitoring system with semi-automated and improved contact tracing capability namely COVICT has been presented with application of real-time data of symptoms collected from individuals and contact tracing. The deployment of COVICT, the prediction of infected persons can be made more effective and contaminated areas can be identified to mitigate the further propagation of the virus by imposing Smart Lockdown. The proposed IoT based architecture can be quite helpful for regulatory authorities for policy making to fight COVID-19.

KEYWORDS:

Covid-19 | Pandemic | Early Identification | Contact Tracing | Internet of Things

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TITLE OF PAPER

Parametric estimation scheme for aircraft fuel consumption using machine learning

NEURAL COMPUTING AND APPLICATIONS

UNITED KINGDOM

W

6.0 (2022)

2023-09-16

https://doi.org/10.1007/s00521-023-08981-4

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

The most efficient technique that is used for aircraft engine tuning is through mounting the engine on the engine test bench (ETB) to analyze, tune and monitor its variables through the ETB run. It is practically very difficult to unmount the engine from the aircraft and mount it on the ETB for analyzing and estimating a single variable such as fuel consumption or oil temperature as the unmounting process requires huge manpower and machinery. This problem can be resolved if the fuel consumption of an air vehicle is estimated without unmounting the engine from the aircraft through applying data analytics and machine learning models. Therefore, in this paper, the fuel consumption of an aircraft is analyzed and estimated through advanced data science techniques. The dataset went through data analyzing and preprocessing techniques before applying multiple machine learning models such as multiple linear regression (MLR), support vector regression, decision tree regression and deep learning algorithm RNN/LSTM. The performance of algorithms has been evaluated using model evaluation methods such as mean absolute error (MAE), root mean square error (RMSE) and coefficient of determination. The models are evaluated in taxi, cruise and approach flight phases where the LSTM performs excellent among all other algorithms with RMSE 15.1%, 10.5% and 0.9%, respectively.

KEYWORDS:

Machine Learning | Engine test bench | Fuel Consumption | Data Analytic

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Dr. Syed Ahmed Pasha, an Associate Professor in the Department of Electrical & Computer Engineering, boasts extensive academic credentials and research experience. He completed his Postdoctoral studies at both The University of Sydney (USyd) and The University of New South Wales (UNSW) in Australia, specializing in cutting-edge areas of Electrical Engineering. Dr. Pasha holds a Ph.D. in Electrical Engineering from UNSW, Australia, showcasing his expertise in the field. He began his academic journey with a Bachelor's degree in Electrical Engineering from the prestigious National University of Sciences and Technology (NUST) in Pakistan in 2001. With his diverse educational background and research accomplishments,

Research Areas

- Time Series Analysis and Point Processes
- Statistical Signal Processing
- Stochastic Filtering
- Machine Learning
- System Identification

	TOTAL	FY 2023
PUBLICATIONS	35	02
CITATIONS	403	31

SGDS TARGETED ---------- 01

DR. SYED AHMED PASHA
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TITLE OF PAPER

On the nonstandard finite difference method for reaction–diffusion models

CHAOS, SOLITONS & FRACTALS

UNITED KINGDOM

W

7.8 (2022)

2023-01-01

https://doi.org/10.1016/j.chaos.2022.112929

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

The nonstandard finite difference (NSFD) method is an elegant approach in that it overcomes the numerical instability and bias exhibited by standard finite difference methods for numerically solving nonlinear differential equations. In addition, the NSFD method preserves some qualitative features of the continuous-time model such as boundedness and positivity. But for an important class of models which include diffusion and reaction–diffusion systems that appear in a number of application domains including epidemiology, ecology, and finance, recently introduced NSFD schemes do not guarantee first-order temporal accuracy or consistency. In this paper, we first show this for a reaction–diffusion epidemic model. We then propose an alternative NSFD scheme that guarantees first-order accuracy in time and second-order accuracy in space whilst preserving positivity of the solution. Stability and consistency analyses of the proposed scheme are then presented. To demonstrate the performance of the proposed scheme we show a comparison with the existing NSFD approach for three examples which confirm the superiority of our proposed approach.

KEYWORDS:

Differential equations | Diffusion | NSFD | Reaction–diffusion epidemic model

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TITLE OF PAPER

False Data Injection Attacks on Networked Control Systems

JOURNAL OF CONTROL AND DECISION

UNITED KINGDOM

Y

1.7 (2022)

2023-09-01

https://doi.org/10.1080/23307706.2023.2261938

SCAN ME

ABSTRACT

The integration of cyber (network) with physical world is a big step in cyber-physical systems. This has revolutionised many industries. But this transformation has made cyber-physical systems vulnerable to attacks. One particular type of attack is the adversarial false data injection which injects false data in either the sensor measurements or the corresponding communication channel. A better understanding of how false data injection (FDI) attacks are constructed is crucial for developing strategies to protect against such attacks. In this paper, we consider two models for networked control systems and present an algorithm for constructing FDI attacks in each case and compare with an existing approach. The conditions for the attack to remain stealthy for systems equipped with a $\chi 2$ failure detector and the design of attack vectors that satisfy these conditions are discussed in detail. The algorithms are demonstrated by developing FDI attacks for two real-world examples.

KEYWORDS:

False Data Injection | Networked Control System | Cyber-physical System | Cyber Attack | Malicious Data

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Dr. Muhammad Adil Khan, an Assistant Professor in the Department of Electrical & Computer Engineering, boasts an impressive academic background. He completed his Postdoctoral research in Electrical Engineering at City University of Hong Kong, further enhancing his expertise in the field. Dr. Khan holds a PhD in Electronics Engineering from Pusan National University, where he conducted research contributing to the advancement of electrical engineering. Prior to this, he earned his Master of Science in Electrical Engineering from the International Islamic University and his Bachelor of Science in Electrical Engineering from UET Peshawar.

Research Areas

- Electrical Vehicles
- Embedded Systems
- Hybrid Renewable Energy Systems
- Efficient Solar PV Systems
- Fast Charging Algorithm for Lithium Ion batteries for EV applications

	TOTAL	FY 2023
PUBLICATIONS	53	01
CITATIONS	1038	236

SGDS TARGETED ---------- 03

DR. MUHAMMAD ADIL KHAN
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TITLE OF PAPER

A Comprehensive Analysis of Online and Offline Energy Management Approaches for Optimal Performance of Fuel Cell Hybrid Electric Vehicles

ENERGIES

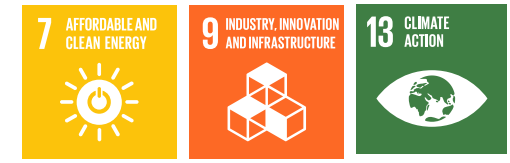
SWITZERLAND

W

3.2 (2022)

2023-03-22

https://doi.org/10.3390/en16083325



SCAN ME

ABSTRACT

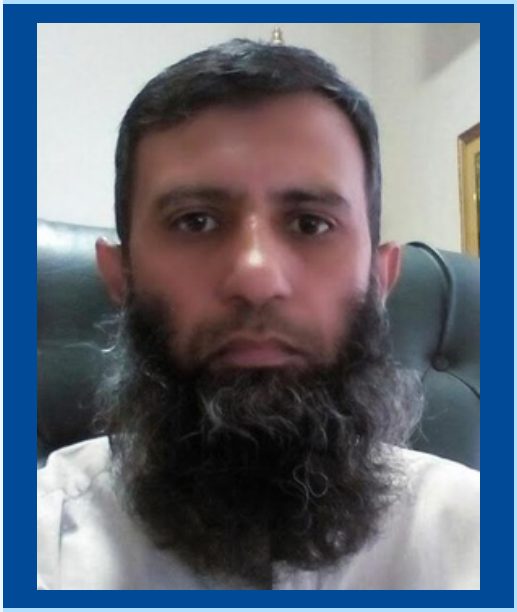
The global impact of hybrid electric vehicles (HEVs) is exponentially rising as it is an emission-free and reliable alternative to fossil fuel-based vehicles that cause enormous negative impacts on the socioeconomic and environmental sectors. Fuel cell hybrid electric vehicles (FCHEV) have been widely considered in the latest research as an energy-efficient, environmentally friendly, and longer-range green transportation alternative. The performance of these FCHEVs, however, is primarily dependent upon the optimal selection of Energy Management Strategies (EMSs) adopted for optimum power split and energy resource management. This research reviews the latest EMS techniques presented in the literature and highlights their working principle, operation, and impact on the FCHEV performance and reliability. This research also highlights the challenges associated with the globalization of FCHEVs and recommends future work and research directions essential for optimal FCHEV performance and commercialization.

KEYWORDS:

Full cell hybrid electric vehicle | Fuel Cell | Battery | Super capacitor | System optimization

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Dr. Waseem Khan is currently an Assistant Professor in Department of Electrical & Computer Engineering, Air University, Islamabad, Pakistan. Earlier he has served in NESCOM for about ten years. He did his MSc Information and Communication Engineering from University of Leicester, UK and PhD in 2015 from Air University Islamabad, Pakistan. He has served as reviewer of several prestigious journals including IEEE Transactions on Antennas and Wireless Propagation, Geoscience and Remote Sensing Letters and many others.

Research Areas

- Beamforming
- Signal Processing for Communications and Radars
- Audio Signal Processing
- Machine Learning for Signal Processing

	TOTAL	FY 2023
PUBLICATIONS	16	01
CITATIONS	712	73

SGDS TARGETED ---------- 03

DR. WASEEM KHAN
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TITLE OF PAPER

Semi-Coprime Array with Staggered Beam-Steering of Sub-Arrays

SENSORS

SWITZERLAND

W

3.9 (2022)

2023-06-10

https://doi.org/10.3390/s23125484



SCAN ME

ABSTRACT

A split-aperture array (SAA) is an array of sensors or antenna elements in which the array is split into two or more sub-arrays (SAs). Recently proposed SAAs, namely coprime and semi-coprime arrays, offer to attain a small half-power beamwidth (HPBW) with a small number of elements, compared to most conventional unified-aperture arrays, at the cost of reduced peak-to-side-lobe ratio (PSLR). To reduce HPBW and increase PSLR, non-uniform inter-element spacing and excitation amplitudes have proven helpful. However, all the existing arrays and beam-formers suffer increased HPBW, degraded PSLR or both when the main beam is steered away from the broadside. In this paper, we propose staggered beam-steering of SAs, a novel technique for decreasing HPBW. In this technique, we steer the main beams of the SAs of a semi-coprime array to angles slightly different from the desired steering angle. In conjunction with staggered beam-steering of SAs, we have utilized Chebyshev weights to suppress the side lobes. The results show that the beam-widening effect of Chebyshev weights can be mitigated considerably by staggered beam-steering of the SAs. Ultimately, the unified beam-pattern of the whole array offers HPBW and PSLR better than the existing SAAs, uniform and non-uniform linear arrays, especially when the desired steering angle is away from the broadside direction.

KEYWORDS:

Beam Pattern | Linear Antenna Array | Semi Coprime Array | Split Aperture Array

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Dr. Ahsan Sarwar Rana, an Assistant Professor in the Department of Electrical & Computer Engineering, holds a Ph.D. in Electrical Engineering from the Information and Technology University (ITU), an MS in Electrical Engineering from the Lahore University of Management Sciences (LUMS), and a BE in Electrical Engineering from the University of Engineering and Technology (UET). With a strong academic background and expertise in electrical engineering, Dr. Rana brings valuable knowledge and experience to his role. His research interests likely span a wide range of topics within the field, contributing to both academic scholarship and practical applications.ineering.

Research Areas

- Electromagnetic waves
- Embedded Systems
- EM Metamaterials and Metasurfaces
- Nanophotonics and nanophotonic devices
- RF and Microwave engineering

	TOTAL	FY 2023
PUBLICATIONS	29	03
CITATIONS	723	227

SGDS TARGETED ---------- 03

Dr. Ahsan Sarwar Rana
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TITLE OF PAPER

Broadband solar absorption by chromium metasurface for highly efficient solar thermophotovoltaic systems

RENEWABLE AND SUSTAINABLE ENERGY REVIEWS

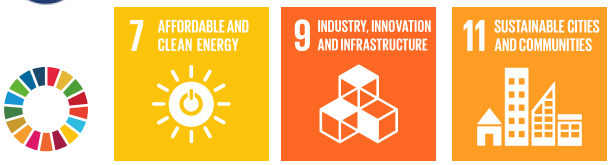
UNITED KINGDOM

W

15.9 (2022)

2023-01-01

https://doi.org/10.1016/j.rser.2022.113005



SCAN ME

ABSTRACT

We report a broadband metasurface solar absorber composed of refractory material chromium (Cr) for the intermediate structure of a solar thermophotovoltaic (STPV) system that can overcome the Shockley–Queisser limit for efficient solar energy harvesting. The metasurface absorber exhibits high broadband absorptance with an average higher than 90% for 300–1200 nm. The self-passivation property of chromium ensures resistance to oxidation and corrosion, besides the benefit of being a low-cost material having stability at higher temperatures. The proposed absorber forms one part of the intermediate structure, whereas the emitter forms its second part. The emitter shapes the incoming electromagnetic (EM) waves to have energies just above the PV cell bandgap to assist in efficient electron-hole pair generation. The proposed STPV system can achieve PV cell efficiency of 43.2% with an efficiency greater than 42% in a broad color temperature range of 1597–2573 K, which is comparable to the state-of-the-art. The innovation in our work comes from efficiency enhancement through the hybridization of selectivity and broadband response of the proposed absorbers and emitter. The designs are also subjected to detailed analyses to understand the mechanism behind their performance. Moreover, a robustness check is performed to know which design parameters are crucial to acquiring such results.

KEYWORDS:

Metasurface | Thermophotovoltaic | Energy harvesting | PV cell efficiency

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TITLE OF PAPER

Multi-Layer Material Characterization at Ka-Band Using Bayesian Inversion Method

ELECTRONICS

BOSNIA AND HERZEGOVINA

Y

2.9 (2022)

2023-01-21

https://doi.org/10.3390/electronics12030563

SCAN ME

ABSTRACT

This paper presents the implementation of the Bayesian inversion method for the characterization and estimation of different dielectric material properties. The scattering parameters of single and multi-layer materials are measured using a free-space experimental setup using a standard gain horn antenna and a Vector Network Analyzer (VNA) at Ka-band (26–40 GHz). The relative permittivity, material thickness, and material positioning error are defined as model parameters and estimated using the observed (measured) data. The FR4 Epoxy, Rogers RT/Duriod 5880, and Rogers AD600 with different relative permittivities and thicknesses are used in the measurement setup. The results displayed good agreement between model parameters and estimated properties of the presented materials, while the corresponding eigenvectors provided a level of confidence in model parameter values. The results were compared with different reported techniques to showcase the possible use of the presented method in microwave imaging, non-destructive testing, and similar applications.

KEYWORDS:

Material Characterization | Beyasian Invesrsion Method | Relative Permittivity | Material Thickness | S-Parameters | Eigenvector

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TITLE OF PAPER

Semi-Coprime Array with Staggered Beam-Steering of Sub-Arrays

SENSORS

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W

3.9 (2022)

2023-06-10

https://doi.org/10.3390/s23125484

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

A split-aperture array (SAA) is an array of sensors or antenna elements in which the array is split into two or more sub-arrays (SAs). Recently proposed SAAs, namely coprime and semi-coprime arrays, offer to attain a small half-power beamwidth (HPBW) with a small number of elements, compared to most conventional unified-aperture arrays, at the cost of reduced peak-to-side-lobe ratio (PSLR). To reduce HPBW and increase PSLR, non-uniform inter-element spacing and excitation amplitudes have proven helpful. However, all the existing arrays and beam-formers suffer increased HPBW, degraded PSLR or both when the main beam is steered away from the broadside. In this paper, we propose staggered beam-steering of SAs, a novel technique for decreasing HPBW. In this technique, we steer the main beams of the SAs of a semi-coprime array to angles slightly different from the desired steering angle. In conjunction with staggered beam-steering of SAs, we have utilized Chebyshev weights to suppress the side lobes. The results show that the beam-widening effect of Chebyshev weights can be mitigated considerably by staggered beam-steering of the SAs. Ultimately, the unified beam-pattern of the whole array offers HPBW and PSLR better than the existing SAAs, uniform and non-uniform linear arrays, especially when the desired steering angle is away from the broadside direction.

KEYWORDS:

Beam-Pattern | Linear Antenna Array | Semi-Coprime Array | Split-Aperture Array | Staggered Steering

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Dr. Saad Ullah Khan, an Assistant Professor in the Department of Electrical & Computer Engineering, holds a combined MS-PhD in Electronic and Electrical Engineering from Sungkyunkwan University, Suwon, South Korea. He earned his BE in Electrical Engineering from the University of Engineering & Technology, Taxila, Pakistan. With expertise spanning both academia and research, Dr. Khan brings a wealth of knowledge in electrical engineering to his role. His educational background and research experience equip him to contribute significantly to the department's academic endeavors and to mentor students in their educational journey.

Research Areas

- Active Distribution Systems
- Electric Vehicles
- Energy Management
- Power System Operation

	TOTAL	FY 2023
PUBLICATIONS	28	02
CITATIONS	710	107
SGDS TARGETED ----------	03	

Dr. Saad Ullah Khan
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TITLE OF PAPER

Demand-Side Management and Its Impact on the Growing Circular Debt of Pakistan's Energy Sector

ENERGIES

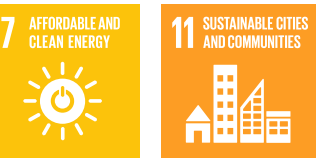
SWITZERLAND

W

3.2 (2022)

2023-07-28

https://doi.org/10.3390/en16155680



SCAN ME

ABSTRACT

In this research, we propose an energy-management scheme for domestic users, which uses the load-shifting strategy of demand-side management (DSM). The research demonstrates that the energy sector's circular debt problem from the viewpoint of a developing country can be solved by incorporating DSM. Circular debt is a chain reaction that arises when the balance between cost and energy supply collapses. Circular debt is an ongoing problem in Pakistan, where economic crises are continuously posing a threat to the energy sector. DSM is envisioned to address these concerns in a dynamic way thoroughly: introducing DSM can minimize circular debt, increase grid reliability, and smooth the supply–demand operation. Circular debt is directly linked with the subsidy offered by the government of Pakistan. As the cost of energy utilized by consumers increases, the subsidy also increases due to the direct link between the two entities. Therefore, the subsidy can be controlled by energy-consumption management with the adoption of DSM. This study addresses that by incorporating optimized cost solutions, circular debt can be regulated to improve the economy of the energy sector. A genetic algorithm is used as an optimization tool to manage demand and generate an optimal schedule under a dynamic electricity pricing signal. To support the utility, a solar system is used as a secondary energy source. Finally, the results show a curtailment in the payable costs at both the consumer and government ends, thus reducing the circular debt in the bigger picture. The reduction is 18% without and 41% with renewable energy support.

KEYWORDS:

Demand-Side Management | Genetic Algorithm | Circular Debt | Real-Time Pricing

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TITLE OF PAPER

A Novel False Measurement Data Detection Mechanism for Smart Grids

ENERGIES

SWITZERLAND

W

3.2 (2022)

2023-09-14

https://doi.org/10.3390/en16186614

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

With the growing cyber-infrastructure of smart grids, the threat of cyber-attacks has intensified, posing an increased risk of compromised communication links. Of particular concern is the false data injection (FDI) attack, which has emerged as a highly dangerous cyber-attack targeting smart grids. This paper addresses the limitations of the variable dummy value model proposed in the authors previous work and presents a novel defense methodology called the nonlinear function-based variable dummy value model for the AC power flow network. The proposed model is evaluated using the IEEE 14-bus test system, demonstrating its effectiveness in detecting FDI attacks. It has been shown that previous detection techniques are unable to detect FDI attacks, whereas the proposed method is shown to be successful in the detection of such attacks, guaranteeing the security of the smart grid's measurement infrastructure.

KEYWORDS:

Cyber-Physical Systems | Power System State Estimation | Cyber Security | False Data Injection Attacks | False-data Detection

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Ashfaq Ahmed did his PhD in electrical engineering from the University of Newcastle, Australia, and the BS and MS in electrical engineering from COMSATS University Islamabad, Pakistan. Currently, he is working as assistant professor at Air University Islamabad, Pakistan. Previously, he served as research fellow (post-doc) in artificial intelligence laboratory within the school of computing sciences at the University of East Anglia, United Kingdom. Dr. Ahmad (co-)authored 45+ research publications in technical international journals and peer-reviewed international conferences. For two years in a row (2021 and 2022), Dr. Ahmad appeared on Stanford's list of World Top 2% Scientists. He has served and is actively serving as associate editor, guest editor, review editor, invited reviewer and technical program committee (TPC) member of several prestigious international journals and conferences/workshops.

Research Areas

Energy Management | Load Forecasting | Optimization Theory | Electricity Theft Detection | Machine Learning

	TOTAL	FY 2023
PUBLICATIONS	51	01
CITATIONS	2613	232
SGDS TARGETED ---------- 03		

Dr. Ashfaq Ahmad
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TITLE OF PAPER

Benchmarking of Heuristic Algorithms for Energy Router-Based Packetized Energy Management in Smart Homes

IEEE SYSTEMS JOURNAL

UNITED STATES

W

4.4 (2022)

2023-06-01

https://doi.org/10.1109/JSYST.2022.3208414

7 AFFORDABLE AND CLEAN ENERGY

11 SUSTAINABLE CITIES AND COMMUNITIES

SCAN ME

ABSTRACT

This article presents an ER-based PEM strategy for PV integrated smart homes to jointly optimize their load scheduling delays, energy transactions cost, and battery degradation cost. The proposed approach incorporates a MA case, where, the ER acts as a main selecting agent realized by all other system elements. This leads to a combinatorial optimization problem, which can be effectively solved by heuristic optimization methods (HOMs), namely, genetic algorithm (GA), binary particle swarm optimization (BPSO), differential evolution (DE) algorithm, and harmony search algorithm (HSA). Specifically, we investigate the impact of the hyperparameters of the HOMs on the designed ER-based PEM system. Simulations are carried out for multiple smart homes under varying weather conditions to evaluate the effectiveness of HOMs in terms of selected performance metrics. Results show that the ER-based PEM reduces the average aggregated system cost, ensures economic benefits by selling surplus energy, while meeting customers energy packet demand, satisfying their quality-of-service, and operational constraints.

KEYWORDS:

Smart Homes | Costs | Delays | Optimization | Biological System Modelling | Heuristic Algorithms | Scheduling

Department of Bio-Medical Engineering

Departmental Overview

Department of Electrical Engineering is the largest constituent unit of Air University in its size and scope. All the graduated batches have Pakistan Engineering Council (PEC) accreditation. Bachelor of Biomedical Engineering was launched in Fall 2019 with PEC Approval and launching MS Biomedical Engineering after the NOC received from HEC for Fall 2020. The department has well-established and well-equipped laboratories to be utilized for the education of student of Biomedical Engineering. Laboratories cover various field of engineering like, electronics, computing, physics, medicine, chemistry and core biomedical engineering. The facility of labs, available for the students to conduct experiments and learn implementation of complex engineering problems, are of Biomedical Instrumentation Lab, Modeling and Simulation Lab, Biomedical Signal Processing Lab, Physiology Lab, Human Anatomy Lab, Biochemistry Lab, Physics Lab, Computing Lab, Basic and Biomedical Eleconics Lab and Embedded Systems Lab.

The Department of Biomedical Engineering is led by the esteemed Dr. Eng. Zia Mohy Ud Din, who serves as the Chair of the department.The department boasts a dedicated team of faculty members committed to advancing the field of biomedical engineering. Dr. Jahan Zeb Gul, an Assistant Professor, contributes to the department's academic and research endeavors. Additionally, a group of accomplished lecturers, including Ms. Aleena Mazhar, Ms. Jamila Akhter, Mr. Inam Ur Rehman Junaid, Mr. Bilal Siddique, Ms. Anum Rashid, Ms. Nabeeha Ehsan, Engr. Maria Tahir, and Engr. Fahad Shakeel, collectively enrich the learning experience for students. The department is further supported by skilled Lab Engineers, including Engr. Muhammad Omar Khan and Engr. Javaria Babar, who play integral roles in facilitating hands-on learning experiences for students in the biomedical engineering domain. Together, this dedicated team is shaping the future of biomedical engineering.

DEPARMENTAL PUBLICATIONS (2023)

02

SDGS TARGETED IN 2023



Dr. Zia Mohy Ud Din

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Dr. Eng. Zia Mohy Ud Din, a distinguished Professor in the Department of Biomedical Engineering, holds a PhD and MS in Medical & Biological Engineering from Kyungpook National University, Daegu, South Korea, as well as a BS in Biomedical Engineering from Sir Syed University of Engineering and Technology, Pakistan. With expertise in biomedical engineering, Dr. Din brings a wealth of knowledge in both academic research and practical application to his role. His academic journey spans across prestigious institutions, fostering a deep understanding of medical and biological engineering principles. Dr. Din's contributions to the field enhance the department's academic endeavors, providing students with valuable insights and fostering innovation in biomedical engineering.

Research Areas

- Biomedical Instrumentation
- Low power medical Devices
- Physiological Measurements
- Neural Engineering

	TOTAL	FY 2023
PUBLICATIONS	42	01
CITATIONS	203	31

SGDS TARGETED ---------- 01

Dr. Zia Mohy Ud Din

Professor

Biomedical Engineering

drzia@mail.au.edu.pk

TITLE OF PAPER

Preparation and Performance Analysis of 3D Thermoformed Fluidic Polymer Temperature Sensors for Aquatic and Terrestrial Applications

SENSORS

SWITZERLAND

W

3.9 (2022)

2023-10-01

https://doi.org/10.3390/s23208506



SCAN ME

ABSTRACT

Employing a combination of Polyethylene terephthalate (PET) thermoforming and 3D-printed cylindrical patterns, we carefully engineer a linear resistive temperature sensor. This intricate process involves initial PET thermoforming, yielding a hollow cylindrical chamber. This chamber is then precisely infused with a composite fluid of graphite and water glue. Ensuring electrical connectivity, both ends are affixed with metal wires and securely sealed using a hot gun. This cost-effective, versatile sensor adeptly gauges temperature shifts by assessing composite fluid resistance alterations. Its PET outer surface grants immunity to water and solubility concerns, enabling application in aquatic and aerial settings without extra encapsulation. Rigorous testing reveals the sensor's linearity and stability within a 10 °C to 60 °C range, whether submerged or airborne. Beyond 65 °C, plastic deformation arises. To mitigate hysteresis, a 58 °C operational limit is recommended. Examining fluidic composite width and length effects, we ascertain a 12 Ω/°C sensitivity for these linear sensors, a hallmark of their precision. Impressive response and recovery times of 4 and 8 s, respectively, highlight their efficiency. These findings endorse thermoforming's potential for fabricating advanced temperature sensors. This cost-effective approach's adaptability underscores its viability for diverse applications.

KEYWORDS:

Graphite-Glue Polymer | Temperature Sensor | Thermoforming | Fuidic Composite | Underwater

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Dr. Jahan Zeb Gul, currently serving as an Assistant Professor in the Department of Biomedical Engineering, brings a wealth of academic expertise to his role. He holds a Ph.D. in Mechatronics Engineering from Jeju National University, South Korea, where he also earned his Master's degree in the same field. Dr. Gul completed his Bachelor of Science in Electrical Engineering from the University of Engineering and Technology (UET), Taxila, Pakistan. With a strong educational background in both engineering and mechatronics, Dr. Gul is well-equipped to contribute to the interdisciplinary field of biomedical engineering. His research interests likely encompass a wide range of topics, from medical device design to biomechanics and rehabilitation engineering.

Research Areas

Hybrid Fabrication Systems | Soft Robots | Biomimetics | Biomedical Devices

	TOTAL	FY 2023
PUBLICATIONS	17	02
CITATIONS	893	179

SGDS TARGETED ---------- 02

Dr. Jahan Zeb Gul
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TITLE OF PAPER

Preparation and Performance Analysis of 3D Thermoformed Fluidic Polymer Temperature Sensors for Aquatic and Terrestrial Applications

SENSORS

SWITZERLAND

W

3.9 (2022)

2023-10-01

https://doi.org/10.3390/s23208506

8 DECENT WORK AND ECONOMIC GROWTH

SCAN ME

ABSTRACT

Employing a combination of Polyethylene terephthalate (PET) thermoforming and 3D-printed cylindrical patterns, we carefully engineer a linear resistive temperature sensor. This intricate process involves initial PET thermoforming, yielding a hollow cylindrical chamber. This chamber is then precisely infused with a composite fluid of graphite and water glue. Ensuring electrical connectivity, both ends are affixed with metal wires and securely sealed using a hot gun. This cost-effective, versatile sensor adeptly gauges temperature shifts by assessing composite fluid resistance alterations. Its PET outer surface grants immunity to water and solubility concerns, enabling application in aquatic and aerial settings without extra encapsulation. Rigorous testing reveals the sensor's linearity and stability within a 10 °C to 60 °C range, whether submerged or airborne. Beyond 65 °C, plastic deformation arises. To mitigate hysteresis, a 58 °C operational limit is recommended. Examining fluidic composite width and length effects, we ascertain a 12 Ω/°C sensitivity for these linear sensors, a hallmark of their precision. Impressive response and recovery times of 4 and 8 s, respectively, highlight their efficiency. These findings endorse thermoforming's potential for fabricating advanced temperature sensors. This cost-effective approach's adaptability underscores its viability for diverse applications.

KEYWORDS:

Graphite-Glue Polymer | Temperature Sensor | Thermoforming | Fuidic Composite | Underwater

DR. JAHAN ZEB GUL
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TITLE OF PAPER

Shape Memory-Based Smart Extra Ocular Muscles for Ophthalmological Studies

ENGINEERING PROCEEDINGS

SWITZERLAND

Y

NOT ANNOUNCED

2023-09-21

3 GOOD HEALTH AND WELL-BEING

https://doi.org/10.3390/engproc2023045054

SCAN ME

ABSTRACT

Vision relies on precise eye movements controlled by six extraocular muscles (EOMs). Training kits and functional eye models are crucial for ophthalmological studies. The study investigates the potential of shape memory material (SMM) in ophthalmology, focusing on eye model mechanics and four thermally actuated smart EOMs. SMM was chosen over other actuators because of its high-power density (36 W/kg), high actuation forces (100 gf), and high displacements (200%). Finite element method (FEM) simulation on a 3D eye model was performed to analyze the thermo-mechanical properties of smart muscle, revealing the shape memory effect and super elasticity which result in the four eye movements of elevation, depression, adduction, and abduction. FEM simulation, compared to the eye model prototype, yielded a 16 mm deformation in smart muscle with a thermal actuation of 313 K (40 °C). FEM analysis, while combining smart muscle with the eye model, resulted in a 6.8517 mm deformation in the simulation. Prototype deformation was acquired as 7.262 mm. The successful actuation of the eye using thermally actuated smart muscles proves its potential for ophthalmology kits.

KEYWORDS:

Extraocular Muscles | Ophthalmological models | Shape memory material | Thermally Acuated smart muscles | Finite element method

Institute of Avionics and Aeronautics

The Institute of Avionics and Aeronautics (IAA) at the Air University has been established as a Centre of Excellence (CoE) for postgraduate studies and Research & Development (R&D) in aviation related fields. The institute aims to support the nascent aeronautical as well as other associated high-tech industries in Pakistan through multi-disciplinary research in navigation systems, guidance and control systems, active and passive surveillance systems, digital signal processing, microwave circuit design, communication systems, system integration, solid mechanics, fluid/aero dynamics, aerospace propulsion systems, spacecraft systems, Micro-Electro-Mechanical-Systems (MEMS), and information security. The Institute of Avionics and Aeronautics consists of two departments: The Department of Mechanical and Aerospace Engineering and the Department of Avionics Engineering. The Department of Mechanical and Aerospace Engineering (DMAE) offers BE, MS and PhD degrees in Mechanical Engineering and MS & PhD degrees in Aerospace Engineering. The Department of Avionics Engineering offers MS and PhD degrees in both Avionics Engineering and Information Security. Matching the challenges of the multi-disciplinary field of Avionics Engineering. the department maintains high-tech labs including Avionics Integration Lab, Electro Optics Lab, Communication Security and Embedded Systems Lab, ECM and Radar Lab. Additionally, in Signal Processing Research Centre (SPRC) has been established to foster theoretical and applied research in the domain of wireless communication such as signal processing, digital communication, 5G technologies, among other areas.

FACULTY PUBLICATIONS (2023)

28

SDGS TARGETED



Department of Mechanical and Aerospace Engineering

Departmental Overview

The Department of Mechanical and Aerospace Engineering (DMAE) is one of the most renown and well-established engineering department of Air University having highly qualified and experienced faculty, with doctorates from technically advanced countries of the world, an elegant and modern infrastructure located in a purpose-built building of Institute of Avionics & Aeronautics (IAA), well-equipped laboratories and allied academic facilities. The department offers state-of-the-art undergraduate and graduate education in Mechanical Engineering and Aerospace Engineering to prepare engineers to effectively contribute towards the social and economic well-being of the nation and the society at large. The DMAE offers degrees in Bachelor of Mechanical Engineering (BEME), Master of Science in Mechanical Engineering (MSME), Master of Science in Aerospace Engineering (MSAE), PhD in Mechanical Engineering and PhD in Aerospace Engineering.

The Department of Mechatronics led by the accomplished Dr. Sohail Iqbal, who serves as the Chair Department. Dr. Iqbal brings extensive expertise and leadership to the department, guiding a team of dedicated faculty members and professionals. The faculty includes renowned experts such as Dr. Jehanzeb Masud and Dr. Syed Irtiza Ali Shah, both holding positions as Professors, along with Dr. Ali Sarosh and Dr. Hamid Ullah Khan Niazi as Associate Professors. The team further comprises Dr. Mehr Nigar and Dr. Asad Islam, along with Dr. Malik Nazir Ahmed and Dr. Babar Saeed as esteemed faculty members. In addition to the academic leaders, a team of lecturers, lab engineers, and research assistants, including Engr. Humza Ahmed, Engr. Bilal Zaman, and Engr. Majid Mehmood, contribute to the vibrant academic environment within the Department of Mechatronics. Together, this diverse and accomplished team ensures the department's commitment to excellence in education and research.

DEPARMENTAL PUBLICATIONS (2023)

23

SDGS TARGETED IN 2023



Dr. Sohail Iqbal

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Dr. Sohail Iqbal is an Assistant Professor in the Department of Mechanical & Aerospace Engineering. He holds a Ph.D. in Mechanical Engineering from Air University, demonstrating his expertise in the field. Additionally, he obtained an MS and BS in Mechanical Engineering from NUST, further enriching his academic background. With a strong foundation in mechanical engineering from two prestigious institutions, Dr. Iqbal brings a wealth of knowledge and experience to his role as an educator and researcher in the field of Mechanical & Aerospace Engineering.

Research Areas

- Modeling and Simulation
- Robotics
- Microelectromechanical System (MEMS) based compliant structures
- Structural Design and Analysis
- Agricultural Technology

	TOTAL	FY 2023
PUBLICATIONS	10	03
CITATIONS	147	39

SGDS TARGETED ---------- 01

Dr. Sohail Iqbal
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TITLE OF PAPER

Design, Analysis and Experimental Investigation of Micro Piezoelectric Vibrational Energy Harvester with Enhanced Power Extraction at Low Frequency

INTERNATIONAL JOURNAL OF PRECISION ENGINEERING AND MANUFACTURING

SOUTH KOREA

1.9 (2022)

X

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

2023-02-01

SCAN ME

10.1007/S12541-022-00726-Y

ABSTRACT

Wireless sensor nodes (WSNs) and embedded microsystems (EMS) have become a center of focus for researchers from all over the world due to their enormous sensing and monitoring applications in multiple areas including biotechnology, agriculture, healthcare, and consumer electronics. To ensure proper functioning of these systems, continuous power supply is required. The research paper presents a piezoelectric vibrational energy harvester that is designed with enhanced power extraction capability at low frequency. A compliant trapezoidal beam with optimized proof mass placement at one end, to enhance piezoelectric output, is designed, fabricated, and experimentally tested. The parametric design of the energy harvester consists of a piezoelectric ceramic crystal barium titanate ($BaTiO_3$) bonded to an optimized micro-folded trapezoidal beam. The designed energy harvester has been analytically modeled using Euler beam theory and simulated using MATLAB. The static, dynamic and piezoelectric energy conversion response of the energy harvester is verified through finite element method (FEM) based Multiphysics simulations. The fabrication of the energy harvester design has been carried out using low-cost wire cutting process. The experimental characterization of the proposed energy harvester shows that 32.36 V voltage and 2.216 mW power can be extracted at the operational frequency of 15 Hz with a factor of safety of 1.30. The experimental characterization results showed a good agreement with the FEM simulations with an error < 7%. The proposed energy harvester can be used to power WSNs, EMS, micro control units and microdevices using low frequency vibrations.

KEYWORDS:

Vibrational Energy Harvester | Trapezoidal Compliant Structure | Piezoelectric | Low frequency | Prototype | Experimentation

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TITLE OF PAPER

Design and characterization of non-linear electromagnetic energy harvester with enhanced energy output

PROCEEDINGS OF THE INSTITUTION OF MECHANICAL ENGINEERS PART C-JOURNAL OF MECHANICAL ENGINEERING SCIENCE

UNITED KINGDOM

2.0 (2022)

W

2023-11-01

10.1177/09544062231205183



SCAN ME

ABSTRACT

This paper presents design, analysis, and characterization of a compliant non-linear electromagnetic energy harvester operating on the principle of bi-stability incorporated with a displacement amplification mechanism. The energy harvester engenders energy from ambient vibrations at multiple modes and with frequencies ranging from 80 to 120 Hz. The energy harvester is analytically modeled using the mechanic's elastic beam theory. Finite Element Analysis (FEA) has been carried out using commercial Finite Element Method (FEM) based software to perform static, fatigue, dynamic and electromagnetic analysis. Bi-stable mechanism has been used to harness energy at a wider frequency bandwidth while lever mechanism is acting as a displacement amplifier for enhancing low frequency vibration amplitude with the amplification factor of 6.24. With such amplification factor, the energy harvester can be deployed to extract vibrations of diminutive level and recast them into electrical energy in the form of generated voltage. Spring steel material, owing to its structural sensitivity, stiffness and higher value of ultimate stress, was used for its fabrication. The use of Neodymium (N52) magnets, copper coils and shaker were put into practice for testing of this device. The coil resistance is 2.5 omega with number of turns kept at 350. The maximum output voltage of 1.86 V was generated at 106 Hz with root mean square value of 548 mV. Testing results are in accordance with the results obtained through simulations and thus useful electrical power of 11.1 mW can be generated from ambient vibrations at a wider bandwidth of 18 Hz with operating frequency ranging from 99 to 117 Hz.

KEYWORDS:

Bi-stable nonlinear mechanism | Displacement Amplification | FEA | Electromagnetic | Characterization

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TITLE OF PAPER

A high sensitivity and multi-axis fringing electric field based capacitive tactile force sensor for robot assisted surgery

SENSORS AND ACTUATORS A-PHYSICAL

NETHERLANDS

W

4.6 (2022)

2023-05-01

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10.1016/J.SNA.2023.114272

SCAN ME

ABSTRACT

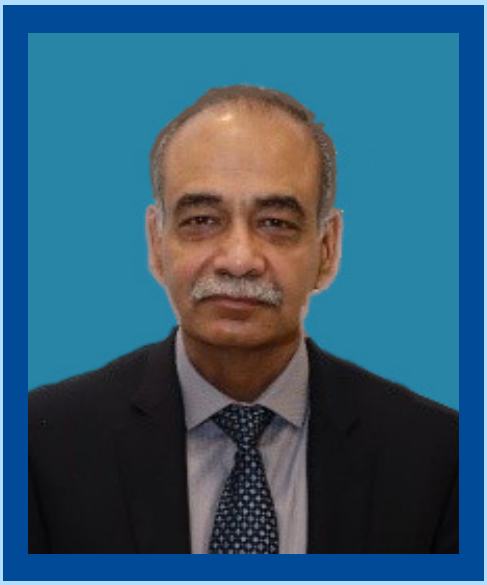
This paper presents a design of multi-axis tactile force sensor using the fringe effect of an electric field between stationary patterned electrodes. The unique configuration of the electrodes consisting of four separate square -shaped sensing electrodes, with each encircled by excitation electrodes, allows to achieve enhanced fringe field effect and hence sensitivity. The proposed sensor can decouple the normal, shear and angular shear applied forces. The sensor is fabricated using low-cost rapid prototyping techniques with flexible Ecoflex 00-30 and silicone rubber RTV-528 as the elastomers for contact with the environment. An analytical model is developed that correlates the nominal capacitance of the sensor with that of the geometric dimensions of the stationary electrodes and air cavity height between the electrodes and elastomer. The force measurement ranges in the normal, shear, and angular axis are 5 N, 1.5 N, and 1 N respectively. The sensor shows a perfectly linear response, repeatability, and a low hysteresis error, thermal stability and robustness to the environmental interferences that makes it suitable to be used for force feedback in minimally invasive robotic surgery.

KEYWORDS:

Multi-axis force sensor | Tactile sensor | Fringing electric field | Robotic surgery | Elastomer | Rapid prototyping

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Dr. Jehanzeb Masud is a distinguished Professor in the Department of Mechanical & Aerospace Engineering. He holds a PhD in Mechanical Engineering with a specialization in Fluid Thermal Sciences from Case Western Reserve University, USA, showcasing his expertise in advanced mechanical principles. Dr. Masud further expanded his knowledge with an MS in Mechanical Engineering from the same institution, emphasizing his focus on fluid dynamics and thermal sciences. His academic journey began with a Bachelor's degree in Aerospace Engineering from NED University, Karachi, reflecting his foundation in aerospace principles. With this extensive educational background, Dr. Masud brings a wealth of experience and expertise to his role as a professor, contributing significantly to research and education in the field of Mechanical & Aerospace Engineering.

Research Areas

Computational and Experimental Fluid Dynamics

Thermal and Fluid Engineering

	TOTAL	FY 2023
PUBLICATIONS	100	03
CITATIONS	543	30

SGDS TARGETED ---------- 02

DR. JEHANZEB MASUD
PROFESSOR
MECHANICAL & AEROSPACE ENGINEERING
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TITLE OF PAPER

Design optimization of bladeless ceiling fan using design of experiments

JOURNAL OF WIND ENGINEERING AND INDUSTRIAL AERODYNAMICS

NETHERLANDS

4.8 (2022)

W

2023-02-01

10.1016/J.JWEIA.2023.105313



SCAN ME

ABSTRACT

- The design technology in the world of fans has been revolutionized by the invention of bladeless fans in recent years. Bladeless fans are unique in shape and highly efficient in performance. At present, a bladeless ceiling fan on the concept of bladeless Air-Multiplier is not available. The present study intends to find an optimized ge-ometry for the bladeless ceiling fan which is comparable to a conventional fan. Design of Experiments analysis was followed in the present study and found that a fan diameter of 1.4 m, jet width of 2.55 mm, jet orientation of 91.21o, and jet velocity of 3 m/s are the optimized parameter for a bladeless fan within the applied constraints. An average velocity of 1.32 m/s and a velocity spread of 76% were calculated during CFD simulations. The results were compared with the experimental data of conventional ceiling fans and a 60% enhancement in air delivery values were recorded for the bladeless fan. It is concluded that the answer to the future economical ceiling fan lies in the application of bladeless technologies.

KEYWORDS:

Bladeless fans | Ceiling fans | Coanda surface | Entrainment | Air multiplication | Optimization | Design of experiments

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TITLE OF PAPER

Flow physics of annular and semi-annular fanjet and integration scheme with aircraft wing

PHYSICS OF FLUIDS

UNITED STATES

W

4.6 (2022)

2023-09-01

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10.1063/5.0165058

SCAN ME

ABSTRACT

Aerodynamic forces created on the lifting body, like an aircraft wing, can be optimized by modifying the flow field around it. These aerodynamic forces directly influence fuel consumption, thus the economy of flight. Various techniques have been developed and tested on wings for improving aerodynamic efficiency. The present work deals with the integration schemes of fanjets with aircraft wings for the same reason. Fanjets, like bladeless fans, can induce and entrain surrounding air for generation of lift and thrust; however, they are not yet integrated with the wing for modification of aerodynamic forces. In this novel research, the flow physics of the fanjet is explored by varying various geometric parameters. With an increase in the fanjet radius, the mass flow rate decreases, whereas the drag increases. A similar trend was observed for an increase in the jet width. For variation in the angle of attack, the maximum mass flow rate and minimum drag were observed at an angle of 00. A similar analysis was carried out for semi-annular fanjets. Based on the results, the preferred selection for geometric parameters of annular and semi-annular fanjets was documented for integration with the aircraft wing.

KEYWORDS:

Vortex Generators | Suction Control | Gurney Flap | Optimization | Airfoil | Region

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TITLE OF PAPER

Objective comparison of numerical spin study with aircraft model free-flight spin tests

PROCEEDINGS OF THE INSTITUTION OF MECHANICAL ENGINEERS PART G-JOURNAL OF AEROSPACE ENGINEERING

UNITED KINGDOM

1.056 (2022)

X

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

2023-02-01

SCAN ME

10.1177/09544100221103011

ABSTRACT

This paper reports on the results of a research project that investigated the spin and recovery characteristics of a multirole fighter aircraft. In the first phase, numerical/computational methods were used to predict full scale aircraft spin and recovery characteristics. The aerodynamic data used in the numerical study was obtained from rotary balance steady coning and oscillatory coning motion dynamic wind tunnel tests conducted on 1/13(th) scale aircraft dynamic model. All the possible steady spin modes were numerically computed, a complete set of dynamic modes of the spinning aircraft were evaluated and six degree of freedom simulations of predicted flat spins were performed to investigate their dynamic stability and recovery characteristics. In the second phase, free-flight spin trials were conducted using 1/5(th) scale dynamic model of the understudy aircraft to validate the results of the analytical spin studies. Dynamic characteristics of the analytically predicted flat spins were objectively compared with flat spins found in free-flight spin trials as a validation process. Our results reveal that the numerically predicted full scale aircraft spin and recovery dynamic characteristics correlate well with those estimated from model test flights. The present study is an important step toward objective comparison of numerical spin studies based on dynamic wind tunnel tests data with free-flight spin trials, yielding important guidelines and results for future aircraft spin studies.

KEYWORDS:

Objective Comparison | Rotary Balance WT Tests | Free-Flight Trials | Flat Spins | 6 DOF Simulations | Dynamic Stability

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Dr. Syed Irtiza Ali Shah, a distinguished Professor in the Department of Mechanical & Aerospace Engineering, holds a PhD in Aerospace Engineering with a specialization in Aerial Robotics from Georgia Tech, USA. He also earned multiple Master's degrees from Georgia Tech, including Mechanical Engineering focusing on Machine Vision & Robot Control, and Aerospace Engineering specializing in Flight Mechanics & Control, as well as Fluid Dynamics/Aerodynamics from the National University of Science. Dr. Shah's extensive academic background further includes a Master's degree in War Studies from the National Defence University and a Master's in Computer Science from Al-Khair University. He completed his Bachelor of Science in Aerospace Engineering from NED University.

Research Areas

Computer Vision and Medical Imaging

UAV Disaster Rescue and Relief systems

	TOTAL	FY 2023
PUBLICATIONS	20	04
CITATIONS	854	238

SGDS TARGETED ---------- 01

Dr. Syed Irtiza Ali Shah

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TITLE OF PAPER

Experimental investigation and analysis of proposed hybrid vertical axis wind turbine design

ENERGY & ENVIRONMENT

UNITED STATES

X

4.2 (2022)

2023-06-01

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10.1177/0958305X231181675

SCAN ME

ABSTRACT

In this research, an experimental and computational analysis of a novel hybrid vertical axis wind turbine (VAWT) arrangement has been performed. We suggest an innovative VAWT design that has a high power coefficient and self-starting capability. The inner side of the proposed hybrid system has been integrated with the H-rotor turbine with cambered blades, which demonstrates strong self-starting capabilities at various azimuths. Three NACA0018 airfoil blades are mounted on the outside of the proposed hybrid wind turbine, while three DU 06-W-200 airfoil blades are installed on the inside. Based on a similarity analysis, a scaled-down model was developed, and performance characteristics such as the output power, power coefficient (C-p), dynamic torque coefficient (C-t), and static torque coefficient (C-ts) were determined. An existing hybrid VAWT and a typical H-rotor Darrieus design were also examined for comparison. The highest C-p for the pro-posed hybrid design was found to be 0.486 at a tip speed ratio (TSR) of 3, while the H-rotor Darrieus' maximum value was 0.42 at a TSR of 2.62 and the existing hybrid VAWT's value was 0.41 at a TSR of 2.5. Positive C-ts values at all azimuths demonstrate that the proposed hybrid wind turbine can start entirely on its own. In comparison to the existing H-rotor and hybrid VAWT, this novel hybrid system has shown enhanced performance parameters (C-p, C-t, C-ts, output power) by around 11%-13% over a wide range of wind speeds.

KEYWORDS:

Hybrid vertical axis wind turbine | Scaled-down Model | Computational Analysis | Wind Tunnel Testing

Dr. Syed Irtiza Ali Shah

Professor

Mechanical & Aerospace Engineering

irtiza@mail.au.edu.pk

TITLE OF PAPER

Flight Dynamic Characteristics of Wide-Body Aircraft with Wind Gust and Turbulence

FLUIDS

UNITED STATES

X

1.9 (2022)

2023-12-01

10.3390/FLUIDS8120320



SCAN ME

ABSTRACT

In this research, a wide-body aircraft was analyzed with critical monitoring of its states, a function of several control inputs (wind gust, turbulence, and microburst). The aerodynamic and stability coefficients of a Boeing 747-200 were obtained from previously published works and 6- DOF equations were formulated. Simulations were conducted for various control inputs to determine the aircraft's free response, as well as the forced response. In order to understand the nature of the atmosphere, three different models were incorporated, including (i) the Dryden Model, (ii) wind gust, and (iii) microburst. The aircraft was found to be stable in the longitudinal and lateral flight modes, with trim conditions agreeing with published data. For a vertical wind gust of -10 ft/s, the AoA and pitch rate were observed to oscillate sinusoidally and became stable with new trim conditions. These states were found to regain trim conditions once the gust was removed. In the case of 3D gust, it was found that the longitudinal modes achieved a new trim condition through Phugoid oscillations, whereas the lateral modes underwent short-period oscillations. For the case of turbulence, random fluctuations were observed for trim conditions with no unstable behavior. When considering the microburst case, it was found that the aircraft initially gained altitude in the region of the headwind; this was followed by a sharp descent under the influence of a vertical velocity component.

KEYWORDS:

Non-linear Aircraft dynamics | Atmospheric Turbulence | Computational Analysis | Wind Gust | Microburst | Control Engineering

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TITLE OF PAPER

Techniques of Fluidic Thrust Vectoring in Jet Engine Nozzles: A Review

ENERGIES

SWITZERLAND

W

3.2 (2022)

2023-07-01

10.3390/EN16155721

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

Thrust vectoring innovations are demonstrated ideas that improve the projection of aerospace power with enhanced maneuverability, control effectiveness, survivability, performance, and stealth. Thrust vector control systems following a variety of concepts have been considered for modern aircraft and missiles to enhance their military performance. Short Take-off and Landing (STOL) and control effectiveness at lower aircraft speeds can be achieved by employing Fluidic Thrust Vectoring Control (FTVC). This paper summarizes a range of ideas for FTVC that have been designed and tested both computationally and experimentally to determine the thrust vectoring performance of supersonic propulsion system nozzles. The conventional method of thrust vectoring involves mechanical means to deflect the direction of flow of the exhaust gases, whereas the most recent method involves fluidic-based thrust vectoring techniques. Fluid-based thrust vectoring has the advantages of simplicity and low weight over mechanical-based thrust vectoring, which has complex geometry and adds extra weight to the aircraft. The fluidic vectoring control nozzles are divided into seven categories: shock vector, bypass shock vector, counterflow, co-flow, throat skewing, dual throat, and bypass dual throat nozzle control. This paper provides a summary of each fluidic thrust vectoring technique with its characteristics, design, classification, and different operational criteria developed to date and compares the intrinsic characteristics of each technique. Based on the present literature, it is concluded that among all the fluidic control techniques, the bypass dual-throat nozzle control can achieve better thrust vectoring performance with large vector angles and low thrust loss.

KEYWORDS:

Thrust Vectoring | Fluidic Thrust Vectoring | Throat Skewing | Thrust Efficiency | Bypass Dual Throat Nozzle

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TITLE OF PAPER

Numerical Investigation on the Thrust Vectoring Performance of Bypass Dual Throat Nozzle

ENERGIES

SWITZERLAND

W

3.2 (2022)

2023-01-01

10.3390/EN16020594



SCAN ME

ABSTRACT

Modern aircraft and missiles are gradually integrating thrust vector control systems to enhance their military capabilities. Bypass Dual-Throat Nozzle (BDTN) control is a new fluidic thrust vectoring technique capable of achieving superior performance with large vector angles and low thrust loss. In this study, we analyzed the flow characteristics and performance parameters of BDTN by varying the bypass angle, nozzle convergence angle, and bypass width. The flow governing equations are solved according to a finite volume discretization technique of the compressible RANS equations coupled with the Renormalization Group (RNG) k-epsilon turbulence model for Nozzle Pressure Ratio (NPR = 2 similar to 10) to capture the significance of under-expanded and over-expanded jets. Results show that by decreasing the bypass angle from 90 degrees to 35 degrees, there is a 6% increase in vectoring angle while the vectoring efficiency is enhanced by 18%. However, a decrease of 3% in the thrust and discharge coefficients is also observed. When the convergence angle was increased from 22 degrees to 37 degrees, vectoring angle, discharge coefficient, and thrust coefficient increased by 2%, 1%, and 0.26%, respectively. Moreover, vectoring efficiency is also enhanced by 8% by reducing the convergence angle from 37 degrees to 22 degrees. Based on the investigated parameters, it is determined that nozzle convergence angle does not significantly influence thrust vectoring performance, however, bypass width and bypass angle have a significant effect on thrust vectoring performance.

KEYWORDS:

Thrust Vectoring | Vectoring Performance | Nozzle Configurations | Thrust Efficiency | Bypass Dual Throat Nozzle

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Dr. Asad Islam is an Assistant Professor in the Department of Mechanical & Aerospace Engineering. He holds a Ph.D. in Aerospace Engineering from Beihang University (BUAA), Beijing, China, where he specialized in advanced aerospace technologies. Prior to his doctoral studies, Dr. Islam completed his Master of Science in Aerospace Engineering at the Institute of Space Technology (IST), Islamabad, Pakistan, focusing on cutting-edge research in the field. He obtained his Bachelor of Engineering in Mechanical Engineering from Air University, Islamabad, Pakistan, laying the foundation for his academic and professional journey. With his diverse educational background and expertise in aerospace and mechanical engineering, Dr. Islam brings a wealth of knowledge and experience to his role as an educator and researcher in the department.

Research Areas

- Advanced Flow Measurement Techniques
- Turbo machinery, Instrumentation and Control
- Numerical modelling & simulations

	TOTAL	FY 2023
PUBLICATIONS	103	03
CITATIONS	3896	31

SGDS TARGETED ---------- 02

Dr. Asad Islam
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TITLE OF PAPER

Modified residual power series approach for the computational results of Newell-Whitehead-Segel model with fractal derivatives

ALEXANDRIA ENGINEERING JOURNAL

EGYPT

W

6.8 (2022)

2023-08-15

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10.1016/J.AEJ.2023.06.094

SCAN ME

ABSTRACT

In the current work, we provide the modified residual power series approach to obtain the fractal solution of the Newell-Whitehead-Segel (NWS) model with fractal derivatives. The proposed strategy relies on the two-scale fractal scheme and residual power series scheme (RPSS) that systematically produces the fractal solution in a convergent power series without the need for any constraint parameters. Three numerical applications are provided to display the validity, authenticity, and robustness of the suggested scheme. The connectivity between the fractal solution and the exact solution has been demonstrated by plotted and numerical findings. The 2D and 3D graphical visuals demonstrate the physical behavior of the NWS fractal model at various fractional orders. It is worth noticing that the behavior of the solution demonstrates that changing the fractal parameter reflects the nature of the solution and yields the exact solution very rapidly.

KEYWORDS:

Two-scale fractal scheme | Residual power series approach | NWS fractal model | Fractal solution

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TITLE OF PAPER

Numerical Analysis of Time-Fractional Porous Media and Heat Transfer Equations Using a Semi-Analytical Approach

SYMMETRY-BASEL

SWITZERLAND

W

2.7 (2022)

2023-07-01

10.3390/SYM15071374



SCAN ME

ABSTRACT

In nature, symmetry is all around us. The symmetry framework represents integer partial differential equations and their fractional order in the sense of Caputo derivatives. This article suggests a semi-analytical approach based on Aboodh transform (AT) and the homotropy perturbation scheme (HPS) for achieving the approximate solution of time-fractional porous media and heat transfer equations. The AT converts the fractional problems into simple ones and obtains the recurrence relation without any discretization or assumption. This nonlinear recurrence relation can be decomposed via the use of the HPS to obtain the iterations in terms of series solutions. The initial conditions play an important role in determining the successive iterations and yields towards the exact solution. We provide some numerical applications to analyze the accuracy of this proposed scheme and show that the performance of our scheme has strong agreement with the exact results.

KEYWORDS:

Aboodh transform | Porous media and heat transfer equations | Homotopy perturbation scheme | Convergence analysis

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TITLE OF PAPER

A Modified Residual Power Series Method for the Approximate Solution of Two-Dimensional Fractional Helmholtz Equations

SYMMETRY-BASEL

SWITZERLAND

W

2.7 (2022)

2023-12-01

10.3390/SYM15122152



SCAN ME

ABSTRACT

In this paper, we suggest a modification for the residual power series method that is used to solve fractional-order Helmholtz equations, which is called the Shehu-transform residual power series method (ST-RPSM). This scheme uses a combination of the Shehu transform (ST) and the residual power series method (RPSM). The fractional derivatives are taken with respect to Caputo order. The novelty of this approach is that it does not restrict the fractional order and reduces the need for heavy computational work. The results were obtained using an iterative series that led to an exact solution. The 3D graphical plots for different values of fractional orders are shown to compare ST-RPSM results with exact solutions.

KEYWORDS:

Shehu transform | Residual power series method | Series solution | Helmholtz equations

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Engr. Hassan Ejaz, currently serving as a Lecturer in the Department of Mechanical & Aerospace Engineering, holds a diverse academic background. He is pursuing a Ph.D. in Mechanical Engineering from NUST (SMME), building upon his prior academic achievements, including an MS in Mechanical Engineering from NUST (SMME) and a BE in Mechanical Engineering from Air University, Islamabad. With a focus on advancing his expertise in the field, Engr. Ejaz demonstrates a commitment to academic excellence and a passion for contributing to the realm of Mechanical Engineering through research and education.

Research Areas

Adhesive Joints | Finite Element Analysis | Composites | Machine Design

	TOTAL	FY 2023
PUBLICATIONS	17	06
CITATIONS	94	44

SGDS TARGETED ---------- 03

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TITLE OF PAPER

Effect of Cork Powder Concentration and Service Temperature on Strength Characteristics and Failure Modes of Adhesively Bonded Lap Joints

THEORETICAL AND APPLIED FRACTURE MECHANICS

NETHERLANDS

W

4.37 (2022)

2023-06-03

10.3390/JMSE11071411

SCAN ME

ABSTRACT

In this study, the combined effects of cork powder particles addition and service temperature on the strength characteristics of lap joints was experimentally investigated. Two types of lap joints i.e. single lap joint (SLJ) and double strap joint (DSJ) with two different adherend material configurations were manufactured using a two-component epoxy system Araldite© LY 556. CFRP and Aluminum alloy 5083 was used as adherends in the fabrication of the lap joints. Cork powder was added in the amounts of 0.25, 0.5, 0.75, and 1 wt% in the host resin and was mechanically mixed at an elevated temperature of 50 °C, below the Tg of epoxy adhesive. The prepared adhesive was then used to make adhesive lap joints. The joints were then tested at four different temperatures of 25, 50, 75, and 100 °C by utilizing a universal testing machine equipped with thermal chamber. The results of the study showed that the joint strength can be increased up to a certain extent with the increase in cork powder addition, however, in general, will be negatively affected by the increase in service temperature. Also, the reinforcing effect of cork powder remained significant even at temperatures close to the glass transition temperature of epoxy adhesive.

KEYWORDS:

Cork Powder | Epoxy adhesive | Lap Joints | Double strap joint (DSJ)

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TITLE OF PAPER

An experimental and simulation study of RGO effects on mechanical behaviour of structural adhesive and lap shear joints strength

INTERNATIONAL JOURNAL OF ADHESION AND ADHESIVES

NETHERLANDS

W

3.8 (2022)

2023-07-31

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10.3390/JMSE11071411

SCAN ME

ABSTRACT

The research investigates the effects of adding Reduced Graphene Oxide (RGO) at various weight fractions (0.25, 0.5, 0.75 and 1 wt%) on mechanical properties of high strength structural adhesive Araldite© 2011 and lap shear strength of adhesive joints. For uniform dispersion of RGO across adhesive, an extensive solution mixing technique was carefully carried out for the preparation of RGO/Epoxy combinations. Two types of lap joints: single lap joint (SLJ) and double lap strap joint (DLSJ) were fabricated. The joints were fabricated using Al 5083 as adherends. The adherends were treated with phosphoric acid anodization (PAA) before joining. A comparison of the strength properties was made after tensile testing of the adhesive specimens and lap joints. In the case of adhesive samples, an increase in mechanical properties was observed at lower concentrations. A maximum increase of 9.5% in the tensile strength and 128% in toughness characteristics was observed with the addition of 0.25 wt% RGO. A maximum improvement of 24% for SLJ and 25% for DLSJ was observed at the same filler percentage. Chemical analysis was conducted using Fourier-Transform Infrared Spectroscopy (FTIR), while dispersion analysis was carried out using Ultraviolet–Visible Spectroscopy (UV-VIS-Nir). Digital and Scanning Electron Microscopy (SEM) techniques were utilised in close examination of the fracture surface at high magnification. A finite element analysis based on cohesive zone modelling (CZM) was performed to predict the failure load characteristics of lap joints. Finally, a comparison of strength and fracture behaviour of RGO with GNPs and MWCNTs was critically discussed.

KEYWORDS: Tensile testing | Phosphoric acid anodization | Reduced Graphene Oxide | Single lap joint | Finite element analysis

ENGR. HASSAN EJAZ
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TITLE OF PAPER

Correlation between toughness and metal volume fraction in carbon-glass fiber laminates tested under tensile loading

COMPOSITE INTERFACES

X

2023-03-12

10.3390/JMSE11071411

NETHERLANDS

2.7 (2022)



SCAN ME

ABSTRACT

The conducted work investigates the correlation between toughness characteristics and metal volume fraction in Fiber Metal Laminates (FMLs) subjected to tensile loads. Aerospace grade Al 7075-T6 was utilized as the varying metal alloy in the study. The metal alloy was combined with glass and carbon fiber layers to create different configurations of FMLs with varying stacking sequences. For better adhesion between metal and composite parts, aluminum layers were etched with sodium hydroxide and chromic-sulfuric acid solutions. The laminate sheets were prepared using the hand layup method which was followed by a vacuum bagging process. Specimens were cut and tested as per ASTM standard. Results of the experimentation showed that the aluminum volume fraction is directly related to the failure strain and modulus of toughness, however, inversely proportional to the stiffness characteristics of the laminates. The highest improvement of 111% in toughness parameter in comparison to pure composite laminate was reported. Finally, a comprehensive analysis on the type of fracture behavior in comparison to classical laminate theory was critically discussed.

KEYWORDS:

Carbon fiber | Glass Fiber | Aluminum Alloy | Fmls | Toughness

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TITLE OF PAPER

The mechanical behavior of modified epoxy adhesive using GNPs, MWCNTs, and RGO nanomaterials

JOURNAL OF ADHESION SCIENCE AND TECHNOLOGY

UNITED KINGDOM

2.3 (2022)

X

2023-10-01

10.1080/01694243.2023.2268230

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

A compact, 3-degrees-of-freedom (DoF), low-cost, remotely operated unmanned underwater vehicle (UUV), or MicroROV, is custom-designed, developed, instrumented, and interfaced with a PC for real-time data acquisition and control. The nonlinear equations of motion (EoM) are developed for the under-actuated, open-frame, cross-coupled MicroROV utilizing the Newton-Euler approach. The cross-coupling between heave and yaw motion, an important dynamic of a class of compact ROVs that is barely reported, is investigated here. This work is thus motivated towards developing an understanding of the physics of the highly coupled compact ROV and towards developing model-based stabilizing controllers. The linearized EoM aids in developing high-fidelity experimental data-driven transfer function models. The coupled heave-yaw transfer function model is improved to an auto-regressive moving average with exogenous input (ARMAX) model structure. The acquired models facilitate the use of the multi-parameter root-locus (MPRL) technique to design baseline controllers for a cross-coupled multi-input, multi-output (MIMO) MicroROV. The controller gains are further optimized by employing an innovative Marine Predator Algorithm (MPA). The robustness of the designed controllers is gauged using gain and phase margins. In addition, the real-time controllers were deployed on an onboard embedded system utilizing Simulink & PRIME;s automatic C++ code generation capabilities. Finally, pool tests of the MicroROV demonstrate the efficacy of the proposed control strategy.

KEYWORDS: Open-frame compact ROV, Cross-coupled mathematical models, MPA optimization, MIMO ROV control, Multi-parameter root locus

ENGR. HASSAN EJAZ
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TITLE OF PAPER

A Review on Tissue-Needle Interaction and Path Planning Models for Bevel Tip Type Flexible Needle Minimal Intervention

MATHEMATICAL BIOSCIENCES AND ENGINEERING

UNITED STATES

W

2.6 (2022)

2023-12-15

10.3934/MBE.2024023

SCAN ME

ABSTRACT

A flexible needle has emerged as a crucial clinical technique in contemporary medical practices, particularly for minimally invasive interventions. Its applicability spans diverse surgical domains such as brachytherapy, cardiovascular surgery, neurosurgery and others. Notably, flexible needles find utility in biopsies requiring deep skin penetration to access infected areas. Despite its minimally invasive advantages, the precise guidance of the needle to its intended target, while avoiding damage to bones, blood vessels, organs and tissues, remains a significant challenge for researchers. Consequently, extensive research has been dedicated to enhancing the steering and accuracy of flexible needles. Here, we aim to elucidate the recent advancements, trends and perspectives in flexible needle steering models and path planning over the last 15 years. The discussed models encompass various types, including symmetric-tip needles, curved-tip needles, tendon-actuated needles, programmable needles and the innovative fracture-directed waterjet needles. Moreover, the paper offers a comprehensive analysis, comparing the trajectories followed by these needle models to attain the desired target with minimal tissue damage. By delving into these aspects, the paper contributes to a deeper understanding of the current landscape of flexible needle technology and guides future research directions in this dynamic field.

KEYWORDS:

Flexible Needle | Surgical Robotics | Needle Steering | Path Planning | Mechanics | FEM

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TITLE OF PAPER

Optimizing Traffic Flow: Utilizing IR and Load Cell Sensors for Cost-Effective Traffic Congestion Alleviation at Smart City Intersections

ENGINEERING PROCEEDINGS

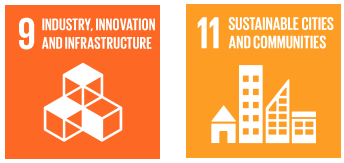
Y

2023-10-26

10.3934/MBE.2024023

NOT MENTIONED

0.9 (2022)



SCAN ME

ABSTRACT

Cities face a significant challenge due to increasing traffic congestion and the rising number of vehicles. Developed countries have introduced smart traffic management systems as a solution to mitigate congestion and improve traffic flow. These systems employ various techniques such as image processing, radar sensing, ultrasonic and microwave detectors, and other sensors. However, each of these methods has its drawbacks, including susceptibility to weather conditions, high costs, and low accuracy. Intelligent traffic control methods like inductive loop detection, wireless sensor networks, and video data analysis have proven to be efficient. However, they suffer from lengthy installation processes and high installation and maintenance expenses. In response to this issue, this article proposes a system that can detect lane density and adjust traffic signal timers accordingly to optimize traffic flow. The proposed system utilizes IR sensors and load sensors to calculate the density of each lane at an intersection, and an RFID system is implemented to accommodate emergency response vehicles. This system is centered around an ATmega 2560 chip. To demonstrate the effectiveness of the proposed approach, real-time experiments were conducted on a scaled-down model of the system. The results showed promising outcomes. The authors argue that this system could serve as a cost-effective and efficient solution for managing traffic in cities, particularly in Pakistan.

KEYWORDS:

Road Traffic Congestions | Smart Traffic Management | IR Sensors | Load Sensor | RFID

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Engr. Ahsan Tanveer received the B.S. degree in mechanical engineering from the University of Engineering and Technology, Peshawar and the M.S. degree in mechanical engineering from the GIK Institute of Engineering Sciences and Technology, Swabi. From 2019 to 2021, he was a research assistant with the Vibrational Dynamics and Controls Laboratory. Since 2022, he has been a lecturer with the Department of Mechanical and Aerospace Engineering, Air University, Islamabad.

Research Areas

Control Theory & Application | Safe Learning Control | Search & Optimization Algorithms | System Identification | Aerial Robotics

	TOTAL	FY 2023
PUBLICATIONS	19	03
CITATIONS	26	24

SGDS TARGETED ---------- 01

ENGR. AHSAN TANVEER
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TITLE OF PAPER

Cross-Coupled Dynamics and MPA-Optimized Robust MIMO Control for a Compact Unmanned Underwater Vehicle

JOURNAL OF MARINE SCIENCE AND ENGINEERING

SWITZERLAND

W

2.9 (2022)

2023-07-01

10.3390/JMSE11071411

SCAN ME

ABSTRACT

A compact, 3-degrees-of-freedom (DoF), low-cost, remotely operated unmanned underwater vehicle (UUV), or MicroROV, is custom-designed, developed, instrumented, and interfaced with a PC for real-time data acquisition and control. The nonlinear equations of motion (EoM) are developed for the under-actuated, open-frame, cross-coupled MicroROV utilizing the Newton-Euler approach. The cross-coupling between heave and yaw motion, an important dynamic of a class of compact ROVs that is barely reported, is investigated here. This work is thus motivated towards developing an understanding of the physics of the highly coupled compact ROV and towards developing model-based stabilizing controllers. The linearized EoM aids in developing high-fidelity experimental data-driven transfer function models. The coupled heave-yaw transfer function model is improved to an auto-regressive moving average with exogenous input (ARMAX) model structure. The acquired models facilitate the use of the multi-parameter root-locus (MPRL) technique to design baseline controllers for a cross-coupled multi-input, multi-output (MIMO) MicroROV. The controller gains are further optimized by employing an innovative Marine Predator Algorithm (MPA). The robustness of the designed controllers is gauged using gain and phase margins. In addition, the real-time controllers were deployed on an onboard embedded system utilizing Simulink & PRIME;s automatic C++ code generation capabilities. Finally, pool tests of the MicroROV demonstrate the efficacy of the proposed control strategy.

KEYWORDS: MPA optimization; MIMO ROV control; Multi-parameter root locus; Cross-coupled mathematical models

ENGR. AHSAN TANVEER
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TITLE OF PAPER

The mechanical behavior of modified epoxy adhesive using GNPs, MWCNTs, and RGO nanomaterials

JOURNAL OF ADHESION SCIENCE AND TECHNOLOGY

UNITED KINGDOM

X

2.3 (2022)

2023-10-01

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10.1080/01694243.2023.2268230

SCAN ME

ABSTRACT

A compact, 3-degrees-of-freedom (DoF), low-cost, remotely operated unmanned underwater vehicle (UUV), or MicroROV, is custom-designed, developed, instrumented, and interfaced with a PC for real-time data acquisition and control. The nonlinear equations of motion (EoM) are developed for the under-actuated, open-frame, cross-coupled MicroROV utilizing the Newton-Euler approach. The cross-coupling between heave and yaw motion, an important dynamic of a class of compact ROVs that is barely reported, is investigated here. This work is thus motivated towards developing an understanding of the physics of the highly coupled compact ROV and towards developing model-based stabilizing controllers. The linearized EoM aids in developing high-fidelity experimental data-driven transfer function models. The coupled heave-yaw transfer function model is improved to an auto-regressive moving average with exogenous input (ARMAX) model structure. The acquired models facilitate the use of the multi-parameter root-locus (MPRL) technique to design baseline controllers for a cross-coupled multi-input, multi-output (MIMO) MicroROV. The controller gains are further optimized by employing an innovative Marine Predator Algorithm (MPA). The robustness of the designed controllers is gauged using gain and phase margins. In addition, the real-time controllers were deployed on an onboard embedded system utilizing Simulink & PRIME;s automatic C++ code generation capabilities. Finally, pool tests of the MicroROV demonstrate the efficacy of the proposed control strategy.

KEYWORDS: Open-frame compact ROV, Cross-coupled mathematical models, MPA optimization, MIMO ROV control, Multi-parameter root locus

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TITLE OF PAPER

Mathematical Modelling and Fluidic Thrust Vectoring Control of a Delta Wing UAV

AEROSPACE

SWITZERLAND

W

2.6 (2022)

2023-06-01

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10.3390/AEROSPACE10060563

SCAN ME

ABSTRACT

Pitch control of an unmanned aerial vehicle (UAV) using fluidic thrust vectoring (FTV) is a relatively novel technique requiring no moving control surfaces, such as elevators. In this paper, the authors' previous work on the characterization of a static co-flow FTV rig is further validated using the free to pitch dynamic test bench. The deflection of a primary jet after injection of a high-velocity secondary jet was captured using the tuft flow visualization technique, along with the experimental recording of subsequent normal force impinged on the Coanda surface resulting in the pitching moment. The effect of primary and secondary flow velocities on exhaust jet deflection, as well as on the pitch angle of the aircraft, is examined. Aerodynamic gain as well as the inertia of a delta wing UAV test bench are computed through experiments and fed into the equation of motion (e.o.m). The e.o.m developed aided in the design of a model-based PID controller for pitch motion control using the multi-parameter root locus technique. The root locus tuned controller serves as a benchmark controller for performance evaluation of the genetic algorithm (GA) and particle swarm optimization (PSO) tuned controllers. Furthermore, the frequency domain metric of gain and phase margins were also employed to reach a robust control design. Experiments conducted in a simulation environment reveal that PSO-PID results in a better response of the UAV in comparison to the baseline pitch controller.

KEYWORDS: Unmanned aerial vehicle | Dynamic model | Fluidic thrust vectoring control | Genetic algorithm optimization | PID controller | Coanda effect | Particle swarm optimization

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Dr. Hamid Ullah Khan Niazi is an Associate Professor in the Department of Mechanical & Aerospace Engineering. He holds a Ph.D. in Mechanical Manufacturing and Automation from Beijing Institute of Technology, China, complemented by an MS in Mechanical Engineering from the College of E&ME, NUST, and a BE in Mechanical Engineering from UET Taxila. With a strong academic background and expertise in mechanical engineering, Dr. Niazi brings a wealth of knowledge to his role. His research interests likely encompass areas such as manufacturing processes, automation, and related fields. As an Associate Professor, he is likely involved in teaching and mentoring students, as well as conducting research to contribute to advancements in the field of mechanical and aerospace engineering.

Research Areas

- Product Design and Development
- Digital and Web based Manufacturing
- Engineering/Project Management
- Manufacturing & Automation

	TOTAL	FY 2023
PUBLICATIONS	11	01
CITATIONS	20	00

SGDS TARGETED ---------- 01

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TITLE OF PAPER

Techniques Used for Process Optimization of Wire Electrical Discharge Machining: A Review

ENGINEERING PROCEEDINGS

NOT MENTIONED

Y

0.7 (2022)

2023-01-01

10.3390/AEROSPACE10060563



SCAN ME

ABSTRACT

Pitch control of an unmanned aerial vehicle (UAV) using fluidic thrust vectoring (FTV) is a relatively novel technique requiring no moving control surfaces, such as elevators. In this paper, the authors' previous work on the characterization of a static co-flow FTV rig is further validated using the free to pitch dynamic test bench. The deflection of a primary jet after injection of a high-velocity secondary jet was captured using the tuft flow visualization technique, along with the experimental recording of subsequent normal force impinged on the Coanda surface resulting in the pitching moment. The effect of primary and secondary flow velocities on exhaust jet deflection, as well as on the pitch angle of the aircraft, is examined. Aerodynamic gain as well as the inertia of a delta wing UAV test bench are computed through experiments and fed into the equation of motion (e.o.m). The e.o.m developed aided in the design of a model-based PID controller for pitch motion control using the multi-parameter root locus technique. The root locus tuned controller serves as a benchmark controller for performance evaluation of the genetic algorithm (GA) and particle swarm optimization (PSO) tuned controllers. Furthermore, the frequency domain metric of gain and phase margins were also employed to reach a robust control design. Experiments conducted in a simulation environment reveal that PSO-PID results in a better response of the UAV in comparison to the baseline pitch controller.

KEYWORDS:

Unmanned aerial vehicle | Dynamic model | Fluidic thrust vectoring control | Genetic algorithm optimization | PID controller | Coanda effect | Particle swarm optimization

Department of Avionics Engineering

Departmental Overview

In recent years, the aircraft industry has experienced an exponential increase in the application of digital communications, controls and navigation systems. On-board computers now control vital flight functions of large aerial vehicles from takeoff to automatically controlled landings while on-board sensors observe physical phenomena as diverse as weather, ground vehicles, crop densities and other aerial targets. The field of avionics is thus multi-disciplinary and challenging. The Avionics Engineering Department of IAA offers MS and PhD degrees in Avionics Engineering and Information Security. The offered programs provide an opportunity for pursuing rigorous course of studies reflecting the challenges of today's high-tech IT and aviation industry.

Advanced concepts and applications are emphasized throughout the program and the thesis research. The aim is to provide the required knowledge and substantial depth so that the alumni can continue to pursue lifelong multidisciplinary learning as professionals.

Welcome to the Departmental Overview of our dynamic academic unit, guided by the leadership of Dr. Muhammad Ashraf, who serves as the Chair of the Department. Dr. Ashraf brings a wealth of experience and expertise to our department, steering a team of dedicated faculty members and professionals. The faculty includes accomplished individuals such as Dr. Noshina Tariq, Dr. Muhammad Zakwan, and Dr. Adnan Fazil, all serving as Assistant Professors, along with Dr. Muhammad Adnan, Dr. Ali Javed Hashmi, and Dr. Muhammad Qasim Saee, contributing as esteemed Faculty Members. In addition to these academic leaders, Engr. Zain ul Abideen, our Lab Engineer, plays a crucial role in fostering an environment conducive to practical learning. Together, this accomplished team ensures the Department's commitment to excellence in education, research, and innovation.

DEPARMENTAL PUBLICATIONS (2023)

05

SDGS TARGETED IN 2023



Dr. Adnan Fazil

Assistant Professor
Department of Avionics Engineering
adnan.fazil@mail.au.edu.pk



Dr. Adnan Fazil, an Assistant Professor in the Department of Avionics Engineering, brings a wealth of academic expertise to his role. He holds a Ph.D. in Electrical Engineering, an MS in Avionics Engineering, and a BE in Avionics Engineering from prestigious institutions including Air University and the College of Aeronautical Engineering (CAE) at NUST, Pakistan. With a strong background in both theoretical knowledge and practical application, Dr. Fazil contributes to the department's mission of providing high-quality education in avionics engineering. His research interests likely span a range of topics within electrical engineering and avionics, and he plays a vital role in mentoring students and conducting cutting-edge research in the field. Dr. Fazil's academic qualifications and commitment to excellence make him a valuable asset to the department and the broader academic community.

Research Areas

- Interference Suppression
- Channel Access Schemes
- Wireless Ad Hoc Networks
- Wireless Communications

	TOTAL	FY 2023
PUBLICATIONS	14	03
CITATIONS	28	15

SGDS TARGETED ---------- 02

DR. ADNAN FAZIL
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TITLE OF PAPER

Cross-Layer RF Distance Bounding Scheme for Passive and Semi-passive Ubiquitous Computing Systems

COMPUTERS & SECURITY

UNITED KINGDOM

W

5.6 (2022)

2023-12-26

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

10.3390/AEROSPACE10060563

SCAN ME

ABSTRACT

Distance Bounding protocols play a crucial role in securing ubiquitous computing systems, where user proximity is paramount for access control. While cryptographic protocols are conventionally employed, vulnerabilities arise from exploiting both the cryptographic and physical layers. Distance Bounding addresses this by tightly integrating cryptographic security with the physical layer, using physical proximity as a security fingerprint. Existing protocols often overlook practical cross-layer concerns, leading to impractical realizations or vulnerabilities. To address this, we propose a holistic approach, identifying essential cross-layer parameters. We optimize communication rates using high-order modulation, ensuring the integrity of cross-layer design. Additionally, we analyze the impact of the prover's impedance mismatch on link efficacy and security. A comparison with prior approaches, introducing Qualitative Measure Matrix (QMM-I) and Quantitative Measure Matrix (QMM-II), highlights the superiority of our scheme in achieving a secure and practical Distance Bounding realization.

KEYWORDS:

Cross-Layer | Qualitative Measure Matrix (QMM-I) | Quantitative Measure Matrix (QMM-II)

DR. ADNAN FAZIL
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TITLE OF PAPER

Snapshot ensemble-based residual network (SnapEnsemResNet) for remote sensing image scene classification

GEOINFORMATICA

NETHERLANDS

W

2.2 (2022)

2023-03-06

https://doi.org/10.1007/s10707-023-00492-7



SCAN ME

ABSTRACT

The scarcity of large-scale remote sensing scene classification datasets has hindered the unleashing of the full potential of deep CNN models like ResNets, primarily due to overfitting concerns with limited training data. This research introduces a snapshot ensemble-based residual network (SnapEnsemResNet), featuring two sub-networks (FC-1024 and Dilated-Conv). FC-1024 addresses overfitting by adding an extra fully connected layer, enhancing generalization. Dilated-Conv focuses on minimizing inter-class similarity with an additional dilated convolutional layer. Integrated with a two-tier snapshot-based ensembling strategy, SnapEnsemResNet achieves competitive accuracy on the NWPU-RESISC45 dataset, outperforming state-of-the-art methods even with a 10% training ratio.

KEYWORDS:

SnapEnsemResNet | Dilated-Conv | NWPU-RESISC45 dataset | CNN models | ResNets | sensing image

DR. ADNAN FAZIL
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TITLE OF PAPER

Foreign Object Debris (FOD) Classification through Material Recognition Using Deep Convolutional Neural Network with Focus on Metal

IEEE ACCESS

UNITED STATES

W

3.9 (2022)

2023-01-01

10.1109/ACCESS.2023.3239424

SCAN ME

ABSTRACT

Foreign object debris (FOD) is any undesired and unintended object placed or found in the specific vicinity of an aircraft (runway/ taxiway) that can cause damage to aircraft or harm personnel on board such as twisted metal strips, screws, nuts, and bolts, depleted concrete runway pieces, stones, pebbles and stationery items. To avoid FOD damages, all airport/ aviation organizations have deployed some sort of FOD prevention procedure. However, automatic FOD detection systems are still scarce owing to the inevitable reliance on human experts that lead to unavoidable human errors. Around 60% of FOD consists of metal which is the most deteriorating for an aircraft. Therefore, the implementation of material recognition techniques for FOD classification through Deep Convolutional Neural Networks (DCNN) is more important than FOD object detection as FOD could be of any shape, size or color. This paper developed a DCNN algorithm for FOD material classification with high accuracy for all included material classes (i.e., metal, concrete, plastic) in general and metal in particular. For this, a new dataset is introduced that consists of 2481 images taken on an operational airport runway in varying illumination and weather conditions. Through extensive testing, it was found that InceptionV3 is the best performing model with 18% improvement in metal recognition, and 11% improvement in average accuracy for all included classes.

KEYWORDS:

Metal | Image Recognition | Computer Vision | Deep Learning | Feature Extraction | Convolutional neural networks

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Dr. Noshina Tariq serves as an Assistant Professor in the Department of Avionics Engineering. She holds a Ph.D. in Cyber Security and an MS in Network Security, both from FAST National University of Computer and Emerging Sciences, Islamabad, Pakistan. With expertise in cybersecurity, Dr. Tariq brings a wealth of knowledge to her role, contributing to the education and research endeavors of the department. Her academic background and research focus equip her to address contemporary challenges in avionics engineering, particularly in the context of cybersecurity measures and network security protocols. Dr. Tariq's dedication to academic excellence and her commitment to advancing knowledge in her field make her a valuable asset to the faculty team.

Research Areas

Internet of Things | Cyber Security | Fog and Cloud Computing Security | Blockchain | Machine Learning

	TOTAL	FY 2023
PUBLICATIONS	26	02
CITATIONS	870	288
SGDS TARGETED	02	

DR. NOSHINA TARIQ
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TITLE OF PAPER

A Federated Learning Approach to Breast Cancer Prediction in a Collaborative Learning Framework

HEALTHCARE

NETHERLANDS

X

2.8 (2022)

2023-12-17

https://doi.org/10.3390/healthcare11243185



SCAN ME

ABSTRACT

Breast cancer continues to pose a substantial worldwide public health concern, necessitating the use of sophisticated diagnostic methods to enable timely identification and management. The present research utilizes an iterative methodology for collaborative learning, using Deep Neural Networks (DNN) to construct a breast cancer detection model with a high level of accuracy. By leveraging Federated Learning (FL), this collaborative framework effectively utilizes the combined knowledge and data assets of several healthcare organizations while ensuring the protection of patient privacy and data security. The model described in this study showcases significant progress in the field of breast cancer diagnoses, with a maximum accuracy rate of 97.54%, precision of 96.5%, and recall of 98.0%, by using an optimum feature selection technique. Data augmentation approaches play a crucial role in decreasing loss and improving model performance. Significantly, the F1-Score, a comprehensive metric for evaluating performance, turns out to be 97%. This study signifies a notable advancement in the field of breast cancer screening, fostering hope for improved patient outcomes via increased accuracy and reliability. This study highlights the potential impact of collaborative learning, namely, in the field of FL, in transforming breast cancer detection. The incorporation of privacy considerations and the use of diverse data sources contribute to the advancement of early detection and the treatment of breast cancer, hence yielding significant benefits for patients on a global scale.

KEYWORDS: Federated learning, Breast Cancer, Collaborative Learning, Deep Neural Network, Prediction

DR. NOSHINA TARIQ
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TITLE OF PAPER

Securing Smart Healthcare Cyber-Physical Systems against Blackhole and Greyhole Attacks Using a Blockchain-Enabled Gini Index Framework

SENSORS

SWITZERLAND

W

3.9 (2022)

2023-11-23

https://doi.org/10.3390/s23239372



SCAN ME

ABSTRACT

The increasing reliance on cyber-physical systems (CPSs) in critical domains such as healthcare, smart grids, and intelligent transportation systems necessitates robust security measures to protect against cyber threats. Among these threats, blackhole and greyhole attacks pose significant risks to the availability and integrity of CPSs. The current detection and mitigation approaches often struggle to accurately differentiate between legitimate and malicious behavior, leading to ineffective protection. This paper introduces Gini-index and blockchain-based Blackhole/Greyhole RPL (GBG-RPL), a novel technique designed for efficient detection and mitigation of blackhole and greyhole attacks in smart health monitoring CPSs. GBG-RPL leverages the analytical prowess of the Gini index and the security advantages of blockchain technology to protect these systems against sophisticated threats. This research not only focuses on identifying anomalous activities but also proposes a resilient framework that ensures the integrity and reliability of the monitored data. GBG-RPL achieves notable improvements as compared to another state-of-the-art technique referred to as BCPS-RPL, including a 7.18% reduction in packet loss ratio, an 11.97% enhancement in residual energy utilization, and a 19.27% decrease in energy consumption. Its security features are also very effective, boasting a 10.65% improvement in attack-detection rate and an 18.88% faster average attack-detection time. GBG-RPL optimizes network management by exhibiting a 21.65% reduction in message overhead and a 28.34% decrease in end-to-end delay, thus showing its potential for enhanced reliability, efficiency, and security.

KEYWORDS: Smart Healthcare System, Cyber-Physical System, Blackhole Attacks, Greyhole Attacks, Gini Index, Blockchain

Faculty of Aerospace & Strategic Studies (FASS)

The discipline of Strategic Studies is a subset of International Relations and Political Science. Strategy concerns itself with the use of elements of power as an instrument of policy to achieve as well as protect a nation's geo-political, economic, social and other interests.

The Department of Strategic Studies (DSS) at the Faculty of Aerospace and Strategic Studies (FASS) offers a Masters of Science in Strategic Studies (MS-SS) (18-Years). The MS-SS is a great academic program for fresh undergraduate students, officers of the Pakistan Air Force and other services, the Intelligence/Security community, civil servants and CSOs. It offers advanced courses on strategic studies, along with research opportunities across the spectrum of contemporary strategic issues. Learning and research at DSS is accomplished by a highly qualified faculty which has both academic and practitioner experience. Students of MS-SS will be able to learn the discipline's theory, engage in its discourse, and conduct academic research.

DSS also offers a Bachelors of Science in International Relations (BS-IR). The Discipline of International Relations is a multidimensional program of study, which examines the relations between actors in the international system and the history, processes, influences, interests, concerns, etc. that govern the relationships between them. It seeks to equip the student with an understanding of how the various elements that constitute an international system function and behave, and aims to lay the foundation for both historical introspection and political analysis.

The BS-IR undergraduate degree accepts students from a variety of academic backgrounds and provides a qualified faculty that prepares them to understand the world around them by grounding them in basic concepts in history, politics, current affairs, IR theory etc. The teaching process is aimed at equipping students with the tools needed to form an informed analysis and make their own contribution towards international relations' discourse.

FACULTY PUBLICATIONS (2023)

08

SDGS TARGETED



Dr. Adil Sultan

Dean & HOD

Aerospace and Strategic Studies (FASS)

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Dr. Adil Sultan is the Dean of Faculty of Aerospace and Strategic Studies (FASS) and Acting Chair of Department of Strategic Studies (DSS).. Before joining the Air University in October 2020, he was a Director at the Centre for Aerospace and Security Studies (CASS) and a Visiting Research Fellow at Centre for Science and Security Studies (CSSS), King's College London from 2017 to 2019. Dr Sultan represented Pakistan at the International Atomic Energy Agency (IAEA) as part of official delegations to develop various guideline documents and for bilateral discussions.

Research Areas

Arms Control & Nonproliferation | Global Strategic Issues | Nuclear Deterrence | National and International Security | Strategic Stability

	TOTAL	FY 2023
PUBLICATIONS	24	03
CITATIONS	--	--

SGDS TARGETED ---------- 01

Dr. Adil Sultan
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adilsultan@mail.au.edu.pk

TITLE OF PAPER

Integrated Deterrence : Relevance and Implications for South Asia

MARGALLA PAPERS (NDU)

PAKISTAN

Y

NOT ANNOUNCED

2023-12-31

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

https://doi.org/10.54690/margallapapers.27.2.176

SCAN ME

ABSTRACT

The US National Security Strategy of 2022 introduced a relatively new concept of Integrated Deterrence (ID) that will likely impact security discourse amongst global rivals such as the US, China, and Russia while affecting the strategic thinking of relatively smaller powers like India, Pakistan, and others. With an expanded scope and objectives, ID aims to build and integrate the entire spectrum of capabilities of the US, its allies, and partners against the perceived threat from China and possibly Russia. Resultantly, the paper focuses on implications of ID for security and strategic stability in South Asia. India, being a major strategic partner with the will to play a significant role in the US-led China containment strategy, is likely to be a major beneficiary of the new US posture of ID. With enhanced and integrated military capabilities, India is likely to adopt a more hostile posture towards its neighbours, especially Pakistan, thus forcing the latter to develop options in the form of 'Integrated Response', to help maintain strategic stability in the region without indulging in an arms race, and by maintaining neutrality in the evolving US-China great power competition.

KEYWORDS:

Integrated Deterrence | Full Spectrum Deterrence | Integrated Response | Emerging Technologies | South Asia | Strategic Stability

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TITLE OF PAPER

US Posture of Integrated Deterrence: China's Response and Implications for the Asian Security

JOURNAL OF STRATEGIC STUDIES

PAKISTAN

Y

NOT ANNOUNCED

2023-08-23

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

https://issi.org.pk/u-s-posture-of-integrated-deterrencechinas-response-and-implications-for-the-asian-security/

SCAN ME

ABSTRACT

As the world is drawn increasingly into a web of shifting geopolitics, battle lines are being drawn and alliances are re-orienting themselves. Working from the premise that the competition between the United States (U.S.) and the People's Republic of China will define the dynamics of the international system for the foreseeable future, this paper takes a look at the U.S.'s evolving posture of Integrated Deterrence and the likely Chinese response, which would have implications for Asian security. It reviews the contours of 'Integrated Deterrence' as it is laid out in the U.S. National Security Strategy 2022 and how this may shape the policy decisions of the U.S. and its partners, especially Taiwan, as well as how major U.S. regional allies, including India are likely to play their role in support of the U.S. interests. The paper also analyses China's strategic thinking, national defence policy and national security objectives that are likely to influence its choices in the evolving great power competition. Taking Taiwan as the case study, the paper finds that in addition to pursuing more traditional approaches, both the U.S. and China will consider influencing domestic public opinion in China and Taiwan as a key focus of their respective policy considerations; it also finds convergences in the related responses of South Asia's two major players, India and Pakistan.

KEYWORDS:

Integrated Deterrence | Asia | Taiwan | US | China | India

Dr. Adil Sultan
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TITLE OF PAPER

Political Drivers of India's Ballistic Missile Defence Program and Implications for South Asian Security

NDU JOURNAL

Y

2023-05-23

https://doi.org/10.54690/ndujournal.37.143

PAKISTAN

NOT ANNOUNCED

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

SCAN ME

ABSTRACT

The reasons for the birth and continuation of India's BMD programme argue for security concerns. However, those are not reflected in on-ground realities. The paper explores said gap and the resulting security implications and highlights defence policy options. The drivers behind India's BMD programme can be analysed by considering the external and internal political drivers that shape India's security interests. India's BMD programme started before formally declaring itself a nuclear weapon state. It grew parallel with the Indo-US strategic partnership to build India's political and military standing as part of the US-led Indo-Pacific strategy. An increase in India's military potential will likely have severe repercussions for security and strategic stability between two nuclear neighbours, India and Pakistan. BMDs could lead to a false sense of protection for the possessor state and provide an incentive for launching a 'first strike' against the adversary. In response, Pakistan can contemplate several options without embroiling itself in a BMD race. Pakistan has already developed several versions of air, land, and sea-launched cruise missiles and is expanding its MIRVs that can sufficiently evade and penetrate India's BMD systems. Additionally, indigenously built UAVs could counter India's BMD system and disrupt or degrade associated ISR through electronic warfare and jamming capabilities.

KEYWORDS:

Ballistic Missile Defence | Political Drivers | Indo-US Strategic Partnership | Strategic Stability | Countermeasures

MR. FARAZ HAIDER

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Mr. Faraz Haider is a lecturer at the Department of Strategic Studies. Air University, Islamabad. Previously, he worked as a Research Associate at the Department of Strategic Studies from April 2022 to August 2023. He has also been previously employed as a User Support Manager for Plagiarism Checker X LLC, a Study Group Leader at the Swinburne University of Technology, as an International Student Representative at the Swinburne Student Representative Council, and as a Compliance Officer at Blockbid Pty Ltd.

Research Areas

Nuclear Non-proliferation | National Security | Arms Control and Disarmament | Comprehensive Security | Climate Security

	TOTAL	FY 2023
PUBLICATIONS	--	02
CITATIONS	--	--

SGDS TARGETED ---------- 01

MR. FARAZ HAIDER
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TITLE OF PAPER

Integrated Deterrence : Relevance and Implications for South Asia

MARGALLA PAPERS (NDU)

PAKISTAN

Y

NOT ANNOUNCED

2023-12-31

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

https://doi.org/10.54690/margallapapers.27.2.176

SCAN ME

ABSTRACT

The US National Security Strategy of 2022 introduced a relatively new concept of Integrated Deterrence (ID) that will likely impact security discourse amongst global rivals such as the US, China, and Russia while affecting the strategic thinking of relatively smaller powers like India, Pakistan, and others. With an expanded scope and objectives, ID aims to build and integrate the entire spectrum of capabilities of the US, its allies, and partners against the perceived threat from China and possibly Russia. Resultantly, the paper focuses on implications of ID for security and strategic stability in South Asia. India, being a major strategic partner with the will to play a significant role in the US-led China containment strategy, is likely to be a major beneficiary of the new US posture of ID. With enhanced and integrated military capabilities, India is likely to adopt a more hostile posture towards its neighbours, especially Pakistan, thus forcing the latter to develop options in the form of 'Integrated Response', to help maintain strategic stability in the region without indulging in an arms race, and by maintaining neutrality in the evolving US-China great power competition.

KEYWORDS:

Integrated Deterrence | Full Spectrum Deterrence | Integrated Response | Emerging Technologies | South Asia | Strategic Stability

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TITLE OF PAPER

Political Drivers of India's Ballistic Missile Defence Program and Implications for South Asian Security

NDU JOURNAL

PAKISTAN

Y

NOT ANNOUNCED

2023-05-23

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

https://doi.org/10.54690/ndujournal.37.143

SCAN ME

ABSTRACT

The reasons for the birth and continuation of India's BMD programme argue for security concerns. However, those are not reflected in on-ground realities. The paper explores said gap and the resulting security implications and highlights defence policy options. The drivers behind India's BMD programme can be analysed by considering the external and internal political drivers that shape India's security interests. India's BMD programme started before formally declaring itself a nuclear weapon state. It grew parallel with the Indo-US strategic partnership to build India's political and military standing as part of the US-led Indo-Pacific strategy. An increase in India's military potential will likely have severe repercussions for security and strategic stability between two nuclear neighbours, India and Pakistan. BMDs could lead to a false sense of protection for the possessor state and provide an incentive for launching a 'first strike' against the adversary. In response, Pakistan can contemplate several options without embroiling itself in a BMD race. Pakistan has already developed several versions of air, land, and sea-launched cruise missiles and is expanding its MIRVs that can sufficiently evade and penetrate India's BMD systems. Additionally, indigenously built UAVs could counter India's BMD system and disrupt or degrade associated ISR through electronic warfare and jamming capabilities.

KEYWORDS: Ballistic Missile Defence, Political Drivers, Indo-US Strategic Partnership, Strategic Stability, Countermeasures

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Dr. Zahid Mehmood Zahid is currently serving as an Assistant Professor (HEC approved Supervisor) in the Department of Strategic Studies, Air University Islamabad. He is a political scientist with expertise in Political Islam, Terrorism, Afghan Affairs, the War on Terror, Foreign Policy of Great Powers, Geo-politics of Religion, and Militant Discourse. He had been a Research Fellow (2018-2019) at the University of Maryland, USA. he designed, conducted, and supervised research on China Pakistan Economic Corridor (CPEC) and Radicalization in Pakistan. As an Analyst, he anchored a radio program at the Pakistan Broadcasting Corporation in 2017.

Research Areas

Afghan Affairs | Political Islam | Terrorism | International Security | Militant Discourses | Foreign Policy of Great Powers | Geopolitics of Religion

	TOTAL	FY 2023
PUBLICATIONS	--	02
CITATIONS	--	--

SGDS TARGETED ---------- 01

Dr. Zahid Mehmood
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TITLE OF PAPER

The Evolution of Islamophobia in the West: A Case Study of France

PAKISTAN JOURNAL OF INTERNATIONAL AFFAIRS

PAKISTAN

Y

NOT ANNOUNCED

2023-06-20

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

https://doi.org/10.52337/pjia.v6i2.789

SCAN ME

ABSTRACT

The pluralist Western societies are witnessing the rise of an exclusivist and polarizing idea – Islamophobia, which is ideologically driven and action-oriented. France is the epicentre of hate against Muslims because of its colonial history and the practice of peculiar secularism, Laicism. Drawing upon Social Constructivism, this paper examines the ideological, populist, and strategic roots of Islamophobia in the West and France in particular. This study identifies the role of language and socio-political frames-cum-rationale that the French leadership uses to construct Islam as a threat to the French Republic. In addition, it attempts to expose the selective representations of the Muslims that, in return, discursively construct the Muslims in France as unacceptable for the native people on French soil. Furthermore, this interpretative study reveals how the French elite uses generalizations to criminalize Islam and Muslim symbols like Hijab, Azan, and beard, which run contrary to their secular values. Finally, this study concludes that Islamophobia is a socially constructed reality that leads to its violent manifestation.

KEYWORDS:

Social Construction | Islamophobia | Identity | Enemy Image | Muslim Threat | Secularism

Dr. Afsah Qazi

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Dr. Afsah had been the Assistant Editor for Journal of Contemporary Studies (published by NDU, Islamabad) from Spring 2017 till Fall 2021. She was also a member of HEC's National Curriculum Review Committee (NCRC) for International Relations (2017-18). Dr. Qazi has taught courses in diverse sub-fields of IR such as: Global Political Economy, International Security, Arms Control and Disarmament, International Law, Conflict and Cooperation in the Asia Pacific, and Government and Politics of China. Dr. Afsah Qazi is an intrinsically motivated professional, committed to the cause of enabling and imparting quality education in any given socio-cultural environment

Research Areas

Comprehensive Security

IR of East Asia

Public Diplomacy and Track-II Processes

Arms Control and Disarmament

	TOTAL	FY 2023
PUBLICATIONS	08	02
CITATIONS	03	02
SGDS TARGETED ---------- 04		

Dr. Afsah Qazi
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TITLE OF PAPER

Russia-Ukraine War and the Indo-Pacific: A Perspective from Pakistan

JOURNAL OF ASIAN AND AFRICAN STUDIES

UNITED KINGDOM

X

1.0 (2022)

2023-05-26

https://doi.org/10.1177/00219096231176743



SCAN ME

ABSTRACT

Pakistan's relevance to the immediate theater of the Russia–Ukraine war was the presence of its prime minister in Moscow on the eve of the Russian invasion. Pakistan proclaimed neutrality but later revisited its position in the face of compelling domestic and external constraints. The trajectory of Pakistan's response to the war and its perception of the consequences of war for itself and the Indo-Pacific region reflected its historical interaction pattern with the United States, China, Russia, and India. External strategic challenges (as the Indo-Pacific gets more competitive) along with economic predicaments constrained the military leadership and the new government to change their stance on the war and consider it an opportunity to realign with the West (its familiar historical preference).

KEYWORDS:

Russia–Ukraine war | Russian invasion | Indo-Pacific region | United States | China | India

Dr. Afsah Qazi
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TITLE OF PAPER

Political Survival through Religious Instrumentalism: Jamiat Ulama-e-Islam Fazlur Rehman's Resistance to Madrassah Reforms in Pakistan

POLITICS AND RELIGION

UNITED KINGDOM

W

1.68 (2022)

2023-03-01

https://doi.org/10.1017/S1755048322000207



SCAN ME

ABSTRACT

Pakistan has strived though unsuccessfully to introduce reforms into thousands of religious seminaries. Among the different sects of seminaries, Deobandi madaris which are mostly led by Jamiat Ulama-e-Islam Fazlur Rehman (JUI-F) have posed the greatest challenge. This paper seeks to analyze why and how JUI-F obstructs the state's attempts of convincing madaris for reforms. Based on the findings of elite group interviews and constructs of "elite instrumentalism" and "political survival theory," this study argues that JUI-F has political interests, both strategic-cum-existential and tactical, at stake in resisting these reforms. This study of Fazlur Rehman's behavior vis-à-vis state's madrassah reform initiatives allows one to bring home the theoretical premises set by "political survival theory" and "elite instrumentalism." Accordingly, JUI-F opposes madrassah reforms because the instrumental use of religion (madaris) has long been vital for retaining its political power which in turn has ensured party's political survival.

KEYWORDS:

Religion | Madrassah | Jamiat Ulama-e-Islam Fazlur Rehman (JUI-F) | Politics | Political Survival

Faculty of Basic & Applied Sciences

The Faculty of Basic & Applied Sciences comprises of two departments: The Department of Mathematics and the Department of Physics. There are 35 faculty members working in these departments, many of them having Ph.D. degrees from leading universities in industrialized countries. They have specializations in topology, image processing, cryptography, numerical analysis, mathematical modeling and simulation, materials science, genetic algorithms, radiation physics and solar energy and computational fluid dynamics. Currently, the faculty of Basic and Applied Sciences offer BS, MS and Ph.D. degrees both in Mathematics and Physics. The Department of Physics offers degrees in Bachelors of Physics (BS), MS in Applied Physics and PhD Physics. The BS Physics (BS) program spreads over eight semesters (04 year) and requires successful completion of around 133 credit hours inclusive of courses, laboratory and final year project. MS and PhD programs initially focus on the fields of Materials Science, Nano Biotechnology, Renewable Energy and Computational Physics. The physicists and engineers via this program could join hands for producing qualified manpower for meeting the growing demand of professionals in these areas. Its graduates trained in the experimental, theoretical, and computational aspects of material science and technology are expected to be active members of interdisciplinary teams for identifying, formulating and solving problems of national interest. The Department of Mathematics promotes excellence in the teaching and learning of mathematics and its applications, encourages industrial research and an appreciation of the intrinsic beauty of mathematics. To advance its mission, the DoM provides a foundation for critical thinking by developing skills in problem solving; and offers a broad selection of courses that can be tailored according to diverse students' needs.

FACULTY PUBLICATIONS (2023)

60

SDGS TARGETED IN 2023



Department of Mathematics

Departmental Overview

The Department of athematics (DoM) at Air University (AU) was established in the year 2004 under the Faculty of Basic and Applied Sciences (FBAS) as a supporting department for engineering, computer sciences and business administration. The department was supposed to teach mathematics courses to undergraduate students in all three departments. The emphasis was to teach mathematics as applications which help the students to understand engineering and statistical based subjects in individual departments. The department was mainly focused on undergraduate teaching.

The Department of Mathematics promotes excellence in the teaching and learning of mathematics and its applications, encourages industrial research and an appreciation of the intrinsic beauty of mathematics. To advance its mission, the DoM provides a foundation for critical thinking by developing skills in problem solving; and offers a broad selection of courses that can be tailored according to diverse students' needs.

To be a model department focused on the solutions of real world scientific and engineering problems, meeting the criteria of the nation and enhancement and sustenance of the academic environment conducive to excellence in teaching and research.

Our Department of Mathematics, led by Dean Dr. Rashid Mahmood and chaired by Dr. Iffat Zehra, coordinates academic activities with visionary leadership. The faculty, including distinguished figures like Professor Dr. Nabeela Kousar Dr. Muhammad Shoaib, encompasses accomplished individuals. With seasoned educators like Associate Professors Dr. Sadia Ahsan and Dr. Waqas Sarwar Abbas, along with Assistant Professors and dedicated.

The team also includes several Assistant Professors, namely Dr. Sardar Muhammad Bi, Dr. Rabil Tabassum, Dr. Tehreem, Dr. Kamran Usman, Dr. Ambreen Khan, Dr. Seemab Bashir, Dr. Khalil Ur Rehman, Dr. Saleem Ullah, Dr. Tanzeela Shaheen, Dr. Khalil Ahmad, Dr. Atif Hassan Soori, Dr. Mahwish Bano, Dr. Sameena Bibi, and Dr. Ammara Nawaz Cheema. Furthermore, the department is enriched by the contributions of Mr. Tauseef Ahmed and Mr. Musaddiq Ibrahim(S), who serve as dedicated Lecturers.

DEPARMENTAL PUBLICATIONS (2023)

47

SDGS TARGETED IN 2023



Dr. Nabeela Kousar

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Dr. Nabeela Kousar, a Professor in the Department of Mathematics, brings extensive expertise to her role, holding a PhD in Applied Mathematics from Shanghai Jiao Tong University, China, and an M.Phil. in Mathematics from Quaid-e-Azam University, Islamabad. With her strong academic background and research experience, Dr. Kousar contributes significantly to the department's teaching and research endeavors, guiding students and advancing knowledge in the field of mathematics.

Research Areas

- Nano Fluids
- Newtonian and Non-Newtonian flows
- Computational Mathematics

	TOTAL	FY 2023
PUBLICATIONS	38	05
CITATIONS	461	94

SGDS TARGETED ---------- 01

Dr. Nabeela Kousar
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TITLE OF PAPER

Magneto-thermal convection in partially heated novel cavity with multiple heaters at bottom wall: A numerical solution

CASE STUDIES IN THERMAL ENGINEERING

UNITED KINGDOM

W

6.8 (2022)

2023-03-01

7 AFFORDABLE AND CLEAN ENERGY

https://doi.org/10.1016/j.csite.2023.102781

SCAN ME

ABSTRACT

It is well consensus that magneto-thermal convection claims various applications in thermal engineering like cancer treatment, drug delivery, and anti-vibration systems to mention just a few. Owing to such importance we explore the heat transfer in a magnetized thermal flow field in the novel cavity with convection mode. Three different heaters are varied at the bottom wall of the enclosure. At the inlet, fluid enters the cavity having a parabolic velocity profile and exits at the right side with the Neumann condition. The upper wall, lower wall, and boundary of the obstacle are kept at no-slip condition. Adiabatic condition is imposed at the lower wall by omitting ribs while all other walls are taken at cold temperature. The mathematical formulations are tackled using the finite element method. Various values of Reynolds and Hartmann numbers are used in this study and observations are concluded by using graphical and tabular outcomes. The numerical findings are displayed as velocity plots, pressure plots, and temperature plots by regulating the Reynolds and Hartmann numbers. For three different installations of heaters, we evaluated the hydrodynamic (drag and lift) forces. These forces are expressed as lift and drag coefficients with the help of line integration around the heated obstacle at different refinement levels. We have noticed that with the occurrence of a magnetic field, the values of lift and drag coefficients are higher for a rectangular heater in comparison with triangular and semi-circular heaters.

KEYWORDS:

Velocity Profile | Thermal Engineering | Hydrodynamic

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TITLE OF PAPER

Thermal enhancement of nano-fluidic transport confined between disk and cone both rotating with distinct angular velocities and heat transfer

INTERNATIONAL JOURNAL OF NUMERICAL METHODS FOR HEAT & FLUID FLOW

UNITED KINGDOM

W

5.1 (2022)

2023-07-01

https://doi.org/10.1108/HFF-04-2023-0182

7 AFFORDABLE AND CLEAN ENERGY

SCAN ME

ABSTRACT

This paper aims to study the fluid flow and heat transfer within the Casson nanofluid confined between disk and cone both rotating with distinct velocities. For a comprehensive investigation, two distinct nano-size particles, namely, silicon dioxide and silicon carbide, are submerged in ethanol taken as the base fluid. This paper explores the disk and cone contraption mostly encountered for viscosity measurement in various industrial applications such as lubrication industry, hydraulic brakes, pharmaceutical industry, petroleum and gas industry and chemical industry. It is worth mentioning here that the radially varying temperature profile at the disk surface is taken into the account. The effect of prominent emerging parameters on velocity fields and temperature distribution are studied graphically, while bar graphs are drawn to examine the physical quantities of industrial interest such as surface drag force and heat transfer rate at disk and cone. To the best of the authors' knowledge, no study in literature exists that discusses the thermal enhancement of nano-fluidic transport confined between disk and cone both rotating with distinct angular velocities with heat transfer.

KEYWORDS:

Conical Gap | Silicon Dioxide | Rotation | Silicon Carbide | Radially Varying Temperature | Heat Transfer Rate

Dr. Nabeela Kousar
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TITLE OF PAPER

Simulation of magneto-hydrodynamics effects on cross fluid (blood) model with entropy generations in multiple stenosed (aneurysm) curved channel

CHINESE JOURNAL OF PHYSICS

TAIWAN

W

3.9 (2022)

2023-10-01

https://doi.org/10.1016/j.cjph.2022.10.007

7 AFFORDABLE AND CLEAN ENERGY

SCAN ME

ABSTRACT

In this letter, the non-Newtonian behavior of the blood flow is captured by using Cross fluid model within curved multiple stenosed channel. The generations of entropy within blood flow due to dissipation and magneto-hydrodynamics effects are also explored in this study. The 2-dimensional curvilinear co-ordinate system is incorporated mathematically in the fundamental proposed physical system. After then, the obtained system of equations is reduced to normalized form with the insertion of mild stenotic condition as well. Explicit finite difference technique is induced on these physical equations to acquire the numerical solution. Flow characteristics such as wall shear stress and velocity are calculated at the stenotic throat of the curved vessel in order to originate the Bejan number (Be) and Entropy generation parameter (NG) numerically. In the last section, the profiles of velocity, Bejan number, temperature and entropy generations are portrayed with the variation of different emerging parameters such as curvature Rc, Wessenburg (We) number, magnetic parameter and Brickmann number(Br). From the obtained results, it is concluded that the values of Bejan number (Be) and Entropy generation parameter (NG) are highly affected with the variation of magnetic and curvature parameters. Impacts of different parameters (such as Brickmann number (Br) and curvature effects (Rc)) on blood flow pattern are visualized in streamlines plot for general reader.

KEYWORDS:

Cross Fluid Model | Flow Characteristics | Entropy

DR. NABEELA KOUSAR
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TITLE OF PAPER

Thermal convective transport energy and environmental applications for magnetised flow with parallel (non-parallel) walls movement simulation of staggered cavity

ENERGY & ENVIRONMENT

UNITED STATES

X

4.2 (2022)

2023-11-01

https://doi.org/10.1177/0958305X231215321



SCAN ME

ABSTRACT

The liquid suspension's staggered domains affect everyday life engineering. In this way, both parallel/anti-parallel movement of walls of staggered domains complicates formulation, making it difficult for researchers to detect liquid suspension flow field features. The current article is a key effort in this regard. The staggered cavity is equipped with liquid suspension. In a vertical path, a magnetic field is affected externally. To be more precise, we considered three cases for moving the top and bottom walls. In Case-I, just the top wall moves, while the other walls stay still. Case-II has parallel top and bottom walls. Case-III: anti-parallel wall movement. The left wall is chilly, the top wall is adiabatic, and the right side and bottom walls are heated consistently. The continuity, momentum, energy, and boundary constraints equations determine the physical configuration. Finite element analysis discretizes the governing equations. Every contour graphic show velocity, pressure, and temperature with an external magnetic field. Line graphs help describe velocity components. At a finer refinement level, all instances record kinetic energy versus magnetic field parameter and Reynolds number in tabular and bar graphs. Fluid flow length and velocity always decrease with magnetic field parameter. Kinetic energy is reduced with magnetic field intensity.

KEYWORDS:

Cross Fluid Model | Flow Characteristics | Entropy

DR. NABEELA KOUSAR
PROFESSOR
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TITLE OF PAPER

Computational Analysis of Heat and Mass Transfer in Magnetized Darcy-Forchheimer Hybrid Nanofluid Flow with Porous Medium and Slip Effects.

CMES-COMPUTER MODELING IN ENGINEERING & SCIENCES

UNITED STATES

X

2.4 (2022)

2023-12-01

https://doi.org/10.32604/cmes.2023.026994



SCAN ME

ABSTRACT

A computational analysis of magnetized hybrid Darcy-Forchheimer nanofluid flow across a flat surface is presented in this work. For the study of heat and mass transfer aspects viscous dissipation, activation energy, Joule heating, thermal radiation, and heat generation effects are considered. The suspension of nanoparticles singlewalled carbon nanotubes (SWCNTs) and multi-walled carbon nanotubes (MWCNTs) are created by hybrid nanofluids. However, single-walled carbon nanotubes (SWCNTs) produce nanofluids, with water acting as conventional fluid, respectively. Nonlinear partial differential equations (PDEs) that describe the ultimate flow are converted to nonlinear ordinary differential equations (ODEs) using appropriate similarity transformation. The ODEs are dealt with numerically by means of MATLAB's inbuilt routine function bvp4c. Velocity, temperature, and concentration profiles are explained pictorially whereas Sherwood number, local skin friction coefficient, and Nusselt number values are represented through bar charts. Thermal radiation and activation parameters shows direct impact on flow field. Furthermore, hybrid nanofluid admits a higher magnitude of velocity and temperature than nanofluid, but the concentration profile exhibits the opposite trend. The notable findings of the present investigation have significant applications in heat combustion and cooling chambers, space technology, the ceramics industry, paint and conductive coatings, bio-sensors, and many more.

KEYWORDS:

Heat Transfer | Hybrid Nanofluid | MCNTs | SCNTs | Darcy-Forchheimer

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Dr. Iffat Zehra, serving as an Assistant Professor in the Department of Mathematics, brings a wealth of academic achievement and expertise to her role. With a Ph.D. in Applied Mathematics and an MSc in Mathematics, both earned from Quaid-i-Azam University, Islamabad, Dr. Zehra possesses a comprehensive understanding of mathematical principles and their real-world applications. Her research interests likely span a wide range of areas within applied mathematics, reflecting her dedication to advancing the field through innovative inquiry and analysis. As an educator, Dr. Zehra is committed to nurturing the mathematical talents of her students, providing them with the knowledge and skills necessary to excel in their academic and professional pursuits.

Research Areas

Computational Fluid Dynamics

	TOTAL	FY 2023
PUBLICATIONS	26	02
CITATIONS	640	153

SGDS TARGETED ---------- 01

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TITLE OF PAPER

Thermal enhancement of nano-fluidic transport confined between disk and cone both rotating with distinct angular velocities and heat transfer

INTERNATIONAL JOURNAL OF NUMERICAL METHODS FOR HEAT & FLUID FLOW

UNITED KINGDOM

W

5.1

2023-07-01

https://doi.org/10.1108/HFF-04-2023-0182

SCAN ME

ABSTRACT

This paper aims to study the fluid flow and heat transfer within the Casson nanofluid confined between disk and cone both rotating with distinct velocities. For a comprehensive investigation, two distinct nano-size particles, namely, silicon dioxide and silicon carbide, are submerged in ethanol taken as the base fluid. This paper explores the disk and cone contraption mostly encountered for viscosity measurement in various industrial applications such as lubrication industry, hydraulic brakes, pharmaceutical industry, petroleum and gas industry and chemical industry. It is worth mentioning here that the radially varying temperature profile at the disk surface is taken into the account. The effect of prominent emerging parameters on velocity fields and temperature distribution are studied graphically, while bar graphs are drawn to examine the physical quantities of industrial interest such as surface drag force and heat transfer rate at disk and cone. To the best of the authors' knowledge, no study in literature exists that discusses the thermal enhancement of nano-fluidic transport confined between disk and cone both rotating with distinct angular velocities with heat transfer.

KEYWORDS:

Conical Gap | Silicon Dioxide | Rotation | Silicon Carbide | Radially Varying Temperature | Heat Transfer Rate

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TITLE OF PAPER

Electro-osmotically modulated magneto hydrodynamic peristaltic flow of menthol based nanofluid in a uniform channel with shape factor

JOURNAL OF MAGNETISM AND MAGNETIC MATERIALS

UNITED KINGDOM

W

3.09 (2022)

2023-06-15

https://doi.org/10.1016/j.jmmm.2023.170774

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

Current article is a study on peristaltic transport of menthol electrolytes altered utilizing an external electric field which contributes to the creation of a net surface charge attracting counter ions and repels co ions from the menthol based nanofluid, thus preceding the formation of an electrical double layer (EDL), a region of net charges at surface vicinity. Effects of electroosmotic body forces are studied on the base fluid with and without the presence of copper nanoparticles. Menthol-based fluid is chosen to owe to its utility in medicines and flavoring. Combine effects of electro-osmotically modulated magneto hydrodynamic peristaltic flow for Menthol based nanofluid in a uniform channel with shape factor is not discussed so far in literature. Streamlines are drawn to examine the collective influence of electroosmosis and peristalsis on trapping a fluid volume (e.g., bolus) inside the channel. Trapping is reported to be significantly influenced by an electric field rather than an electro-osmotic parameter. The present investigation may also be beneficial in the design of organs on chip-like devices for improved drug design and delivery.

KEYWORDS: Nanofluid, Hybrid Nanofluid, Electro-osmotically

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Dr. Khalil Ahmad, serving as an Assistant Professor in the Department of Mathematics, brings a wealth of academic expertise to his role. With a Ph.D. in Mathematics from COMSATS Institute of Information Technology and an M.Phil in Mathematics from BZU, Multan, Dr. Ahmad has demonstrated a deep understanding of mathematical principles and methodologies. His research interests span various areas within mathematics, contributing to the advancement of knowledge in the field. In addition to his scholarly pursuits, Dr. Ahmad is committed to providing high-quality education to students, utilizing innovative teaching methods to enhance learning outcomes. His dedication to academic excellence and passion for mathematics inspires students and fellow faculty members alike, fostering a dynamic and intellectually stimulating academic environment within the department. Dr. Ahmad's contributions to both research and teaching make him an integral part of the mathematics faculty.

Research Areas

Global and local stability analysis of nonlinear models.

	TOTAL	FY 2023
PUBLICATIONS	15	02
CITATIONS	145	41
SGDS TARGETED ---------- 01		

DR. KHALIL AHMAD
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TITLE OF PAPER

On new classes of strongly Janowski type functions of complex order

APPLIED MATHEMATICS-A JOURNAL OF CHINESE UNIVERSITIES

Y

2023-03-16

https://doi.org/10.1007/s11766-023-3990-7

GERMANY

1.0 (2022)

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

We investigate some new subclasses of analytic functions of Janowski type of complex order. We also study inclusion properties, distortion theorems, coefficient bounds and radius of convexity of the functions. Moreover, analytic properties of these classes under certain integral operator are also discussed. Our findings are more comprehensive than the existing results in the literature.

KEYWORDS:

Subordination | Janowski Function | Star-like Function | Complex Order | Convex Function

DR. KHALIL AHMAD
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TITLE OF PAPER

New Exact Solutions of Landau-Ginzburg-Higgs Equation Using Power Index Method

JOURNAL OF FUNCTION SPACES

EGYPT

X

1.67 (2022)

2023-12-1

https://doi.org/10.1155/2023/4351698

SCAN ME

ABSTRACT

In the present study, the optimality approach is applied to find the exact solution of the Landau-Ginzburg-Higgs Equation (LGHE) using new transformations. This method is a direct algebraic method for obtaining exact solutions of nonlinear differential equations. We find suitable solutions of the LGHE in terms of elliptic Jacobi functions by applying transformations of basic functions. Exact solutions of the equations are obtained with the help of symbolic software (Maple) which allows the computation of equations with parameter constants. It is exposed that PIM is influential, suitable, and shortest and offers an exact solution of LGHE

KEYWORDS:

Optimality Approach | Landau-Ginzburg-Higgs Equation | Symbolic software | Convex Function

Dr. Mahwish Bano

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Dr. Mahwish Bano is an Assistant Professor in the Department of Mathematics, boasting an extensive academic background in the field. She holds a Ph.D. in Mathematics, an M.Phil in Mathematics, and an MSc in Mathematics, all from Quaid-i-Azam University in Islamabad. Additionally, she obtained her BSc in Mathematics and Statistics from Punjab University Lahore. With her strong educational foundation and expertise in mathematics, Dr. Bano contributes significantly to the department's teaching and research endeavors. Dr. Bano is known for her dedication to teaching and her ability to make complex mathematical concepts accessible to her students.

Research Areas

Steganography
Applied Cryptography
Block chains
Cyber Security
Fuzzy Logic

	TOTAL	FY 2023
PUBLICATIONS	15	01
CITATIONS	145	41

SGDS TARGETED ---------- 01

Dr. Mahwish Bano
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TITLE OF PAPER

Highly secured and quickest image encryption algorithm based on trigonometric chaotic map and S-box

SOFT COMPUTING

GERMANY

W

3.73 (2022)

2023-06-15

https://doi.org/10.1007/s00500-023-08493-2

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

The purpose of this research is to develop a highly secured non-breakable fastest cryptosystem. A significant number of image encryption plans have been proposed during the past years. By far, most such plans arrive at a high-security level; be that as it may, their moderate velocities due to their complex phenomenon make them of no utilization progressively applications. Motivated by this, we propose another proficient and quick image encryption plan subject to the trigonometric turbulent guide. In contrast with most current plans, we utilize this basic map to create just a couple of arbitrary rows and columns in the form of S-boxes. Besides, to, moreover, accelerate, we raise the handling unit from the pixel level to the line/segment level. Security of the new plan is acquired through a replacement stage organization, where we implemented around the shift of lines and segments to break the strong relation between adjoining pixels and non-repeating sequences. By then, we join the Exclusive-OR operation with modulo capacity to cover the pixel esteems and avoid any spilling of information. High-security tests and reenactment examinations have been done to display that the plan is extremely safe and particularly speedy for continuous picture preparation at 80 fps (frames per second). The present research has developed a cryptosystem based on Exclusive-OR with S-box (Substitution Box) and trigonometric chaotic map (TCM) of image matrices. High security is achieved due to the non-repeating sequence of the TCM. Earlier, the author has already presented the efficacy of the TCM combined with the S-Boxes.

KEYWORDS: Encryption | Image Encryption | S-box | Trigonometric Chaotic Map | XOR

DR. RABIL TABASSUM

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Dr. Rabil Tabassum, an Assistant Professor in the Department of Mathematics, brings a wealth of academic achievement and expertise to her role. She holds a PhD from HITEC University, Taxila, Pakistan, although the specific field of her doctoral research remains undisclosed. Additionally, she has earned an MS degree in Mathematical Modeling and Scientific Computing from Air University, Islamabad, Pakistan. Dr. Tabassum's research interests likely span across various mathematical disciplines, given her background in both theoretical and computational aspects of mathematics. With her advanced knowledge and experience, she actively contributes to the department's academic programs, mentoring students and fostering an environment of intellectual growth and discovery.

Research Areas

- Numerical schemes
- Oblique stagnation point flows
- Modeling and simulation of fluid flow problems
- Nano fluid flow problems

	TOTAL	FY 2023
PUBLICATIONS	21	02
CITATIONS	202	42

SGDS TARGETED ---------- 01

DR. RABIL TABASSUM
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TITLE OF PAPER

Crosswise Stream of Cu-H2O Nanofluid with Micro Rotation Effects: Heat Transfer Analysis

NANOMATERIALS

SWITZERLAND

W

5.3 (2022)

2023-01-24

https://doi.org/10.3390/nano13030471

SCAN ME

ABSTRACT

The present study focuses on a crosswise stream of liquid-holding nano-sized particles over an elongating (stretching) surface. Tiny particles of copper are added into base liquid (water). The influence of the micro rotation phenomenon is also considered. By means of appropriate transformations non-linear coupled ordinary differential equations are attained that govern the flow problem. The Runge–Kutta–Fehlberg scheme, together with the shooting method, is engaged to acquire results numerically. Micropolar coupling parameter, microelements concentration and nanoparticles volume fraction effects are examined over the profiles of velocity, temperature and micro-rotation. Moreover, heat flux and shear stress are computed against pertinent parameters and presented through bar graphs. Outcomes revealed that material constant has increasing effects on normal components of flow velocity; however, it decreasingly influences the tangential velocity, micro-rotation components and temperature profile. Temperature profile appeared to be higher for weak concentration of microelements. It is further noticed that normal velocity profile is higher in magnitude for the case of strong concentration (n = 0) of microelements, whereas tangential velocity profile is higher near the surface for the case of weak concentration (n = 0.5) of microelements. An increase of 3.74% in heat flux is observed when the volume fraction of nanoparticles is increased from 1 to 5%.

KEYWORDS:

Micro rotation | Copper Nano particles | Oblique Flow | Numerical Schemes

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TITLE OF PAPER

Influence of Hall current & Lorentz force with nonlinear thermal radiation in an inclined slip flow of couple stress fluid over a Riga plate

AIN SHAMS ENGINEERING JOURNAL

EGYPT

W

6.0 (2022)

2023-06-14

4 QUALITY EDUCATION

https://doi.org/10.1016/j.asej.2023.102319

SCAN ME

ABSTRACT

Partially ionised fluids subject to an external magnetic field results in a completely different dynamical behaviour. Very few studies are conducted to explore the fascinating properties of Hall current and Ion slip in fluid flows. Flow over a Riga plate with MHD Ion and Hall currents, nonlinear thermal radiation is still rare. We aim to analyse the inclined stagnation point slip flow of Couple Stress fluid over a stretched horizontal Riga plate to close this gap. The flow problem is modelled using Navier stokes theory along with energy conservation and then principal partial differential equations are converted into ordinary differential equations. The governed system is solved mathematically by numerical technique RK Fehlberg method. The behaviour of fluid is described through graphs including fluid's motion and energy. Local surface skin friction coefficients and local heat and mass flux at surface are the concerned physical magnitudes which are described through graphs and tables and are highly recommended in practical solicitations in numerous production plants and manufacturing workshops. Thermally radiative MHD flow with Ion Hall currents are broadly used in thermal controlling systems, spectro scopy, microchip technology, Magnetohydrodynamic energy conversion campaigns, exploration and expansion for high & low efficiency release, power-driven & power generation structures, MHD accelerations & thrusters, and drift regulator in hypersonic and automobiles.

KEYWORDS:

Couple Stress fluid | MHD Hall & Ion currents | Nonlinear thermal radiation | Stretched Riga plate | Slip Flow

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Dr. Asif Mehmood, serving as an Assistant Professor in the Department of Mathematics, brings a wealth of academic experience and expertise to his role. With advanced degrees including an M-Phil in Statistics and an MS in Mathematics from Quaid-i-Azam University, Islamabad, Dr. Mehmood possesses a solid foundation in both theoretical and applied aspects of mathematics. His research interests span various areas within mathematics and statistics, reflecting his multidisciplinary approach to problem-solving and analysis. As an educator, Dr. Mehmood is dedicated to nurturing students' mathematic

Research Areas

Numerical schemes

Nano fluid flow problems | Oblique stagnation point flows | Fluid Mechanics

	TOTAL	FY 2023
PUBLICATIONS	12	01
CITATIONS	53	42

SGDS TARGETED ---------- 02

DR. ASIF MEHMOOD
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TITLE OF PAPER

Features of the power-law fluid over cylinders in a channel via gap aspects: Galerkin finite element method (GFEM)-based study

FRONTIERS IN PHYSICS

SWITZERLAND

W

3.718 (2022)

2023-01-16

https://doi.org/10.3389/fphy.2022.1081130

SCAN ME

ABSTRACT

The goal of this investigation is to carry out a comprehensive analysis of hydrodynamic forces, with particular attention being paid to the power-law fluid flow across cylinders and presence gap considerations. With the assistance of the Galerkin finite element method (GFEM), the discretization of the two-dimensional system of non-linear partial differential equations was successfully completed. The research is carried out with a significant variance of the flow behavior index (n) from .3 to 1.7, gap aspects (Gp) from 0 .0 to .3, and fixed Reynolds number (Re) 20. To obtain an extremely accurate solution, first, a coarse hybrid computational mesh needs to be developed, and then, more refinement must take place. The selection of the best possible case can be determined by comparing flow patterns, coefficients of drag and lift, and cylinder gaps. The shear-thickening behavior of fluids has a substantially greater influence on the drag characteristics than either the Newtonian or the shear-thinning behavior of fluids do. In addition to this, the shear-thickening action causes the upstream obstacle's drag coefficient to increase because the gap spacing becomes more widespread.

KEYWORDS:

Power-law fluid | Hydrodynamic forces | Gap Spacing | Cylinders | GFEM

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Dr. Waqas Sarwar Abbasi, an accomplished Associate Professor in the Department of Mathematics, brings a wealth of academic expertise to his role. Holding a PhD in Mathematics from COMSATS Islamabad, Dr. Abbasi has a deep understanding of mathematical principles and their applications. With a strong research background, he actively contributes to the advancement of mathematical knowledge through his publications and scholarly work. Dr. Abbasi is committed to fostering a stimulating learning environment for students, utilizing innovative teaching methods to enhance their understanding of complex mathematical concepts. His dedication to excellence in education and research makes him a valuable asset to the department and the academic community as a whole.

Research Areas

- Optimization of flow induced forces
- Consistency and stability analysis
- Lattice Boltzmann method
- Oscillatory flows

	TOTAL	FY 2023
PUBLICATIONS	37	06
CITATIONS	365	55

SGDS TARGETED ---------- 01

Dr. Waqas Sarwar Abbasi
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TITLE OF PAPER

Passive control of wake flow behind a square cylinder using a flat plate

FRONTIERS IN PHYSICS

SWITZERLAND

W

3.718 (2022)

2023-04-03

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10.3389/fphy.2023.1132926

SCAN ME

ABSTRACT

In this study, control over the wake flow of a single square cylinder exercised by a flat plate attached to the rear side of the cylinder is analyzed numerically via the lattice Boltzmann method. The Reynolds number (Re) is fixed at 150, and the length of the plate is varied from 0.1 to 8.5. Three distinct flow modes are observed in this study: unsteady, transient, and steady flow in the cases of plate lengths (L) in the ranges $0.1 \leq L \leq 6.5$, $6.75 \leq L \leq 7.5$, and $7.75 \leq L \leq 8.5$, respectively. The streamlines exhibit different flow structures, termed hairpin-like, ellipse-like, and elongated bubble-like, at different values of L. Complete wake control is achieved at plate lengths beyond 7.75. This study reveals that the drag and lift coefficients exhibit unsteadiness at short plate lengths in early time steps, but as the plate length increases, unsteadiness slows down and eventually disappears, confirming the steady flow pattern. The mean drag coefficient (CDm), Strouhal number (St), and root-mean-square value of drag and lift coefficients (CDrms; CLrms) are reduced by maximums of 23.5%, 100%, 84.6%, and 99.5%, respectively, as a result of the presence of the plate.

KEYWORDS:

Flow | Cylinders | Laminar | Vortex shedding | Plate

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TITLE OF PAPER

Passive flow control around two side-by-side square cylinders using a control plate

MATHEMATICAL PROBLEMS IN ENGINEERING

UNITED STATES

X

NOT ANNOUNCED

2023-02-18

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

https://doi.org/10.1155/2023/1652994

SCAN ME

ABSTRACT

This article is concerned with the numerical analysis of reduction of fluid forces (drag and lift) and suppression of vortex shedding around two side-by-side square cylinders using the lattice Boltzmann method. For this purpose, a passive flow control methodology is adopted in which a flat plate (termed as the control plate) is placed at the upstream position of cylinders. The gap ratio () between the cylinders and the plate is varied from 0 to 4 while the height of the control plate is varied from 0.2 to 0.8 at fixed Reynolds number of 150. Different flow patterns are found in this study depending on the gap ratios and different heights of the control plate. These flow patterns are single bluff body flow, flip-flopping flow, and antiphase vortex shedding flow patterns. The narrow gap ratio (= 0.5) is found to have more impact in terms of force reduction and flow control as compared to larger gap ratios. This article also shows that the fluid flow parameters such as the mean drag coefficient, the Strouhal number, and rms values of drag and lift coefficients of both cylinders reduce considerably due to the control plate as compared to without the control plate. In this regard, it is found that the mean drag coefficient of upper cylinder reduces upto 45.94%, the Strouhal number of both cylinders reduces upto 18.66%, while a maximum reduction of 83.47% and 95.39% is observed in root-mean-square values of drag and lift coefficients of upper cylinder, respectively. Another important finding of this article is that the control plate does not suppress forces and control flow at all gap ratios and heights of control plate considered in this article. In some cases, the flow-induced forces were found to be increasing as compared to without the control plate, and this generally happened at higher gap ratios.

KEYWORDS:

Lattice Boltzmann method | Cylinder | Gap Ratio

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TITLE OF PAPER

Numerical analysis of hydrodynamic forces and fow modes variation around a cluster of four cylinders

JOURNAL OF THE BRAZILIAN SOCIETY OF MECHANICAL SCIENCES AND ENGINEERING

GERMANY

2.2 (2022)

W

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

2023-05-07

SCAN ME

https://doi.org/10.1007/s40430-023-04327-2

ABSTRACT

This work describes the results of numerical computations of fluid flow around four-square cylinders, forming a square cluster, using the lattice Boltzmann method. The purpose of this study is to analyze the transitions in flow modes and variations in hydrodynamic drag and lift forces under the effects of changing Reynolds number (Re) and gap ratio (G) between cylinders. Reynolds number is varied from 1 to 200 with two configurations of cylinders depending on the gap ratios: G = 0 (closely packed) and G = 7 (wide spacing). The results indicate three different flow modes, namely: the steady, transient and unsteady flow mode. At G = 0, the steady flow mode is found in the range $1 \leq Re \leq 39$, transient mode in the range $40 \leq Re \leq 54$ and unsteady mode for $55 \leq Re \leq 200$. While at G = 7, the flow remains steady for $1 \leq Re \leq 34$, becomes transient for $35 \leq Re \leq 37$ and completely unsteady in the range $38 \leq Re \leq 200$. The unsteady mode further exhibits different flow patterns categorized as the extended body vortex shedding, stable shielding flow, wiggling shielding flow and binary vortex shedding. Results indicate a strong influence of spacing values as well as a strong effect of both the proximity and wake interference on flow structure mechanism and flow induced hydrodynamic forces.

KEYWORDS:

Lattice Boltzmann method | Fluid Forces | Reynolds Number | Cylinder | Vorticity

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TITLE OF PAPER

Rectangular cylinder orientation and aspect ratio impact on the onset of vortex shedding

MATHEMATICS

SWITZERLAND

W

2.4 (2022)

2023-11-07

https://doi.org/10.3390/math11224571

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

Rectangular cylinders have the potential to provide valuable insights into the behavior of fluids in a variety of real-world applications. Keeping this in mind, the current study compares the behavior of fluid flow around rectangular cylinders with an aspect ratio (AR) of 1:2 or 2:1 under the effect of the Reynolds number (Re). The incompressible lattice Boltzmann method is used for numerical computations. It is found that the flow characteristics are highly influenced by changes in the aspect ratio compared to the Reynolds number. The flow exhibits three different regimes: Regime I (steady flow), Regime II (initial steady flow that becomes unsteady afterward), and Regime III (completely unsteady flow). In the case of the cylinder with an aspect ratio of 2:1, vortex generation, variation in drag, and the lift coefficient occur much earlier at very low Reynolds numbers compared to the cylinder with an aspect ratio of 1:2. For the cylinder with an aspect ratio of 1:2, the Reynolds number ranges for Regimes I, II, and III are $1 \leq Re \leq 120$, $121 \leq Re \leq 144$, and $145 \leq Re \leq 200$, respectively. For the cylinder with an aspect ratio of 2:1, the Reynolds number ranges for Regimes I, II, and III are $1 \leq Re \leq 24$, $25 \leq Re \leq 39$, and $40 \leq Re \leq 200$, respectively. The cylinder with an aspect ratio of 1:2 is found to have the ability to stabilize the incoming flow due to its extended after-body flatness. Generally, it has been found that a cylinder with an AR of 2:1 is subjected to higher pressures, higher drag forces, higher curvatures of cross-flow rotations, and higher amplitudes of flow-induced drag, as well as higher lift coefficients and lower shedding frequencies, compared to cylinders with an AR of 1:2. In Regime III, elliptic and vertically mounted airfoil-like flow structures are also observed in the wake of the cylinders.

KEYWORDS:

Lattice Boltzmann method | Reynolds Number | Rectangular Cylinder | Incompressible Flow

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TITLE OF PAPER

Control over vortex shedding and drag force on a circular obstacle using a pair of downstream splitter plates in a transient flow

MATHEMATICAL PROBLEMS IN ENGINEERING

UNITED STATES

X

NOT ANNOUNCED

2023-02-21

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

https://doi.org/10.3390/math11224571

SCAN ME

ABSTRACT

Te current work is an analysis of the laminar, two-dimensional, and transient fow over a circular cylinder with a two-branched splitter plate. For complex nonlinear governing equations, the fnite element method is used as a computational approach. Te objective of the current study is to determine the best conditions using geometrical characteristics along with the impact of Reynolds number Re.Te geometric parameters, α which is the angle of separation between the pair of splitter plates of length L and G/D which is the gap from diameter ratio of the splitter plate to cylinder diameter, are the controlling tools for the present study. Due to its little impact on fow characteristics, it was discovered that using a two-branched splitter plate in Reynolds numbers under 100 is not desirable. A complete vortex shedding has been achieved with α 0° and G/D 2 at Re100 and also the periodic behavior of velocity has been controlled. Te least drag force is observed at an angle of 30° between the two plates compared to another angle of 0°. It is not advised to use two splitter plates at angles more than 30° because this will not further contribute in the drag reduction. Since the gap to diameter ratio between the splitter plates and the cylinder increased up to a signifcant value, the overall control on hydrodynamic efects is achieved. It is concluded that the maximum drag reduction of 48% over the cylinder has taken place when the Re is 200, α is 30°, andG/D is 2.

KEYWORDS:

Reynolds Number | Cylinder | Splitter Plate

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TITLE OF PAPER

Numerical simulations of flow characteristics of two side-by-side square cylinders with connected splitters

COMPUTATIONAL PARTICLE MECHANICS

SWITZERLAND

W

3.3 (2022)

2023-03-08

https://doi.org/10.1007/s40571-023-00572-3

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

The influence of splitters on the flow structure mechanism around two side-by-side square cylinders with connected splitters at downstream position has been investigated in this article using lattice Boltzmann method at a fixed Reynolds number of 150. The normalized distance between the two cylinders is varied from 0.5 to 5 (e.g., 0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5), and the normalized length of the connected splitters is varied from 1 to 4 with an increment of 0.5 (e.g., 1, 1.5, 2, 2.5, 3, 3.5, 4). For varying spacing ratios and length of splitters, the flow structure has been characterized into single bluff body, flip-flopping, in-phase non-synchronized, and anti-phase synchronized flow pattern. Changing the length of the splitters influences force statistics like the mean drag coefficient and the Strouhal number, which are examined in this study as well. The mean drag coefficients and Strouhal numbers of two side-by-side square cylinders with splitters are compared to the data of two side-by-side square cylinders without splitters, and it is observed that these forces did not always reduce and that in some cases, accession rather than reduction may happen. The computational and experimental results of other researchers are compared to the current observed flow patterns, and good agreement is found.

KEYWORDS:

Reynolds Number | Cylinder | Flow Pattern | Side-by-side | Spacing Ratio

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Dr. Sadia Ahsan, an esteemed Associate Professor in the Department of Mathematics, brings a wealth of academic achievements and expertise to her role. With a PhD in Applied Mathematics from COMSATS University, Islamabad, and M-Phil and MSc degrees in Applied Mathematics from Quaid-i-Azam University, Islamabad, Dr. Ahsan demonstrates a strong foundation in her field. Her research interests likely encompass a diverse range of topics within applied mathematics, reflecting her dedication to advancing knowledge and solving real-world problems through mathematical modeling and analysis. As an Associate Professor, Dr. Ahsan is actively involved in both teaching and research, mentoring students and contributing to the academic community through her scholarly work.

Research Areas

Simulation of liquid chromatographic models

Mathematical modeling

	TOTAL	FY 2023
PUBLICATIONS	15	02
CITATIONS	87	21

SGDS TARGETED ---------- 01

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TITLE OF PAPER

Theoretical Analysis of a Nonequilibrium Transport Model of Two-Dimensional Nonisothermal Reactive Chromatography Accounting for Bi-Langmuir Isotherm

ACS-OMEGA

UNITED STATES

W

4.1 (2022)

2023-01-13

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

10.1021/acsomega.2c06317

SCAN ME

ABSTRACT

The current study investigates a nonequilibrium and nonlinear two-dimensional lumped kinetic transport model of nonisothermal reactive liquid chromatography, considering the Bi-Langmuir adsorption isotherm, heterogeneous reaction rates, radial and axial concentration variations, and the adsorption and reaction enthalpies. The mathematical models of packed bed chromatographic processes are expressed by a highly nonlinear system of coupled partial differential algebraic equations connecting the phenomena of convection, diffusion, and reaction, for mass and energy balance, the differential algebraic equations for mass balance in the solid phase, and the algebraical expressions for the adsorption isotherms and for the reaction rates. The nonlinearity of the reaction term and the adsorption isotherm preclude the derivation of an analytical solution for the model equations. For this reason, a semidiscrete, high-resolution, finite-volume technique is extended and employed in this study to obtain the numerical solution. Several consistency checks are performed to evaluate the model predictions and analyze the precision of the proposed numerical scheme. A number of heterogeneously catalyzed stoichiometric reactions are numerically simulated to examine reactor performance under the influence of temperature and Bi-Langmuir adsorption dynamics, the level of coupling between mass and energy fronts, and to study the effects of various critical parameters. The numerical results obtained are beneficial for optimal predictive control and process optimization during production and the development of methods for systematic design and fault detection of nonisothermal liquid chromatographic reactors, and hence constitute the first step to provide deeper insight into the overall evaluation of integrated reaction and separation processes.

KEYWORDS:

Chemical Reactions | Adsorption | Chromatography | Enthalpy | Separation Science

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TITLE OF PAPER

Theoretical Investigation of the Nonlinear General Rate Model with the Bi-Langmuir Adsorption Isotherm Using Core−Shell Adsorbents

ACS-OMEGA

UNITED STATES

W

4.1 (2022)

2023-03-08

https://doi.org/10.1021/acsomega.3c06023

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

SCAN ME

ABSTRACT

Core–shell particles enable the separation of intricate mixtures in a highly efficient and rapid manner. The porous shell particles increased the separation efficiency with expedited flow rates due to an abatement in the pore volume accessible for longitudinal diffusion and a decrease in diffusion path length. This study focuses on the numerical approximation of a nonlinear isothermal general rate model applied to stationary bed columns that are replete with inert core adsorbents featuring double adsorption sites. The transport of solute in heterogeneous porous media can be modeled by a nonlinear convection acquiescent partial differential equation system together with a specific nonlinear algebraic relation: the bi-Langmuir adsorption isotherm. Therefore, it is important to develop accurate and reliable numerical techniques that can perform accurate numerical simulations of these models. We extended and implemented a second-order, semidiscrete, high-resolution finite volume method to simulate the governing equations of the model. Single solute flow and multi component mixture flows are assessed through a series of numerical experiments to theoretically illustrate the repercussions of intraparticle diffusion, film mass resistance, axial dispersion, and the size of the inert core radius upon simulated elution curves. Standard performance criteria are assessed to determine the optimal core radius fraction range for optimizing the separation performance.

KEYWORDS:

High-performance liquid chromatography | Adsorption | Diffusion | Mixtures

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Dr. Tehreem, serving as an Assistant Professor in the Department of Mathematics, brings a wealth of academic achievements and expertise to her role. Her academic journey includes a rigorous pursuit of knowledge, culminating in a PhD in Mathematics from Quaid-i-Azam University (QAU), Pakistan. Prior to this, she completed an MS in Pure Mathematics and an MSc in Mathematics, also at QAU. Her foundational education includes a B.Sc. in Maths (A&B) and Statistics from the University of the Punjab, Pakistan. Dr. Tehreem's diverse educational background equips her with a comprehensive understanding of mathematical principles across various domains. With her advanced degrees and extensive academic training, she is well-prepared to engage students in complex mathematical concepts and methodologies.

Research Areas

Rough sets | Aggregation operators | Fuzzy Algebra | Application decision support system | Semihypergroups | Spherical fuzzy sets

	TOTAL	FY 2023
PUBLICATIONS	15	05
CITATIONS	99	02

SGDS TARGETED ---------- 01

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TITLE OF PAPER

Some Aczel–Alsina Power Aggregation Operators Based on Complex q-Rung Orthopair Fuzzy Set and Their Application in Multi-Attribute Group Decision-Making

IEEE ACCESS

UNITED STATES

W

3.9 (2022)

2023-10-12

10.1109/ACCESS.2023.3324067

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

The complex q-Rung orthopair fuzzy (Cq-ROF) sets are an extended version of the fuzzy sets and q-rung orthopair fuzzy circumstances. The Cq-ROF set carried extensive information about an object with two components: membership grade (MG) and non-membership grade (NMG). The MG and NMG enlarged the unit circle to a complex plane. The decision maker evaluates complex and complicated information more accurately considering the Cq-ROF domain. This article aims to present the importance of energy sources, and we discuss the application for the selection of a suitable company selection for dam construction. Dams are the most appropriate and cheap sources to produce electricity. Now, the day's importance of electricity is not ignorable. So, construct the multi-attribute group decision-making (MAGDM) methodology by utilizing Aczel-Alsina (AA) t-norm (TN) and t-conorm (TCN) operational laws with power aggregation operators (PAO) to solve the appropriate company selection problem for dam construction. PAO provides more accurate aggregation results between the several attributes. Finally, we define the Cq-ROF Aczel-Alsina power-weighted averaging (Cq-ROFAAPWA) and aggregation Cq-ROF Aczel-Alsina power-weighted geometric (Cq-ROFAAPWG) operators. Also, some fundamental axioms are discussed. By applying the proposed Cq-ROFAAPWA and Cq-ROFAAPWG operators, solve the real-life MAGDM problematic issue through a numerical example. For the superiority and applicability of proposed techniques, provide a comprehensive comparative analysis with other prevailing aggregation operators (AOs). In the end, provide solid conclusions.

KEYWORDS:

Decision Making | Dams | Fuzzy Sets | Data Aggregation | Rivers | Reliability

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TITLE OF PAPER

A Robust Decision-Making Approach for Supplier Selection Using Complex Picture Fuzzy Information Involving Prioritization of Attributes

IEEE ACCESS

UNITED STATES

W

3.9 (2022)

2023-08-23

4 QUALITY EDUCATION

10.1109/ACCESS.2023.3308030

SCAN ME

ABSTRACT

To reduce the risk and interruptions of the supply chain, some appropriate aggregation operators are used to deal with crucial challenges and to keep the support system reliable. In this article, we explore the notion of the complex picture fuzzy (CPF) set (CPFS), a wider framework of fuzzy and picture fuzzy sets. Some robust operations of the Aczel Alsina aggregation tools are characterized based on CPF information to overcome the impact of uncertain and imprecision situations. We also explain an innovative concept of the prioritized aggregation operators (AOs) in the light of CPF information. The theory of unknown weight vectors is used to develop some new approaches of the CPF environments, including CPF Aczel Alsina prioritized average (CPFAPA) and CPF Aczel Alsina priortized geometric (CPFAPG) operators. We also propose a class of new methodologies under considering CPF information, such as CPF Aczel Alsina prioritized weighted average (CPFAPWA) and CPF Aczel Alsina prioritized weighted geometric (CPFAPWG) operators. To illustrate the flexibility of our invented methodologies, some appropriate characteristics of the proposed approaches are also demonstrated. The multi-attribute decision-making (MADM) technique is used to evaluate many crucial real-life challenges. An algorithm for the MADM problem is also proposed to show the robustness of our invented approaches. By using proposed methodologies, we demonstrate an experimental case study to choose a sustainable supplier agnet based on CPF information. To show the practicability and consistency of our invented approaches by contrasting the results of existing approaches in the literature review with currently presented methodologies.

KEYWORDS:

Fuzzy Sets | T.V | Uncertainty | Decision Making | Supply Chains

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TITLE OF PAPER

Choquet Integral-Based Aczel–Alsina Aggregation Operators for Interval-Valued Intuitionistic Fuzzy Information and Their Application to Human Activity Recognition

SYMMETRY

SWITZERLAND

W

2.7 (2022)

2023-07-18

https://doi.org/10.3390/sym15071438

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

Human activity recognition (HAR) is the process of interpreting human activities with the help of electronic devices such as computer and machine version technology. Humans can be explained or clarified as gestures, behavior, and activities that are recorded by sensors. In this manuscript, we concentrate on studying the problem of HAR; for this, we use the proposed theory of Aczel and Alsina, such as Aczel–Alsina (AA) norms, and the derived theory of Choquet, such as the Choquet integral in the presence of Atanassov interval-valued intuitionistic fuzzy (AIVIF) set theory for evaluating the novel concept of AIVIF Choquet integral AA averaging (AIVIFC-IAAA), AIVIF Choquet integral AA ordered averaging (AIVIFC-IAAOA), AIVIF Choquet integral AA hybrid averaging (AIVIFC-IAAHA), AIVIF Choquet integral AA geometric (AIVIFC-IAAG), AIVIF Choquet integral AA ordered geometric (AIVIFC-IAAOG), and AIVIF Choquet integral AA hybrid geometric (AIVIFC-IAAHG) operators. Many essential characteristics of the presented techniques are shown, and we also identify their properties with some results. Additionally, we take advantage of the above techniques to produce a technique to evaluate the HAR multiattribute decision-making complications. We derive a functional model for HAR problems to justify the evaluated approaches and to demonstrate their supremacy and practicality. Finally, we conduct a comparison between the proposed and prevailing techniques for the legitimacy of the invented methodologies.

KEYWORDS:

Interval-valued intuitionistic fuzzy sets | Choquet integral | Decision Making | Aczel–Alsina

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TITLE OF PAPER

Prioritized aggregation operators based on Schweizer-Sklar t-norm for linear Diophantine fuzzy sets and their application in green sustainable chain

ALEXANDRIA ENGINEERING JOURNAL

EGYPT

W

6.8 (2022)

2023-10-25

https://doi.org/10.1016/j.aej.2023.09.033

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

Schweizer and Sklar invented the idea of the Schweizer-Sklar t-norm and Schweizer-Sklar t-conorm in 1960. Additionally, prioritized aggregation operators were derived by Yager in 2008. Further, linear Diophantine fuzzy (LDF) information is a most recent generalization of q-rung orthopair, Pythagorean, and intuitionistic fuzzy sets. In this article, we invent the Schweizer-Sklar operational laws for LDF set based on the Schweizer-Sklar t-norm and t-conorm. Furthermore, we expose the LDF Schweizer-Sklar prioritized averaging (LDFSSPoA) operator, LDF Schweizer-Sklar weighted prioritized averaging (LDFSSWPoA) operator, LDF Schweizer-Sklar prioritized geometric (LDFSSPoG) operator, LDF Schweizer-Sklar weighted prioritized geometric (LDFSSWPoG) operator and evaluate their fundamental properties and results. Moreover, after evaluation of these operators, we evaluate the problem of the green sustainable chain to enhance the worth of the invented theory. Finally, we show the supremacy and accuracy of the proposed theory with the help of a comparative analysis between the proposed techniques with some existing techniques.

KEYWORDS:

Linear Diophantine fuzzy sets | Prioritized aggregation operators | Schweizer-Sklar norms

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TITLE OF PAPER

Innovative Similarity Measures and TOPSIS Method for Multi-Stage Decision Analysis with Cubic Intuitionistic Fuzzy Information

JOURNAL OF INTELLIGENT & FUZZY SYSTEMS

NETHERLANDS

W

1.7 (2022)

2023-12-01

10.3233/JIFS-232085

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

This research work proposes a novel approach for multi stage decision analysis (MSDA) using innovative concepts of cubic intuitionistic fuzzy set (CIFS) theory. The paper introduces CIF-technique for order preference by similarity to ideal solution (TOPSIS) as a robust method for MSDA problems, particularly for the diagnosis of epilepsy disorders. To achieve this goal, new similarity measures (SMs) are developed for CIFS, including the Cosine angle between two vectors, a new distance measure, and the Cosine function, presented as three different types of Cosine similarity measures. The proposed CIF-TOPSIS approach is found to be suitable for precise value performance ratings and is expected to be a viable approach for case studies in the diagnosis of epilepsy disorders. The efficiency and reliability of the proposed MSDA methods is efficiently carried through numerical examples and comparative analysis.

KEYWORDS:

CIF information | CIF-TOPSIS | Similarity | Measures | Epilepsy Disorder

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Dr. Ambreen Khan, an Assistant Professor in the Department of Mathematics, holds a Ph.D. in Mathematics from Comsats University, Islamabad, along with an M.Phil. and M.Sc. in Mathematics from Quaid-e-Azam University, Islamabad. With her extensive educational background, Dr. Khan brings a wealth of knowledge and expertise to her role. Her academic journey demonstrates a strong commitment to advancing mathematical research and education. As an Assistant Professor, she is dedicated to fostering a conducive learning environment and inspiring students to excel in their mathematical studies.

Research Areas

High-Performance Liquid Chromatography | Computational Fluid Dynamics

	TOTAL	FY 2023
PUBLICATIONS	05	01
CITATIONS	14	--

SGDS TARGETED ---------- 01

DR. AMBREEN KHAN
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TITLE OF PAPER

Simulation of Fixed-Bed Chromatographic Processes Considering the Nonlinear Adsorption Isotherms

ACS-OMEGA

NETHERLANDS

W

4.1 (2022)

2023-09-03

https://doi.org/10.1021/acsomega.3c04641

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

This paper presents the numerical approximation of a nonlinear equilibrium-dispersive (ED) model of multicomponent mixtures for simulating single-column chromatographic processes. Using Danckwerts boundary conditions (DBCs), the ED is studied for both generalized and standard bi-Langmuir adsorption isotherms. Advection–diffusion partial differential equations are used to represent fixed-bed chromatographic processes. As the diffusion term is significantly weaker than the advection term, sophisticated numerical techniques must be applied for solving such model equations. In this study, the model equations are numerically solved by using the Runge–Kutta discontinuous Galerkin (RKDG) finite element method. The technique is designed to handle sudden changes (sharp discontinuities) in solutions and to produce highly accurate results. The method is tested with several case studies considering different parameters, and its results are compared with the high-resolution finite volume scheme. One-, two-, and three-component liquid chromatography elutions on fixed beds are among the case studies being considered. The dynamic model and its accompanying numerical case studies provide the initial step toward continuous monitoring, troubleshooting, and effectively controlling the chromatographic processes.

KEYWORDS:

Adsorption Chromatography Mixtures Isotherms Energy

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Dr. Kamran Usman, currently serving as an Assistant Professor in the Department of Mathematics, holds a Ph.D. in Mathematics from TU Dortmund, Germany, showcasing his expertise in advanced mathematical concepts. He further enriched his academic journey with an M.Phil. and M.Sc. in Mathematics from QAU, Islamabad. With a diverse educational background, Dr. Usman brings a wealth of knowledge and experience to his role, enabling him to effectively teach and mentor students in various mathematical disciplines. His research interests likely span across a wide range of mathematical areas, reflecting his passion for exploring complex mathematical theories and applications. As an Assistant Professor, Dr. Usman is dedicated to fostering a dynamic learning environment and nurturing the mathematical talents of his students, contributing to the academic excellence of the mathematics department.

Research Areas

- Solid-liquid two phase flows
- CFD and finite element method
- Collision models for particulate flows

	TOTAL	FY 2023
PUBLICATIONS	23	02
CITATIONS	210	39

SGDS TARGETED ---------- 01

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TITLE OF PAPER

Temporal features of thermal flows over a rotating cylinder in a channel: Multigrid based simulations

CASE STUDIES IN THERMAL ENGINEERING

UNITED KINGDOM

W

6.8 (2022)

2023-10-07

https://doi.org/10.1016/j.csite.2023.103602

SCAN ME

ABSTRACT

The purpose of this study is to simulate thermal flows via quasi-Newtonian modeling by employing Finite Element Methods (FEM), as well as Newton Multigrid Solvers (NMS). A heated rotating cylinder is exposed to an inflowing fluid stream in a channel to facilitate the thermal energy transfer in the fluid. The NMS may be more easily parallelized as a result of an excessive number of degrees of freedom. The discretization of a dimensionless system of partial differential equations that are to be solved over an extensive computational domain is accomplished by using the higher-order stable finite element pair. Temporal discretization is performed using a 2nd order Crank-Nicolson scheme. By applying the Newton method, the discretized nonlinear system of algebraic equations is transformed into a linear form. To compute the linearized subproblems that arise from each nonlinear sweep, a geometric multigrid approach has been put in place. The whole framework has been implemented in an open-source finite element software Featflow. It has been deduced that in a clockwise rotation of the cylinder, more fluid will move from above the cylinder, and when it is rotated in an anticlockwise direction, more fluid will move from bottom side of the cylinder. In addition to this, there is a correlation between an increase in the rotational parameter and a reduction in both the lift coefficient and drag coefficient. The benchmark values fits very well with the available data for certain special cases of this study.

KEYWORDS:

Flow and heat transfer | Rotating cylinder | Multigrid | Featflow | Unsteady Flow

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TITLE OF PAPER

Kinetics of suspended particles with different shapes interacting in a fluid channel

COMPUTATIONAL PARTICLE MECHANICS

SWITZERLAND

W

3.1 (2022)

2023-11-11

https://doi.org/10.1007/s40571-023-00684-w

SCAN ME

ABSTRACT

The behavior of a single and pair of solid particles in particulate flow has been analyzed for different particle shapes. Five different particle shapes are considered which include triangle, ellipse, rectangle, square and a star. Results for each shape are presented by varying their orientations (angle). Numerical experiments are performed for pairs of falling particles which are about to collide and interacting with each other subject to the hydrodynamic forces and the gravitational force. Current study helps in determining the trajectories of different shaped particles and interactions of particle pair with each other while settling in a fluid channel. The hydrodynamic forces acting on the surface of a single falling particle have been calculated using an explicit volume integral approach and the results for drag and lift coefficients have been presented. An Eulerian approach consisting of fixed background mesh has been used in this work. The interaction between particles and fluid has been determined using a fictitious boundary method (FBM). A collision model proposed by Glowinski et al. is used to handle particle-particle interactions. The simulations of particulate flow are carried out using a multigrid finite element solver FEATFLOW.

KEYWORDS:

Particulate Flow | Fictitious Boundary Method | Finite Element Method | Multigrid Method

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Research Areas

Numerical Optimization

Variational Inequalities

Dr. Saleem Ullah, an Assistant Professor in the Department of Mathematics, brings a wealth of knowledge and expertise to his role. With a PhD in Mathematics from COMSATS, Islamabad, Dr. Ullah's academic journey reflects his dedication to mastering complex mathematical concepts and methodologies. His research interests likely span a wide range of mathematical disciplines, from pure mathematics to applied areas, contributing to the department's diverse academic profile. As an Assistant Professor, Dr. Ullah is committed to fostering a stimulating learning environment for students, encouraging critical thinking and problem-solving skills essential for success in mathematics and related fields. His passion for mathematics is evident in his teaching approach, where he seeks to inspire and empower students to explore the depths of mathematical theory and its practical applications.

	TOTAL	FY 2023
PUBLICATIONS	22	04
CITATIONS	382	38

SGDS TARGETED ---------- 01

DR. SALEEM ULLAH
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TITLE OF PAPER

New Iterative Scheme Involving Self-Adaptive Method for Solving Mixed Variational Inequalities

AXIOMS

SWITZERLAND

X

2.0 (2022)

2023-03-20

4 QUALITY EDUCATION

https://doi.org/10.3390/axioms12030310

SCAN ME

ABSTRACT

The behavior of a single and pair of solid particles in particulate flow has been analyzed for different particle shapes. Five different particle shapes are considered which include triangle, ellipse, rectangle, square and a star. Results for each shape are presented by varying their orientations (angle). Numerical experiments are performed for pairs of falling particles which are about to collide and interacting with each other subject to the hydrodynamic forces and the gravitational force. Current study helps in determining the trajectories of different shaped particles and interactions of particle pair with each other while settling in a fluid channel. The hydrodynamic forces acting on the surface of a single falling particle have been calculated using an explicit volume integral approach and the results for drag and lift coefficients have been presented. An Eulerian approach consisting of fixed background mesh has been used in this work. The interaction between particles and fluid has been determined using a fictitious boundary method (FBM). A collision model proposed by Glowinski et al. is used to handle particle-particle interactions. The simulations of particulate flow are carried out using a multigrid finite element solver FEATFLOW.

KEYWORDS:

Particulate Flow | Fictitious Boundary Method | Finite Element Method | Multigrid Method

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TITLE OF PAPER

A novel iterative approach for resolving generalized variational inequalities

AIMS MATHEMATICS

UNITED STATES

W

2.29 (2022)

2023-03-06

10.3934/math.2023547

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

For figuring out general variational inequalities, we propose a novel and innovative iterative method. First, we demonstrate that the fixed point formulation and general vaiational inequality are equivalent. The fixed point formulation is used to formulate the explicit and implicit schemes. The general variational inequalities are the basis for the new algorithms. The newly developed algorithm is demonstrated numerically. For figuring out general variational inequalities, these new methods are innovative. Additionally, the convergence analysis is provided under certain favorable conditions.

KEYWORDS:

General variational inequalities | Iterative Methods | Fixed point problems | Convergence Criteria | Projection Iterative process

DR. SALEEM ULLAH
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TITLE OF PAPER

k-Fractional inequalities associated with a generalized convexity

AIMS MATHEMATICS

UNITED STATES

X

2.29 (2022)

2023-10-19

4 QUALITY EDUCATION

10.3934/math.20231460

SCAN ME

ABSTRACT

The aim of this paper is to present the bounds of k-fractional integrals containing the Mittag-Leffler function. For establishing these bounds, a generalized convexity namely strongly exponentially $(\alpha,h-m)-p$-convexity is utilized. The results of this article provide many new fractional inequalities for several types of fractional integrals and various kinds of convexities. Moreover, an identity is established which helps in proving a Hadamard type inequality.

KEYWORDS:

Convex Function | Strongly exponentially $(\alpha,h-m)-p$ Convex Function | Mittag-Leffler function | Generalized fractional integrals

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TITLE OF PAPER

Optimizing Waste Collection and Transportation in Islamabad: Efficient Vehicle Routing for Sustainable Waste Management

ENGINEERING PROCEEDINGS

-

Y

0.5 (2022)

2023-09-14

10.3934/math.20231460

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

The municipal solid waste management is key for preserving the environment, protecting public health, and maintaining public cleanliness. Apart from these benefits, developing countries are more attracted to such systems as they offer an economical solution for waste management. This article intends to present a cost-effective and optimized waste management solution for Islamabad, Pakistan. The key steps of this research include; 1. acquisition of data; 2. transformation of data into coordinate form; 3. modeling of optimized waste collection routes and transportation; 4. modification of the capacitated vehicle routing algorithm to yield the optimized vehicle routes. The simulations are performed in MATLAB 2017B. Trial results show the efficacy of the recommended method.

KEYWORDS:

Capacitated vehicle routing problem (CVRP) | Islamabad Waste Management | Vehicle Routing Problem

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Dr. Atif Hasan Soori is an Assistant Professor in the Department of Mathematics at Air University. He holds a Ph.D. in Fundamental Mathematics from East China Normal University, China. With a focus on research, Dr. Soori specializes in the development and application of mathematical methods in computational biology, particularly in mathematical modeling of infectious diseases. Additionally, his research extends to the application of algebra in coding theory and cryptography. He has been actively involved in developing algebraic codes using Ore polynomials and plans to explore this area further using semiring polynomials in the future. Dr. Soori's expertise and dedication contribute significantly to the field of mathematics education and research at Air University.

Research Areas

Algebraic Coding Theory | Algebraic Geometry | Cryptography | Algebra

	TOTAL	FY 2023
PUBLICATIONS	15	02
CITATIONS	155	37

SGDS TARGETED ---------- 01

Dr. Atif Hasan Soori
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TITLE OF PAPER

A dynamical study of diarrhea delayed epidemic model: application of mathematical biology in infectious diseases

EUROPEAN PHYSICAL JOURNAL PLUS

UNITED STATES

W

3.51 (2022)

2023-07-25

https://doi.org/10.1140/epjp/s13360-023-04287-5



SCAN ME

ABSTRACT

This manuscript presents the stability analysis of the diarrhea epidemic model with the effect of time delay. The delayed epidemic model for the disease of diarrhea contains four compartments, including susceptible, infective, treated, and recovered classes. The artificial delay parameter is designed with a saturated incidence rate of the model. The mathematical analysis is carried out by studying the equilibria, positivity, boundedness, and reproduction number for the said model. Furthermore, the sensitivity of the parameters is studied to strengthen the mathematical analysis. The diarrhea epidemic model's local and global stabilities are investigated using the acknowledged results of the Routh Hurwitz criterion and Lyapunov function, respectively. Moreover, the numerical results are obtained to support the analysis.

KEYWORDS:

Diarrhea epidemic model | Routh Hurwitz | Lyapunov function

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TITLE OF PAPER

A two-stage multi-step numerical scheme for mixed convective Williamson nanofluid flow over flat and oscillatory sheets

INTERNATIONAL JOURNAL OF MODERN PHYSICS B

SINGAPORE

X

1.77 (2022)

2023-09-18

3 GOOD HEALTH AND WELL-BEING

10.1142/S0217979224502989

SCAN ME

ABSTRACT

The novelty of this contribution is to propose an implicit numerical scheme for solving time-dependent boundary layer problems. The scheme is multi-step and consists of two stages. It is third-order accurate in time and constructed on three-time levels. For spatial discretization, a fourth-order compact scheme is adopted. The stability of the proposed scheme is analyzed for scalar linear partial differential equation (PDE) that shows its conditional stability. The convergence of the scheme is also provided for a system of time-dependent parabolic equations. Moreover, a mathematical model for heat and mass transfer of mixed convective Williamson nanofluid flow over flat and oscillatory sheets is modified with the characteristic of the Darcy–Forchheimer model. The results show that the temperature profile rises by developing thermophoresis and Brownian motion parameter values. Also, the proposed scheme is compared with an existing Crank–Nicolson method. It is found that the proposed scheme converges faster than the existing one for solving scalar linear PDE as well as the system of linear and nonlinear parabolic equations, which are dimensionless forms of governing equations of a flow phenomenon. The findings provided in this study can serve as a helpful guide for future investigations into fluid flow in closed-off industrial settings.

KEYWORDS:

Third order Scheme | Williamson Fluid | Stability | Convergence

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Research Areas

Chromatography

Fluid Mechanics

Dr. Seemab Bashir, an Assistant Professor in the Department of Mathematics, brings a wealth of academic expertise to the field. With a PhD in Applied Mathematics from COMSAT University Islamabad, Pakistan, and an M-Phil in Mathematics from Quaid-e-Azam University, Islamabad, Dr. Bashir has a strong foundation in both theoretical and applied mathematical principles. Her research interests likely span a broad spectrum, ranging from pure mathematical theory to practical applications in various fields. With her advanced academic qualifications and passion for mathematics, Dr. Bashir is dedicated to inspiring and educating students while contributing to the advancement of mathematical knowledge and its real-world implications.

	TOTAL	FY 2023
PUBLICATIONS	15	02
CITATIONS	247	37

SGDS TARGETED ---------- 02

Dr. Seemab Bashir
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TITLE OF PAPER

Insight into heterogeneous catalysis in a Ree-Eyring nanofluid flow influenced by a magnetic dipole with irreversibility analysis

JOURNAL OF CENTRAL SOUTH UNIVERSITY

UNITED STATES

W

2.3 (2022)

2023-08-08

https://doi.org/10.1007/s11771-023-5387-4



SCAN ME

ABSTRACT

The Ree-Eyring fluid is a type of non-Newtonian fluid with interesting characteristics of yield stress and shear thinning. Examples include emulsions, slurries, and polymer solutions. Keeping in view such amazing attributes of Ree-Eyring fluid, the aim of this analysis is to deliberate the flow of electrically conducting Ree-Eyring nanofluid due to a stretched surface under the impact of the magnetic dipole with surface-catalyzed reaction. Non-uniform heat generation/absorption and viscous dissipation effects are considered to analyze the heat transport phenomenon. The uniqueness of the envisaged model is enhanced by studying the entropy generation analysis with convective conditions at the surface of the boundary. Adequate transformations are employed to transform the system of partial differential equations (PDEs) into coupled ordinary differential equations (ODEs). An effective MATLAB bvp4c methodology is adopted for the numerical computations. Several graphs and numerically calculated results in tabular form are displayed. The outcomes revealed that the rate of irreversibility generation upsurges for the varied values of the Brinkman number. Also, upon minimizing the thermophoretic parameter, the temperature drops near the boundary whereas it upsurges far from the boundary. Surface catalysis parameter decreases the solutal profile. The endorsement of the foreseen model is also added to this study.

KEYWORDS:

Ree-Eyring nanofluid | Magnetic dipole | Entropy Generation | Heterogeneous catalysis

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TITLE OF PAPER

Analysis of Liquid Chromatography Considering a Linear Single-Component Heterogeneous-Type Reactive General Rate Model

ACS-OMEGA

NETHERLANDS

W

4.1 (2022)

2023-09-01

https://doi.org/10.1021/acsomega.3c01752

8 DECENT WORK AND ECONOMIC GROWTH

SCAN ME

ABSTRACT

This paper elaborates on the significance of liquid chromatography for a single-component reactive linear general rate model. The model equations consist of a set of two coupled partial differential equations, which include diffusion, interfacial mass transfer, axial dispersion, external and intraparticle pore diffusivity, and heterogeneous chemical reaction of the first order with two sets of boundary conditions. The model equations are solved by the Laplace transformation. The actual time domain solution is obtained by numerical Laplace inversion, as analytical inversion cannot be obtained. The graphical sketch of different physical parameters is presented to analyze the dynamics of the elution profiles. The result indicates that the chromatographic reactor works more efficiently on increasing the value of the heterogeneous-type first-order reaction. To check the analytical results, a second-order high-resolution finite volume scheme is used. Both results are in good agreement and indicate the correctness of the numerical scheme. The current work is also compared with the previously available numerical schemes, which shows that the proposed numerical scheme is better for elaborating the chromatographic reactor performance. A comparison table is also presented to compute error analysis and computational run time for analyzing the efficiency of the reactor. A graphical sketch of the numerical temporal moment analysis is also presented, which gives significant information about the performance and the shape of the concentration profiles.

KEYWORDS:

Chromatography | Colloids | Diffusion | Fluxes | Liquid Chromatography

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Research Areas

Fuzzy and rough sets theories

Decision making

Dr. Tanzeela Shaheen, an Assistant Professor in the Department of Mathematics, holds a Ph.D. in Mathematics from Quaid-i-Azam University, Islamabad. With her advanced academic background and expertise in the field, Dr. Shaheen contributes significantly to the department's academic endeavors. She brings a wealth of knowledge and experience to her role, fostering a dynamic learning environment for students and actively engaging in research activities. As an Assistant Professor, Dr. Shaheen is dedicated to promoting mathematical literacy and excellence among her students while pursuing her own scholarly interests in mathematics. Her contributions to teaching and research enhance the department's reputation for academic excellence and contribute to the development of future mathematicians and scholars.

	TOTAL	FY 2023
PUBLICATIONS	21	11
CITATIONS	283	93

SGDS TARGETED ---------- 08

DR. TANZEELA SHAHEEN
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TITLE OF PAPER

An Improved Intuitionistic Fuzzy Decision-Theoretic Rough Set Model and Its Application

AXIOMS

SWITZERLAND

X

2.0 (2022)

2023-10-24

10 REDUCED INEQUALITIES

https://doi.org/10.3390/axioms12111003

SCAN ME

ABSTRACT

The Decision-Theoretic Rough Set (DTRS) model represents a significant advancement in rough set theory, offering broader applicability and risk delineation rooted in Bayesian theory. This study presents an enhanced iteration, the Generalized Intuitionistic Decision-Theoretic Rough Set (GI-DTRS), merging DTRS principles with intuitionistic fuzzy sets to address conventional approach limitations. The GI-DTRS incorporates an error function tailored to hesitancy grades, aligning seamlessly with membership functions. Departing from norms, similarity classes are constructed based on measures rather than equivalence, effectively overcoming information system aggregation challenges. Empirical experimentation within the information technology domain demonstrates the practical efficacy of the proposed approach, highlighted through comprehensive comparative analysis against existing techniques. The article offers insights, recommendations, and future directions, solidifying its contribution to decision modeling and aggregation techniques.

KEYWORDS:

Intuitionistic fuzzy sets | Decision-theoretic fuzzy rough set model | Fluxes | Three-way decision model

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TITLE OF PAPER

A Novel Interval-Valued Decision Theoretic Rough Set Model with Intuitionistic Fuzzy Numbers Based on Power Aggregation Operators and Their Application in Medical Diagnosis

MATHEMATICS

SWITZERLAND

W

2.5 (2022)

2023-10-3

3 GOOD HEALTH AND WELL-BEING

https://doi.org/10.3390/math11194153

SCAN ME

ABSTRACT

Intuitionistic fuzzy information is a valuable tool in medical diagnosis due to its ability to handle imprecise data, but decision-making based on it can be challenging due to ambiguity. To address this, power aggregation operators can effectively combine various sources of information, such as expert opinions and patient data, for more accurate diagnoses. In this study, we propose a novel approach for the three-way decision model using decision-theoretic rough sets and power aggregation operators. This approach, essential in managing vague and uncertain medical data, utilizes interval-valued classes for intuitionistic fuzzy information, enhancing diagnosis accuracy. Intuitionistic fuzzy power weighted average (IFPWA) and intuitionistic fuzzy power weighted geometric (IFPWG) aggregation operators are employed to combine attribute values, enabling more accurate diagnoses. Bayesian decision rules, considering expected loss factors, are generated to transform outcomes into interval-valued classes for effective decision-making. Validated through a medical case study, this approach classifies participants based on symptoms into three regions, showcasing its efficacy in medical diagnosis. In conclusion, the proposed approach, integrating decision-theoretic rough sets and power aggregation operators, effectively manages vague and uncertain medical information, leading to timely and accurate diagnoses and improved patient outcomes.

KEYWORDS:

Intuitionistic fuzzy sets | Decision-theoretic rough set | Three-way decision | Efficiency

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TITLE OF PAPER

A Novel Framework of Pythagorean Fuzzy Dominance-Based Rough Sets and Analysis of Knowledge Reductions

IEEE ACCESS

UNITED STATES

W

3.9 (2022)

2023-10-2

4 QUALITY EDUCATION

10.1109/ACCESS.2023.3321134

SCAN ME

ABSTRACT

The dominance-based rough set approach is crucial to the advancement of rough set theory. It gives a more thorough and adaptable framework for knowledge acquisition, information analysis, and DM. It is a means of expressing discrepancies resulting from the examination of the domains with specified preference rankings of the characteristics. This work seeks to extend the Rough set approach utilizing dominance relationships to a Pythagorean fuzzy setting. The lower and upper approximations of Pythagorean fuzzy dominance-based rough set are determined by using the constructive technique. Next, we examine the basic characteristics for the rough estimations relying on the Pythagorean fuzzy dominance. By combining Approximate Distribution Reductions with a Pythagorean fuzzy dominance-based rough set, reductions are prescribed in four distinct manners. Additionally, the discernibility matrices and theorems connected to these reductions are produced. Such findings are all Pythagorean fuzzy generalizations or extensions of the conventional rough set method relying on dominance. Finally, the conceptual ideas are supported with a numerical example.

KEYWORDS:

Rough Sets | Probabilistic logic | Information systems | Estimation | Computational modeling | Technological advancements

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TITLE OF PAPER

A Novel Generalization of Q-Rung Orthopair Fuzzy Aczel Alsina Aggregation Operators and Their Application in Wireless Sensor Networks

SENSORS

SWITZERLAND

W

3.84 (2022)

2023-09-27

https://doi.org/10.3390/s23198105

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

Q-rung orthopair fuzzy sets have been proven to be highly effective at handling uncertain data and have gained importance in decision-making processes. Torra's hesitant fuzzy model, on the other hand, offers a more generalized approach to fuzzy sets. Both of these frameworks have demonstrated their efficiency in decision algorithms, with numerous scholars contributing established theories to this research domain. In this paper, recognizing the significance of these frameworks, we amalgamated their principles to create a novel model known as Q-rung orthopair hesitant fuzzy sets. Additionally, we undertook an exploration of Aczel–Alsina aggregation operators within this innovative context. This exploration resulted in the development of a series of aggregation operators, including Q-rung orthopair hesitant fuzzy Aczel–Alsina weighted average, Q-rung orthopair hesitant fuzzy Aczel–Alsina ordered weighted average, and Q-rung orthopair hesitant fuzzy Aczel–Alsina hybrid weighted average operators. Our research also involved a detailed analysis of the effects of two crucial parameters: λ, associated with Aczel–Alsina aggregation operators, and N, related to Q-rung orthopair hesitant fuzzy sets. These parameter variations were shown to have a profound impact on the ranking of alternatives, as visually depicted in the paper. Furthermore, we delved into the realm of Wireless Sensor Networks (WSN), a prominent and emerging network technology. Our paper comprehensively explored how our proposed model could be applied in the context of WSNs, particularly in the context of selecting the optimal gateway node, which holds significant importance for companies operating in this domain. In conclusion, we wrapped up the paper with the authors' suggestions and a comprehensive summary of our findings

KEYWORDS:

Q-rung orthopair hesitant fuzzy sets | Wireless Sensor Networks | Aczel–Alsina aggregation operators

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TITLE OF PAPER

Novel Fermatean Fuzzy Aczel–Alsina Model for Investment Strategy Selection

MATHEMATICS

SWITZERLAND

W

2.5 (2022)

2023-07-21

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

https://doi.org/10.3390/math11143211

SCAN ME

ABSTRACT

For choosing the optimal option for multiple issues, the multiattribute decision-making (MADM) technique within a Fermatean fuzzy environment is a well-known and significant method. This paper presents a novel superiority inferiority ranking (SIR) approach for Fermatean fuzzy sets in group decision-making using multicriteria to reduce investment risk. This approach aims to evaluate the strategies for selecting the optimal investment company. The SIR method is depicted, and its effectiveness in decision-making is explored. In this manuscript, we develop new types of *Aczel–Alsina* operations on the Fermatean fuzzy environment and Fermatean Fuzzy *Aczel–Alsina* (FF-AA) average aggregation operators, including their properties such as idempotency, monotonicity, and boundedness. Further, we introduce a Fermatean fuzzy *Aczel–Alsina* weighted average closeness coefficient (FF-AA-WA-$\mathscr{CC}$) aggregation operator (AO) based on the closeness coefficient for MAGDM issues. By utilizing the proposed technique, we solve a numerical example of an MAGDM problem. The results show that this approach is accurate and practical, and consistent with a realistic investment circumstance. A demonstration was created to emphasize the significance and credibility of this approach and assess its validity by comparing its outcomes with the established methods.

KEYWORDS:

Fermatean fuzzy Sets | *Aczel–Alsina* Operators | Multicriteria group decision-making

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TITLE OF PAPER

Incomplete Dominance-based Intuitionistic Fuzzy Rough Sets and their Application in Estimation of Inflation Rates in the Least Developed Countries

IEEE ACCESS

UNITED STATES

W

3.9 (2022)

2023-06-30

1 NO POVERTY

10.1109/ACCESS.2023.3290963

SCAN ME

ABSTRACT

Although the concepts of imprecision are captured by both rough sets and intuitionistic fuzzy sets, investigations combining these two ideas and their applications in incompletely ordered information systems are scarce. The semantics of many kinds of missing information still lacks consensus on a global level. Rule extraction is also an important task in a sort of decision system in which condition attributes are treated as intuitionistic fuzzy values and decision attributes are crisp ones. The main goal of this paper is to address semantic issues related to incomplete information. This paper contributes to the following aspects: First, four types of incomplete information are classified (i.e., “do-not-care value”, “partially-known value”, “class-specific value” and “non-applicable value”), and then a complete information system is introduced using novel semantics, followed by a ranking approach to create each object’s neighborhood using intuitionistic fuzzy values for condition attributes. Further, a dominance-based intuitionistic fuzzy decision table is proposed. Second, the lower and upper approximation sets of an object and crisp classes validated by decision attributes are determined by comparing their relationships. Third, the rule extraction approach is developed using the discernibility matrix and discernibility function to collect knowledge from existing dominance intuitionistic fuzzy decision tables. Finally, the provided approach is used for the estimation of inflation rates in LDCs with inadequate data.

KEYWORDS:

Rough Sets | Information systems | Semantics | Fuzzy Sets | Data Mining

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TITLE OF PAPER

An Innovative Decision Model Utilizing Intuitionistic Hesitant Fuzzy Aczel-Alsina Aggregation Operators and Its Application

MATHEMATICS

SWITZERLAND

W

2.5 (2022)

2023-06-19

https://doi.org/10.3390/math11122768

SCAN ME

ABSTRACT

The intuitionistic hesitant fuzzy set is a significant extension of the intuitionistic fuzzy set, specifically designed to address uncertain information in decision-making challenges. Aggregation operators play a fundamental role in combining intuitionistic hesitant fuzzy numbers into a unified component. This study aims to introduce two novel approaches. Firstly, we propose a three-way model for investors in the business domain, which utilizes interval-valued equivalence classes under the framework of intuitionistic hesitant fuzzy information. Secondly, we present a multiple-attribute decision-making (MADM) method using various aggregation operators for intuitionistic hesitant fuzzy sets (IHFSs). These operators include the IHF Aczel–Alsina average ($IHF\mathcal{A}\mathcal{A}A$) operator, the IHF Aczel–Alsina weighted average ($IHF\mathcal{A}\mathcal{A}WA_{\Psi}$) operator, and the IHF Aczel–Alsina ordered weighted average ($IHF\mathcal{A}\mathcal{A}OWA_{\Psi}$) operator and the IHF Aczel–Alsina hybrid average ($IHF\mathcal{A}\mathcal{A}HA_{\Psi}$) operators. We demonstrate the properties of idempotency, boundedness, and monotonicity for these newly established aggregation operators. Additionally, we provide a detailed technique for three-way decision-making using intuitionistic hesitant fuzzy Aczel–Alsina aggregation operators. Furthermore, we present a numerical case analysis to illustrate the pertinency and authority of the esteblished model for investment in business. In conclusion, we highlight that the developed approach is highly suitable for investment selection policies, and we anticipate its extension to other fuzzy information domains.

KEYWORDS:

Intuitionistic Fuzzy Sets | Hesitant Fuzzy Sets | Three Way Decision | Aczel–Alsina aggregation operators

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TITLE OF PAPER

Selection of investment policy using a novel three-way group decision model under intuitionistic hesitant fuzzy sets

APPLIED SCIENCES

SWITZERLAND

Y

2.7 (2022)

2023-03-30

https://doi.org/10.3390/app13074416

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

In today's dynamic business landscape, investment decision-making faces increasing complexity due to financial data's inherent uncertainty and ambiguity. Traditional models relying on crisp data are inadequate for these challenges. Fuzzy logic-based models offer a solution, yet struggle with complex, multi-criteria decision-making. To address this, we propose a novel three-way group decision model integrating decision-theoretic rough sets and intuitionistic hesitant fuzzy sets for selecting investment policies. Decision-theoretic rough set theory reduces information redundancy and inconsistency, while intuitionistic hesitant fuzzy sets allow decision makers to express hesitancy degrees. Novel aggregation operators under intuitionistic hesitant fuzzy sets, including IHF Aczel-Alsina average, weighted average, ordered weighted average, and hybrid average, effectively combine group opinions. These operators possess key properties such as idempotency and monotonicity, crucial for reliable decision-making. A mathematical model evaluates the proposed approach's effectiveness, demonstrating superior investment policy recommendations compared to existing methods. This research aids investors and financial analysts in making informed decisions, advancing their investment goals amidst uncertainty.

KEYWORDS:

Intuitionistic Fuzzy Sets | Decision Making | Three Way Decision | Aczel–Alsina aggregation operators

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TITLE OF PAPER

Multiple-Attribute Decision Making Based on Intuitionistic Hesitant Fuzzy Connection Set Environment

SYMMETRY

SWITZERLAND

W

2.7 (2022)

2023-03-22

https://doi.org/10.3390/sym15030778

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

SCAN ME

ABSTRACT

The intuitionistic hesitant fuzzy set (IHFS) is an enriched version of hesitant fuzzy sets (HFSs) that can cover both fuzzy sets (FSs) and intuitionistic fuzzy sets (IFSs). By assigning membership and non-membership grades as subsets of [0, 1], the IHFS can model and handle situations more proficiently. Another related theory is the theory of set pair analysis (SPA), which considers both certainties and uncertainties as a cohesive system and represents them from three aspects: identity, discrepancy, and contrary. In this article, we explore the suitability of combining the IHFS and SPA theories in multi-attribute decision making (MADM) and present the hybrid model named intuitionistic hesitant fuzzy connection number set (IHCS). To facilitate the design of a novel MADM algorithm, we first develop several averaging and geometric aggregation operators on IHCS. Finally, we highlight the benefits of our proposed work, including a comparative examination of the recommended models with a few current models to demonstrate the practicality of an ideal decision in practice. Additionally, we provide a graphical interpretation of the devised attempt to exhibit the consistency and efficiency of our approach.

KEYWORDS:

Intuitionistic Fuzzy Sets | Set Pair analysis theory | Hesitant Fuzzy Sets | Power Aggression operators | Connection number

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TITLE OF PAPER

An Improved Algorithm for Identification of Dominating Vertex Set in Intuitionistic Fuzzy Graphs

AXIOM

SWITZERLAND

X

2.0 (2022)

2023-03-09

https://doi.org/10.3390/axioms12030289

6 CLEAN WATER AND SANITATION

SCAN ME

ABSTRACT

In graph theory, a "dominating vertex set" is a subset of vertices in a graph such that every vertex in the graph is either a member of the subset or adjacent to a member of the subset. In other words, the vertices in the dominating set "dominate" the remaining vertices in the graph. Dominating vertex sets are important in graph theory because they can help us understand and analyze the behavior of a graph. For example, in network analysis, a set of dominant vertices may represent key nodes in a network that can influence the behavior of other nodes. Identifying dominant sets in a graph can also help in optimization problems, as it can help us find the minimum set of vertices that can control the entire graph. Now that there are theories about vagueness, it is important to define parallel ideas in vague structures, such as intuitionistic fuzzy graphs. This paper describes a better way to find dominating vertex sets (DVSs) in intuitive fuzzy graphs (IFGs). Even though there is already an algorithm for finding DVSs in IFGs, it has some problems. For example, it does not take into account the vertex volume, which has a direct effect on how DVSs are calculated. To address these limitations, we propose a new algorithm that can handle large-scale IFGs more efficiently. We show how effective and scalable the method is by comparing it to other methods and applying it to water flow. This work's contributions can be used in many areas, such as social network analysis, transportation planning, and telecommunications.

KEYWORDS: Intuitionistic Fuzzy Sets | Intuitionistic Fuzzy Graphs | Hesitant Fuzzy Sets | Minimal intuitionistic dominating vertex subset | Domination Sets

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TITLE OF PAPER

Aczel-Alsina-based aggregation operators for intuitionistic hesitant fuzzy set environment and their application to multiple attribute decision-making process

AIMS MATHEMATICS

UNITED STATES

X

2.0 (2022)

2023-05-25

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10.3934/math. 2023916

SCAN ME

ABSTRACT

An intuitionistic hesitant fuzzy set is an extension of the fuzzy set which deals with uncertain information and vague environments. Multiple-attribute decision-making problems (MADM) are one of the emerging topics and an aggregation operator plays a vital role in the aggregate of different preferences to a single number. The Aczel-Alsina norm operations are significant terms that handle the impreciseness and undetermined data. In this paper, we build some novel aggregation operators for the different pairs of the intuitionistic hesitant fuzzy sets (IHFSs), namely as Aczel-Alsina average and geometric operators. Several characteristics of the proposed operators are also described in detail. Based on these operators, a multi-attribute decision-making algorithm is stated to solve the decision-making problems. A numerical example has been taken to display and validate the approach. A feasibility and comparative analysis with existing studies are performed to show its superiority.

KEYWORDS:

Intuitionistic Fuzzy Sets | IHFSs | MADM | Aczel-Alsina aggression operations

Department of Physics

Departmental Overview

The Department of Physics offers degrees in Bachelors of Physics (BS), MS in Applied Physics and PhD Physics. The BS Physics (BS) program spreads over eight semesters (04 year) and requires successful completion of around 133 credit hours inclusive of courses, laboratory and final year project. MS and PhD programs initially focus on the fields of Materials Science, Nano Biotechnology, Renewable Energy and Computational Physics. The physicists and engineers via this program could join hands for producing qualified manpower for meeting the growing demand of professionals in these areas. Its graduates trained in the experimental, theoretical, and computational aspects of material science and technology are expected to be active members of interdisciplinary teams for identifying, formulating and solving problems of national interest. The MS degree program requires successful completion of 24 credit hours of course work and 6 credit hours of research work. Whereas, the PhD degree program requires successful completion of 18 credit hours of course work and 30 credit hours of research work.

The Department of Physics boasts a distinguished faculty committed to academic excellence. Led by Dr. Waqas Khalid, the Chair, the team includes Professors Dr. Asghari Maqsood and Dr. Muhammad Atif, along with Associate Professor Dr. Mozaffar Hussain and Assistant Professor Dr. Umer Rehman. Dr. Zulqurnain Ali, Associate Professors Dr. Rubina Nasir and Dr. Saima Rafique, and Assistant Professors Dr. Rizwan Akram and Dr. Shakeel Mahmood contribute significantly to research and teaching. The department is further enriched by dedicated lecturers: Mr. Azad Hussain, Mr. Naveed Ahmed, Ms. Maryam Bibi, Ms. Anam Ashraf, and Mr. Muhammad Waqas, all playing a vital role in nurturing a passion for physics among students. Together, they create a vibrant academic environment.

DEPARMENTAL PUBLICATIONS (2023)

13

SDGS TARGETED IN 2023





Dr. Asghari Maqsood, SI

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Dr. Asghari Maqsood, awarded with Sitara-e-Imtiaz, is a distinguished Professor in the Department of Physics at Air University. With over four decades of illustrious academic experience, Dr. Maqsood has made significant contributions to the field of physics. Currently serving as the Dean of the Faculty of Basic and Applied Sciences at Air University since July 2015, he has been instrumental in shaping the academic landscape and fostering excellence in scientific education. Prior to her tenure at Air University, Dr. Maqsood held positions of professorship at prestigious institutions including NUST School of Electrical Engineering & Computer Science and Quaid-e-Azam University of Engineering, Science & Technology (QUEST). Her academic journey began with a Bachelor of Science in Physics from Dhaka University, followed by a Master of Science from the University of the Punjab, Lahore. She furthered his studies with a Master of Science in Experimental Solid State Physics from the University of Oxford and completed his Doctor of Philosophy in Physics from the University of Gothenburg.

Research Areas

Material Sciences

Condensed Matter Physics | Solid State Physics | Experimental Physics

	TOTAL	FY 2023
PUBLICATIONS	298	03
CITATIONS	5948	498

SGDS TARGETED ---------- 01

Dr. Asghari Maqsood, SI

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TITLE OF PAPER

High-frequency dielectric response of 3d metal (Mn and Cu) doped zinc ferrite nanoparticles for microwave applications

MATERIALS TODAY COMMUNICATIONS

NETHERLANDS

W

3.66 (2022)

2023-03-01

https://doi.org/10.1016/j.mtcomm.2022.105042

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

In this work, 3d metal (Mn and Cu) doped zinc ferrite nanoparticles (Zn1-x Mx Fe2 O4, M = Mn and Cu, $0 \leq x \leq 0.10$) were prepared via the co-precipitation technique. The synthesized nano-particles were characterized by X-ray diffraction, FT-IR spectroscopy, SEM, EDX, and dielectric measurements. The dielectric response was investigated in the range of frequency from 10 MHz to 3 GHz and studied as a function of frequency. The findings show that the dielectric parameters initially decrease and then increase with the increase in frequency. The dielectric dispersion is explained in terms of Maxwell-Wagner polarization and Debye relaxation. The observed high-quality factor (Q) and low reflection loss for 3d metal (Mn and Cu) zinc ferrite nanoparticles showed that the nanoparticles are promising materials for microwave applications.

KEYWORDS:

Nano-Particles | Dielectric | EDX | Maxwell-Wagner polarization

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TITLE OF PAPER

Microstructural analysis, magnetic interactions, and electrical transportstudies of Zn1-xCuxFe2O4 nanoparticles

JOURNAL OF ALLOYS AND COMPOUNDS

NETHERLANDS

W

6.3 (2022)

2023-09-05

https://doi.org/10.1016/j.jallcom.2023.170172

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

This study investigates copper-doped zinc ferrite (Zn1−xCuxFe2O4) nanoparticles with varying Cu concentrations (x = 0.00, 0.03, 0.06, 0.10) synthesized via the co-precipitation method. Structural and morphological properties were analyzed using X-ray diffraction (XRD) and scanning electron microscopy (SEM), complemented by transmission electron microscopy (TEM) and BET technique for surface area analysis. The nanoparticles exhibited a cubic spinel structure, with lattice parameters decreasing as Cu content increased. Photoluminescence spectra indicated emission energies in the green region. Magnetic properties, analyzed with a vibrating sample magnetometer (VSM), showed the highest saturation magnetization (16.47 emu/g) with Cu+2 doping. Electrical properties were studied over a frequency range from 25 Hz to 2 MHz and temperatures from 300 K to 480 K, revealing an increase in electrical conductivity with temperature and Cu content, attributed to thermally activated mechanism and overlapping large polaron tunneling (OLPT). Activation energy obtained from DC conductivities ranged from 0.63–0.48 eV. Temperature-dependent drift mobility exhibited p-type semiconducting behavior. These findings suggest potential applications of Zn1−xCuxFe2O4 NPs in sensors, energy storage, and catalysis.

KEYWORDS:

Nano-Particles | Lattice Parameter | Activetion Energy | TEM

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TITLE OF PAPER

Temperature and frequency-dependent electrical transport studies of manganese-doped zinc ferrite nanoparticles

MATERIALS SCIENCE AND ENGINEERING: B

UNITED KINGDOM

W

3.4 (2022)

2023-10-15

4 QUALITY EDUCATION

doi.org/10.1016/j.mseb.2023.116615

SCAN ME

ABSTRACT

Manganese substituted zinc ferrite nanoparticles (Zn1-xMnxFe2O4, x ≤ 10%) have been successfully synthesized by the co-precipitation technique. The x-ray diffraction technique was employed to determine the structure of nano-ferrites at room temperature. SEM, EDX, and FT-IR spectroscopy were used to establish surface morphologies, elemental composition, and phase formation. Impedance spectral analysis was carried out at various temperature ranges varying from 600 K to 870 K in the frequency range of 100 Hz to 2 MHz. The dielectric parameter measurements were used to compute the types of conduction in the synthesized samples. The significance of the distribution of cations between A and B sites was analyzed using frequency and temperature-dependent ac electrical transport studies of the synthesized nanoparticles. The conduction mechanism, overlapping large polaron tunneling (OLPT) was found in Zn1-xMnxFe2O4 nano-ferrite system.

KEYWORDS:

Nano-Particles | Spectroscopy | Overlapping large polaron tunneling (OLPT)

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Dr. Shakeel Mahmood serves as an Assistant Professor in the Department of Physics, bringing a wealth of academic expertise to his role. He holds a Ph.D. in Particle Physics from COMSATS, Islamabad, Pakistan, showcasing his specialized knowledge in this field. Additionally, Dr. Mahmood obtained an M.Phil. and M.Sc. in Physics from Quaid-e-Azam University, Islamabad, Pakistan, further solidifying his foundation in the subject. With his extensive educational background, Dr. Mahmood contributes valuable insights and instruction to the department, fostering a dynamic learning environment for students. His dedication to research and teaching ensures that students benefit from the latest advancements and methodologies in the field of physics. Dr. Mahmood's expertise and commitment to academic excellence make him a valuable asset to the faculty and students alike.

Research Areas

Theoretical Physics | Relativity and Cosmology | Particle Physics

	TOTAL	FY 2023
PUBLICATIONS	17	03
CITATIONS	102	09
SGDS TARGETED ----------	01	

DR.SHAKEEL MAHMOOD
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TITLE OF PAPER

Room for new physics in electron and neutrino scattering

KUWAIT JOURNAL OF SCIENCE

KUWAIT

W

1.4 (2022)

2023-12-14

https://doi.org/10.1016/j.kjs.2023.12.004

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

να e ⟶ νβ e is studied to search new physics (NP). Both model dependent and independent approaches are used. Non-Standard Neutrino interactions (NSI) are invoked for the search of NP. The bounds on NSI parameter εε are found by using experimental data of LSND, LAMPF-E225, CHARM-II, BNL-COL and BNL-E734. The process is analyzed by using R parity violating Supersymmetry (/Rp SUSY) model which is proceeding through s-bosons exchange. Experimental data of LSND and LAMPF-E225 utilized for the identification of allowed region for non-universal SUSY parameters ∑*jλ*1*j*1. In the similar fashion, CHARM-II, BNL-COL and BNL-E734 data is exploited for the exploration of allowed and forbidden limits for Σκ|λ21k| and ∑|*jλ*21. We also establish relationship between MI and SUSY coupling parameters.

KEYWORDS:

New Physics (NP) | Model Independent (MI) | Supersymmetry (SUSY) | Super Symmetric Standard Model (MSSM)

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TITLE OF PAPER

Non-universality of leptons as a source of new physics from tree level interactions of pseudoscalar mesons

KUWAIT JOURNAL OF SCIENCE

KUWAIT

W

1.4 (2022)

2023-10-25

http://doi.org/10.1016/j.ijthermalsci.2023.108403

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

This article is based on the study of pure leptonic decays of charged pseudoscalar mesons taking non-universality into account. We calculate the branching ratios of the processes ±, K±, D±, $D8$±,B±. For the search for new physics (NP), we examine the discrepancies between theoretical and experimental results. The discrepancies are possibly due to massive neutrinos, processed massless in the Standard Model (SM), and universal coupling of leptons. We focus on the non-universality of leptons in order to find the bounds on Non-Standard Interaction (NSI) parameters εε. We use charge current like NSI and conclude that these decays could provide strong constraints on the NSI parameter.

KEYWORDS:

Meson decays | FCCC | Non-universality | NSI | Tree Level

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TITLE OF PAPER

Non universality of leptons as a source of new physics from non standard interactions of pseudoscalar mesons

KUWAIT JOURNAL OF SCIENCE

KUWAIT

W

1.4 (2022)

2023-10-04

https://doi.org/10.1016/j.kjs.2023.06.009

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

The rare decays, $K+\rightarrow\pi+\nu\nu^{-}$, $B+\rightarrow\pi+\nu\nu^{-}$ and $D+\rightarrow\pi+\nu\nu$, are investigated in the frame work of nonstandard neutrino interactions (NSI). It is claimed that NSI are arising due to non-universality of the leptons and bounds on NSI parameters $\epsilon ll'uL$ are determined. For this purpose, the branching ratios (Br) of these processes with in the Standard Model (SM) and beyond the SM are calculated by applying the non-universality of the leptons. The NSI in $K+\rightarrow\pi+\nu\nu^{-}$and $B+\rightarrow\pi+\nu\nu^{-}$ proceed with u quark in the loop while other two with d quark in the loop. Very stringent 1 σ level constrains on non-standard parameters (($\epsilon\tau\tau uL$ and $\epsilon\tau l'uL$) are pointed out

KEYWORDS:

Meson decays | FCNC | New Physics | Non-universality | NSI

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Dr. Saima Rafique is an Associate Professor in the Department of Physics, bringing a wealth of academic expertise to her role. She holds a Ph.D. in Physics, an M.Phil. in Physics, both from COMSATS Institute of Information Technology, Islamabad, and an MSc in Physics from Punjab University, Lahore, Pakistan. With a strong foundation in physics acquired from prestigious institutions, Dr. Rafique is equipped with advanced knowledge and skills in her field. Her research interests likely span a wide range of topics within physics, given her extensive academic background. As an Associate Professor, Dr. Rafique is likely deeply involved in teaching, research, and academic leadership within the department. Her qualifications and experience position her as a valuable asset to the academic community, contributing significantly to the advancement of knowledge and the education of future physicists.

Research Areas

Nanoparticle functionalization | Electrochemical Immunosensor | Material science

	TOTAL	FY 2023
PUBLICATIONS	27	03
CITATIONS	148	55

SGDS TARGETED ---------- 02

DR. SAIMA RAFIQUE
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TITLE OF PAPER

Fabrication of novel chitosan @Ag/CeO2 hybrid nanocomposites for the study of antibacterial activity

PHYSICA E: LOW-DIMENSIONAL SYSTEMS AND NANOSTRUCTURES

NETHERLANDS

W

3.3 (2022)

2023-09-02

https://doi.org/10.1016/j.physe.2023.115683



SCAN ME

ABSTRACT

Well crystalline cerium oxide nanostructures (CeO2 Ns), silver nanostructures (Ag Ns), silver/cerium oxide (Ag/CeO2), and chitosan-coated silver/cerium oxide (CS@Ag/CeO2) nanocomposites were synthesized using a simple solution combustion synthesis approach. The morphological and structural qualities of CeO2 Ns, Ag Ns, Ag/CeO2, and CS@Ag/CeO2 nanocomposites were studied by using different characterization techniques. These techniques included X-ray diffraction, Fourier transform infrared spectroscopy, scanning electron microscopy, and transmission electron microscopy. The antibacterial activity of novel and unique nanocomposite CS@Ag/CeO2 was examined against (Staphylococcus aureus (S. aureus) gram-positive) and (Escherichia coli (E. coli) gram-negative) bacterial strains. The data revealed that the minimum concentration to inhibit S. aureus growth was 2 µg.ml-1 with a zone of inhibition of 6 mm and for E. coli was 8 µg.ml-1 with a zone of inhibition of 10 mm, respectively. It showed that compared to CeO2 Ns, Ag Ns, and Ag/CeO2, the antibacterial capabilities of CS@Ag/CeO2 nanocomposites were clearly enhanced, and they might be employed for biomedical applications.

KEYWORDS:

Cerium oxide nanostructures | Combustion synthesis | Nano-Structures

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TITLE OF PAPER

In vitro anticancer activity and comparative green synthesis of ZnO/Ag nanoparticles by moringa oleifera, mentha piperita, and citrus lemon

CERAMICS INTERNATIONAL

UNITED KINGDOM

W

5.2 (2022)

2023-02-15

https://doi.org/10.1016/j.ceramint.2022.10.163





SCAN ME

ABSTRACT

This study proposes a simple, effective, and environmentally friendly approach for the synthesis of zinc oxide/silver nanoparticles (ZnO/Ag NPs) using three different plant extracts. The plants used in this study were moringa oleifera (MO), mentha piperita (MP), and citrus lemon (CL). Characterizations of ZnO/Ag NPs were done using ultraviolet–visible spectroscopy (UV vis), X-ray diffraction (XRD), field emission scanning electron microscope (FESEM) along with energy dispersive spectroscopy (EDX), and fourier transform infrared spectroscopy (FTIR). In accordance with size distribution findings, ZnO/Ag NPs synthesized with MO have a narrow size distribution, with the average particle size being 119 ± 36 nm. Among these three reducing agent MO act as the best reducing agent. Moreover, the anticancer activity of silver nanoparticles (Ag NPs), zinc oxide nanoparticles (ZnO NPs) and ZnO/Ag NPs synthesized with MO were demonstrated in human cervical cancer cells (HeLA). The results revealed that ZnO/Ag NPs demonstrate in vitro cell viability of 72%, 81%, and 84% using 2.5, 5, and 10 μgml−1of ZnO/Ag NPs for 24 h. While Ag NPs and ZnO NPs prepared with MO showed 50% and 60% cell viability using 2.5 μgml−1concentration for 24 h. This showed that the ZnO/Ag NPs act as a strong anticancer agent compared to Ag NPs and ZnO NPs. Overall, this research proposes a green synthesis approach for ZnO/Ag NPs with a wide range of potential uses, particularly in biomedicine.

KEYWORDS:

Nanoparticles | Fourier transform infrared spectroscopy (FTIR) | ZnO/Ag

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TITLE OF PAPER

Facile green microwave-assisted synthesis of silver-chitosan nanoparticle for antioxidant, antibacterial, and non-enzymatic biosensor for dopamine detection

JOURNAL OF MATERIALS RESEARCH

SWITZERLAND

W

2.7 (2022)

2023-03-22

DOI:10.1557/s43578-023-00972-4



SCAN ME

ABSTRACT

The green synthesized nanoparticles have multiple functions because of their ecological origin and biocompatibility. The silver-chitosan nanoparticles (Ag-CS NPs) were synthesized using the microwave-assisted green synthesis method at different reaction temperatures of 80–120 °C. The Ag-CS NPs nanoparticles have spherical shapes, with an average particle size between 19 and 49 nm. The in vitro antioxidant potential of Ag-CS NPs was examined, and the obtained IC50 value was 36.94 µgml−1. The antibacterial activity against Vibrio cholerae and Staphylococcus Aureus produced maximum inhibition zones of 11.1 mm and 9 mm, respectively. The biosensing ability of Ag-CS NPs for dopamine using differential pulse voltammetry (DPV) showed a LOD of 0.01 µM, with a linear range of 0.1–60 µM, which is less than 0.3–3 mM for detecting DA in urine samples. These findings demonstrate the potential of Ag-CS NPs as an inexpensive antioxidant and antibacterial agent. The proposed sensor was successfully applied to rapidly detect dopamine in human urine.

KEYWORDS:

Electrochemical Biosensor | Glassy Carbon Electrode | Silver-chitosan nanoparticles | Dopamine

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TITLE OF PAPER

PCGA: Polynomial collocation genetic algorithm for singular Poisson-Boltzmann equation arising in thermal explosions

HELIYON

NETHERLANDS

W

4.0 (2022)

2023-04-02

https://doi.org/10.1016/j.heliyon.2023.e15076

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

This study addresses heat generation in exothermic reactions leading to explosions, with a focus on the Frank-Kamenetzkii (FK) parameter ρ governing the balance between heat generation and conduction through vessel walls. To determine the critical FK value for explosion, a solution for the singular nonlinear Poisson-Boltzmann equation is sought, complicated by the lack of an analytical exact solution due to exponential nonlinearity and singularity, especially for non-integer shape factors (k). The study employs Polynomial Collocation Genetic Algorithm (PCGA) for solving the Poisson-Boltzmann equation, considering different configurations of genetic algorithm parameters. The method is applied to cylindrical (k = 1), parallelepiped (k = 0.438, 0.694), and arbitrary shape (k = 0.5) vessels. The PCGA results demonstrate good agreement with analytical results for k = 1, with minimal absolute error. Critical FK values are determined for different shape factors, showing convergence of the order of . The solution remains stable over independent runs with a fitness value variation of . Additional simulations validate the results through statistical error indices, confirming reliable optimum solution, accuracy, and stability.

KEYWORDS:

Frank-kamenetzkii parameter | Genetic algorithm | Non-linear thermal sources | Singular model

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TITLE OF PAPER

A simple, sensitive, label-free electrochemical immunosensor based on the chitosan-coated silver/cerium oxide (CS@Ag/CeO2) nanocomposites for the detection of alpha-fetoprotein (AFP)

NANOTECHNOLOGY

UNITED KINGDOM

W

3.5 (2022)

2023-04-13

DOI: 10.1088/1361-6528/acc8d8



SCAN ME

ABSTRACT

Metal oxide-based sensors have the benefit of inexpensive, quick response, and high sensitivity in detecting specific biological species. In this article, a simple electrochemical immunosensor was fabricated using antibody-chitosan coated silver/cerium oxide (Ab-CS@Ag/CeO2) nanocomposites on a gold electrode for sensitive alpha-fetoprotein (AFP) diagnosis in human serum samples. Successfully synthesis of AFP antibody-CS@Ag/CeO2conjugates was confirmed through Fourier transform infrared spectra of the prototype. The amine coupling bond chemistry was then used to immobilize the resultant conjugate on a gold electrode surface. It was observed that the interaction of the synthesized Ab-CS@Ag/CeO2nanocomposites with AFP prevented an electron transfer and reduced the voltammetric Fe(CN)63-/4-peak current, which was proportional to the amount of AFP. The linear ranges of AFP concentration were found from 10-12-10-6g.ml-1. The limit of detection was calculated using the calibration curve and came out to be 0.57 pg.ml-1. The designed label-free immunosensor successfully detected AFP in human serum samples. As a result, the resulting immunosensor is a promising sensor plate form for AFP detection and could be used in clinical bioanalysis.

KEYWORDS:

CS@Ag/CeO2 nanocomposites | Alpha-fetoprotein (AFP) | Cyclic voltammetry(CV) | Electrochemical impedance spectroscopy(EIS)

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TITLE OF PAPER

Comparative study of antibacterial properties and label-free electrochemical detection of digoxin based on MWCNTs-chitosan-Fe3O4/TiO2 composites

JOURNAL OF MATERIALS RESEARCH

SWITZERLAND

W

2.7 (2022)

2023-06-02

https://doi.org/10.1557/s43578-023-01059-w

3 GOOD HEALTH AND WELL-BEING

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

This study formulates biocomposites of chitosan, multi-walled carbon nanotubes (MWCNTs), iron oxide, and titanium oxide, characterizes their physical properties, and evaluates their antibacterial and biosensor toward digoxin detection. SEM was used to investigate morphology, whereas FTIR analysis peaks of active compounds of chitosan, MWCNTs, and composites were observed. The composites demonstrate strong antibacterial effects having ZOI 25, 12 mm; 35, 3 mm; and 43, 12 mm using M-chitosan, M-chitosan-TiO2, M-chitosan-Fe3O4 against S. aureus and A. baumannii, respectively. The composites were deposited on GCSPE to detect serum digoxin using CV. The biosensor can detect digoxin in the range 0–50 fM and 0–100 fM, with a detection limit of 0.8 pM and 0.03 pM for M-chitosan-TiO2 and M-chitosan-Fe3O4. The prepared biosensor showed strong specific recognition properties, ease, affordability of preparation, sensitive, and enable routine clinical analysis to identify trace amounts of digoxin. Thus, the present study developed composites with improved functional properties.

KEYWORDS:

MWCNTs-chitosan-Fe3O4 | MWCNTs-chitosan-TiO2 | Electrochemical properties | Antibacterial properties

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TITLE OF PAPER

Microstructural and magnetic properties of cobalt-substituted Nd32.5Dy1.0Fe64.2-xCoxNb1.0Al0.2B1.1 alloy prepared by ball milling technique

KUWAIT JOURNAL OF SCIENCE

KUWAIT

W

1.4 (2022)

2023-07-01

https://doi.org/10.1016/j.kjs.2023.01.009

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

Nanocrystalline Nd32.5Dy1.0Fe64.2-xCoxNb1.0Al0.2B1.1 (x = 0, 0.5, 1, 1.5, 2.0, & 2.5 wt %) alloys were prepared using arc melting method under argon atmosphere followed by ball milling. Results revealed that substitution of 2.0 wt% Co for Iron (Fe) is beneficial for excellent microstructure and magnetic properties in the series of studied alloys. Powder ball milling for 80 min provokes optimum magnetic properties such as saturation magnetization (Ms) of 71.11 emu/g, remanence magnetization (Mr) of 45.5 emu/g and coercivity (Hc) of 2.87 kOe. The Mr/Ms ratio for optimal magnetic powder was determined to be 0.63, which leads to a magnetic exchange coupling between the α-Fe soft and NdFeB hard grains. Magnetic analysis revealed substitution of Co above 2.0 wt% for Fe led to the drastic decline of both Ms and Mr due to non-ideal intermetallic phases in the microstructure. Results showed that optimization of parameters at the initial stage (casting and ball milling) is essential to obtain good, hard magnetic properties in the studied alloys.

KEYWORDS:

Arc-melting | Ball milling | Melt spinning | Magnetic properties | NdFeB magnets

Faculty of Social Sciences

Social Sciences are an incumbent part of any university's basic curriculum. Social Sciences help explain the world in which we live. They help students define their role in the society and develop their ability to think critically.

The Faculty of Social Sciences is one of the vibrant Faculties at Air University. Its PhD and MPhil/MS Linguistics and Literature, and BS English Programs are one of the most sought after programs in the country. English language courses and other subjects of Humanities are also taught to the undergraduate students of Engineering, Basic, and Administrative Sciences by our well-trained faculty.

The Faculty of Social Sciences also aims to extend its programs and courses in various fields for graduate and postgraduate students to combine academic rigor and research design with a strong focus on real-world experience, involving their engagement in the field of social sciences. The faculty is committed to put a strong focus on practical skills along with moral ethical code – to prepare students for an in-depth exploration of contemporary social issues with an intellectual and practical engagement in their chosen field. The faculty also desires to draw on its unique strengths in collaboration with other organizations to establish Social Sciences Research Centre, (SSRC) with the purpose to respond to the contemporary challenges of the society. The Faculty of Social Sciences encourages students to combine their theoretical knowledge of the contemporary world with an understanding of the cultural and political processes to participate more effectively in the formal and informal events.

FACULTY PUBLICATIONS (2023)

48

SDGS TARGETED



Department of English

Departmental Overview

The Department of English emerged as a pioneer in developing the critical thinking, academic writing and communication of the students.

The department's faculty was initially attached with the engineering departments, of the University for teaching English language and related functional courses. In 2010, with the approval of Higher Education Commission Pakistan, the department launched its much-anticipated M.Phil/MS Program in Linguistics and Literature. With this program, students from all over the country started applying for admission. With such progress, in 2012, the department launched its PhD program in Linguistics and Literature, which is still being successfully run. Keeping in line with this success, the department went further and efficaciously launched its BS Program in English in 2016.

In addition to these academic achievements, the department holds international conferences every year, which are based on different social, literary and linguistic issues. Moreover, over the years, the department has prolifically conducted various community work projects as well.

The Department of English is led by an accomplished faculty committed to academic excellence and research. Prof. Dr. Wasima Sheh, the Dean, provides visionary leadership, while Dr. Farzana Masroor serves as the Chair. The Associate Professors, Dr. Uzma Anjum, Dr. Sham Haidar, and Dr. Naveed ur Rehman Khan, contribute extensive expertise. The team also includes Assistant Professors Dr. Lauren Franklin, Dr. Maria Farooq Maan, Dr. Sadia Irshad, Dr. Huma Batool, Dr. S. Tehseen Zehra, Ms. Humera Faraz, Mr. Hamza Rehman, Dr. Fizza Farrukh, Ms. Mehwish Haider, and Ms. Sadaf Iftikhar. Complementing them are dedicated Lecturers, Ms. Sonya Kanwal, Mr. Adil Khan, Mr. Sareer Ahmed, Mr. Kashif Jamshaid, Mr. Ahmad Umar Ayaz, Ms. Sana Jehangir Mirza, and Ms. Afroz Ilyas, collectively fostering a dynamic academic environment.

DEPARMENTAL PUBLICATIONS (2023)

31

SDGS TARGETED IN 2023



DR. WASIMA SHEHZAD

PROFESSOR

DEPARTMENT OF ENGLISH

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Dr Wasima Shehzad is a Professor of English in the Department of English at Air University Islamabad. She is a chief editor of two research journals. She won and completed several HEC and foreign-funded research projects. Her areas of interest are Genre Studies, Corpus Linguistics, Language Planning, and Discourse Analysis.

Research Areas

Genre Studies | Discourse Studies | TESOL Teacher Training | Corpus Linguistics | Curriculum Designing

	TOTAL	FY 2023
PUBLICATIONS	72	04
CITATIONS	442	58

SGDS TARGETED ---------- 03

Dr. Wasima Shehzad
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TITLE OF PAPER

Dissecting Banking Websites: Genre Analysis of Design, Structure, and Organization for Customer-Centric Objectives

LINGUISTIC FORUM-A JOURNAL OF LINGUISTICS

PAKISTAN

Y

NOT ANNOUNCED

2023-09-30

https://doi.org/10.53057/linfo/2023.5.3.9

8 DECENT WORK AND ECONOMIC GROWTH

SCAN ME

ABSTRACT

This study addresses the genre analysis of banking websites, focusing on a gap in research within the context of Pakistani banks. Employing a qualitative approach and utilizing theoretical frameworks of Bhatia (1997) and Swales (1990), the analysis explores how these banks organize and design their websites to meet customer-centric and institutional goals. Five Pakistani banking websites were qualitatively examined, revealing strategies such as credibility appeals, visual cues, formal language, and interactive techniques aimed at enhancing reliability and user-friendliness. The findings provide valuable insights for banks to improve customer engagement, establish trust, and enhance user satisfaction. This study not only uncovers nuances in banking websites but also lays the groundwork for future research, offering a foundation for creating customer-centric websites aligned with institutional objectives.

KEYWORDS:

Banks | Websites | Credibility Appeals | Visual Cues | Positive Image

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TITLE OF PAPER

Genre Analysis of Promotional Text Messages

PAKISTAN JOURNAL OF SOCIETY, EDUCATION AND LANGUAGE (PJSEL)

Y

2023-06-20

https://jehanf.com/pjsel/index.php/journal/article/view/1182

PAKISTAN

NOT ANNOUNCED

8 DECENT WORK AND ECONOMIC GROWTH

SCAN ME

ABSTRACT

The virtual world, with its many ways of communication, illustrates the most visible way in which communicative behavior has altered. These new modalities offer a robust testing ground for language theories, including genre studies. Mobile technology in general and in particular SMS, has brought with it its own culture and language as has every other media. SMS is an asynchronous, text-based, electronically mediated interaction with a single channel. It represents the unpredictability and unconstrained nature of contemporary communication technology, which is evolving at breakneck pace. The aim of this study was to analyze the SMS sent by three companies providing goods and services. It included promotional SMSs of banks, clothing brands and transport services. Bhatia's (2005) Model was applied to see how this promotional genre conforms to the 10 moves given in the model. 15 SMSs from each category were selected. On the second level, their linguistic features were also studied to observe how tense, lexical choice and formality levels changed from one category to another. It was concluded that SMS being a new, brief and purely text-based promotional genre did not have all the 10 moves of Bhatia's Model. The study shows that being a very brief, textual and electronically mediated genre, SMS has its own genre structure which leaves out some moves from Bhatia Model that is applicable to multi-modal promotional genres.

KEYWORDS:

Bhatia Model | Genre studies | Move analysis | Promotional Genres | SMS analysis

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TITLE OF PAPER

Defining mission statements in higher education: Towards a genre perspective

HIGHER EDUCATION QUARTERLY

UNITED KINGDOM

W

2.2 (2022)

2023-01-01

https://doi.org/10.1111/hequ.12378

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

Mission statements provide educational institutions with the legitimacy to market and promote services through positive statements. This study applied genre analysis to examine the function of promotional rhetoric in top 100 international universities' mission statements. Bhatia's rhetorical moves of promotional genre was triangulated with Pearce and David's components for mission-writing. It was seen that international universities rely on promotional rhetorical moves to articulate their self-concept and services. Moreover, universities actively compete against each other to secure a high position in the international ranking lists. This ensures that they obtain additional incentives that help them gain economic stability and build a reputation. Promotional genre has become a practiced culture in the professional discourse community of higher education. Hence, there is a need to allow mission statements genre membership. We suggested a genre model that can be taught and used for writing mission statements. The most recurrent moves employed suggest that the communicative purpose for mission-writing used by international universities is to target the international market and build a public image to reel in more students, thereby improving their financial status while ensuring a good reputation. Based on this study, institutions can get guidance on designing and drafting effective mission statements.

KEYWORDS:

Discourse Community | Genre analysis | Systemic Functional Linguistics | International universities | Move analysis

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TITLE OF PAPER

Transformation in Pashto Language: An Analysis of Pashto Phrases and sentences

CARC RESEARCH IN SOCIAL SCIENCES

PAKISTAN

Y

NOT ANNOUNCED

2023-12-31

10 REDUCED INEQUALITIES

https://doi.org/10.58329/criss.v2i4.57

SCAN ME

ABSTRACT

Transformation is a significant area of research that focuses on how language users utilise knowledge of their language (s) to generate different surface structures from the same deep structure. The study aims to describe how different surface structures are generated from the deep structure and how Pashto speakers use different transformational processes to generate various constructions from a single construction. The study is qualitative in nature, using qualitative data and analysing it qualitatively. The untested sentences selected based on the researcher's general observation served as the study's data. Transformational Generative Grammar theory was used as a theoretical framework for the study. The study confirmed that the speakers of Pashto construct new structures from a deep structure using all the transformational processes found in English. The transformational processes the Pashto speakers use are merging, movement, insertion, and deletion. The study supports Noam Chomsky's view that languages share some universal features.

KEYWORDS:

Transformations | Movements | Merging | Insertion | Deletion

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Dr. Farzana Masroor is a Tenured Associate Professor with a Ph.D. in TESL, from University Technology Malaysia. She is currently working as Chair of the English Department, at Air University, Islamabad. She has published her research work in HEC-recognized local journals as well as well-reputed international journals with publishers such as Elsevier, John Benjamins, Taylor & Francis and Sage. She was bestowed with HEC's Best Research Paper Award in 2019. She has supervised a number of PhD and MPhil research in diverse fields such as Language and Power, Genre Analysis, Critical Discourse analysis, Language and Gender, Argumentation, Media Discourse, Social Media Discourse, Academic Discourse, Multimodal Discourse, Corpus Linguistics, and Stylistics.

Research Areas

Genre Analysis
EAP/ESP
Cross-Cultural Discourse
Argumentative Texts

	TOTAL	FY 2023
PUBLICATIONS	42	06
CITATIONS	188	58

SGDS TARGETED ---------- 03

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TITLE OF PAPER

Generic Moves in the Literature Review Section of PhD Dissertations

PAKISTANI JOURNAL OF HUMANITIES AND SOCIAL SCIENCES

PAKISTAN

Y

NOT ANNOUNCED

2023-06-27

4 QUALITY EDUCATION

https://doi.org/10.52131/pjhss.2023.1102.0519

SCAN ME

ABSTRACT

The dissertation/thesis, as an academic genre, has evolved over the past 30 years. While research on academic genres and thesis writing has been ongoing for more than two decades, there is a notable gap in the theorization of literature review (LR) writing as a distinct genre within theses, particularly in non-native English contexts. This study addresses this gap by examining the construction of literature reviews in theses within Pakistani academic settings. It explores how students organize this section, addressing potential problems and employing sound argumentation. Using move analysis in genre theory, the study investigates schematic patterns in the literature review, drawing data from fifteen doctoral theses in English linguistics. The methodology involves in-depth coding of LR chapters, incorporating insights from Kwan (2006) and Swales' CARS model (1990). The results indicate a dominant presence of Move 1, Move 2, and Move 4, with less frequent use of Move 3, highlighting the need for improved training in crafting argumentative LRs. The study proposes a revised model to address this shortcoming.

KEYWORDS:

Generic Moves | Swales | Aforementioned Moves

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TITLE OF PAPER

Higher Education and Marketization of Intellect University Admission Advertisement from a genre perspective

JOURNAL OF MARKETING FOR HIGHER EDUCATION

UNITED STATES

W

3.3 (2022)

2023-07-11

https://doi.org/10.1080/08841241.2023.2233914



SCAN ME

ABSTRACT

Recent years have witnessed drastic changes in the priorities of higher education institutions due to evolving market ethos in academia. The trend has resulted in the hybridization of academic genres, impacting their generic structure and communicative purpose/s. This paper uses discourse analysis to qualitatively investigate admission advertisements as a case to witness the impact of corporate culture and marketization on academic genres. The framework of genre analysis is used to uncover the rhetorical strategies for fulfilling informational and promotional goals. A ten-move structure establishes private universities as comparatively more promotional, while public universities increasingly follow the ways to capture the 'market'. The results affirm the adoption of corporate trends in Pakistani universities. The discovered move-patterning has implications for the higher education sector across the globe. The in-depth generic knowledge thus gained can act as a resource for the expert members of academia to bring reforms to the existing academic culture.

KEYWORDS:

University admission advertisements | Higher Education Institutions | Promotional discourse | Genre Analysis

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TITLE OF PAPER

The Chinese as an Emerging Linguistics Resource in the Educaton Sector of Pakistan

JOURNAL OF SOCIAL SCIENCES REVIEW

PAKISTAN

Y

NOT ANNOUNCED

2023-06-30

https://doi.org/10.54183/jssr.v3i2.252

SCAN ME

ABSTRACT

Investment in a new language restructures the prevailing ideologies through its potential as an alternative resource in the future linguistic market. This resource modifies the learners' existing identities with the imagined identities of this new resource. This study aims to explore how learning Chinese language evolved as an investment in the education sector of Pakistan to construct an alternative identity in the future linguistic market. Under thematic analysis, in-depth interviews of the stakeholders investing themselves at various levels in promoting, learning, and teaching Chinese were analyzed with power discourse as the theoretical framework. Darvin and Norton's (2015) model of investment was used as analysis model to investigate how investing learners in Chinese is reshaping their current identities in a structured habitus of shifting ideologies. The findings show a corresponding relationship of Chinese with a powerful economy, innovative technologies, and higher education. The major themes focus on the Chinese as an alternative resource with better employment potential in the future job market. This serves as a better alternative linguistic resource to improve the learners' social and economic capital. This is where learners of this language invest themselves at different levels of the education sector in Pakistan to re-envision their future identities.

KEYWORDS:

Linguistic resource | Imagined identity | Linguistic capital | Shifting ideologies

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TITLE OF PAPER

Projecting the Chinese Language as a power tool in the discourse on the China-Pakistan Economic Corridor (CPEC)

INTERNATIONAL JOURNAL OF STRATEGIC COMMUNICATION

UNITED STATES

W

1.38 (2022)

2023-04-27

https://doi.org/10.1080/1553118X.2023.2204295

10 REDUCED INEQUALITIES

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

SCAN ME

ABSTRACT

Vision and mission statements are mostly studied with a focus on organizations. This study moves away from the traditional approach by integrating the knowledge of vision/mission/value statements and ads on the same designated object. The organizations involved in the discourse of the China-Pakistan Economic Corridor (CPEC discourse) use an emergent hybrid strategy of utilizing vision/mission/value statements and ads under the umbrella of economic incentives to project the Chinese language as a power-tool in the context of CPEC. Based on the criteria/drivers for strategic communication in Zerfass et al. (2018), CPEC discourse fulfills 6/7 criteria/drivers mentioned: it is resource-driven, competition-driven, environment-driven, innovation-driven, engagement-driven, and operationally-driven. Power theory has been applied, linking the statements and ads to power discourse to find out how different themes carry an underlying power structure exercised by the stakeholders. Using thematic analysis supported by word-clouds as an analytical tool, this study finds out that the intended signaling-effect of the Chinese language in CPEC projects is received willingly by the consumers and stakeholders who, in turn, learn and promote this language as a skill/resource for employability and exertion of power. The findings show that these communicative sources can be utilized strategically in a competition-driven environment.

KEYWORDS:

Chinese Language | China-Pakistan Economic Corridor (CPEC) | Power structure

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TITLE OF PAPER

Functions of Modal Verbs in Pakistani Research Discourse of Economic as an Academic Discipline

PALARCH'S JOURNAL OF ARCHAEOLOGY OF EGYPT / EGYPTOLOGY

NETHERLANDS

Y

0.11 (2022)

2023-06-26

https://archives.palarch.nl/index.php/jae/article/view/11887

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

Academic discourse, particularly in argumentative writing, aims to construct compelling arguments by expressing certainty and doubt through the use of modal verbs. Modal verbs enhance language expressions, conveying opinions, obligations, and purposes while fostering a nuanced understanding of concepts. This study focuses on the persuasive nature of academic genres, specifically thesis writing in Economics. Analyzing five selected PhD theses, the research explores modal trends across key chapters—Introduction, Literature Review, Methodology, and Discussion—revealing an intersubjective trend in Pakistani academic research discourse within the social sciences. Utilizing the Systemic Functional Linguistics model of contextual analysis (Halliday & Matthiessen, 2014), the study examines modal trends, incorporating Halliday's (2014) modality choices model and a third category of inter-subjectivity by Lyons (1977) and Coates (1983). The results unveil modulation patterns of inclinations and obligation, extending beyond traditional modalization patterns in academic discourse. Modal verbs in economic research discourse play a crucial role in presenting writer propositions, implicitly inviting reader validation, and proposing future actions. The research sheds light on how economic researchers use modalities not only to convey facts but also to engage and sometimes influence readers regarding the writer's proposed stance.

KEYWORDS:

Modal Verbs | Economics Discourse | Academic discourse

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TITLE OF PAPER

Conceptualization of Ideas Through Novel Metaphors in Hayley Long's Sophie Someone

PAKISTAN JOURNAL OF SOCIETY, EDUCATION AND LANGUAGE (PJSEL)

PAKISTAN

Y

0.11 (2022)

2023-12-01

https://pjsel.jehanf.com/index.php/journal/article/view/1271

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

Metaphors for most of the traditional rhetoric have been defined as a figure of speech through which writers equate one thing with another by directly comparing them. Traditionally, metaphors have been analyzed on the linguistic plain, based on their literariness. However, lately, their relationship with human cognition has been established. This idea led to the postulation of the Theory of Cognitive/ Conceptual Metaphors which stated that metaphors are not simply linguistic but the cognitive conceptualization of one concept into another to make sense of it. Some conceptual metaphors are hard to map and create uniqueness in the literary work that they are being used in. Hayley Long's Sophie Someone makes use of novel conceptual metaphors to create a metaphorically deviant work that functions as codes, and by decoding them the complete meaning is drawn. The current study aimed to contextualize the selected novel conceptual metaphors from Sophie Someone, analyze these metaphors, and unpack the significance of the selected conceptual metaphors. The results show that the novel conceptual metaphors not only add to the style of the novel but also are closely related to Sophie's cognition and are in accordance with how Sophie sees the world from her standpoint. The findings of the study will be useful for later studies on the analysis of novel metaphors in different pieces of literature.

KEYWORDS:

Conceptual metaphor | Novel metaphors | Sophie Someone | Language and thought

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Sham Haidar is an associate professor of English at Air University, Islamabad, Pakistan. His research interests lie in sociolinguistics, equity in education, language and power, language ideology, English and globalization, and TESOL. He has published his research in several ISI indexed journals.

Research Areas

Sociolinguistics

Neolibelaism and English | Discourse Analysis

TESOL Sociolinguistics | Language and Power | Equiaty in education

	TOTAL	FY 2023
PUBLICATIONS	35	04
CITATIONS	502	171

SGDS TARGETED ---------- 03

DR. SHAM HAIDAR
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TITLE OF PAPER

Beyond market and language commodification: Contemplating social-market value and social-welfare concerns in language education policy and practice in Pakistan

LANGUAGE AND EDUCATION

UNITED KINGDOM

W

2.6 (2022)

2023-01-01

10.1080/09500782.2021.1955917



SCAN ME

ABSTRACT

This study demonstrates how stakeholders' treatment of English language as the sole marketable/saleable commodity in educational setting can have implications for multilingualism and existing linguistic diversity in Pakistan. Language commodification refers to the valuation of languages as marketable/saleable commodities and their relative exchange value. The findings are based on semi-structured interviews with students, teachers, and administrators/principals conducted in schools and a university during three different PhD studies. This article specifically focusses on how stakeholders view English-medium education and indigenous languages. Given stakeholders' diversity-as-a-problem orientations and rationalization of English-medium education, we propose an epistemic reorientation in which the social-market value of languages and social-welfare considerations may become the basis of language-in-education policy and planning. Social-market value refers to the role languages play as social, educational, cultural, and pedagogical resources for the larger social development, peace, and integration of society. The social-market perspective upholds multilingualism as a resource rather than as a problem. The article concludes that academic researchers could use intellectual activism as change agents to foster critical multilingual awareness and expose stakeholders to alternative competing epistemologies. This awareness is expected to help redress the conceptual myths and fallacies most stakeholders hold about the social potential of languages and multilingualism.

KEYWORDS:

Pakistan | Indigenous Language | Peace Building | Language Comodicfication

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TITLE OF PAPER

Peace and Well-being with Storytelling in TESOL: Exploring Peacebuilding through Voices of English Language Learners in Pakistan

TESOL JOURNAL

UNITED STATES

W

1.4 (2022)

2023-11-01

https://doi.org/10.1002/tesj.736



SCAN ME

ABSTRACT

Storytelling was initiated, as a part of this study, in a Pakistani university's undergraduate English class, involving reflective discussions and journal writing, to create a safe space where students can raise their voices. In a collectivist society, like Pakistan, society's norms are preferred over individual agencies (Bittles & Small, 2016), which instills a "collectivist obligation" amongst the youth to follow society's ways (Watkins & Biggs, 2001, p. 282) and, ultimately, distancing critical thinking (Feyyaz, 2016) and muting disparate voices (Zaidi et al., 2016). Moreover, Pakistan, being a developing country, faces multiple social and political issues (Droogan, 2018; Saeed et al., 2014) adding further pressure on these young minds. With technology, media, and education, the country's youth, especially majors in English, have started comparing their norms with modern values (Zubair, 2006) resulting in adjustment issues (Haidar, 2021a) which require attention and ventilation. In this study, the classroom was developed as a venting space for students whereby storytelling helped students in confronting conflicts, deliberating causes and navigating solutions. Data from journaling, discussions, and students' interviews revealed these practices were helpful in attaining mental peace, developing tolerance and building stronger human connections.

KEYWORDS:

Storytelling | TESOL | Peace Building | English Language Learners

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TITLE OF PAPER

English writing and social stratification in Pakistan: Exploring the role of SES on students' writing

READING & WRITING QUARTERLY

UNITED KINGDOM

W

1.9 (2022)

2023-09-01

10.1080/10573569.2022.2103056



SCAN ME

ABSTRACT

English writing skills are important in English language teaching due to the practice of evaluating students' academic performance in English writing both of other subjects' content knowledge and of English language itself. However, students come to high schools with baggage of varying linguistics competencies due to differential exposure to English at home and schools. Elite class students are exposed to social and linguistic capitals both in family and educational institutions, while ordinary people lack the resources to provide such exposure to their children. How such differential upbringing affect their performance in English language proficiency including English writing skills has been less focused earlier. This study explores the role of socioeconomic statuses on students' writing skills. Employing qualitative research methodology, this study elicited English writing samples of different text types from the Higher Secondary School (HSSC) level students. Along with writing tasks as sample, data were also collected through ten students' narratives and focus group discussion of five teachers. Data were analyzed inductively through coding, categories and themes. The study found that socioeconomic factors such as social capital that is environment, cultural capitals like mother and father education, reading books, watching English movies and cartoons and school contribute to the writing skills of the students. The study calls for giving more importance to the English writing skills in the English instructions.

KEYWORDS:

Writing skills | English language teaching | English

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TITLE OF PAPER

Online community development through social interaction — K-Pop Stan Twitter as a community of practice.

INTERACTIVE LEARNING ENVIRONMENTS

UNITED KINGDOM

W

5.4 (2022)

2023-03-01

4 QUALITY EDUCATION

10.1080/10494820.2020.1805773

SCAN ME

ABSTRACT

Fandom practices are often considered meaningless and unnecessary. However, the use of social media carries the potential for positive as well as negative impact on the users. Using the fraemwork of Community of Practice, the latest theory addressing community formation and interaction, as its theoretical framework, the study explores the Twitter-based online fandom community (called stan twitter) of Korean Pop-Music (K-Pop) as a working Community of Practice (CoP). This community is a hub of non-native English language speakers, who actively communicate on this platform. This qualitative study uses semi-structured interviews and participant observations to collect data, and analyzes it using qualitative coding. The study finds that the members of K-Pop Stan Twitter form interpersonal bonds, communicate regularly, and create a close-knit community where everyone contributes in their own capacity. The study suggests that the platform in question does possess the characteristics to be considered a working CoP, with the addition of another element that makes it unique: power hierarchy among the participants of the community, which is usually the least noticed aspect in research on online platforms. Moreover, it carries implications for inculcation of various positive qualities in the users.

KEYWORDS:

Korean (Kpop) Music | Social Media and Community of Practice | Community of Practice | Online Twitter Fandom

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Dr. Uzma Anjum, currently an associate professor at Air University, Islamabad, claims over 15 years of experience in linguistic research on Pakistan's minority languages. Her doctoral dissertation focused on the Tarawara community, delving into language shift among Mankiyali speakers. She played a crucial role in the National Science Foundation Language Documentation Project on Mankiyali, managing it locally and receiving training at the University of North Texas. With 30 articles published, 7 WoS H-index, and numerous workshops organized, she continues to contribute significantly to linguistic research and preservation in Pakistan.

Research Areas

Morphology

Phonetics & Phonology | Sociolinguistics | Pragmatics | Core Linguistics

	TOTAL	FY 2023
PUBLICATIONS	38	04
CITATIONS	140	26

SGDS TARGETED ---------- 02

DR. UZMA ANJUM
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TITLE OF PAPER

The Use of English Loanwords in Balti Language

PJSEL

PAKISTAN

Y

NOT ANNOUNCED

2023-12-02

4 QUALITY EDUCATION

10 REDUCED INEQUALITIES

https://jehanf.com/pjsel/index.php/journal/article/view/1279

SCAN ME

ABSTRACT

This study aims to investigate the English loan words in Balti with a focus on number assignment. This study also sheds light on phonological and semantic changes that the loan words undergo and the factors affecting the linguistic changes. The analysis is based on 35 nominal loanwords culled from 3 local radio podcasts in Balti. The result showed that most of the English loan words were pluralized attaching the Balti plural markers {kʊn} and {ʊŋ} following the phonological conditioned rule in order not to violate the phonological and morphological system of the native language. However, only one instance of an irregular plural pattern of English loan word in Balti was found that the loan word /sɪnəmə/ "cinema" ends in a vowel sound /ə/. Still, it does not follow the phonologically conditioned plural rule of Balti and takes the plural marker /kʊn/ instead of /ʊŋ/. The finding also revealed that the English loanwords have also undergone phonological and morphological changes in Balti to fit into the linguistic system of the native. Moreover, we can determine that the only reason for the adaptation of English loanwords in Balti is due to the lack of corresponding terms in the Balti language. Based on the research outcomes, it has significant pedagogical implications for the ESL teachers who are serving in Baltistan. The study concludes with a recommendation for further research on loanwords concerning the plural formation of Urdu loanwords in Balti.

KEYWORDS:

English Loanwords | Balti | Lexical Borrowing | Plural Marker | Number

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TITLE OF PAPER

A DESCRIPTIVE ANALYSIS OF ENGLISH VOWEL SOUNDS BY L1 PAHARI LEARNERS

PJSEL

PAKISTAN

Y

NOT ANNOUNCED

2023-06-01

https://jehanf.com/pjsel/index.php/journal/article/view/1119



SCAN ME

ABSTRACT

This study aimed to analyze the acoustic characteristics of English vowels produced by Pahari L1 learners of Pakistani English (PakE) from Murree and Islamabad. The researchers used PRAAT version 6.1.04 to measure the F1 and F2 formants and duration of ten monosyllabic words with the CVC structure in the 'hVd' context. They compared the results with those of native British English speakers and analyzed the data using t-tests in SPSS and R software for graphical representation. The findings revealed significant differences between PakE and British English recordings, confirming that PakE is a distinct and rule-governed variety of English with its own phonology. The results have practical implications for PakE language teachers to improve their students' pronunciation skills and for designing speech technologies that aim to improve the accuracy of PakE pronunciation. The study contributes to the phonological system of PakE and can be helpful for future research in the field of phonetics and speech technologies, particularly for Asian English varieties.

KEYWORDS:

Acoustics | Formants | Euclidean | PRAAT | Vowel duration and quality | R representation

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TITLE OF PAPER

Voice Onset Time of Mankiyali Language: An Acoustic Analysis

GEMA ONLINE JOURNAL OF LANGUAGE STUDIES

MALAYSIA

W

1.03 (2023)

2023-05-01

4 QUALITY EDUCATION

10 REDUCED INEQUALITIES

http://doi.org/10.17576/gema-2023-2302-14

SCAN ME

ABSTRACT

The endangered Indo-Aryan language Mankiyali, spoken in northern Pakistan, lacks linguistic documentation and necessitates research. This study explores the Voice Onset Time (VOT) values of Mankiyali's stop consonants to determine the duration of sound release, characterized as negative, positive, and zero VOTs. The investigation aims to identify the laryngeal categories present in the language. Using a mixed methods approach, data were collected from five native male speakers via the Zoom H6 platform. The study employed the theoretical framework of Fant's (1970) source filter model and analyzed each phoneme using PRAAT software. Twenty-five tokens of a single phoneme were recorded across the five speakers. The results reveal that Mankiyali encompasses three laryngeal categories: voiceless unaspirated (VLUA) stops, voiceless aspirated (VLA) stops, and voiced unaspirated (VDUA) stops. The study highlights significant differences in VOTs based on place of articulation and phonation. In terms of phonation, the VLUA bilabial stop /p/, alveolar stop /t/, and velar stop /k/ exhibit shorter voicing lag compared to their VLA counterparts /pʰ, tʰ, kʰ/. All VLUA and VLA stops display +VOT values, while all VDUA stops exhibit -VOT values. Regarding place of articulation, the bilabial /p/ demonstrates a longer voicing lag than the alveolar /t/ but a shorter lag than the velar /k/. Additionally, the results indicate similarities in voicing lag among the VDUA stops /b, d, ɡ/. This study offers valuable insights into the phonetic and phonological aspects of Mankiyali and holds potential significance for the language's preservation.

KEYWORDS:

VOT | Indo-Aryan | Place of articulation | Aspiration | Acoustic Analysis

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TITLE OF PAPER

Tone Recognition of Pahari Language

JOURNAL OF COMMUNICATION AND CULTURAL TRENDS

PAKISTAN

Y

NOT ANNOUNCED

2023-09-01

4 QUALITY EDUCATION

10 REDUCED INEQUALITIES

10.32350/jcct.52.04

SCAN ME

ABSTRACT

Pahari is an under-resourced, endangered, and undocumented tonal language, spoken in Pakistan Administered State of the Azad Jammu and Kashmir (AJK). Preliminary studies have established the notion, that the Pahari language has three discrete level tones; high, mid, and low. In the current study, tone distribution in monosyllabic words is measured with 45 iterations consisting of 15 high, 15 mid, and 15 low tones, collected from 5 native speakers of Pahari language. An attempt has been made to automatically recognize the phonologically contrastive tones in Pahari language, by using the Random Forest and the Linear Mixed Effect Models with f0 as a preliminary feature along with duration, intensity, F1, F3, and (Cepstral Peak Prominence) CPP. The results showed that the overall accuracy of the Random Forest was higher than the accuracy of the linear mixed effect model. Additionally, the mean f0 played a highly significant role in the prediction of tone while duration, intensity, F1, F3, and CPP played a less significant role

KEYWORDS:

Random forest | Linear mixed effect models | Fundamental frequency | Cepstral peak prominence

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Dr. Naveed-Ur-Rehman Khattak is currently working as an Associate Professor at Air University Islamabad Pakistan. He has been teaching English for Specific Purposes (ESP), and Linguistics courses to graduate and Post-graduate level since 2008. Along with teaching and research supervision, he has also been actively engaged in administrative, managerial, and student counseling as an academic in-charge of BS, M.Phil., and Ph.D. His research interests encompass English for Academic Purposes (EAP), Sociolinguistics, Psycholinguistics, Semantics, Pragmatics, Peace Linguistics, Ecolinguistics, World englishes, Curriculum development, and Teaching Materials Designing

Research Areas

Psycholinguistics | Sociolinguistics | Syntax, Semantics | Historical Linguistics | World Englishes | Curriculum development and Teaching materials designing

	TOTAL	FY 2023
PUBLICATIONS	14	02
CITATIONS	12	3

SGDS TARGETED ---------- 02

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TITLE OF PAPER

Generic Patterns in Discussion Sections: A Corpus-Based Analysis of Academic Moves Structures in Dissertations in Pakistan

CORPORUM: JOURNAL OF CORPUS LINGUISTICS

PAKISTAN

Y

NOT ANNOUNCED

2023-12-25

4 QUALITY EDUCATION

https://journals.au.edu.pk/ojscrc/index.php/crc/article/view/258

SCAN ME

ABSTRACT

Writing discussion in dissertation, though has textual generics, yet is influenced by the context, research domain, and writers' linguistic competence. In Pakistan, graduates, despite being non-native English writers, know about the generics of writing discussion; yet, their mother tongue and cultural context influence their writing. In order to compare and contrast the generics of writing discussion, and identify the commonalities and variation; this research aims to explore the academic move-structures in the discussion sections. By adopting Corpus-based research tools corpora of M.Phil. and Ph.D. dissertations from the field of English Linguistics and Education were compiled. Based on Yang and Allison (2003) model the data was analyzed through Antmover (text structure analyzer software). Different types of moves in discussion section, such as obligatory, conventional, and optional moves, were analyzed in accordance with the strategies of Kanoksilapatham (2005). The commonalities and contrast in the moves of writing discussion has enabled the researcher in identifying 5-moves generic pattern that can serve as a guideline for novice researchers in writing discussion of the dissertations in the fields of English Linguistics and Education in Pakistan. Furthermore, paying attention to the ways in which these disciplines use specific structural moves would facilitate researchers to become more aware of the need for employing these structural moves in properly discussing the data and results in research.

KEYWORDS:

Discussion Sections | Dissertations | Generic Patterns | Structural Moves

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TITLE OF PAPER

English as a Linguistic Capital: The Lexical Impact of English on Pashtu Speech in Pakistan

EREVNA JOURNAL OF LINGUISTICS AND LITERATURE

PAKISTAN

Y

NOT ANNOUNCED

2023-06-03

10 REDUCED INEQUALITIES

https://journals.au.edu.pk/ojserevna/index.php/erevna/article/view/274

SCAN ME

ABSTRACT

English language enjoys a privileged position in Pakistan. It is the official language, medium of instruction in education and is used in daily formal and informal interactions. The local languages in Pakistan have registered an influence of English penetration in almost all linguistic domains. The study is undertaken to ascertain the influence of English over Pashtu that is the local language of the province Khyber Pakhtunkhwa in Pakistan. By employing mixed methods research, the concept of English as a linguistic capital has been explored by identifying the lexical influence of English in Pashtu speech. It has specifically focused on the exploration of the mutual impact of English; as a dominant language, over Pashtu; as a subordinate language, from the point of view of „penetration" of English lexicology. The frequently used categories and types of English lexical items in Pashtu speech have been analyzed and the influence of English in Pashtu Speech has been described by illustrating the positivity and negativity of the use of English words in Pashtu speech. The research has illustrated that the penetration of English in Pashtu speech has rendered richness and easiness in using the Pashtu language for spoken purposes. The study is significant in bringing awareness about the current socio-linguistic domains of the English language as a linguistic capital for the Pashtu speech community and has manifested the growing influence of English over Pashtu that has proved detrimental for the structural, syntactical, and semantic properties of speech in Pashtu

KEYWORDS: Linguistic Capital | English penetration | Lexical influence | Negativity/Positivity

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Dr. Sadia Irshad's academic journey is marked by a fervent exploration of pedagogical strategies, particularly within diverse technological and linguistic landscapes. Her distinguished accomplishments include securing the coveted Higher Education Commission (HEC) funding for the National Research Program for Universities (NRPU) in 2021, focusing on "Technology Integration: Training Prospective and Novice English Language Teachers.

Research Areas

Critical Discourse Analysis | Computer Assisted Language Learning | Language Pedagogy | Feminism & English Language Teaching

	TOTAL	FY 2023
PUBLICATIONS	28	03
CITATIONS	65	18

SGDS TARGETED ---------- 02

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TITLE OF PAPER

The Analysis of Attitudinal Resources in Noam Chomsky and Shah Mahmood Qureshi's speeches at United Nations

UW JOURNAL OF SOCIAL SCIENCES

PAKISTAN

Y

NOT ANNOUNCED

2023-06-01

10 REDUCED INEQUALITIES

https://uwjss.org.pk/index.php/ojs3/article/view/36

SCAN ME

ABSTRACT

The paper investigates the attitudinal resources of speeches delivered at UNO during the Israel-Palestine Conflict. The study aims to investigate the use of interpersonal functions in speeches and how language resources are used to organise affect, judgment, and appreciation. In these circumstances, the language used by politicians and public figures played a significant role in highlighting the issue and influencing the audience. In total, two speeches were taken that were delivered by Noam Chomsky and Shah Mahmood Qureshi at the United Nations in 2014 and 2021, respectively. The qualitative method was used in this study, and the appraisal theory by Martin and White (2005) was applied to selected speeches. Findings show that appreciation and affect are mostly used by both speakers, and the least used resource was judgment, as the main aim of speeches was to highlight the ongoing incident. This shows that various resources are used by speakers to convey attitudes and negotiate relationships.

KEYWORDS:

Attitudinal resources | Appraisal theory | Systematic Functional Linguistics | Noam Chomsky | Shah Mahmood Qureshi's Speech

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TITLE OF PAPER

English Language Teachers' Perceptions About Outcomes-Based Approach For Developing English Language Competencies

JOURNAL OF POSITIVE SCHOOL PSYCHOLOGY

PAKISTAN

Y

NOT ANNOUNCED

2023-06-01

4 QUALITY EDUCATION

10 REDUCED INEQUALITIES

https://www.journalppw.com/index.php/jpsp/article/view/15202

SCAN ME

ABSTRACT

Experts in English language teaching have, of late, been recommending the development of requisite language competencies through an outcomes-based education (OBE). Following this spirit, the government of Punjab in Pakistan outlined the desired core competencies for secondary school students in the National Curriculum for English Language (NCEL) in 2006. Foregrounding Biggs' (2014) theory of Constructive Alignment, this study attempted to explore the extent of alignment of these core competencies with the classroom practices. For this purpose, 5 focus group discussions of two-hour duration, each consists of 7 members, were held with 35 teachers, who teach English to grade 10 in the government secondary schools of district Jhelum. The data was transcribed and analyzed thematically following interpretative analysis approach. The findings show a lack of alignment of teachers' self-reported classroom practices with the learning outcomes presented in NCEL. Lack of awareness of the teachers regarding OBE, absence of professional qualification and training, a traditional assessment system, and lack of expertise of the teachers and students in English language were found to be some of the main reasons for this lack of alignment. The study has implications for policymakers who devise and implement policies without taking sufficient actions on the ground at the micro-level. It recommends an overhaul of the teaching and assessment system to make the OBE work.

KEYWORDS: Outcomes-Based Approach | English Language | English Language Teachers

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TITLE OF PAPER

Perceptions of teachers regarding literacy drive policy for teaching and learning English language skills and its implementational effectiveness.

JAHAN-E-TEHQEEQ

PAKISTAN

Y

NOT ANNOUNCED

2023-01-01

https://jahan-e-tahqeeq.com/index.php/jahan-e-tahqeeq/article/view/1044/935

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

This research paper explores teachers' perceptions of the Literacy Drive Policy (LDP) and its implementation effectiveness in teaching English at Grade 3 level in government schools of Punjab since 2015. Conducted in Lahore city, the quantitative study surveyed 60 English teachers from primary schools in tehsil Cantt, district Lahore, using a stratified random sample. The questionnaire included open and closed-ended questions, and data analysis was performed using SPSS 21. Pearson's Correlation Coefficient was employed to investigate the relationship between teachers' perception of LDP and its effectiveness. Findings indicate a strong correlation, highlighting the importance of teachers' understanding for effective policy implementation. The study suggests addressing policy enactment challenges through teacher training, emphasizing awareness of policy features, use of specified instructional materials, and teaching and assessment through PC-tablet.

KEYWORDS:

Literacy drive policy | English language | Teachers

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Dr. Maria Farooq Maan, currently serving as an Assistant Professor in the Department of English, brings a wealth of academic achievement and expertise to her role. She holds a PhD in English Literature from the National University of Modern Languages, Islamabad, where she conducted advanced research in her field. Dr. Maan's academic journey began with a Master of Arts (MA) in English from Kinnaird College, University of the Punjab, Lahore, where she laid a solid foundation in literary studies. She is passionate about literature and creative writing as a research method.

Research Areas

Postcolonial Studies | Bakhtin | Women's writings | Pakistani Writings in English | Narratives and Identity

	TOTAL	FY 2023
PUBLICATIONS	13	02
CITATIONS	27	14

SGDS TARGETED ---------- 01

DR. MARIA FAROOQ MAAN
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TITLE OF PAPER

Resurrecting Voice: A Subaltern Study of Doshi and Singh's Selected Poems

JOURNAL OF GENDER AND SOCIAL ISSUES

PAKISTAN

Y

NOT ANNOUNCED

2023-07-10

5 GENDER EQUALITY

https://jgsi.fjwu.edu.pk/jgsi/article/view/355

SCAN ME

ABSTRACT

Due to the emerging academic scope of subaltern studies, it is crucial to have a nuanced understanding of peripheral narratives of/about the subaltern women exposed to brutality and injustices for a long time. This study aims at adding another dimension to Spivak's famous question, Can the Subaltern Speak? In the light of the selected poems, it can be said that the unheard stories of the subaltern have no means of expression because of the long-endured marginalization. Rather than dismissing the brutal treatment towards the women, it is significant to resurrect their voices. The present study attempts to revive and rejuvenate these voices and prevent them from fading away completely. The study does so by conducting a textual analysis of selected poems of Tishani Doshi and Chandni Singh.

KEYWORDS:

Subaltern | Rape | Harassment | Unheard | Resurrecting voice

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TITLE OF PAPER

An Exploration of Metafunctions and Binary Oppositions in Pakistani Paintings and Poems

PAKISTAN LANGUAGES AND HUMANITIES REVIEW (PLHR)

PAKISTAN

Y

NOT ANNOUNCED

2023-03-29

https://doi.org/10.47205/plhr.2023(7-II)23

5 GENDER EQUALITY

SCAN ME

ABSTRACT

Art and poetry go hand in hand to appeal to the senses of the creators and art lovers. The objective of this research was to explore the connection of visual art and poetry and how these forms juxtaposed to create meaning. A collection, Maritime Treasures of Pakistan, featuring art and poetry was selected to be analyzed using the Visual Grammar framework (2006) and in light of Derrida's (1967/1997) theory of deconstruction, respectively. The analysis showed that Visual Grammar can help us interpret images but using a theoretical perspective for the textual mode can provide us an even better understanding of the connection between the different semiotic modes. As in the analysis we saw that the theory of deconstruction helped us uncover the underlying message behind the poems and together with the analysis of the paintings, the meaning of the multimodal piece as one whole was deduced.

Binary Opposition | Deconstruction | Multimodality | Visual Grammar

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Dr. Huma Batool, a distinguished Language and Brain Researcher and a member of the Society of Neurobiology of Language, is frequently invited as a guest speaker to various universities and as a keynote speaker at international conferences. Her supervisory role spans a range of research projects, including the conceptualization of space among neurotypicals and the visually impaired, wayfinding strategies as complex cognitive processes, Neuro-Linguistic Programming, and language production and comprehension challenges in slow learners and individuals with hearing impairment, aphasia, Down syndrome, epilepsy, and autism. In addition to her research activities, Dr. Batool serves as the Focal Person for the Quality Enhancement Cell (QEC), Associate Editor for Corporum: Journal of Corpus Linguistics, and oversees the Research Ethics Committee, affirming her commitment to the ethical conduct and integrity of academic research.

Research Areas

Cognitive Linguistics | Neuro-Linguistic Programming | Language & Communication Disorders | Psycholinguistics/Neurolinguistics

	TOTAL	FY 2023
PUBLICATIONS	20	02
CITATIONS	68	22

SGDS TARGETED ---------- 02

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TITLE OF PAPER

An Exploration of Metafunctions and Binary Oppositions in Pakistani Paintings and Poems

PAKISTAN LANGUAGES AND HUMANITIES REVIEW (PLHR)

PAKISTAN

Y

NOT ANNOUNCED

2023-03-29

4 QUALITY EDUCATION

https://doi.org/10.47205/plhr.2023(7-II)23

SCAN ME

ABSTRACT

Art and poetry go hand in hand to appeal to the senses of the creators and art lovers. The objective of this research was to explore the connection of visual art and poetry and how these forms juxtaposed to create meaning. A collection, Maritime Treasures of Pakistan, featuring art and poetry was selected to be analyzed using the Visual Grammar framework (2006) and in light of Derrida's (1967/1997) theory of deconstruction, respectively. The analysis showed that Visual Grammar can help us interpret images but using a theoretical perspective for the textual mode can provide us an even better understanding of the connection between the different semiotic modes. As in the analysis we saw that the theory of deconstruction helped us uncover the underlying message behind the poems and together with the analysis of the paintings, the meaning of the multimodal piece as one whole was deduced.

Binary Opposition | Deconstruction | Multimodality | Visual Grammar

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TITLE OF PAPER

Awareness posters and 1st wave of COVID-19 in Pakistan: A multimodal metaphotonymic analysis

PALARCH'S JOURNAL OF ARCHAEOLOGY OF EGYPT / EGYPTOLOGY

NETHERLANDS

NOT ANNOUNCED

Y

3 GOOD HEALTH AND WELL-BEING

2023-04-19

https://archives.palarch.nl/index.php/jae/article/view/11714

SCAN ME

ABSTRACT

This research focuses on the conceptualization of text and visuals used in the awareness posters (of 1st wave) of COVID-19 in Pakistan to see how concepts vary within the same domain or in two different domains and how metonymy provided basis for metaphor to convey and understand abstract ideas. Therefore, cognitive semantic approach is used as a conceptual framework, and metaphtonymy (Goossens, 1990) is used as theoretical framework for the identification and interpretation of COVID-19 awareness posters at the level of both text and visuals. A total of eight awareness posters of COVID-19 were collected from two specific landscape of Pakistan – Centaurus Mall and Safa Gold Mall – through purposive sampling technique. The metaphtonymy is identified on the basis of metaphors and metonymy used in the awareness posters. The results show that a total of 16 metaphors and 3 types of metonymies were found embedded in awareness posters. The metaphors of PRECAUTION IS PROTECTION, HEALTH IS WAR, SAFETY IS DISTANCE, and the metonymy of Cause-Effect were excessively used in both texts and visuals. On the basis of these findings, this study concludes that there is a metonymic orientation for metaphorical meanings, and the aspect of multimodality is more appealing than only textual representation.

KEYWORDS:

Covid-19 | Metonymy | Cause-Effect | Textual Representation

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Dr. S. Tehseen Zehra, an Assistant Professor in the Department of English, brings a wealth of academic expertise to her role. She holds a Ph.D. in English with a specialization in Linguistics from the National University of Modern Languages, Islamabad. Prior to her doctoral studies, she completed her Master of Science (MS) and Master of Arts (MA) degrees in English Linguistics and English Literature, respectively, from Baha-ud-din Zakria University. With a strong foundation in both theoretical and applied linguistics, Dr. Zehra is committed to fostering a dynamic learning environment and engaging students in the exploration of language and literature. Her research interests encompass a wide range of topics within linguistics, including sociolinguistics, discourse analysis, and language acquisition

Research Areas

Corpus Linguistics | Corpus Pragmatics | Discourse analysis | English Language teaching | Sociolinguistics | Corpus Approaches to Social Issues

	TOTAL	FY 2023
PUBLICATIONS	50	01
CITATIONS	107	35

SGDS TARGETED ---------- 01

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TITLE OF PAPER

Exploring Maxim of Quantity in Spoken Academic Discourse

PANACEA JOURNAL OF LINGUISTICS AND LITERATURE

PAKISTAN

Y

NOT ANNOUNCED

2023-12-22

4 QUALITY EDUCATION

https://journals.airsd.org/index.php/pjll/article/view/307

SCAN ME

ABSTRACT

Grice's maxim of quantity is accredited to govern linguistic performance. Speakers are presumed to contribute as much information as required for referent identification, while listeners are ideally believed to expect clear, unambiguous and concise summarization of conversation. The Maxim of quantity is exploited to explore the quantity of information delivered in classroom sessions. The data for this study is gathered from undergraduate classroom sessions of three public sector universities in Pakistan. This study explores how far Grice's maxim of quantity is relevant in determining the quantity of information in classroom discourse and how far speakers and hearers observe and non-observe Grice's maxim of quantity in classroom discourse. This study is quantitative as well as qualitative in nature. Words per minute uttered by the speakers and the context/atmosphere of classroom sessions are explored. The findings of the study reveal that observance and non-observance of the maxim of quantity depend on the activities performed in classrooms, the needs of the students and the context of classroom sessions.

KEYWORDS:

Maxim of quantity | Academic discourse | Classroom Sessions | Context

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Being a qualitative social scientist, Dr. Fizza Farrukh have researched on numerous societal conundrums including stereotyping, image-building, identity-shifts and conflict-resolution. With more than 7 years of university teaching experience, she have been organizing numerous conferences, academic events and co-curricular activities. Dr. Fizza Farrukh have had the honor of getting published in top-tier journals published by Wiley, John Benjamin and Springer.

Research Areas

Media Studies | Academic Writing | Discourse Studies | Sociolinguistics | Language and Technology

	TOTAL	FY 2023
PUBLICATIONS	14	01
CITATIONS	40	10

SGDS TARGETED ---------- 02

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TITLE OF PAPER

Peace and Well-being with Storytelling in TESOL: Exploring Peacebuilding through Voices of English Language Learners in Pakistan

TESOL JOURNAL

UNITED STATES

W

1.4 (2022)

2023-11-01

https://doi.org/10.1002/tesj.736



SCAN ME

ABSTRACT

Storytelling was initiated, as a part of this study, in a Pakistani university's undergraduate English class, involving reflective discussions and journal writing, to create a safe space where students can raise their voices. In a collectivist society, like Pakistan, society's norms are preferred over individual agencies (Bittles & Small, 2016), which instills a “collectivist obligation” amongst the youth to follow society's ways (Watkins & Biggs, 2001, p. 282) and, ultimately, distancing critical thinking (Feyyaz, 2016) and muting disparate voices (Zaidi et al., 2016). Moreover, Pakistan, being a developing country, faces multiple social and political issues (Droogan, 2018; Saeed et al., 2014) adding further pressure on these young minds. With technology, media, and education, the country's youth, especially majors in English, have started comparing their norms with modern values (Zubair, 2006) resulting in adjustment issues (Haidar, 2021a) which require attention and ventilation. In this study, the classroom was developed as a venting space for students whereby storytelling helped students in confronting conflicts, deliberating causes and navigating solutions. Data from journaling, discussions, and students' interviews revealed these practices were helpful in attaining mental peace, developing tolerance and building stronger human connections.

KEYWORDS:

Storytelling | TESOL | Peace Building | English Language Learners

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Mr. Kashif Jamshaid is a dedicated Lecturer in the Department of English at Air University, Islamabad. He holds a Master of Philosophy (MPhil) in Linguistics and Literature from Air University and a Master's degree in English Linguistics and Literature from the National University of Modern Languages. With extensive experience in language teaching and academic instruction, Mr. Jamshaid has been contributing to the field of education for over five years at Air University. Prior to his current role, he served as a Fulbright Language Teaching Assistant at The University of Georgia, where he gained valuable international teaching experience. Additionally, he has worked as an English Language Instructor at the Regional English Language Office, US Embassy, Islamabad, further enriching his expertise in language instruction and curriculum development.

Research Areas

Ecocriticism

Islamic Feminism

Stylistics

Corpus Linguistics

	TOTAL	FY 2023
PUBLICATIONS	--	01

SGDS TARGETED ---------- 01

MR. KASHIF JAMSHAID

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TITLE OF PAPER

A Corpus-based Study of Newspaper Articles on Lockdown Issue in Indian Occupied Kashmir

PAKISTAN JOURNAL OF SOCIETY, EDUCATION AND LANGUAGE (PJSEL)

PAKISTAN

Y

0.11 (2022)

2023-12-01

https://pjsel.jehanf.com/index.php/journal/article/view/1271

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

This study explores newspapers' role in constructing ideologies, focusing on The Dawn and The News and analyzing 10 and 12 headline articles, respectively. The data, centered on the current lockdown in Indian Occupied Kashmir, undergoes analysis using AntConc and Critical Discourse Analysis (CDA), particularly Van Dijk's (1988) "Structures of News in Press." Richardson's (2007) tools—naming, referencing, hyperbole, implicature, generalization, and reconstruction—are incorporated for a nuanced analysis. Results indicate that The Dawn portrays a negative image of India and a positive image of Pakistan using the naming technique, while The News remains neutral. Both newspapers depict Pakistan as a supporter and savior of Kashmiris and India as a manipulator inflicting cruelty. The study recommends utilizing corpus tools and CDA for uncovering hidden ideologies in newspapers, suggesting their efficacy for future research on a broader scale.

KEYWORDS:

Critical Discourse Analysis | Newspapers | Ideologies | Corpus Analysis | Kashmir

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Mr. Sareer Ahmad, currently serving as a Lecturer in the Department of English at Air University, holds an impressive academic background. He completed his Master of Philosophy (MPhil) in Literature from Air University from 2015 to 2017. During his time there, he actively participated in various literary and reading forums, including the Literary Society and Iqbal Society. Prior to this, he obtained a Master's degree in English linguistics and literature from the National University of Modern Languages (NUML) from 2011 to 2013. Currently, he is pursuing his Doctor of Philosophy (PhD) in English linguistics and literature at Air University, demonstrating his commitment to furthering his academic pursuits. Mr. Ahmad has also been involved in projects such as the English Access Microscholarship Program from June 2017 to June 2019.

Research Areas

Postmodernism
Psychoanalysis
Borderland Theories
Post-Truth
Post colonialism

	TOTAL	FY 2023
PUBLICATIONS	03	01

SGDS TARGETED ---------- 01

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TITLE OF PAPER

A Corpus-based Study of Newspaper Articles on Lockdown Issue in Indian Occupied Kashmir

PAKISTAN JOURNAL OF SOCIETY, EDUCATION AND LANGUAGE (PJSEL)

PAKISTAN

Y

0.11 (2022)

2023-12-01

https://pjsel.jehanf.com/index.php/journal/article/view/1271

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

This study explores newspapers' role in constructing ideologies, focusing on The Dawn and The News and analyzing 10 and 12 headline articles, respectively. The data, centered on the current lockdown in Indian Occupied Kashmir, undergoes analysis using AntConc and Critical Discourse Analysis (CDA), particularly Van Dijk's (1988) "Structures of News in Press." Richardson's (2007) tools—naming, referencing, hyperbole, implicature, generalization, and reconstruction—are incorporated for a nuanced analysis. Results indicate that The Dawn portrays a negative image of India and a positive image of Pakistan using the naming technique, while The News remains neutral. Both newspapers depict Pakistan as a supporter and savior of Kashmiris and India as a manipulator inflicting cruelty. The study recommends utilizing corpus tools and CDA for uncovering hidden ideologies in newspapers, suggesting their efficacy for future research on a broader scale.

KEYWORDS:

Critical Discourse Analysis | Newspapers | Ideologies | Corpus Analysis | Kashmir

Department of Humanities, Education and Psychology

Departmental Overview

The Department of Humanities is a vibrant department with professionally skilled, highly qualified and energetically motivated faculty. BS, MS/MPhil and PhD in Linguistics and Literature are the leading programs of the Department of Humanities. Based on a blend of two major areas comprising Linguistics and Literature, these programs provide the scholars with a sound theoretical knowledge complemented with hands on practice in the form of intensive and activities carried out during the extensive research period.

The Department ensures reinforcement of classroom teaching through modern teaching techniques and state-of-the-art technology available in language laboratories and computer-aided programs. The primary goal of the Department is personal, academic and professional grooming of the students inspired by the values of humanism – intended as a guiding principle combined with innovation through cultural, social, political and economic processes.

The Department of Humanities, Education, and Psychology, under the leadership of Dr. Sohaib Sultan as Chair, boasts a dedicated faculty. Assistant Professors such as Dr. Sadaf Zamir Ahmed, Dr. ANSA QURAT-UL-AIN, and Mr. Farman Kakar contribute valuable expertise. The team is further enriched by Dr. Shumaila Tasleem, Mr. Tariq Ejaz, and Ms. Samina Batool Shah, each bringing passion to teaching and research. Lecturers, including Ms. Arshia Saif, Ms. Zaofishan Qureshi, Ms. Ayesha Nayyar, and Mr. M. Yasar Usmani, play crucial roles in creating engaging learning environments. Ms. Hafsa Ali, Dr. Aziz Ullah Kakar, and Ms. Afia Misri add diverse perspectives, ensuring a vibrant academic community. This cohesive team, committed to student success, collaborates to shape well-rounded individuals in the realms of humanities, education, and psychology.

DEPARMENTAL PUBLICATIONS (2023)

17

SDGS TARGETED IN 2023



Dr. Sohaib Sultan

Assistant Professor
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Dr. Sohaib Sultan serves as an Assistant Professor in the Department of Humanities, Education, and Psychology, bringing a wealth of knowledge and expertise to the academic environment. He holds a Doctorate in Education from the National University of Modern Languages, Islamabad, demonstrating his dedication to advancing his field of study. With his extensive educational background, Dr. Sultan contributes to the department's mission of providing high-quality education and fostering intellectual growth among students. His research interests likely encompass various aspects of education, including pedagogy, curriculum development, and educational psychology.

Research Areas

Curriculum Development

Evaluation and assessment and Educational Research

	TOTAL	FY 2023
PUBLICATIONS	--	04
CITATIONS	--	--

SGDS TARGETED ---------- 01

DR. SOHAIB SULTAN
ASSISTANT PROFESSOR
DEPARTMENT OF HUMANITIES, EDUCATION AND PSYCHOLOGY
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TITLE OF PAPER

Effectiveness Of Reward As A Modifier On Students Behavior At Primary Level

JOURNAL OF POSITIVE SCHOOL PSYCHOLOGY (JPSP)

TURKEY

X

NOT ANNOUNCED

2023-07-01

4 QUALITY EDUCATION

https://journalppw.com/index.php/jpsp/article/view/16942

SCAN ME

ABSTRACT

The effects of reward system on student of Chak Shahzad performance and there learning behavior at primary level were explored in this study. The incentive Theory was used in this investigation. This theory is critical to comprehend a student's performance and learning behavior. In this study descriptive research method was selected. The influence of the reward system on students' performance was investigated using questionnaires. A total of 200 students were chosen as a sample from Windsor International school Chak shahzad, Islamabad. This study's findings showed that a student's reward system significantly affects their performance at the elementary level.Moreover, this study provided a substantial contribution to understanding the links between reward systems and primary school students' performance and learning processes at primary level. It is recommended that a university- level study be done to determine the elements influencing students' psychological well-being measure in order to improve their academic success.

KEYWORDS:

Reinforcement | Positive and Negative Reinforcement | Stimulus | Achievement

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TITLE OF PAPER

Impacts Of Cloud-Based Educational Platforms On Learning Outcomes: A Study In Islamabad's Public Elementary Schools

JOURNAL OF POSITIVE SCHOOL PSYCHOLOGY (JPSP)

TURKEY

X

NOT ANNOUNCED

2023-04-01

https://journalppw.com/index.php/jpsp/article/view/16942

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

This study explores the impact of Cloud-Based Educational Platforms (CBEP) on students' science performance at the elementary level, utilizing a quasi-experimental, post-test only design. The research was conducted among eighth-grade students from the IMCG Bhadana Kalan Ternoul Islamabad with a sample of 40 students selected via simple random sampling. Four tests (T1, T2, T3, & T4), devised based on revised Bloom's taxonomy, were used to assess student achievement post-teaching in both a traditional and a cloud-based classroom environment. The experimental group was taught using Cloud based incorporating visuals and activity corners, while the control group relied on conventional lecture methods. Mean values for knowledge and application levels were the same for both groups, but the control group demonstrated a decrease in comprehension, analysis, synthesis, and evaluation. Conversely, the experimental group showed an increase in all cognitive domains. The study found a significant difference in knowledge, comprehension, application, analysis, synthesis, and evaluation levels between students taught via lecture methods and those utilizing a cloud-based platform, underlining the potential effectiveness of Cloud based teaching in improving learning outcomes at the elementary level.

KEYWORDS:

Cloud computing | Traditional classroom | Elementary Education | Revised blooms taxonomy

Dr. Sohaib Sultan
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TITLE OF PAPER

Investigating the Student's Perceptions of the Principal's Leadership Strategies on Their Academic Achievement at Secondary School Level

CEMJP

NOT ANNOUNCED

X

NOT ANNOUNCED

2023-10-07

4 QUALITY EDUCATION

http://journals.kozminski.cem-j.org/index.php/pl_cemj/article/view/1028

SCAN ME

ABSTRACT

The current research examined into how secondary school principals might help students excel academically. Three goals were developed to direct data collection and analysis based on the study's general goals. This research was done to examine the leadership actions the principal does to raise student accomplishment, to evaluate the methods the principle employs to monitor instruction to raise student achievement, and to gauge the level of teacher involvement. The study was carried out in D.G. Khan City. The study used a descriptive study design with a primary focus on quantitative research, with case quantification where required. Two public schools in the district city of D.G. Khan were used as the population source for the sake of generalizing the results. There were 450 pupils in all, divided equally between the 9th and 10th grades. Probability sampling was used to choose a sufficient sample of 200 students, or 208. The researcher employs a straightforward random sample approach in this regard. Data were gathered via a questionnaire. Nine restricted response items made up the adopted questionnaire. The questionnaire was examined using a Likert scale with five possible ratings. The following methods of data tabulation and analysis were used: Statement-by-statement analysis, Mean analysis of restricted response items, and Percentage-by-statement analysis.

KEYWORDS:

Leadership | Students Academic Achievement | Principal

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TITLE OF PAPER

Security of Educational Institutions in Pakistan: A missing link

BOLETIN DE LITERATURA ORAL - THE LITERARY JOURNAL

X

2023-11-11

https://www.boletindeliteraturaoral.com/index.php/bdlo/article/view/432

NOT ANNOUNCED

NOT ANNOUNCED



SCAN ME

ABSTRACT

9/11 as an important landmark event has changed the security dynamics globally. Security of today might not be security of tomorrow. In this twenty-first century, the world has been facing the menace of terrorism, not only resulting into number of causalities and injuries, but also it has vandalized the international image of the states. Moreover, Descriptive and analytical methods were used in the following research paper. The research paper analyzed the militant's ideology from the prism of constructivism, how reality is socially constructed near them. Furthermore, with the help of frustration aggression theory it explains why the terrorists and militants are shifting from hard targets to soft targets. The paper also discusses campus security as an important ingredient of educational institutions. Horrifying attacks on educational institutions like Army Public School attack and Bacha Khan University attack shows that Pakistan's priority list is convoluted. The notion of human security shall be the very first priority. There seems to be a missing link when it comes to the security of schools and universities in Pakistan. Shutting down of schools due to inadequate security measures is also discussed in the research paper. The following research paper also reflects on the educational security models adopted by various schools and universities in United States. So, this research substantiates how Pakistan's security apparatus is flawed and is more focused towards "reactive approach" rather than "Proactive approach.

KEYWORDS:

Security | Educational Institutions | Pakistan

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Dr. Sadaf Zamir Ahmed serves as an Assistant Professor in the Department of Humanities, Education, and Psychology. She holds a PhD in Education from the International Islamic University, Islamabad. With her expertise in Educational Administration and Management. Dr. Ahmed contributes significantly to the academic and research endeavors of the Department. Her doctoral studies equip her with specialized knowledge in educational theory, pedagogy, and research methodologies, enhancing her ability to engage with students and advance scholarly inquiries in the field of education.

Research Areas

- Educational Administration and Management
- Educational Psychology
- Curriculum Design and Development

	TOTAL	FY 2023
PUBLICATIONS	31	04

SGDS TARGETED ---------- 01

DR. SADAF ZAMIR AHMED
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TITLE OF PAPER

Effectiveness Of Reward As A Modifier On Students Behavior At Primary Level

JOURNAL OF POSITIVE SCHOOL PSYCHOLOGY (JPSP)

TURKEY

X

NOT ANNOUNCED

2023-07-01

4 QUALITY EDUCATION

https://journalppw.com/index.php/jpsp/article/view/16942

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ABSTRACT

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KEYWORDS:

Reinforcement | Positive and Negative Reinforcement | Stimulus | Achievement

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TITLE OF PAPER

Impacts Of Cloud-Based Educational Platforms On Learning Outcomes: A Study In Islamabad's Public Elementary Schools

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4 QUALITY EDUCATION

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SCAN ME

ABSTRACT

This study explores the impact of Cloud-Based Educational Platforms (CBEP) on students' science performance at the elementary level, utilizing a quasi-experimental, post-test only design. The research was conducted among eighth-grade students from the IMCG Bhadana Kalan Ternoul Islamabad with a sample of 40 students selected via simple random sampling. Four tests (T1, T2, T3, & T4), devised based on revised Bloom's taxonomy, were used to assess student achievement post-teaching in both a traditional and a cloud-based classroom environment. The experimental group was taught using Cloud based incorporating visuals and activity corners, while the control group relied on conventional lecture methods. Mean values for knowledge and application levels were the same for both groups, but the control group demonstrated a decrease in comprehension, analysis, synthesis, and evaluation. Conversely, the experimental group showed an increase in all cognitive domains. The study found a significant difference in knowledge, comprehension, application, analysis, synthesis, and evaluation levels between students taught via lecture methods and those utilizing a cloud-based platform, underlining the potential effectiveness of Cloud based teaching in improving learning outcomes at the elementary level.

KEYWORDS:

Cloud computing | Traditional classroom | Elementary Education | Revised blooms taxonomy

Dr. Sadaf Zamir Ahmed
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TITLE OF PAPER

Investigating the Student's Perceptions of the Principal's Leadership Strategies on Their Academic Achievement at Secondary School Level

CEMJP

NOT ANNOUNCED

X

NOT ANNOUNCED

2023-10-07

4 QUALITY EDUCATION

http://journals.kozminski.cem-j.org/index.php/pl_cemj/article/view/1028

SCAN ME

ABSTRACT

The current research examined into how secondary school principals might help students excel academically. Three goals were developed to direct data collection and analysis based on the study's general goals. This research was done to examine the leadership actions the principal does to raise student accomplishment, to evaluate the methods the principle employs to monitor instruction to raise student achievement, and to gauge the level of teacher involvement. The study was carried out in D.G. Khan City. The study used a descriptive study design with a primary focus on quantitative research, with case quantification where required. Two public schools in the district city of D.G. Khan were used as the population source for the sake of generalizing the results. There were 450 pupils in all, divided equally between the 9th and 10th grades. Probability sampling was used to choose a sufficient sample of 200 students, or 208. The researcher employs a straightforward random sample approach in this regard. Data were gathered via a questionnaire. Nine restricted response items made up the adopted questionnaire. The questionnaire was examined using a Likert scale with five possible ratings. The following methods of data tabulation and analysis were used: Statement-by-statement analysis, Mean analysis of restricted response items, and Percentage-by-statement analysis.

KEYWORDS:

Leadership | Students Academic Achievement | Principal

DR. SADAF ZAMIR AHMED
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TITLE OF PAPER

Security of Educational Institutions in Pakistan: A missing link

BOLETIN DE LITERATURA ORAL - THE LITERARY JOURNAL

NOT ANNOUNCED

X

NOT ANNOUNCED

2023-11-11

4 QUALITY EDUCATION

https://www.boletindeliteraturaoral.com/index.php/bdlo/article/view/432

SCAN ME

ABSTRACT

9/11 as an important landmark event has changed the security dynamics globally. Security of today might not be security of tomorrow. In this twenty-first century, the world has been facing the menace of terrorism, not only resulting into number of causalities and injuries, but also it has vandalized the international image of the states. Moreover, Descriptive and analytical methods were used in the following research paper. The research paper analyzed the militant's ideology from the prism of constructivism, how reality is socially constructed near them. Furthermore, with the help of frustration aggression theory it explains why the terrorists and militants are shifting from hard targets to soft targets. The paper also discusses campus security as an important ingredient of educational institutions. Horrifying attacks on educational institutions like Army Public School attack and Bacha Khan University attack shows that Pakistan's priority list is convoluted. The notion of human security shall be the very first priority. There seems to be a missing link when it comes to the security of schools and universities in Pakistan. Shutting down of schools due to inadequate security measures is also discussed in the research paper. The following research paper also reflects on the educational security models adopted by various schools and universities in United States. So, this research substantiates how Pakistan's security apparatus is flawed and is more focused towards "reactive approach" rather than "Proactive approach.

KEYWORDS:

Security | Educational Institutions | Pakistan

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Dr. Ansa Qurat-ul-ain is an accomplished Assistant Professor with five years of experience teaching undergraduate, graduate, and postgraduate courses in Psychology. With a Doctor of Philosophy (PhD) in Clinical, Counseling, and Applied Psychology from University Utara Malaysia, she possesses a comprehensive understanding of mental health disorders and effective treatment approaches. Dr. Qurat-ul-ain is a skilled mental health professional dedicated to providing exceptional care to patients with diverse mental health needs. She excels in implementing personalized treatment plans and is known for her ability to manage various personality types, diffuse stressful situations, and proactively resolve issues.

Research Areas

Clinical Psychology | Social Psychology | Personality Psychology

	TOTAL	FY 2023
PUBLICATIONS	17	08

SGDS TARGETED ---------- 03

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TITLE OF PAPER

Trait-emotional Intelligence, Social Desirability and Non-Suicidal Self-harm Behavior among Adolescents: A Cross-sectional Study

JOURNAL OF PROFESSIONAL AND APPLIED PSYCHOLOGY

PAKISTAN

Y

NOT ANNOUNCED

2023-09-30

3 GOOD HEALTH AND WELL-BEING

4 QUALITY EDUCATION

doi.org/10.52053/jpap.v4i3.211

SCAN ME

ABSTRACT

Non-suicidal self-injury (NSSI) is the intentional and acute harm done to one's body without the intention of committing suicide. Suicidal behavior (SB) and non-suicidal self-injury (NSSI) are the two primary health issues affecting teenagers. Despite increasing attention to such issues, very little work is done regarding these issues in Pakistan. The objective of this research was to determine the incidence of non-suicidal self-harm in adolescents and to find an association between non-suicidal self-injury and traits of emotional intelligence and social desirability in Pakistani adolescents who made up a typical sample of the general community. For this purpose, 195 participants were selected from different hospitals and areas of Islamabad and Rawalpindi. The non-suicidal self-injury student questionnaire, the trait emotional intelligence questionnaire (TEIQue-SF), and the social desirability scale (SDS-17) were used to collect data. According to the findings, people who were more socially desirable and have lower emotional intelligence traits were more likely to engage in NSSI. The results of this research provide insight into the intricate interactions among these factors and how they affect NSSI. Mental health practitioners can improve their capacity to recognize and assist people who are experiencing NSSI, thereby, supporting their well-being and recovery, by developing a deeper understanding of these aspects.

KEYWORDS:

Non-Suicidal Self-injury | Social Desirability | Trait Emotional Intelligence

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TITLE OF PAPER

Effect of Childhood Experiences on Psychological Well-being and Resilience among Young Adults: Mediating Role of Defense Mechanism

PAKISTAN JOURNAL OF LAW, ANALYSIS AND WISDOM

PAKISTAN

Y

NOT ANNOUNCED

2023-09-29

doi.org/10.1234/pjlaw.v2i02.56

SCAN ME

ABSTRACT

The purpose of this study was to investigate the relationship between early childhood experiences, psychological well-being, and resilience, as well as the mediation role of defense mechanisms. For this purpose, a sample of 210 young adults was collected using a random sampling method. For the collection of data, a detailed demographic sheet, Benevolent Childhood Experiences (BCEs) (Narayan et al., 2017), Psychological Well Being (Ryff, 1989), Adult Resilience Scale (AMR-R), Defense Mechanisms Rating Scales-Self-Report-30 (DMRS-SR-30) (Prout et al., 2022) were used. The results were statistically analyzed using SPSS 23 software. Some of the study's hypotheses were shown to be significant, while others were rejected. The result showed a significant positive relation between benevolent childhood experiences and psychological well-being. Similarly, a significant correlation was found between benevolent childhood experiences and resilience. The mediating role of overall defense functioning was found between benevolent childhood experiences and psychological well-being however no significant mediating role was found between benevolent childhood experiences and resilience. Similarly, the mediating role of the categories of defense levels was not found significant.

KEYWORDS:

Defence Mechanism | Resilience | Benevolent Childhood Experiences | Psychological well-being

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TITLE OF PAPER

Effect of parental acceptance/rejection on social anxiety and difficulty in emotion regulation: considering resilience as moderator

JOURNAL OF ASIAN DEVELOPMENT STUDIES (JADS)

PAKISTAN

Y

NOT ANNOUNCED

2023-09-30

https://doi.org/10.62345/



SCAN ME

ABSTRACT

This study examines the influence of parental acceptance-rejection on social anxiety and emotion regulation among young adults in Pakistan, with resilience as a moderating factor. We surveyed 200 young adults aged 18 to 25, using the Parental Acceptance/Rejection Questionnaire-Short Form (PARQ-SF), Liebowitz Social Anxiety Scale (LSAS), Difficulty in Emotion Regulation Scale (DERS), Brief Resilience Scale (BRS), and a demographic survey. This study analyzed the data using Pearson's Product Moment Correlation and Multivariate Linear Regression—parental acceptance correlated with lower social anxiety, better emotion regulation, and higher resilience. Conversely, parental rejection is associated with increased social pressure, poorer emotion regulation, and lower strength. Parental acceptance-rejection significantly impacts social anxiety and emotion regulation in young adults, with resilience moderating these effects. Enhancing resilience can mitigate the negative impact of parental rejection, promoting emotional well-being. Recognizing these factors is crucial for targeted interventions and support programs.

KEYWORDS:

Emotion Regulation | Resilience | Social Anxiety | Parental Acceptance-Rejection

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TITLE OF PAPER

The Effect of Perfectionism and Self-compassion on Positive and Negative Affect and Appearance Anxiety among Adolescents

PAKISTAN JOURNAL OF INTERNATIONAL AFFAIRS

PAKISTAN

Y

2.8 (2022)

2023-06-20

https://doi.org/10.52337/pjia.v6i2.809

3 GOOD HEALTH AND WELL-BEING

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

Perfectionism is unquestionably ingrained in our daily lives and can be found in a variety of contexts, including work, school, relationships etc. While self-compassion entails being compassionate and understanding towards oneself in the face of perceived failures or weaknesses, perfectionism manifests itself by setting unreasonably demanding standards for self and being unduly critical of one's own performance.. Through a comprehensive review of existing literature and quantitative research, this study examines the effect of perfectionism as well as selfcompassion on appearance anxiety and positive and negative affect. For this purpose, 240 Pakistani students were selected. The Frost Multidimensional Perfectionism Scale (FMPS), The Self Compassion Scale (SCS), Appearance Anxiety Inventory (API) and Positive and Negative Affect Schedule (PANAS) were selected to collect the data. It is hypothesized that there will be a significant positive relationship between perfectionism and appearance anxiety and negative affect, as well as significant negative relationship between perfectionism and positive affect. Furthermore, self-compassion will have significant positive relationship with positive affect and significant negative relationship with appearance anxiety and negative affect.

KEYWORDS:

Perfectionism | Affect | Self-Compassion | Appearance Anxiety

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TITLE OF PAPER

Psychological Effect of Polycystic Ovary Syndrome on Health Related Quality of Life among Young Women: Moderating Role of Proactive Coping Strategies

REVIEW OF APPLIED MANAGEMENT AND SOCIAL SCIENCES

PAKISTAN

NOT ANNOUNCED

Y

3 GOOD HEALTH AND WELL-BEING

4 QUALITY EDUCATION

2023-06-20

https://doi.org/10.47067/ramss.v6i2.340

SCAN ME

ABSTRACT

Polycystic Ovary Syndrome (PCOS) significantly affects the quality of life (QoL) and mental well-being of young women, with a prevalence rate of over 70% worldwide. Our study aimed to assess the impact of PCOS on health-related QoL (HR-QoL) among young women and to investigate the moderating role of proactive coping strategies. We selected 200 diagnosed PCOS patients from various hospitals in Islamabad and had them complete questionnaires assessing PCOS symptoms, HR-QoL, and proactive coping strategies. Regression analysis revealed a significant negative impact of PCOS on HR-QoL. Specifically, higher scores on the PCOS symptom checklist were associated with lower HR-QoL. Proactive coping strategies, particularly Strategic Planning and Preventive Coping, were found to moderate the relationship between PCOS and HR-QoL. Overall, PCOS predominantly affects psychological and social well-being rather than physical functioning in young women.

KEYWORDS:

Polycystic Ovary Syndrome | Health Related Quality of Life | Proactive Coping Strategies | Preventive Coping | Strategic Coping

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TITLE OF PAPER

Chemotherapy Induced Alopecia Distress, Body Image and Psychosocial Wellbeing among Breast Cancer Patients: The Moderating Role of Locus of Control

REVIEW OF EDUCATION, ADMINISTRATION & LAW

PAKISTAN

NOT ANNOUNCED

Y

2023-06-30

doi.org/10.47067/real.v6i2.339

SCAN ME

ABSTRACT

To explore the relationship of chemotherapy induced distress with body image and psychological wellbeing, this study was proposed considering locus of control as a moderating variable among breast cancer patients. This study was a cross-sectional research. A convenient Sample of 80 breast cancer patients were selected from different hospitals of Islamabad and Rawalpindi. Chemotherapy Induced Alopecia Distress Scale (CADS), Body Image Scale (BR23), Psychosocial Well-being Scale (EORTC QLQ C30), and Health Locus of Control Scale (HLCS) were used to find the relationship between study variables. The study found a significant association between chemotherapy-induced alopecia, body image, and psychosocial well-being in breast cancer patients. The moderating role of Locus of Control was found to be insignificant between chemotherapy induced alopecia distress, body image, and psychosocial well-being. The results of present research study highlighted the negative effect of hair loss on dissatisfaction of body image and wellbeing of psychological and social factors, emphasizing the need for comprehensive psychosocial support for these patients. The study also underscores the importance of considering individuals' locus of control when designing interventions to mitigate the psychosocial effects of hair loss.

KEYWORDS:

Chemotherapy Induced Alopecia Distress | Psychosocial Well-being | Health Locus of Control | Breast Cancer Patients

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TITLE OF PAPER

Role of Religiosity in Psychological Well-Being and Subjective Happiness among Transgender Considering Social Support as a Moderator

INTERNATIONAL JOURNAL OF SOCIAL SCIENCE AND ENTREPRENEURSHIP

PAKISTAN

NOT ANNOUNCED

Y

2023-07-30

doi.org/10.58661/ijsse.v3i3.182

SCAN ME

ABSTRACT

Religiosity encompasses individuals' commitment to religious beliefs and practices, with research indicating its mixed impact on psychological well-being. Despite this, exploring positive transgender development remains limited, particularly considering high rates of victimization and scarce resources. This study investigates the associations between Psychological Well-being, Subjective Happiness, Social Support, and religiosity among transgender individuals, focusing on both bivariate and multivariate analyses. A sample of 100 transgender individuals from various Pakistani communities was gathered using snowball sampling. Data were collected through measures including the Index of Religiosity, Ryff's Scales of Psychological Well-being, Multidimensional Scale of Perceived Social Support, and Subjective Happiness Scale. Analysis using SPSS showed a significant correlation between Subjective Happiness and Psychological Well-being among transgender individuals ($p<.05$). Additionally, higher religious practices were associated with better Psychological Well-being, while Social Support showed no significant impact. Religiosity emerged as a significant predictor of Subjective Happiness, with Social Support moderating this relationship. These findings suggest that religious practices can potentially enhance the well-being of the transgender community.

KEYWORDS:

Transgender | Religiosity | Psychological well-being | Subjective happiness

DR. AZIZ ULLAH KAKAR

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Dr. Aziz Ullah Kakar, serving as a Lecturer, holds a Ph.D. in Pakistan Studies from Quaid-i-Azam University, Islamabad. With expertise in the field of Pakistan Studies, Dr. Aziz brings a wealth of knowledge and academic rigor to his role. His research and teaching interests likely encompass a wide range of topics related to Pakistan's history, politics, culture, and society. As a lecturer, Dr. Kakar is dedicated to imparting valuable insights and fostering critical thinking among students in his field of specialization. His academic background and commitment to excellence make him a valuable asset to the institution's academic community.

Research Areas

Social and Cultural Anthropology | Critical Theories

	TOTAL	FY 2023
PUBLICATIONS	03	01

SGDS TARGETED ---------- 01

DR. AZIZ ULLAH KAKAR

LECTURER

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TITLE OF PAPER

The Pashtun Household: A Cultural Space for Political Training

PAKISTAN JOURNAL OF SOCIETY, EDUCATION AND LANGUAGE (PJSEL)

PAKISTAN

Y

NOT ANNOUNCED

2023-06-25

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

https://pjsel.jehanf.com/index.php/journal/article/view/1213

SCAN ME

ABSTRACT

The objective of this paper is to analyze the role of the Pashtun household (kor) in the evolution of political authority. The Pashtun household serves as the principal context in which senior members of a family transmit the concept of leadership to their descendants. This study focuses on the interconnection between two primary themes: the upbringing of male family members in Pashtun society to fulfil political roles, and the criteria employed by the people to evaluate the concept of political leadership. There is a contention that the Pashtun home offers a conducive atmosphere for males to acquire the necessary skills and readiness to assume the position of a political leader. Once an individual acquires the necessary skills and knowledge to assume a leadership role, he must adhere to the specific requirements established within their local context in order to become a political leader. The data collection for the present study was carried out in Tehsil Killa Saif Ullah, located in the province of Balochistan. The demographic composition of this area primarily consists of people belonging to the Kakar tribe, a Pashtun ethnic group, with the majority of its inhabitants adhering to the Sunni sect of Islam.

KEYWORDS:

Household | Culture | Habitus | Pashtuns | Politics

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Ms. Samina Batool Shah serves as an Assistant Professor in the Department of Humanities, Education, and Psychology. She is currently pursuing her Ph.D. in Islamic Studies from NUML Islamabad, with a focus on Islamic Philosophy. Ms. Shah holds an MPhil degree in Islamic Studies with a specialization in Islamic Philosophy from NUML University. With her academic background and expertise, she contributes to the department's mission of providing quality education in humanities, education, and psychology. Ms. Shah's research interests likely span across various aspects of Islamic studies and philosophy, enriching the academic environment and fostering critical inquiry within her field.

Research Areas

Sufism and Contemporary issues in Muslim world

Comparative Religions

	TOTAL	FY 2023
PUBLICATIONS	05	01
CITATIONS	02	01

SGDS TARGETED ---------- 01

Ms. Samina Batool Shah
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TITLE OF PAPER

The Pashtun Household: A Cultural Space for Political Training

PAKISTAN JOURNAL OF SOCIETY, EDUCATION AND LANGUAGE (PJSEL)

PAKISTAN

Y

NOT ANNOUNCED

2023-06-25

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

https://pjsel.jehanf.com/index.php/journal/article/view/1213

SCAN ME

ABSTRACT

The objective of this paper is to analyze the role of the Pashtun household (kor) in the evolution of political authority. The Pashtun household serves as the principal context in which senior members of a family transmit the concept of leadership to their descendants. This study focuses on the interconnection between two primary themes: the upbringing of male family members in Pashtun society to fulfil political roles, and the criteria employed by the people to evaluate the concept of political leadership. There is a contention that the Pashtun home offers a conducive atmosphere for males to acquire the necessary skills and readiness to assume the position of a political leader. Once an individual acquires the necessary skills and knowledge to assume a leadership role, he must adhere to the specific requirements established within their local context in order to become a political leader. The data collection for the present study was carried out in Tehsil Killa Saif Ullah, located in the province of Balochistan. The demographic composition of this area primarily consists of people belonging to the Kakar tribe, a Pashtun ethnic group, with the majority of its inhabitants adhering to the Sunni sect of Islam.

KEYWORDS:

Household | Culture | Habitus | Pashtuns | Politics

Faculty of Computing & AI

The Faculty of Computing and Artificial Intelligence (FCAI) at Air University envisions itself as a leader in computing education, research, and enterprise, aiming to produce world-class computing professionals who can make significant contributions at both national and international levels. With a mission focused on achieving excellence in teaching and research, FCAI is committed to nurturing graduates with sound professional knowledge, integrity, social responsibility, and a passion for lifelong learning. Established initially as a computer science department in 2016, FCAI has rapidly evolved into a comprehensive Faculty of Computing & Artificial Intelligence, comprising three distinct departments: Computer Science, Creative Technologies, and Cyber Security. This expansion has led to a diverse range of 15-degree programs, 10 research groups, and the presence of 3 technical student societies, catering to a student body of 1500 individuals. The faculty's academic prowess is underscored by the fact that its members are rated among the top 2% of researchers globally, actively engaged in securing external research grants to push the boundaries of computing knowledge. FCAI prioritizes the development of the next generation of scientists through robust MS and PhD programs, preparing students to tackle the challenges of the computing domain and excel in their careers. Looking towards the future, FCAI aims to establish leading national research labs to further enhance its research capabilities. This commitment is reflected in the establishment of a local Research & Enterprise office and the Air University Computing Academy, which offers certification programs from industry giants such as Huawei, Oracle, Microsoft, and CISCO, thereby expanding job opportunities for students. and internationally.

FACULTY PUBLICATIONS (2023)

68

SDGS TARGETED



Department of Computer Science

Departmental Overview

The Department of Computer Science at the Faculty of Computing and Artificial Intelligence (FCAI) in Air University is dedicated to producing highly skilled professionals in Computer Science and Information Technology. Recognized by the Higher Education Commission (HEC) and NCEAC, Pakistan, the department emphasizes industry collaboration and continuous curriculum revision. Graduates have found employment in globally renowned organizations such as Netsol, SBP, Huawei, Teradata, IBM, and Microsoft. Faculty members, with degrees from reputable national and international universities, have contributed significantly to research, securing substantial funding. With abundant opportunities locally and abroad, the Department of Computer Science at FCAI offers an exciting prospect for researchers, teachers, and students to make a meaningful impact in the field.

The Department of Computer Science in Air University boasts a diverse team of faculty members dedicated to delivering quality education and research excellence. Led by Dr. Mehdi Hassan, a Tenured Associate Professor serving as Chair, the department comprises esteemed academics such as Dr. Hafiz Ahmad Jalal, Dr. Syed Fahad Tahir, and Dr. Ashfaq Hussain, who hold positions ranging from Associate Professor to Assistant Professor. These faculty members are highly qualified, with degrees from reputable national and international universities, and are actively involved in research, publishing significant articles, and securing funding. Their commitment to industry collaboration and continuous curriculum enhancement ensures graduates are equipped with the skills necessary. Additionally, the department benefits from a team of dedicated lecturers, contributing to a vibrant learning environment for students.

DEPARMENTAL PUBLICATIONS (2023)

21

SDGS TARGETED IN 2023



Dr. Mehdi Hassan

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Dr. Mehdi Hassan holds a Ph.D. in Computer Science from the Pakistan Institute of Engineering and Applied Sciences (PIEAS), Islamabad, Pakistan. He earned his MS in Computer System Engineering from Ghulam Ishaq Khan Institute of Engineering Sciences and Technology (GIKI), Topi, Swabi, KPK, Pakistan, and a MSc in Computer Science from Gomal University, Dera Ismail Khan Wah Cantt, Pakistan. With a strong educational background spanning multiple prestigious institutions, Dr. Hassan brings a wealth of knowledge and expertise to his role as a faculty member.

Research Areas

Medical Image Processing | Deep Learning | Pattern Recognition | Natural Language Processing | Data Mining | Computer Vision

	TOTAL	FY 2023
PUBLICATIONS	52	04
CITATIONS	741	232

SGDS TARGETED ---------- 02

DR. MEHDI HASSAN
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TITLE OF PAPER

Developing a Breast Cancer Resistance Protein Substrate Prediction System Using Deep Features and LDA

COMPUTERS, MATERIALS & CONTINUA

UNITED STATES

W

3.1 (2022)

2023-08-01

3 GOOD HEALTH AND WELL-BEING

10.32604/cmc.2023.038578

SCAN ME

ABSTRACT

Breast cancer resistance protein (BCRP) is an important resistance protein that significantly impacts anticancer drug discovery, treatment, and rehabilitation. Early identification of BCRP substrates is quite a challenging task. This study aims to predict early substrate structure, which can help to optimize anticancer drug development and clinical diagnosis. For this study, a novel intelligent approach-based methodology is developed by modifying the ResNet101 model using transfer learning (TL) for automatic deep feature (DF) extraction followed by classification with linear discriminant analysis algorithm (TLRNDF-LDA). This study utilized structural fingerprints, which are exploited by DF contrary to conventional molecular descriptors. The proposed in silico model achieved an outstanding accuracy performance of 98.56% on test data compared to other state-of-the-art approaches using standard quality measures. Furthermore, the model's efficacy is validated via a statistical analysis ANOVA test. It is demonstrated that the developed model can be used effectively for early prediction of the substrate structure. The pipeline of this study is flexible and can be extended for in vitro assessment efficacy of anticancer drug response, identification of BCRP functions in transport experiments, and prediction of prostate or lung cancer cell lines.

KEYWORDS:

BCRP | Drug response | Deep Learning | Transfer Learning | LDA

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TITLE OF PAPER

Developing a Novel Methodology by Integrating Deep Learning and HMM for Segmentation of Retinal Blood Vessels in Fundus Images

COMPUTERS, MATERIALS & CONTINUA

GERMANY

X

4.8 (2022)

2023-01-07

https://doi.org/10.1007/s12539-022-00545-9

3 GOOD HEALTH AND WELL-BEING

SCAN ME

ABSTRACT

Accurate segregation of retinal blood vessels is crucial for clinical assessments and treatments. A new segmentation framework is proposed, combining deep neural networks and a hidden Markov model. It comprises three modules: an Atrous spatial pyramid pooling-based encoder, a decoder, and a hidden Markov model vessel tracker. The encoder employs a modified ResNet18 model for feature extraction, while the decoder performs convolution operations for initial segmentation. To address overlooked capillaries, the hidden Markov model vessel tracker is integrated. Final segmentation is achieved by combining multi-oriented sub-images. Experimental validation on standard datasets demonstrates high accuracy, area under the curve, and sensitivity, outperforming state-of-the-art approaches. With improved learning and generalization capabilities, this framework offers efficient and automatic blood vessel tracking, benefiting human eye assessment, disease diagnosis, and rehabilitation.

KEYWORDS:

HMM | Fundus Vessel | Deep Neural Networks | Transfer Learning | ResNet

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TITLE OF PAPER

Segmentation of shoulder muscle MRI using a new region and edge based deep auto-encoder

MULTIMEDIA TOOLS AND APPLICATIONS

NETHERLANDS

W

3.6 (2022)

2023-04-01

https://doi.org/10.1007/s11042-022-14061-x

3 GOOD HEALTH AND WELL-BEING

SCAN ME

ABSTRACT

Automatic segmentation of shoulder muscle MRI presents challenges due to variations in muscle size, shape, texture, and tear spatial positions. Manual segmentation is laborious, time-consuming, and subjective to pathology expertise. This study introduces a novel Region and Edge-based Deep Auto-Encoder (RE-DAE) for shoulder muscle MRI segmentation. RE-DAE utilizes average and max-pooling operations to harmoniously process information in Convolutional encoder and decoder blocks. The approach encourages homogeneous and anatomical information extraction through region and edge-based segmentation, generating a discriminative hybrid feature space. Additionally, static attention is leveraged in RE-DAE to effectively learn tear regions. Performance evaluation on a 3D MRI shoulder muscle dataset from Korea University Anam Hospital demonstrates promising results compared to existing architectures, with a dice similarity of 85.58% and 87.07% and an accuracy of 81.57% and 95.58% for tear and muscle regions, respectively. The proposed SA-RE-DAE offers accurate segmentation, facilitating improved clinical decisions.

KEYWORDS:

MRI | Shoulder Muscle | Deep Auto-Encoder | Transfer Learning | Segmentation

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TITLE OF PAPER

Social media content classification and community detection using deep learning and graph analytics

TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE

UNITED STATES

W

12 (2022)

2023-03-01

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

https://doi.org/10.1016/j.techfore.2022.122252

SCAN ME

ABSTRACT

Social cybermedia has greatly changed the world's perspective on information sharing and propagation. These platforms build virtual user communities in the form of followings or followers that can spread positive or negative content. These virtual communities play a vital role in the spread of hate content, which may create a severe law-and-order situation and social unrest in any country. Hate content can include offensive, anti-state, anti-religion, sexist, and racist posts. Classifying such content and identifying influential individuals who participate in these communities are challenging tasks for law enforcement agencies. This study proposes novel deep learning and graph-based approaches to identifying hate content, followed by approaches to detecting communities and exploring social media to detect hate content. Twitter is used as a case study, and tweets are extracted and annotated by linguistic experts to develop a dataset for experimentation and validation. The proposed customized LSTM-GRU model is used to classify hate content into six categories. The developed model offers an accuracy of 98.14% on the obtained dataset. The Girvan–Newman algorithm is employed for Twitter community detection and successfully identifies the most influential individuals. Moreover, the proposed approach precisely detects intraclass communities and highly influential persons. The developed model effectively identifies hate tweets and communities and can be used to monitor social media to identify any potential threat of unrest.

KEYWORDS:

Social cybermedia | Deep Learning | Graph-based approaches | LSTM-GRU model

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Mr. Tariq Naeem is an Assistant Professor at the Faculty of Computing and Artificial Intelligence (FCAI) in Air University. He holds a Master of Science in Computer Science (MSCS) and a Bachelor of Science in Computer Science (BSCS), both from the University of Peshawar, KP. With his educational background and expertise, Mr. Naeem brings valuable knowledge and experience to the department, contributing to the academic and research endeavors of FCAI.

Research Areas

NLP

Computational Linguistics | Machine Learning / Deep Learning

	TOTAL	FY 2023
PUBLICATIONS	09	01
CITATIONS	25	9

SGDS TARGETED ---------- 01

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TITLE OF PAPER

UtilityAware: A framework for data privacy protection in e-health

INFORMATION SCIENCES

UNITED STATES

W

8.1 (2022)

2023-05-29

3 GOOD HEALTH AND WELL-BEING

https://doi.org/10.1016/j.ins.2023.119247

SCAN ME

ABSTRACT

Data privacy in e-health deals with the protection of sensitive medical information that is collected, stored, and analyzed in electronic health systems. Several organizations publish sensitive person-specific data for research purposes. E-health data and related domains are the loci of research. First, in publishing sensitive person-specific datasets, ensuring the privacy of user sensitive information is an issue. Secondly, ascertaining both privacy-preservation and data utility simultaneously are contradictory to each other. In addition, all transactions have the same prior belief that may result in erroneous modeling and privacy breaches. To refrain from the belief of an adversary and to solve the above discussed issues, a semantic privacy guarantee must be ensured before publishing data by any organization. This paper proposes a solution to the former issue, a framework for privacy preservation of structured datasets in ascertaining that an adversary has low confidence in extrapolation. The latter problem is also tackled by the proposed framework that combines stratified sampling with generalization to achieve representative semantic privacy-preservation with high data utility. Moreover, this study presents a mathematical proof that the proposed framework achieves differential privacy. Our experimental results show that our algorithm provides better data utility and privacy simultaneously. The proposed framework achieves 3% and 0.04% higher classification accuracy and low relative error, respectively, compared to state-of-the-art existing privacy-preservation approaches.

KEYWORDS:

Sensitive information | Privacy breaching | Stratified Sampling | Relative error

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Research Areas

Computational Intelligence | Machine and Deep Learning | Network security | Risk Management and Assessment

	TOTAL	FY 2023
PUBLICATIONS	16	03
CITATIONS	286	30

SGDS TARGETED ---------- 01

DR. ASHFAQ HUSSAIN FAROOQI
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TITLE OF PAPER

A Systematic Literature Review of 3D Deep Learning Techniques in Computed Tomography Reconstruction

TOMOGRAPHY

SWITZERLAND

X

2.3 (2022)

2023-12-05

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

https://doi.org/10.3390/tomography9060169

SCAN ME

ABSTRACT

Computed tomography (CT) is used in a wide range of medical imaging diagnoses. However, the reconstruction of CT images from raw projection data is inherently complex and is subject to artifacts and noise, which compromises image quality and accuracy. In order to address these challenges, deep learning developments have the potential to improve the reconstruction of computed tomography images. In this regard, our research aim is to determine the techniques that are used for 3D deep learning in CT reconstruction and to identify the training and validation datasets that are accessible. This research was performed on five databases. After a careful assessment of each record based on the objective and scope of the study, we selected 60 research articles for this review. This systematic literature review revealed that convolutional neural networks (CNNs), 3D convolutional neural networks (3D CNNs), and deep learning reconstruction (DLR) were the most suitable deep learning algorithms for CT reconstruction. Additionally, two major datasets appropriate for training and developing deep learning systems were identified: 2016 NIH-AAPM-Mayo and MSCT. These datasets are important resources for the creation and assessment of CT reconstruction models. According to the results, 3D deep learning may increase the effectiveness of CT image reconstruction, boost image quality, and lower radiation exposure. By using these deep learning approaches, CT image reconstruction may be made more precise and effective, improving patient outcomes, diagnostic accuracy, and healthcare system productivity.

KEYWORDS:

3D Deep Learning | Computed Tomography Reconstruction | Systematic literature review

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TITLE OF PAPER

Enhancing Network Intrusion Detection Using an Ensemble Voting Classifier for Internet of Things

SENSORS

SWITZERLAND

W

6.8 (2022)

2023-12-26

https://doi.org/10.3390/s24010127

SCAN ME

ABSTRACT

In the realm of 6G technology, the Internet of Everything aims to establish an extensive network connecting humans and devices across various dimensions. This integration of smart healthcare, agriculture, transportation, and homes offers convenient control through touch or voice commands. However, heightened Internet connectivity also escalates security risks, necessitating stronger measures to secure IoT-enabled metaverse connections. Attacks, often orchestrated via botnets, pose a threat to IoT networks, emphasizing the need for anomaly detection to avert potential consequences. Our research proposes a novel classification technique, DRX, merging Decision tree, Random forest, and XGBoost algorithms. This ensemble voting classifier significantly improves the accuracy and precision of intrusion detection systems. Experimentation using NSL-KDD, UNSW-NB15, and CIC-IDS2017 datasets demonstrates DRX's superiority, achieving accuracy rates of 99.88%, 99.93%, and 99.98% respectively, with notably reduced false positive rates.

KEYWORDS:

Machine Learning | Synthetic minority over-sampling technique (SMOTE) | Network intrusion detection system (NIDS)

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Dr. Syed Atif Ali Shah brings a wealth of experience to his role as a Lecturer in the Department of Computer Science, with a strong background in both academia and industry. He holds a Doctor of Philosophy (PhD) degree in Artificial Intelligence from Al-Madinah International University, complemented by a Master of Science (MS) in Electrical Engineering from Abasyn University. Additionally, he possesses a Master of Science (MS) in Computer Software Engineering from the Virtual University of Pakistan and a Master of Science (MSc) in Computer Science from Brains Postgraduate College. Dr. Shah's academic journey also includes a Bachelor's degree in Computer Science from the University of Peshawar. His professional experience extends to industry, where he served as an Officer SCM (Oracle Vision and Automation Project) at Mobilink (PMCL), demonstrating his expertise in technical procurement and user acceptance testing.

Research Areas

CNN | Data Science | Deep Learning

	TOTAL	FY 2023
PUBLICATIONS	24	02
CITATIONS	406	158

SGDS TARGETED ---------- 02

DR. SYED ATIF ALI SHAH

LECTURER

DEPARTMENT OF COMPUTER SCIENCE

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TITLE OF PAPER

Street-crimes Modelled Arms Recognition Technique Employing Deep Learning and Quantum Deep Learning (SMARTED)

INDONESIAN JOURNAL OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

INDONESIA

2.9 (2022)

Y

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

2023-04-01

http://doi.org/10.11591/ijeecs.v30.i1.pp528-544

SCAN ME

ABSTRACT

An increase in population causes loopholes in controlling law and order situations. One of the threatening aspects of peace is the availability of weapons to the general public. As a result, many dangerous situations arise, most notably street crimes. Traditional methods are not sufficient to deal with such situations. Consequently, the police and other security concerns need serious technological reforms to prevent such situations. In modern technology tools, deep learning has made great improvements in various areas of daily life, especially in object detection. This paper presents an efficient technique for detecting weapons from closed-circuit television (CCTV) cameras, videos, or images. Upon the detection of the weapon, the concerned person is automatically informed to take the necessary action; without human intervention. For the first time, RetinaNet has been employed to detect weapons in real-time scenarios. RetinaNet has shown remarkable improvement in this domain, by achieving an average of 90% accuracy in real-time scenarios. With the emergence of quantum computing, many computer environments saw a revolution. Thus, we have also utilized quantum computing technology for real-time weapons detection using quantum deep learning. In this paper, quantum inspired RetinaNet (QIR-Net) is developed for weapons detection and amazing results are observed.

KEYWORDS: Automatic weapon detection | Convolutional neural networks | Quantum inspired CNN | Deep Learning

DR. SYED ATIF ALI SHAH

LECTURER

DEPARTMENT OF COMPUTER SCIENCE

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TITLE OF PAPER

Energy Efficient Data Dissemination for Large-Scale Smart Farming Using Reinforcement Learning

ELECTRONCS , MDPI

SWITZERLAND

W

2.9 (2022)

2023-03-05

https://doi.org/10.3390/electronics12051248



SCAN ME

ABSTRACT

Smart farming is essential to increasing crop production, and there is a need to consider the technological advancements of this era; modern technology has helped us to gain more accuracy in fertilizing, watering, and adding pesticides to the crops, as well as monitoring the conditions of the environment. Nowadays, more and more sophisticated sensors are being developed, but on a larger scale, agricultural networks and the efficient management of them is very crucial in order to obtain proper benefits from technology. Our idea is to achieve sustainability in large-scale farms by improving communication between wireless sensor nodes and base stations. We want to increase communication efficiency by introducing machine learning algorithms. Reinforcement learning is the area of machine learning which is concerned with how involved agents are supposed to take action in specified environments to maximize reward and achieve a common goal. In our network, a large number of sensors are being deployed on large-scale fields; reinforcement learning is used to find the optimal set of paths towards the base station. After a number of successful paths have been developed, they are then used to transmit the sensed data from the fields. The simulation results have shown that in larger scales, our proposed model had less transmission delay than the shortest path transmission model and broadcasting techniques that were tested against the data transmission paths developed by reinforcement learning.

KEYWORDS: Wireless sensor network | Reinforcement learning | Agent Based modelling | AnyLogic

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Dr. Ayesha Saadia is an Assistant Professor in the Department of Computer Science at Air University. She holds a PhD in Software Engineering from NUST, Pakistan, along with a Master's degree in Computer Science and a Bachelor's degree in Computer Science, both from Virtual University, Pakistan. Dr. Saadia's expertise lies in the field of Software Engineering, where her academic background and research contribute to the advancement of knowledge and practice in the domain.

Research Areas

Medical Image Processing | Deep Learning | Remote Sensing | Document Analysis | Pattern Recognition

	TOTAL	FY 2023
PUBLICATIONS	13	03
CITATIONS	91	28

SGDS TARGETED ---------- 02

DR. AYESHA SAADIA
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TITLE OF PAPER

Artificial Intelligence for Cognitive Health Assessment: State-of-the-Art Open Challenges and Future Directions

COGNITIVE COMPUTATION

UNITED KINGDOM

W

5.4 (2022)

2023-06-24

3 GOOD HEALTH AND WELL-BEING

https://doi.org/10.1007/s12559-023-10153-4

SCAN ME

ABSTRACT

The subjectivity and inaccuracy of in-clinic Cognitive Health Assessments (CHA) have led many researchers to explore ways to automate the process to make it more objective and to facilitate the needs of the healthcare industry. Artificial Intelligence (AI) and machine learning (ML) have emerged as the most promising approaches to automate the CHA process. In this paper, we explore the background of CHA and delve into the extensive research recently undertaken in this domain to provide a comprehensive survey of the state-of-the-art. In particular, a careful selection of significant works published in the literature is reviewed to elaborate a range of enabling technologies and AI/ML techniques used for CHA, including conventional supervised and unsupervised machine learning, deep learning, reinforcement learning, natural language processing, and image processing techniques. Furthermore, we provide an overview of various means of data acquisition and the benchmark datasets. Finally, we discuss open issues and challenges in using AI and ML for CHA along with some possible solutions. In summary, this paper presents CHA tools, lists various data acquisition methods for CHA, provides technological advancements, presents the usage of AI for CHA, and open issues, challenges in the CHA domain. We hope this first-of-its-kind survey paper will significantly contribute to identifying research gaps in the complex and rapidly evolving interdisciplinary mental health field.

KEYWORDS:

Healthcare | Internet of things | Sustainability | Cognitive health

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TITLE OF PAPER

Cross-Domain Transfer Learning for Natural Scene Classification of Remote-Sensing Imagery

APPLIED SCIENCES

SWITZERLAND

W

2.9 (2022)

2023-06-24

https://doi.org/10.1007/s12559-023-10153-4



SCAN ME

ABSTRACT

Natural scene classification, which has potential applications in precision agriculture, environmental monitoring, and disaster management, poses significant challenges due to variations in the spatial resolution, spectral resolution, texture, and size of remotely sensed images of natural scenes on Earth. For such challenging problems, deep-learning-based algorithms have demonstrated amazing performances in recent years. Among these methodologies, transfer learning is a useful technique which employs the learned features already extracted from the pre-trained models from large-scale datasets for the problem at hand, resulting in quicker and more accurate models. In this study, we deployed cross-domain transfer learning for the land-cover classification of remotely sensed images of natural scenes. We conducted extensive experiments to measure the performance of the proposed method and explored the factors that affect the performance of the models. Our findings suggest that fine-tuning the ResNet-50 model outperforms various other models in terms of the classification accuracy. The experimental results showed that the deployed cross-domain transfer-learning system achieved outstanding (99.5% and 99.1%) accurate performances compared to previous benchmarks on the NaSC-TG2 dataset with the final tuning of the whole structure and only the last three layers, respectively.

KEYWORDS: Natural Scene classification; Convolutional neural network; Deep learning; Remote sensing

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TITLE OF PAPER

Cortex-inspired ensemble based network intrusion detection system

NEURAL COMPUTING AND APPLICATIONS

UNITED KINGDOM

W

6.0 (2022)

2023-04-11

https://doi.org/10.1007/s00521-023-08561-6

3 GOOD HEALTH AND WELL-BEING

SCAN ME

ABSTRACT

Natural scene classification, which has potential applications in precision agriculture, environmental monitoring, and disaster management, poses significant challenges due to variations in the spatial resolution, spectral resolution, texture, and size of remotely sensed images of natural scenes on Earth. For such challenging problems, deep-learning-based algorithms have demonstrated amazing performances in recent years. Among these methodologies, transfer learning is a useful technique which employs the learned features already extracted from the pre-trained models from large-scale datasets for the problem at hand, resulting in quicker and more accurate models. In this study, we deployed cross-domain transfer learning for the land-cover classification of remotely sensed images of natural scenes. We conducted extensive experiments to measure the performance of the proposed method and explored the factors that affect the performance of the models. Our findings suggest that fine-tuning the ResNet-50 model outperforms various other models in terms of the classification accuracy. The experimental results showed that the deployed cross-domain transfer-learning system achieved outstanding (99.5% and 99.1%) accurate performances compared to previous benchmarks on the NaSC-TG2 dataset with the final tuning of the whole structure and only the last three layers, respectively.

KEYWORDS:

Machine learning | Neural network | Intrusion Detection system | Brain's visual cortex

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Dr. Syed Fahad Tahir is a Tenured Associate Professor at the Faculty of Computing and Artificial Intelligence (FCAI) in Air University. He holds a PhD in Interactive and Cognitive Environments from Queen Mary University of London, UK, showcasing his expertise in advanced computational systems. With a Master's degree in Computer System Engineering from GIKI, Pakistan, and a Bachelor's degree in Computer Sciences from FAST-NU, Pakistan, Dr. Tahir brings a comprehensive understanding of both theoretical concepts and practical applications in the field.

Research Areas

Computer Vision | Data Analysis | Pattern Matching | Video Surveillance

	TOTAL	FY 2023
PUBLICATIONS	22	01
CITATIONS	566	96

SGDS TARGETED ---------- 01

DR. SYED FAHAD TAHIR
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TITLE OF PAPER

Image forgery detection by transforming local descriptors into deep-derived features

APPLIED SOFT COMPUTING, ELSEVIER

NETHERLANDS

W

6.7 (2022)

2023-08-14

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

https://doi.org/10.1016/j.asoc.2023.110730

SCAN ME

ABSTRACT

Image forgery is the intentional alteration of digital images, either manually using image editors or through deep fake techniques, for the purpose of disseminating fake information. We propose a forgery detection approach that efficiently detects copy-move and splicing attacks of varying scales in digital images. Our goal is to identify the homogeneous region(s) inconsistent with the rest of the image. This region property has been typically employed in object detection and classification, while we exploit this property to detect forgery in images. Thus, we generate the deep-derived features from the existing hand-crafted features in forgery detection as input to the VGG16, a deep learning method, trained for object classification. We use a binary class SVM trained on the obtained deep-derived features to determine whether an image is real or fake. We perform extensive experiments on three publicly available image manipulation datasets, DVMM, Casia and Korus to validate the effectiveness of the proposed methodology. The results show a better accuracy compared to the state-of-the-art methods.

KEYWORDS:

Forgery detection | Deep learning | SVM | Deep-derived features

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Research Areas

Image Processing | Brain Tumor Segmentation | Deep Learning

	TOTAL	FY 2023
PUBLICATIONS	02	02
CITATIONS	2	2

SGDS TARGETED ---------- 01

Ms. Kainat Nazir
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TITLE OF PAPER

Brain Tumor Detection Based on Deep Learning Approach

JOURNAL OF COMPUTING & BIOMEDICAL INFORMATICS

PAKISTAN

NOT ANNOUNCED

Y

3 GOOD HEALTH AND WELL-BEING

2023-03-29

https://www.jcbi.org/index.php/Main/article/view/238

SCAN ME

ABSTRACT

Detection of brain tumors presents a significant challenge in the medical field, requiring experts to carefully evaluate MRI images to pinpoint the issue. In recent years, various artificial intelligence techniques have been explored to automate this process. However, earlier methods faced limitations, primarily being trained on single data sets, hindering their ability to detect brain tumors across diverse environments in MRI images. To address this, this research investigates brain tumor detection using data augmentation and denoising techniques across three distinct data sets. Two deep learning algorithms, EfficientNet and ResNet50, are employed to evaluate the effectiveness of these techniques. EfficientNet demonstrated 100% training and 100% test accuracy on the first data set, small-bt-2c, while ResNet50 achieved 100% training and 96% test accuracy. Results on the second data set, large-bt-2c, showed EfficientNet with training accuracy of 98.80% and test accuracy of 96.73%, and ResNet50 with training accuracy of 98.72% and test accuracy of 96.08%. Similarly, the third data set, large-bt-4c, yielded training accuracy with EfficientNet of 99.93% and test accuracy of 96.32%, and with ResNet50 of 99.44% and 95.09%, respectively. Overall, both models demonstrated proficiency in detecting brain tumors, with EfficientNet often outperforming ResNet50. These findings underscore the potential of data augmentation and denoising methods in enhancing the accuracy of brain tumor detection using deep learning algorithms. This study contributes to ongoing efforts in the medical community to advance the early and precise detection of brain tumors through cutting-edge machine learning approaches.

KEYWORDS:

Brain Tumor Detection | EfficientNET | Resnet-50 | Data Augmentation

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TITLE OF PAPER

3D Kronecker Convolutional Feature Pyramid for Brain Tumor Semantic Segmentation in MR Imaging.

COMPUTERS, MATERIALS & CONTINUA

GERMANY

X

4.8 (2022)

2023-10-01

10.32604/cmc.2023.039181



SCAN ME

ABSTRACT

Brain tumor significantly impacts the quality of life and changes everything for a patient and their loved ones. Diagnosing a brain tumor usually begins with magnetic resonance imaging (MRI). The manual brain tumor diagnosis from the MRO images always requires an expert radiologist. However, this process is time-consuming and costly. Therefore, a computerized technique is required for brain tumor detection in MRI images. Using the MRI, a novel mechanism of the three-dimensional (3D) Kronecker convolution feature pyramid (KCFP) is used to segment brain tumors, resolving the pixel loss and weak processing of multi-scale lesions. A single dilation rate was replaced with the 3D Kronecker convolution, while local feature learning was performed using the 3D Feature Selection (3DFSC). A 3D KCFP was added at the end of 3DFSC to resolve weak processing of multi-scale lesions, yielding efficient segmentation of brain tumors of different sizes. A 3D connected component analysis with a global threshold was used as a post-processing technique. The standard Multimodal Brain Tumor Segmentation 2020 dataset was used for model validation. Our 3D KCFP model performed exceptionally well compared to other benchmark schemes with a dice similarity coefficient of 0.90, 0.80, and 0.84 for the whole tumor, enhancing tumor, and tumor core, respectively. Overall, the proposed model was efficient in brain tumor segmentation, which may facilitate medical practitioners for an appropriate diagnosis for future treatment planning.

KEYWORDS: Brain tumor segmentation | Kronecker convolution | Deep learning | Connect component analysis

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Research Areas

Computer Networks & Security

Wireless Networks and 5G Technologies

Internet Security

IoT

	TOTAL	FY 2023
PUBLICATIONS	03	01
CITATIONS	47	08

SGDS TARGETED ---------- 01

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TITLE OF PAPER

Analysis of Deep Learning Algorithms for Detection and Classification of Tomato Leaf Diseases

JOURNAL OF COMPUTING & BIOMEDICAL INFORMATICS

PAKISTAN

Y

NOT ANNOUNCED

2023-03-29

3 GOOD HEALTH AND WELL-BEING

https://jcbi.org/index.php/Main/article/view/237

SCAN ME

ABSTRACT

The use of deep learning models for identifying and categorizing Tomato Leaf Disease has become popular due to the complexity of the task. However, current models are primarily assessed based on their ability to differentiate between healthy and diseased leaves, which is limiting. These models are trained on a small dataset of 2000-5000 images, known as Plant Village, which is considered unreliable and lacks robustness. This study aims to address these limitations by proposing the use of a larger multi-source dataset comprising 40,000-45,000 images. Data preprocessing techniques, including data augmentation, were employed to balance the dataset's classes, resulting in a final augmented dataset of 60,000 images. This approach significantly improved the model's classification efficacy to 99.97% while reducing training time for the large dataset. Addressing the deficiency in localization of damaged regions is crucial for accurate diagnoses and treatments, emphasizing the need for comprehensive evaluation and validation of these models.

KEYWORDS:

Brain tumor segmentation | Machine Learning | Data Augmentation | Tomato Leaf Disease | Feature Extraction

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Muhammad Ayaz khan is a Lecturer at Air University's Computer Department and a PhD scholar in Cyber security at Air University. He has contributed significantly to the academic community with 4 research manuscripts. He has also conducted top-notch cybersecurity training sessions and workshops at Digital Pakistan Cybersecurity Hands-on Training workshop 2023 under IGNITE and CPD Air University. Mr. Ayaz's awarded as a Best Trainer in Digital Pakistan Cybersecurity Hands-on Training workshop 2023 presented by Air Marshal Javaid Ahmed (VC Air University).

Research Areas

Cyber Security /Information Security

Applied Cryptography

Cryptography

IoT Security

	TOTAL	FY 2023
PUBLICATIONS	03	02
CITATIONS	11	06

SGDS TARGETED ---------- 01

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TITLE OF PAPER

Fortifying Smart Home Security: A Robust and Efficient User-Authentication Scheme to Counter Node Capture Attacks

SENSORS

SWITZERLAND

W

6.8 (2022)

2023-08-19

https://doi.org/10.3390/s23167268

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

In smart home environments, the interaction between a remote user and devices commonly occurs through a gateway, necessitating the need for robust user authentication. Despite numerous state-of-the-art user-authentication schemes proposed over the years, these schemes still suffer from security vulnerabilities exploited by the attackers. One severe physical attack is the node capture attack, which allows adversaries to compromise the security of the entire scheme. This research paper advances the state of the art by conducting a security analysis of user-authentication approaches regarding their vulnerability to node capture attacks resulting in revelations of several security weaknesses. To this end, we propose a secure user-authentication scheme to counter node capture attacks in smart home environments. To validate the effectiveness of our proposed scheme, we employ the BAN logic and ProVerif tool for verification. Lastly, we conduct performance analysis to validate the lightweight nature of our user-authentication scheme, making it suitable for IoT-based smart home environments.

KEYWORDS:

Smart home security | User Authentication | Node capture attack

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TITLE OF PAPER

Enhancing Security and Privacy in Healthcare Systems Using a Lightweight RFID Protocol

SENSORS

SWITZERLAND

W

6.8 (2022)

2023-06-12

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

https://doi.org/10.3390/s23125518

SCAN ME

ABSTRACT

Utilizing Radio Frequency Identification (RFID) technology in healthcare systems enhances patient care and safety but exposes vulnerabilities compromising patient privacy and credential management. This paper aims to enhance security in RFID-based healthcare systems by proposing a lightweight protocol ensuring patient privacy in the Internet of Healthcare Things (IoHT) domain. By employing pseudonyms instead of real IDs, secure communication between tags and readers is ensured. Rigorous testing confirms the protocol's resilience against security attacks. The article provides an overview of RFID technology in healthcare, highlighting challenges, and reviews existing authentication protocols. Our proposed protocol addresses anonymity and traceability issues, with lower computational costs and improved security. Ensuring patient privacy with pseudonyms, our lightweight RFID protocol fortifies security against known attacks.

KEYWORDS:

RFID protocol | Internet of Healthcare Things (IoHT) | RFID authentication | IoT security

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Dr. Arif-ullah is an Assistant Professor with a PhD in Information Technology from Universiti Tun Hussein Onn Malaysia (UTHM), Malaysia. He also holds a Master of Science (MS) degree in Computer Science from The University of Agriculture, Peshawar, Pakistan, and a Master of Science in Computer Science (MSC) from The University of Peshawar, Pakistan. Furthermore, Dr. Arif-ullah obtained his Bachelor of Science (BSC) in Computer Science from The University of Peshawar, Pakistan.

Research Areas

Cloud computing | Artificial intelligence | E-Learning | Wireless Sensor Network | IoT

	TOTAL	FY 2023
PUBLICATIONS	46	01
CITATIONS	681	295

SGDS TARGETED ---------- 01

DR. ARIF-ULLAH
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TITLE OF PAPER

Latency aware smart health care system using edge and fogcomputing

MULTIMEDIA TOOLS AND APPLICATIONS

NETHERLANDS

W

3.6 (2022)

2023-09-25

8 DECENT WORK AND ECONOMIC GROWTH

https://doi.org/10.1007/s11042-023-16899-1

SCAN ME

ABSTRACT

Numerous gadgets are linked together globally by the Internet of Things (IoT). Health checking, exercise programmers and remote medical assistance are a few examples of emerging areas in the healthcare system. Implementing cloud computing functionality on edge devices is the constant goal of fog computing. The approach is anticipated to surpass the minimum latencies requirement when used with Internet of Things (IoT) medical equipment. IoT devices produce different amounts of healthcare data. Due to the enormous volume of data produced, networks get overloaded, increasing delay. Traditional cloud servers are unable to meet the low latency requirements of IoT medical equipment and consumers. IoT data transfer, it is therefore vital to reduce network latency, computation delay, and energy consumption. Using FC, data can be stored, processed, and analyzed. Cloud computing data is located at a network edge to reduce high latency. Here, a novel resolution to the problem mentioned earlier is proposed. It combines an analytical model with a hybrid fuzzy-based reinforced learning technique in an FC setting. The objective is to reduce energy usage and cloud server latency for health-care IoT. The Internet of Things-FC context is selected and placed by the proposed smart FC analysis technique and algorithm using a fuzzy inference system, optimization techniques, and development approaches. The results showed that our suggested strategy reduced latency by 1.2% in comparison to other techniques.

KEYWORDS:

Fog | Edge Computing | IoT appliances | Healthcare Applications

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Research Areas

- Artificial Intelligence in Wireless Sensor network
- Wired Networks
- Wireless Sensor Network

	TOTAL	FY 2023
PUBLICATIONS	01	01
CITATIONS	01	01

SGDS TARGETED ---------- 01

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TITLE OF PAPER

Energy Efficient Data Dissemination for Large-Scale Smart Farming Using Reinforcement Learning

ELECTRONCS

SWITZERLAND

W

2.9 (2022)

2023-03-05

8 DECENT WORK AND ECONOMIC GROWTH

https://doi.org/10.3390/electronics12051248

SCAN ME

ABSTRACT

Smart farming is essential to increasing crop production, and there is a need to consider the technological advancements of this era; modern technology has helped us to gain more accuracy in fertilizing, watering, and adding pesticides to the crops, as well as monitoring the conditions of the environment. Nowadays, more and more sophisticated sensors are being developed, but on a larger scale, agricultural networks and the efficient management of them is very crucial in order to obtain proper benefits from technology. Our idea is to achieve sustainability in large-scale farms by improving communication between wireless sensor nodes and base stations. We want to increase communication efficiency by introducing machine learning algorithms. Reinforcement learning is the area of machine learning which is concerned with how involved agents are supposed to take action in specified environments to maximize reward and achieve a common goal. In our network, a large number of sensors are being deployed on large-scale fields; reinforcement learning is used to find the optimal set of paths towards the base station. After a number of successful paths have been developed, they are then used to transmit the sensed data from the fields. The simulation results have shown that in larger scales, our proposed model had less transmission delay than the shortest path transmission model and broadcasting techniques that were tested against the data transmission paths developed by reinforcement learning.

KEYWORDS:

Wireless sensor networks | Reinforcement learning | Agent based modelling

Department of Cyber Security

Departmental Overview

The Department of Cyber Security at Air University is committed to providing graduates with the knowledge and skills to solve real-world cyber security issues while instilling a sense of social responsibility and fostering lifelong learning. Established in Fall 2018 with a BS in Cyber Security program, the department has swiftly expanded its offerings to include MS and PhD programs in Cyber Security, aligning with international standards and guidelines. With dedicated faculty and specialized labs, we offer a dynamic learning environment conducive to experiential learning and practical engagement with cyber security challenges. Our focus on innovative research is underscored by the National Center for Cyber Security (NCCS) and 11 specialized labs strategically located across Pakistan. Our programs have quickly become essential components of the educational landscape, preparing students to become proficient cyber security professionals and contribute to enhancing Pakistan's cyber security posture.

The Department of Cyber Security at Air University is supported by a dedicated team of faculty members committed to excellence in education and research. Led by Dr. Zunera Jalil, Dr. Kashif Kifayat, and Dr. Ghalib Asadullah Shah as Professors, the department benefits from their extensive expertise and leadership. Additionally, Associate Professor Dr. Ammar Masood, and Assistant Professors Dr. Mohammad Imran, Dr. Ammara Gul, Mr. Khwaja Mansoor ul Hassan, Dr. Zafar Iqbal, Dr. Syed Muhammad Sajjad, and Dr. Balawal Shabir contribute significantly to the department's academic endeavors. Complementing the faculty team are lecturers including Ms. Memoona Sadaf, Mr. Jameel Arif, Ms. Hina Batool, Mr. Azhar Ghafoor, Mr. Muhammad Jalal Shah, Mr. Hilmand Khan Tareen, Mr. Usama Bin Amir, and Ms. Mehmoona Jabeen, who play crucial roles in delivering quality education to students.

DEPARMENTAL PUBLICATIONS (2023)

11

SDGS TARGETED IN 2023





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Dr. Mohammad Imran is an Assistant Professor at the Faculty of Computing and Artificial Intelligence (FCAI), bringing a wealth of expertise to the department. Holding a Ph.D. in Computer Science from Capital University of Science & Technology, Islamabad, Dr. Imran further enriched his academic credentials with an MS in Computer Science from Lahore University of Management Sciences (LUMS), Lahore, and a BSc (Hon's) in Computer Science from the University of Reading, UK. With this comprehensive educational background, Dr. Imran is well-equipped to contribute to the department's research endeavors and academic excellence.

Research Areas

Embedded systems security

Hardware security

Malware classification

	TOTAL	FY 2023
PUBLICATIONS	07	01
CITATIONS	85	08
SGDS TARGETED ----------	01	

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TITLE OF PAPER

MOPTIC-SM - Sleep mode-enabled multi-optimized intermittent computing for transiently powered systems

JOURNAL OF SYSTEMS ARCHITECTURE

NETHERLANDS

W

4.5 (2022)

2023-04-01

https://doi.org/10.1016/j.sysarc.2023.102850



SCAN ME

ABSTRACT

The proliferation of Internet of Things (IoT) based devices has led to a significant increase in their usage across a broad range of application areas. However, the replacement and/or periodic maintenance of the billions of conventional power supplies used by these systems is required on an annual basis, which raises serious environmental and economic concerns. To subjugate these issues, transiently-powered embedded systems (TPESs) make use of an ambient energy resource. However, the non-uniform availability of ambient energy results in frequent system reboots. This problem can be mitigated by utilizing state checkpointing in non-volatile memory, yet a high number of checkpoints can lead to excessive energy consumption. In this research, a novel sleep mode-enabled multi-optimized intermittent computing method is proposed that combines data sampling and memoization to reduce the number of checkpoints. The proposed method is validated using the Microchip SAM-L11 embedded platform for the implementation of the Canny Edge Detection (CED) algorithm. The results of the experiments indicate that the proposed method effectively reduces the number of checkpoints for a given application by 50 percent in CED and maintains 70 percent accuracy in comparison to conventional TPES checkpointing. It is believed that the proposed solution will have several exciting applications in both the consumer market and industry.

KEYWORDS:

IoT | Canny Edge Detection (CED) algorithm | Multi-optimized intermittent computing

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Dr. Zafar Iqbal is an Assistant Professor with expertise in Cyber Security. He holds a Ph.D. in Cyber Security from the National University of Science and Technology (NUST), along with an MSc in Networking from the University of Engineering and Technology, Taxila, and an MCS in Computer Science from Al-Khair University. With this strong educational background, Dr. Iqbal brings a wealth of knowledge and experience to his role, contributing significantly to the field of Cyber Security within academia and beyond.

Research Areas

- Cyber Threat Intelligence
- DLP systems
- Advanced Cyber Attacks Analysis
- Machine Learning
- Smart phone threat analysis
- Memory Forensic
- IoT and Smart devices security analysis

	TOTAL	FY 2023
PUBLICATIONS	17	03
CITATIONS	148	83

SGDS TARGETED ---------- 01

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TITLE OF PAPER

Circumventing Google Play vetting policies - a stealthy cyberattack that uses incremental updates to breach privacy

JOURNAL OF AMBIENT INTELLIGENCE AND HUMANIZED COMPUTING

GERMANY

3.66 (2022)

X

2023-01-28

https://doi.org/10.1007/s12652-023-04535-7



SCAN ME

ABSTRACT

Digital technologies are rapidly evolving to support small businesses and entrepreneurs, facilitating quick innovation in mobile, Extended Reality (XR), Internet of Things (IoT), cloud, and edge devices. While the Android operating system typically takes one to a few days to vet applications before production using code analysis technologies in Play Protect, malicious developers seek to exploit Google's trust policies. This paper presents a proof-of-concept malware that exploits user trust and Google's lenient policies to bypass popular voice search applications. Our findings demonstrate how attackers can initially bypass Play Protect by uploading benign applications to gain trust and then introduce malicious feature updates to distribute highly intrusive malware. This malware can gather private user data and transmit it to a command-and-control server. Our contributions include the development of a stealthy malware and publishing mechanism, a comprehensive evaluation using major anti-malware solutions, and recommendations to prevent such attacks and address user privacy concerns. This attack, termed IMUTA, slowly adds malicious functionality to a benign application through updates, evading malware detection tools and exploiting user trust on platforms like the Play Store.

KEYWORDS:

Mobile Security | Android Security | Android Malware | Innovation and Growth

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TITLE OF PAPER

Security Assessment and Evaluation of VPNs: A Comprehensive Survey, Journal of ACM Computing Surveys

ACM COMPUTING SURVEYS

UNITED STATES

W

14.32 (2022)

2023-07-13

https://doi.org/10.1145/3579162



SCAN ME

ABSTRACT

The use of Virtual Private Networks (VPNs) has witnessed an outstanding rise as they aim to provide confidentiality and anonymity to communication. Despite this enormous and ubiquitous usage, VPNs come with various security, misconfiguration, and performance related issues thereby hindering the users to take maximum advantage of this revolutionary technology. To address this concern, VPN users must choose the most secure and perfect VPN solution for the smooth functioning of daily life activities. Generally, no clear set of directions is available for assisting a common VPN user thereby accentuating the need to develop an elucidated and coherent checklist that thoroughly helps in evaluating any VPN based on its security, performance, auditing, and management function. This research comprehensively surveys VPN technologies, its features, working principles, and compliance principles that evolved over the last two decades. Based on it, this research presents a new methodology in the form of a feature-enriched template to comprehensively analyze a VPN solution. Each VPN feature is given its score against the potential damage it may cause in case of failure and the probability of occurrence of that failure. In this way, the corporate sector and individual users can quantitatively and qualitatively grade available options while choosing a VPN and use it effectively.

KEYWORDS:

Virtual Private Networks (VPNs) | Peer-to-Peer Tunneling Protocol (PPTP) | Man-in-the-Middle (MITM) attacks

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TITLE OF PAPER

Connected and automated vehicles: Infrastructure, applications, security, critical challenges, and future aspects

TECHNOLOGIES

NOT MENTIONED

Y

3.5 (2022)

2023-09-04

https://doi.org/10.3390/technologies11050117

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

Autonomous vehicles (AV) are game-changing innovations that promise a safer, more convenient, and environmentally friendly mode of transportation than traditional vehicles. Therefore, understanding AV technologies and their impact on society is critical as we continue this revolutionary journey. Generally, there needs to be a detailed study available to assist a researcher in understanding AV and its challenges. This research presents a comprehensive survey encompassing various aspects of AVs, such as public adoption, driverless city planning, traffic management, environmental impact, public health, social implications, international standards, safety, and security. Furthermore, it presents emerging technologies such as artificial intelligence (AI), integration of cloud computing, and solar power usage in automated vehicles. It also presents forensics approaches, tools used, standards involved, and challenges associated with conducting digital forensics in the context of autonomous vehicles. Moreover, this research provides an overview of cyber attacks affecting autonomous vehicles, attack management, traditional security devices, threat modeling, authentication schemes, over-the-air updates, zero-trust architectures, data privacy, and the corresponding defensive strategies to mitigate such risks. It also presents international standards, guidelines, and best practices for AVs. Finally, it outlines the future directions of AVs and the challenges that must be addressed to achieve widespread adoption.

KEYWORDS:

Survey | Autonomous Vehicles | Vehicular Technology | Cloud Computing

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Dr. Zunera Jalil is a highly accomplished professor with a Ph.D. in Computer Science from the National University of Computer and Emerging Sciences (FAST-NUCES), Islamabad. She also holds a Master's degree (MS) in Computer Science from the same institution. Additionally, Dr. Jalil has a Master's in Computer Science (MCS) from the International Islamic University, Islamabad. With her extensive educational background and expertise, Dr. Jalil brings a wealth of knowledge and experience to her role as a professor, contributing significantly to the field of Computer Science.

Research Areas

- Criminal profiling
- Smart Environment
- Intelligent Systems
- Digital Forensics
- Computer forensics & AI
- Watermarking & AI
- Cyber-attacks detection using deep learning
- Digital forensics for cyber-physical systems

	TOTAL	FY 2023
PUBLICATIONS	64	03
CITATIONS	2617	906

SGDS TARGETED ---------- 02

DR. ZUNERA JALIL
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TITLE OF PAPER

Data Augmentation-based Novel Deep Learning Method for Deepfaked Images Detection

ACM TRANSACTIONS ON MULTIMEDIA COMPUTING

UNITED STATES

W

4.09 (2022)

2023-04-13

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

https://doi.org/10.1145/3592615

SCAN ME

ABSTRACT

Recent advances in artificial intelligence have led to deepfake images, enabling users to replace a real face with a genuine one. deepfake images have recently been used to malign public figures, politicians, and even average citizens. deepfake but realistic images have been used to stir political dissatisfaction, blackmail, propagate false news, and even carry out bogus terrorist attacks. Thus, identifying real images from fakes has got more challenging. To avoid these issues, this study employs transfer learning and data augmentation technique to classify deepfake images. For experimentation, 190,335 RGB-resolution deepfake and real images and image augmentation methods are used to prepare the dataset. The experiments use the deep learning models: convolutional neural network (CNN), Inception V3, visual geometry group (VGG19) and VGG16 with a transfer learning approach. Essential evaluation metrics (accuracy, precision, recall, F1-score, confusion matrix and AUC-ROC curve score) are used to test the efficacy of the proposed approach. Results revealed that the proposed approach achieves an accuracy, recall, F1-score and AUC-ROC score of 90% and 91% precision, with our fine-tuned VGG16 model outperforming other DL models in recognizing real and deepfakes.

KEYWORDS:

Deepfake images | Data augmentation technique | Convolutional neural network (CNN)

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TITLE OF PAPER

Supply Chain Management Using an Industrial Internet of Things Hyperledger Fabric Network

HUMAN-CENTRIC COMPUTING AND INFORMATION SCIENCES

UNITED STATES

W

6.6 (2022)

2023-01-30

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10.22967/HCIS.2023.13.004

SCAN ME

ABSTRACT

Supply chain management (SCM) is crucial for the industrial life cycle, ensuring on-time delivery and maintaining a safe and secure supply of products. The Industrial Internet of Things (IIoT) can help with tracking supplies using sensor devices and 5G. However, blockchain-based platforms like Ethereum have limitations such as low transaction speed, computation power requirement, and cyberattack vulnerability. This research proposes a novel approach called SCMIIOT (supply chain management using industrial Internet of Things), which maintains traceability, security, data integrity, transparency, and fast transaction speed. A distributed database system is used to store and transfer transaction ledgers for SCM, with IBM Watson IoT as an IoT device for input temperature and Kubernetes cluster for deploying Hyperledger Fabric. Docker Hub and Hyperledger composer playground provide business network connections for importers, suppliers, retailers, manufacturers, and consumers/end-users. SCMIIOT's effectiveness is demonstrated through experiments, showing that it takes only 1 minute to copy local files to storage on the cloud, create a genesis block, and connect peers. The worst-case transaction speed is recorded as 48 seconds on the Watson IoT platform.

KEYWORDS:

Supply Chain Management | Blockchain | Industrial Internet of Things (IoT)

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TITLE OF PAPER

Multimodal Religiously Hateful Social Media Memes Classification based on Textual and Image Data

ACM TRANSACTIONS ON ASIAN AND LOW-RESOURCE LANGUAGE INFORMATION PROCESSING

UNITED STATES

2.0 (2022)

X

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

2023-08-01

https://doi.org/10.1145/3623396

SCAN ME

ABSTRACT

This study focuses on the detection of hateful social media memes in the vision-language domain. It aims to improve the accuracy of deep learning-based models in detecting religiously hateful memes. The study creates a publicly available religiously hateful memes dataset, containing over 2000 images and their corresponding text. The proposed approach compares and fine-tunes VisualBERT pre-trained on the Conceptual Caption dataset and extends the dataset with the Facebook hateful memes dataset. Visual features are extracted using ResNeXT-152 Aggregated Residual Transformations based Masked Regions with Convolutional Neural Networks (R-CNN) and Bidirectional Encoder Representations from Transformers (BERT) uncased for textual encoding. The model's separability is measured using an Area Under the Operator Characters Curve (AUROC) metric. The results show a higher AUCROC score of 78%, indicating higher separability performance and an accuracy of 70%. This approach shows superior performance compared to ensemble-based machine learning approaches.

KEYWORDS:

Social Media Memes | Multimodal | Facebook hateful memes | Area Under the Operator Characters Curve (AUROC)

GHALIB ASADULLAH SHAH

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Dr. Ghalib Asadullah Shah is a distinguished Professor in the field of Computer Engineering. He holds a Ph.D. in Computer Engineering from Middle East Technical University, Ankara, Turkey, showcasing his expertise in the field. Dr. Shah's academic journey also includes an MSc in Computer Science and a BSc in Mathematics, both from Bahauddin Zakariya University, Multan. With his strong educational background and extensive experience, Dr. Shah brings a wealth of knowledge and insight to his role as a faculty member, contributing significantly to the academic and research endeavors of the institution.

Research Areas

- Multimedia Wireless Networks
- Industrial Control System (ICS) Security
- Cyber-Physical System (CPS) Security
- Internet of Things (IoT) Communication Protocols and Applications

	TOTAL	FY 2023
PUBLICATIONS	87	03
CITATIONS	3100	434

SGDS TARGETED ---------- 01

GHALIB ASADULLAH SHAH
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TITLE OF PAPER

Energy management of smart homes over fog-based IoT architecture

SUSTAINABLE COMPUTING: INFORMATICS AND SYSTEM

W

2023-09-01

https://doi.org/10.1016/j.suscom.2023.100898

UNITED STATES

4.5 (2022)

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

Existing research studies on home automation systems mostly conserve energy by modeling the occupancy of users within home. Some others apply statistical approaches on the survey data about usage of appliances. Consequently, these research works either reduce wastage of electricity through automation or achieve energy efficiency based on appliances' usage estimations. However, they do not provide energy consumption modeling which is human comfort centric and also validated through practical implementation in real-world smart homes. We present a Markov-chain-based probabilistic model to obtain users stochastic activity patterns which are used to forecast the energy consumption in a smart home environment. These predictions are then leveraged by our novel comfort aware energy saving mechanism named as prediction- and feedback-based proactive energy conservation (PF-PEC) algorithm. The PF-PEC algorithm reduces the total energy consumption while ensuring standard human comfort. Furthermore, a fog-based Internet of Things (IoT) architecture is implemented and deployed in a smart home to efficiently incorporate the proposed algorithm in real-world scenarios. Experimental results show up to 36% energy conservation, marking substantial reduction in daily electricity usage.

KEYWORDS:

Smart home | IoT | Home automation system | Energy optimization | Markov chain

GHALIB ASADULLAH SHAH

PROFESSOR

DEPARTMENT OF CYBER SECURITY

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TITLE OF PAPER

An intelligent context-aware threat detection and response model for smart cyber-physical systems

INTERNET OF THINGS

UNITED STATES

W

5.9 (2022)

2023-10-01

https://doi.org/10.1016/j.iot.2023.100843



SCAN ME

ABSTRACT

Smart cities, businesses, workplaces, and even residences have all been converged by the Internet of Things (IoT). The types and characteristics of these devices vary depending on the industry 4.0 and have rapidly increased recently, especially in smart homes. These gadgets can expose users to serious cyber dangers because of a variety of computing constraints and vulnerabilities in the security-by-design concept. The smart home network testbed setup presented in this study is used to evaluate and validate the protection of the smart cyber-physical system. The context-aware threat intelligence and response model identifies the states of the aligned smart devices to distinguish between real-world typical and attack scenarios. It then dynamically writes specific rules for protection against potential cyber threats. The context-aware model is trained on IoT Research and Innovation Lab - Smart Home System (IRIL-SHS) testbed dataset. The labeled dataset is utilized to create a random forest model, which is subsequently used to train and test the context-aware threat intelligence SHS model's effectiveness and performance. Finally, the model's logic is used to gain rules to be included in Suricata signatures and the firewall rulesets for the response system. Significant values of the measuring parameters were found in the results. The presented model can be used for the real-time security of smart home cyber-physical systems and develops a vision of security challenges for Industry 4.0.

KEYWORDS:

Smart home | Cyber-physical systems | Context-aware IoT security | Machine learning

GHALIB ASADULLAH SHAH

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TITLE OF PAPER

Agentless Approach for Security Information and Event Management in Industrial IoT

ELECTRONICS MDPI

UNITED STATES

X

2.9 (2022)

2023-04-12

https://doi.org/10.3390/electronics12081831

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

The Internet of Things (IoT) has revolutionized real-time communication in various sectors, but it has also faced disruptions due to privilege escalation, misconfiguration exploitation, firmware hijacking, malicious node injection, botnets, and malware infiltrations. A proposed agentless module for Wazuh security information and event management (SIEM) solution aims to secure small- to large-scale IoT networks in industry 4.0. The module sniffs IoT device traffic and passes it to a machine learning model for initial detection and prediction. The output is embedded in JSON log format and passed through a Wazuh agent to a server where a decoder is added. Industrial protocols are thoroughly analyzed and feature set determined for event monitoring in Wazuh. Custom and dynamic rules are written at the Wazuh end to generate alerts to respond to anomalies detected by the machine learning model or protocols used. If an event or attack is detected, alerts are fired on the Wazuh dashboard. This agentless SIEM solution has practical implications for the security of industrial control systems in industry 4.0.

KEYWORDS:

Industrial IoT | Cyber Security | SIEM Solution | Agentless | Machine learning

MR. KHWAJA MANSOOR UL HASSAN

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Mr. Khwaja Mansoor ul Hassan is an Assistant Professor currently pursuing his PhD in Computer Science at the Military College of Signals, National University of Sciences and Technology (NUST). He holds a Master of Science (MS) degree in Computer Science from the International Islamic University Islamabad, as well as a Bachelor of Science (BS) degree in Computer Science from the same institution. With a strong academic background and ongoing doctoral studies, Mr. Hassan brings a wealth of knowledge and expertise to his role as a faculty member.

Research Areas

Information-Security | Applied-Cryptography | Cloud-Forensic | Information Security Management | Offensive Security | Cloud Computing

	TOTAL	FY 2023
PUBLICATIONS	--	--
CITATIONS	--	--

SGDS TARGETED ---------- 01

MR. KHWAJA MANSOOR UL HASSAN

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TITLE OF PAPER

Fortifying Smart Home Security: A Robust and Efficient User-Authentication Scheme to Counter Node Capture Attacks

SENSORS

SWITZERLAND

W

4.1 (2022)

2023-08-19

https://doi.org/10.3390/s23167268

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

In smart home environments, the interaction between a remote user and devices commonly occurs through a gateway, necessitating the need for robust user authentication. Despite numerous state-of-the-art user-authentication schemes proposed over the years, these schemes still suffer from security vulnerabilities exploited by the attackers. One severe physical attack is the node capture attack, which allows adversaries to compromise the security of the entire scheme. This research paper advances the state of the art by conducting a security analysis of user-authentication approaches regarding their vulnerability to node capture attacks resulting in revelations of several security weaknesses. To this end, we propose a secure user-authentication scheme to counter node capture attacks in smart home environments. To validate the effectiveness of our proposed scheme, we employ the BAN logic and ProVerif tool for verification. Lastly, we conduct performance analysis to validate the lightweight nature of our user-authentication scheme, making it suitable for IoT-based smart home environments.

KEYWORDS:

Smart home security | User Authentication | Node Capture Attack

Department of Creative Technology

Departmental Overview

The Department of Cyber Security at Air University focuses on providing quality education and producing skilled professionals in Creative Technologies and Information Technology. With four undergraduate programs and MS programs in Artificial Intelligence, Data Science, and Gaming and Multimedia, the department emphasizes industry-aligned curriculum and research excellence. Faculty members, with expertise in various domains, collaborate with national and international universities on research projects. The department also organizes workshops and encourages student participation in competitions, fostering a culture of innovation. Additionally, it supports student-led startups through the University Incubation Center, aiming to revolutionize the industry as per international standards. The Department of Cyber Security at Air University is dedicated to equipping students with the latest industry-standard skills and fostering a spirit of entrepreneurship.

The Creative Technology Department at the Faculty of Computing and Artificial Intelligence (FCAI), Air University, houses a dedicated team of faculty members ranging from Associate Professors like Dr. Amanullah Yasin and Dr. Imran Ihsan, whose expertise spans various domains, to Assistant Professors such as Dr. Iqbal Murtza and Dr. Azhar Imran Mudassir, each contributing significantly to their respective areas of specialization. Complemented by a committed group of lecturers and a research assistant, the department fosters a dynamic learning environment where innovation thrives. With a focus on quality education, research, and industry collaboration, the faculty members of the Creative Technology Department at FCAI are shaping the future of technology and creativity while preparing students to excel in their chosen fields.

DEPARMENTAL PUBLICATIONS (2023)

21

SDGS TARGETED IN 2023



DR. AZHAR IMRAN MUDASSIR

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Dr. Azhar Imran Mudassir, a distinguished faculty member of the Creative Technology Department at Air University, brings a wealth of expertise to the table with a PhD in Software Engineering from Beijing University of Technology, complemented by an MS in Computer Science and a BS in Software Engineering from the University of Sargodha. With a strong academic background and practical experience, Dr. Azhar Imran Mudassir is committed to advancing knowledge and innovation in the field, contributing significantly to both research and education within the department.

Research Areas

- Mobile Security (MANETs)
- Machine Learning
- Deep Learning
- Image Processing
- Social Media Analysis
- Natural Language Processing

	TOTAL	FY 2023
PUBLICATIONS	71	07
CITATIONS	1255	543

SGDS TARGETED ---------- 03

Dr. Azhar Imran Mudassir
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TITLE OF PAPER

Analysis of Birth Data using Ensemble Modeling Techniques

APPLIED ARTIFICIAL INTELLIGENCE

UNITED KINGDOM

X

2.8 (2022)

2023-02-28

https://doi.org/10.1080/08839514.2022.2158273



SCAN ME

ABSTRACT

Machine learning and data mining play crucial roles in various domains, including healthcare, where they aid in data analysis, prediction, and image processing. Recent research has focused extensively on leveraging these technologies to extract insights from historical data and improve predictive capabilities. By applying machine learning algorithms, researchers have developed decision support systems, analyzed clinical data, and categorized diseases to assist physicians in making informed decisions. This study employs an ensemble modeling voting technique to classify birth datasets, combining algorithms like Gradient Boosting Classifier, Random Forest, Bagging Classifier, and Extra Trees Classifier. Results indicate that the voting classifier, incorporating Support Vector Machine, Random Forest, Extra Trees Classifier, and Bagging Classifier, achieved the highest accuracy at 94.78%, surpassing individual algorithm accuracies. Ensemble modeling enhances accuracy by reducing variance and classification errors, promising improvements in maternal health assessment and fostering interdisciplinary research opportunities.

KEYWORDS:

Machine learning | Data mining | Support Vector Machine | Extra Trees Classifier

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TITLE OF PAPER

Navigating Emotions Across Borders: Deep Learning-Driven Location-Informed Sentiment Analysis Of Twitter

LAHORE GARRISON UNIVERSITY RESEARCH JOURNAL OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

PAKISTAN

NOT ANNOUNCED

Y

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

2023-10-19

SCAN ME

https://doi.org/10.54692/lgurjcsit.2023.073493

ABSTRACT

Emotion assessment, crucial in natural language processing, is vital for understanding feelings conveyed in textual content. This paper introduces an innovative approach to sentiment analysis on Twitter data, merging deep learning techniques with geographic context. Expanding sentiment classes to include diverse emotions such as positive, negative, neutral, and others, our framework effectively captures varied emotional expressions. By integrating location-based sentiment analysis, we unveil cross-border sentiment dynamics, enriching our understanding of emotional resonance across geographical regions. Our meticulously designed deep learning model seamlessly integrates text and location information, achieving exceptional accuracy and uncovering temporal engagement trends and tweet length dynamics. Our investigation into global locations reveals key activity hubs, enhancing our comprehension of Twitter's diverse user interactions. This paper not only advances sentiment analysis but also lays groundwork for future research on sentiment dynamics and real-time interactions in the Twitter landscape.

KEYWORDS:

Cross-Location Analysis | Embedding Techniques | Geographical Nuances | Multi-Class Sentiment Analysis

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TITLE OF PAPER

Addressing Imbalance Problem for Multi Label Classification of Scholarly Articles

IEEE ACCESS

UNITED STATES

W

3.9 (2022)

2023-07-10

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10.1109/ACCESS.2023.3293852

SCAN ME

ABSTRACT

Scientific document classification, a crucial aspect of machine learning, currently relies on manual categorization. Existing taxonomies like the ACM CCS and Bibsonomy aid authors in assigning categories to their manuscripts. However, Multi-Label Classification (MLC) presents challenges as it allows assigning multiple classes to a single document. Two methods, Problem Transformation and Algorithm Adaptation, are commonly employed to address MLC. Despite various classification techniques, the issue of imbalance in Multi-Label Datasets (MLD) remains overlooked. This study aims to mitigate this issue by evaluating six MLDs, nine transformation techniques, and seven classifiers. The proposed research seeks to enhance document classification accuracy, particularly for classes with fewer instances. LPROS emerges as the most effective resampling technique for imbalanced MLDs, while the BRkNN classifier outperforms others for MLC. Ultimately, this research will facilitate improved document classification, benefiting various citation indexes.

KEYWORDS:

Classification Algorithm | Task analysis | Computer Science | Long Short term memory | Libraries

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TITLE OF PAPER

Cloud Intrusion Detection System Based on SVM

INTERNATIONAL JOURNAL OF INTERACTIVE MOBILE TECHNOLOGIES

GERMANY

2.46 (2022)

X

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

2023-06-07

SCAN ME

10.3991/ijim.v17i11.39063

ABSTRACT

The demand for better intrusion detection and prevention solutions has elevated due to the current global uptick in hacking and computer network attacks. The Intrusion Detection System (IDS) is essential for spotting network attacks and anomalies, which have increased in size and scope. A detection system has become an effective security method that monitors and investigates security in cloud computing. However, several existing methods have faced issues such as low classification accuracy, high false positive rates, and low true positive rates. To solve these problems, a detection system based on Support Vector Machine (SVM) is proposed in this paper. In this method, the SVM classifier is utilized for network data classification into normal and abnormal behaviors. The Cloud Intrusion Detection Dataset is used to test the effectiveness of the suggested system. The experimental results show which the suggested system can detect abnormal behaviors with high accuracy.

KEYWORDS:

Detection system | Network intrusion detection | SVM | Machine Learning | Cloud Computing | Normal and abnormal behaviors

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TITLE OF PAPER

Opinion Mining from Online Travel Reviews: An Exploratory Investigation on Pakistan Major Online Travel Services Using Natural Language Processing

IEEE ACCESS

UNITED STATES

W

3.9 (2022)

2023-03-21

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10.1109/ACCESS.2023.3260114

SCAN ME

ABSTRACT

Online tourism evaluations are a valuable origin of data for traveler organizations, defining as they could be excellently recognized critically prompting traveler opinion-designing using opinion mining. As technology advanced, online review forums of any organization become an attractive source of communication with them, where people can share their views in the form of comments. The main determination of this research article is to recognize normal topics and connect them to contrasts in web-based travel reviews. Online millions of reviews, got from two significant web-based travel organizations (Uber, and Careem) in Pakistan, and a semantic affiliation examination was utilized to extract thematic words and construct a semantic affiliation organization. In the Python programming language, we use natural language processing (NLP), which includes data cleansing and tokenization. The results of network visualization are able to evidently recognize main topics and thematic words with social network associations. The proposed logical system extends our grip on the strategic complications and gives new points of view on the best way to dig popular assessments to assist vacationers, inns, and travel industry organizations.

KEYWORDS:

Semantics | Sentiment Analysis | Technological innovation | Information technology | Natural Language processing

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TITLE OF PAPER

Aspect-Based Sentiment Analysis for Social Multimedia: A Hybrid Computational Framework

COMPUTER SYSTEMS SCIENCE AND ENGINEERING

UNITED KINGDOM

3.1 (2022)

X

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

2023-02-09

10.3991/ijim.v17i11.39063

SCAN ME

ABSTRACT

People utilize microblogs and other social media platforms to express their thoughts and feelings regarding current events, public products and the latest affairs. People share their thoughts and feelings about various topics, including products, news, blogs, etc. In user reviews and tweets, sentiment analysis is used to discover opinions and feelings. Sentiment polarity is a term used to describe how sentiment is represented. Positive, neutral and negative are all examples of it. This area is still in its infancy and needs several critical upgrades. Slang and hidden emotions can detract from the accuracy of traditional techniques. Existing methods only evaluate the polarity strength of the sentiment words when dividing them into positive and negative categories. Some existing strategies are domain-specific. The proposed model incorporates aspect extraction, association rule mining and the deep learning technique Bidirectional Encoder Representations from Transformers (BERT). Aspects are extracted using Part of Speech Tagger and association rule mining is used to associate aspects with opinion words. Later, classification was performed using BER. The proposed approach attained an average of 89.45% accuracy, 88.45% precision and 85.98% recall on different datasets of products and Twitter. The results showed that the proposed technique achieved better than state-of-the-art sentiment analysis techniques.

KEYWORDS:

Deep Learning | Aspect | Lexicon | Sentiments | Reviews

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TITLE OF PAPER

Computer-Aided Early Melanoma Brain-Tumor Detection Using Deep-Learning Approach

BIOMEDICINES

SWITZERLAND

W

4.7 (2022)

2023-01-11

3 GOOD HEALTH AND WELL-BEING

10.3991/ijim.v17i11.39063

SCAN ME

ABSTRACT

Brain tumors affect the normal functioning of the brain and if not treated in time these cancerous cells may affect the other tissues, blood vessels, and nerves surrounding these cells. Today, a large population worldwide is affected by the precarious disease of the brain tumor. Healthy tissues of the brain are suspected to be damaged because of tumors that become the most significant reason for a large number of deaths nowadays. Therefore, their early detection is necessary to prevent patients from unfortunate mishaps resulting in loss of lives. The manual detection of brain tumors is a challenging task due to discrepancies in appearance in terms of shape, size, nucleus, etc. As a result, an automatic system is required for the early detection of brain tumors. In this paper, the detection of tumors in brain cells is carried out using a deep convolutional neural network with stochastic gradient descent (SGD) optimization algorithm. The multi-classification of brain tumors is performed using the ResNet-50 model and evaluated on the public Kaggle brain-tumor dataset. The method achieved 99.82% and 99.5% training and testing accuracy, respectively. The experimental result indicates that the proposed model outperformed baseline methods, and provides a compelling reason to be applied to other diseases.

KEYWORDS:

Medical Imagery | Convolutional Neural Network | Deep Learning

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Dr. Imran Ihsan, an Associate Professor in the Creative Technology Department at FCAI, Air University, holds a PhD in Semantic Web from Capital University of Science and Technology, Islamabad, along with an MS in Multimedia Communications and MCS in Computer Science from universities in Islamabad, Pakistan. Additionally, he holds an MSc in Physics from the University of the Punjab, Lahore, showcasing his interdisciplinary expertise. Dr. Ihsan's diverse educational background enriches his teaching and research in technology and semantics, contributing significantly to the department's academic endeavors.

Research Areas:

Semantic web | Ontology Engineering | Data sciences

	TOTAL	FY 2023
PUBLICATIONS	36	06
CITATIONS	122	32

SGDS TARGETED ---------- 01

Dr. Imran Ihsan
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TITLE OF PAPER

Exploiting data science for measuring the performance of technology stocks

COMPUTERS, MATERIALS CONTINUA

UNITED STATES

X

3.98 (2022)

2023-10-08

https://doi.org/10.32604/cmc.2023.036553



SCAN ME

ABSTRACT

Our study focuses on measuring the performance of technology stocks using six supervised machine learning (ML) strategies and deep learning (DL) models with long short-term memory (LSTM). We analyzed data from Apple Inc. (AAPL), Microsoft Corporation (MSFT), Broadcom Inc., Taiwan Semiconductor Manufacturing Company Limited (TSM), NVIDIA Corporation (NVDA), and Avigilon Corporation (AVGO) obtained from the Yahoo Finance API spanning seventeen years. Our research compared various models, including the Hidden Markov Model (HMM), linear regression, support vector machines, and ARIMA, with HMM demonstrating the highest accuracy score of 99.98%. Additionally, LSTM emerged as the second-best performing model. These findings offer valuable insights for early measurement of technology stock performance, aiding investors in making informed decisions in dynamic market environments.

KEYWORDS:

Data Science | Smart Environments | Stock Marketing | Machine Learning | Stocks Movement | Deep Learning

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TITLE OF PAPER

Improving in-text citation reason extraction and classification using supervised machine learning techniques

COMPUTER SPEECH AND LANGUAGE

UNITED STATES

W

3.25 (2022)

2023-07-01

https://doi.org/10.1016/j.csl.2023.101526

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

In the last decade, automatic extraction and classification of in-text citations have received immense popularity and have become one of the most frequently used techniques to evaluate research. Due to the large volume of in-text citations in various digital libraries such as Web of Science, Scopus, Google Scholar, Microsoft Academic, etc., machine learning models and natural language processing techniques are being used to extract, classify, and analyze them. Typical automatic in-text classification techniques use sentiment-based classes (Positive, Negative, and Neutral). However, there are cognitive-based schemes as well that classify in-text citations based on the author's perspective. In such schemes, extracting citation reasons with high recall is challenging. To address this challenge, we have used eight citations' context and reason classes defined by CCRO (Citation's Context and Reasons Ontology) to develop a machine learning model to achieve high recall without compromising on precision. We have worked on Association for Computational Linguistics Corpus with over 7000 in-text citations, randomly annotated by experts in CCRO classes. Afterwards, an array of machine-learning models is implemented on the annotated dataset: Support Vector Machine (SVM), Naïve Bayesian (NB), and Random Forest (RF). We have used various part-of-speech (Nouns, Verbs, Adverbs, and Adjectives) as novel features. Our results show that we have outperformed the three comparative models by achieving 91% accuracy.

KEYWORDS:

Machine Learning | Natural Language Processing | Support Vector Machine

Dr. Imran Ihsan
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TITLE OF PAPER

Generative knowledge graph construction of in-text citation data

JOURNAL OF COMPUTING & BIOMEDICAL INFORMATICS

PAKISTAN

Y

NOT ANNOUNCED

2023-06-05

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

https://www.jcbi.org/index.php/Main/article/view/194

SCAN ME

ABSTRACT

Recent years have seen an increase in the use of the phrase ”knowledge graph” in academic and professional circles, frequently in conjunction with Semantic Web technologies, linked data, massive data analytics, and cloud computing. Though there has been a marked increase in the availability of scholarly information online in recent decades, all scholarly discourse continues to be conducted through the written word. Scholarly knowledge is difficult to process mechanically in this format. In this research, an extensive dataset is used which is composed of 8,700 academic scholar (research papers sentences). The proposed approach consist of multiple steps; data preprocessing, entity extraction, relationship extraction and knowledge graph construction. We propose a more efficient representation of a scalable knowledge graph by instantly extracting the information from corpus of ACL dataset, and we test whether a knowledge graph can be used as an effective application in analyzing and generating knowledge representation from the extracted corpus of research citations.

KEYWORDS:

Knowledge Graph | Intext Citation | Data Mining | Entity Recognition

Dr. Imran Ihsan
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TITLE OF PAPER

Knowledge graph embedding based sentiment analysis of product reviews using LSTM and fuzzy logic

JOURNAL OF COMPUTING & BIOMEDICAL INFORMATICS

PAKISTAN

Y

NOT ANNOUNCED

2023-06-05

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

https://www.jcbi.org/index.php/Main/article/view/195

SCAN ME

ABSTRACT

The surge in online shopping, especially during and post the COVID-19 pandemic, underscores the importance of product reviews in aiding purchasing decisions and facilitating product enhancements for retailers and manufacturers. However, reading through numerous reviews can be time-consuming. To address this, sentiment analysis techniques have been explored by researchers to analyze product reviews efficiently. Intelligent systems employing machine learning and deep learning algorithms have gained traction, enabling customers to uncover product trends swiftly. While the accuracy of such systems remains debatable, researchers continually refine strategies to enhance it. This study takes a unique approach by employing knowledge graph embedding alongside a deep learning model like LSTM to analyze product reviews, aiming for increased recall, precision, and accuracy. Using three Amazon datasets from Kaggle, including "Customer reviews of Amazon Products," "Amazon Cell Phones Reviews," and "Amazon Fine Food Reviews," the study classifies sentiments into four categories: "Positive," "Negative," "Highly Positive," and "Highly Negative." The proposed LSTM+KGemb model achieves accuracy levels of 97%, 98%, and 96%, respectively.

KEYWORDS:

Knowledge Graph | Intext Citation | Data Mining | Entity Recognition

DR. IMRAN IHSAN
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imranihsan@mail.au.edu.pk

TITLE OF PAPER

Sentiment analysis in movie reviews using knowledge graph embeddings and deep learning classification

JOURNAL OF COMPUTING & BIOMEDICAL INFORMATICS

PAKISTAN

Y

NOT ANNOUNCED

2023-12-05

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

https://www.jcbi.org/index.php/Main/article/view/292

SCAN ME

ABSTRACT

Movie reviews are a good source of deciding whether the movie is worth the time or not, but going through all the reviews manually is a laborious and time-wasting effort. Automatic analysis of movie reviews can help in the reduction of this human effort. To create this automatic analysis, various techniques are available. However, the most promising technique is Sentiment Analysis. Sentiment Analysis can classify a movie review as positive or negative. Traditionally, Sentiment Analysis of movie reviews is performed using different Machine Learning or Deep Learning models. But with the advent of Knowledge Graphs, some experiments are available that are using Knowledge Graph and Knowledge Graph Embedding approaches for Sentiment Analysis. This research attempts to integrate two techniques: Deep Learning and Knowledge Graph Embedding to get the sentiments of the Text. The process includes knowledge graph embedding in Large Movie Review Dataset as an input to the Transformer-based model BERT. In the end, a comparison is done with BERT itself and two-hybrid Deep Learning model. For experiments, we are using the Large Movie Review Dataset. The dataset is equally distributed into positive and negative classes.

KEYWORDS:

Knowledge Graph | Semantic Analysis | Bert | Knowledge Graph Embedding

Dr. Imran Ihsan
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TITLE OF PAPER

A temporal scope prediction for storyline generation using events knowledge graphs

JOURNAL OF COMPUTING & BIOMEDICAL INFORMATICS

PAKISTAN

Y

NOT ANNOUNCED

2023-09-17

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

https://www.jcbi.org/index.php/Main/article/view/152

SCAN ME

ABSTRACT

Knowledge graphs (KGs) have become powerful tools for organizing and making sense of complex datasets, especially when time information is included. However, ensuring the accuracy of events in temporal knowledge graphs remains a challenge. To address this issue, researchers proposed a new approach that uses event storyline generation and visualization to analyze trends and situations. The proposed approach involves conducting experiments using traditional embedding techniques and a transformer-based BERT base model to generate temporal graph embeddings. These embeddings result in lower-dimensional representations that are easier to process and input into factorization machines, leading to improved event classification accuracy. The approach was tested using event-based datasets such as ICEWS and Wikidata12k, achieving an accuracy of 80% when compared to the baseline model. This approach shows promise for analyzing trends and situations, with potential applications in industries that require planning, such as disaster planning and cyber-physical systems. By using event storyline generation and visualization, the proposed approach can facilitate downstream applications, such as trend and situation analysis, and improve the accuracy of events in temporal knowledge graphs. This research highlights the significance of knowledge graphs in managing and analyzing vast amounts of data and emphasizes the importance of developing accurate and efficient strategies for decision-making.

KEYWORDS:

Knowledge Graph | Temporal data | Story Timeline | Factorization Machines

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Mr. Ch. Anwar-ul-Hassan, a Lecturer in the Creative Technology Department at the Faculty of Computing and Artificial Intelligence (FCAI), Air University, brings a wealth of academic knowledge and experience to his role. Holding a Master of Science in Software Engineering from COMSATS University, Islamabad, and a Bachelor of Science in Software Engineering from the National University of Modern Languages, Islamabad, Mr. Anwar-ul-Hassan is well-equipped to guide students in their educational journey and contribute effectively to the department's academic endeavors. With a strong foundation in software engineering,

Research Areas

- Blockchain Technologies
- Machine Learning
- Deep Learning
- Software Costing and Estimation
- Data warehousing
- Data Analysis

	TOTAL	FY 2023
PUBLICATIONS	23	02
CITATIONS	287	136

SGDS TARGETED ---------- 01

MR. CH. ANWAR-UL-HASSAN

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TITLE OF PAPER

Enhancing Elderly Fall Detection through IoT-Enabled Smart Flooring and AI for Independent Living Sustainability

SUSTAINABILITY

SWITZERLAND

W

3.88 (2022)

2023-11-07

https://doi.org/10.3390/su152215695

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

In the context of aiding elderly individuals living alone, falls pose significant risks, including post-fall complications and prolonged immobility. This study introduces an innovative Elder Fall Detection system, merging IoT and AI technologies. Using RFID tags integrated into smart carpets and RFID readers, our IoT setup identifies falls among the elderly. Experiments with 13 participants demonstrated the system's effectiveness in distinguishing fall events from regular movements. Upon detection, the system triggers alarms and notifies caregivers. Employing machine and deep learning classifiers like Random Forest, XGBoost, GRUs, Logistic Regression, and KNN on collected data, we achieved varying accuracy rates. Notably, KNN stood out with a remarkable 99% accuracy. This research proposes a robust fall detection framework to bolster the safety of independent elderly individuals, in line with sustainability principles in IoT and AI applications.

KEYWORDS:

Fall Detection | RFID Tags | IoT | Artificial Intelligence | Machine Learning | Cost Efficiency

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LECTURER

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TITLE OF PAPER

Nature-inspired solutions for energy sustainability using novel optimization methods

PLOSONE

UNITED STATES

W

3.75 (2022)

2023-11-27

https://doi.org/10.1371/journal.pone.0288490



SCAN ME

ABSTRACT

This research focuses on developing a Home Electricity Management (HEM) system, essential for optimizing home electrical power distribution. Utilizing advanced meta-heuristics like the Social Spider Algorithm (SSA) and Strawberry Algorithm (SWA), the system efficiently schedules intelligent home gadgets to manage energy consumption. Acting as a crucial link in the distribution and utilization of electricity within households, akin to optimizing resource allocation in supply chains, HEM ensures efficient operation and cost-effectiveness. Simulations show SWA excels in cost savings, while SSA effectively reduces peak-to-average power ratios. The proposed solution reduces residential costs by up to 3.5%, showcasing significant potential for savings and efficiency improvements. Moreover, it contributes to reducing carbon emissions, aligning with sustainability goals in the energy supply chain. By promoting energy efficiency and integrating renewable sources, the HEM system mirrors the emphasis on sustainability in supply chain practices, offering practical and sustainable home energy management solutions.

KEYWORDS:

Home Electricity Management (HEM) system | Sustainability | Novel optimization methods

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Mr. Nasir Ayub, a Lecturer in the Creative Technology Department at the Faculty of Computing and Artificial Intelligence (FCAI), Air University, brings a wealth of academic credentials to his role. With a Ph.D. in Computer Science from SEECS, NUST, Islamabad, an MS in Software Engineering from COMSATS University Islamabad, and a BS in Computer Science from FUUAST Islamabad, Mr. Ayub possesses a strong foundation in both theoretical knowledge and practical skills. His diverse educational background equips him to contribute effectively to the department's mission of fostering innovation and excellence in technology and creativity.

Research Areas

Blockchain | Smart Grid | Artificial Intelligence | Natural Language Processing

	TOTAL	FY 2023
PUBLICATIONS	46	05
CITATIONS	514	193

SGDS TARGETED ---------- 01

MR. NASIR AYUB

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TITLE OF PAPER

Ensemble learning approach for advanced metering infrastructure in future smart grids

PLOSONE

UNITED STATES

W

3.75 (2022)

2023-10-18

https://doi.org/10.1371/journal.pone.0289672



SCAN ME

ABSTRACT

This research focuses on developing a Home Electricity Management (HEM) system, essential for optimizing home electrical power distribution. Utilizing advanced meta-heuristics like the Social Spider Algorithm (SSA) and Strawberry Algorithm (SWA), the system efficiently schedules intelligent home gadgets to manage energy consumption. Acting as a crucial link in the distribution and utilization of electricity within households, akin to optimizing resource allocation in supply chains, HEM ensures efficient operation and cost-effectiveness. Simulations show SWA excels in cost savings, while SSA effectively reduces peak-to-average power ratios. The proposed solution reduces residential costs by up to 3.5%, showcasing significant potential for savings and efficiency improvements. Moreover, it contributes to reducing carbon emissions, aligning with sustainability goals in the energy supply chain. By promoting energy efficiency and integrating renewable sources, the HEM system mirrors the emphasis on sustainability in supply chain practices, offering practical and sustainable home energy management solutions.

KEYWORDS:

Learning approach | Smart grids | Electricity Load and Price Forecasting (ELPF)

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TITLE OF PAPER

Enhancing Smart IoT Malware Detection: A GhostNet-based Hybrid Approach

SYSTEMS

SWITZERLAND

X

2.0 (2022)

2023-11-11

https://doi.org/10.3390/systems11110547



SCAN ME

ABSTRACT

The Internet of Things (IoT) constitutes the foundation of a deeply interconnected society in which objects communicate through the Internet. This innovation, coupled with 5G and artificial intelligence (AI), finds application in diverse sectors like smart cities and advanced manufacturing. With increasing IoT adoption comes heightened vulnerabilities, prompting research into identifying IoT malware. While existing models excel at spotting known malicious code, detecting new and modified malware presents challenges. This paper presents a novel six-step framework. It begins with eight malware attack datasets as input, followed by insights from Exploratory Data Analysis (EDA). Feature engineering includes scaling, One-Hot Encoding, target variable analysis, feature importance using MDI and XGBoost, and clustering with K-Means and PCA. Our GhostNet ensemble, combined with the Gated Recurrent Unit Ensembler (GNGRUE), is trained on these datasets and fine-tuned using the Jaya Algorithm (JA) to identify and categorize malware. The tuned GNGRUE-JA is tested on malware datasets. A comprehensive comparison with existing models encompasses performance, evaluation criteria, time complexity, and statistical analysis. Our proposed model demonstrates superior performance through extensive simulations, outperforming existing methods by around 15% across metrics like AUC, accuracy, recall, and hamming loss, with a 10% reduction in time complexity. These results emphasize the significance of our study's outcomes, particularly in achieving cost-effective solutions for detecting eight malware strains.

KEYWORDS:

Deep Learning | IoT | Malware Detection | Java Algorithm

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TITLE OF PAPER

An Efficient Optimized DenseNet Model for Aspect-Based Multi-Label Classification

ALGORITHMS

SWITZERLAND

X

2.3 (2022)

2023-11-29

https://doi.org/10.3390/a16120548



SCAN ME

ABSTRACT

Sentiment analysis plays a crucial role in natural language processing by examining expressed and underlying emotions in review content. However, relying solely on overall sentiment is insufficient, leading to the development of sentiment analysis to extract nuanced expressions. This paper introduces the Ensemble of DenseNet based on Aquila Optimizer (EDAO), aiming to enhance precision and diversity in multi-label learners. Unlike traditional methods, EDAO prioritizes improving model accuracy and diversity in multi-label scenarios. Experimental evaluation on seven datasets, covering emotions, hotels, movies, proteins, automobiles, medical, and news, demonstrates the effectiveness of EDAO. By employing aspect-based multi-labeling, DenseNet-AO achieves accuracy rates of 95%, 97%, and 96% on news, emotion, auto, bird, movie, hotel, protein, and medical datasets, respectively. The proposed model surpasses standard methods across various multi-label datasets, validating its effectiveness compared to existing approaches.

KEYWORDS:

Classification | Multi-labeling | Natural language processing | Deep learning | Sentiment Analysis | Optimization Method

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TITLE OF PAPER

Online Payment Fraud Detection Model Using Machine Learning Techniques

IEEE ACCESS

UNITED STATES

W

3.9 (2022)

2023-12-04

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10.1109/ACCESS.2023.3339226

SCAN ME

ABSTRACT

In today's wireless communication-dependent world, financial fraud poses a growing threat, necessitating innovative solutions. Our ResNeXt-embedded Gated Recurrent Unit (GRU) model (RXT) is tailored for real-time financial transaction data processing, aiming to address this challenge. We systematically approach fraud detection by preprocessing data to mitigate imbalances, employing an ensemble feature extraction method (EARN), and fine-tuning our model with hyperparameters using the Jaya optimization algorithm (RXT-J). Evaluation on three authentic financial transaction datasets consistently demonstrates our model's superiority, outperforming existing algorithms by 10% to 18% across various metrics while ensuring computational efficiency. This pioneering research promises heightened security and efficiency in financial transactions, contributing to the ongoing battle against fraud and enhancing stability in the financial industry.

KEYWORDS:

Frauds | Credit-card | Data Model | Hidden Markov Models | Cost recurring neural networks | Financial Management | Optimization Models

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TITLE OF PAPER

Hybrid Algorithm-Driven Smart Logistics Optimization in IoT-Based Cyber-Physical Systems.

COMPUTERS, MATERIAL AND CONTINUA TECHSCIENCE

UNITED STATES

3.1 (2022)

X

2023-12-26

https://doi.org/10.32604/cmc.2023.046602



SCAN ME

ABSTRACT

Effectively managing complex logistics data is crucial for sustainable development, particularly in optimizing distribution routes. This article introduces the Hybrid Firefly-Spotted Hyena Optimization (HFSHO) algorithm to address limitations in current logistics path optimization methods, aiming to overcome inefficiencies and high operational costs. HFSHO combines the rapid exploration and global search capabilities of the Firefly Algorithm (FO) with the localized search and region-exploitation skills of the Spotted Hyena Optimization Algorithm (SHO). Through rigorous comparative analyses with established algorithms like the Ant Colony Algorithm (ACO), Cuckoo Search Algorithm (CSA), and Jaya Algorithm (JA), HFSHO demonstrates superior performance in logistic optimization scenarios, achieving a minimum path distance of 546 units. This comprehensive evaluation underscores HFSHO's exceptional effectiveness, emphasizing the critical importance of algorithm selection for logistics path navigation. By synergizing FO and SHO, HFSHO offers a promising solution for optimizing logistics paths, delivering valuable insights to logistics planners and decision-makers and contributing significantly to sustainable sectoral growth by improving operational efficiency and reducing costs.

KEYWORDS:

Hybrid optimization | Internet of things | Smart logistics | Intelligent transport system | Optimal path finding | Traffic congestion

Department of Computer Games Development

Departmental Overview

The Faculty of Computing and Artificial Intelligence at Air University is dedicated to producing highly skilled professionals in Computer Games Development. Our pioneering undergraduate program, "BS in Computer Games Development," launched in 2019, equips students with essential skills in game design, programming, graphics, and animation. With the global gaming industry booming, career opportunities abound locally and internationally. The industry's exponential growth, as evidenced by its revenue projections exceeding $562 billion by 2025, underscores the demand for skilled professionals. Our curriculum, bolstered by industry partnerships and state-of-the-art facilities, ensures graduates are well-prepared for this dynamic field. Through practical projects and internships, students gain real-world experience, enhancing their employability and positioning them as industry leaders. Join us at the forefront of innovation, where creativity meets cutting-edge technology, and together, we'll shape the future of gaming.

The Department of computer games development at Air University comprises a dedicated team of educators and professionals committed to excellence in education and research. Led by Associate Professor Dr. Hameedur Rahman, our faculty includes esteemed individuals such as Assistant Professor Dr. Numan Ali, and a team of talented lecturers including Mr. Amir Ali, Mr. Usman Sarwar, Ms. Tanvir Fatima Naik, Mr. Soud Ali, Mr. Muhammad Sufyan K., and Mr. Mudabbir Ali. With their expertise and guidance, students receive a comprehensive education in Computer Games Development, preparing them for success in the rapidly evolving gaming industry. Additionally, our team of Lab Engineers, including Muhammad Saqib Raza, Fahad Mirza Shafique, and Mr. Hamza Khakwani, ensures students have access to state-of-the-art facilities and resources for hands-on learning experiences.

DEPARMENTAL PUBLICATIONS (2023)

15

SDGS TARGETED IN 2023



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Dr. Hameedur Rahman, an Associate Professor at the Department of Computer games development, brings a wealth of expertise to the department. Holding a BSc in Software Engineering with Multimedia from Limkokwing University of Creative Technology, Malaysia, he furthered his education with an MS in Software Engineering from the same institution. Dr. Rahman's dedication to academia led him to pursue a Ph.D. in Computer Science from The National University of Malaysia, solidifying his position as a leading expert in the field.

Research Areas

Augmented/Virtual Reality | Artificial Intelligence | Computer Vision | Data Mining | Cyber Security | Metaverse & Blockchain | IoT

	TOTAL	FY 2023
PUBLICATIONS	57	08
CITATIONS	439	231

SGDS TARGETED ---------- 03

DR. HAMEEDUR RAHMAN
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TITLE OF PAPER

Multi-Tier Sentiment Analysis of Social Media Text Using Supervised Machine Learning

COMPUTERS, MATERIALS & CONTINUA

UNITED STATES

W

3.1 (2022)

2023-09-28

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10.32604/cmc.2023.033190

SCAN ME

ABSTRACT

Sentiment Analysis (SA) is often referred to as opinion mining. It is defined as the extraction, identification, or characterization of the sentiment from text. Generally, the sentiment of a textual document is classified into binary classes i.e., positive and negative. However, fine-grained classification provides a better insight into the sentiments. The downside is that fine-grained classification is more challenging as compared to binary. On the contrary, performance deteriorates significantly in the case of multi-class classification. In this study, pre-processing techniques and machine learning models for the multi-class classification of sentiments were explored. To augment the performance, a multi-layer classification model has been proposed. Owing to similitude with social media text, the movie reviews dataset has been used for the implementation. Supervised machine learning models namely Decision Tree, Support Vector Machine, and Naïve Bayes models have been implemented for the task of sentiment classification. We have compared the models of single-layer architecture with multi-tier model. The results of Multi-tier model have slight improvement over the single-layer architecture. Moreover, multi-tier models have better recall which allow our proposed model to learn more context. We have discussed certain shortcomings of the model that will help researchers to design multi-tier models with more contextual information.

KEYWORDS:

Machine learning | Sentiment analysis | Multi-class classification | Decision Tree | Naïve bayes | svm

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TITLE OF PAPER

Enhanced clustering based routing protocol in vehicular ad-hoc networks

IET ELECTRICAL SYSTEMS IN TRANSPORTATION

UNITED KINGDOM

X

5.7 (2022)

2023-01-13

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

https://doi.org/10.1049/els2.12069

SCAN ME

ABSTRACT

A vehicular ad-hoc network (VANET) is derived from a mobile ad-hoc network that is a part of less infrastructure network design. Vehicular communication in VANET can be achieved using vehicle-to-infrastructure (V2I) and vehicle-to-vehicle (V2V) communication. A vehicle communicates with other vehicles through onboard units while communicating with roadside units in an infrastructure mode. Secure clustering is required for the communication between nodes in the whole network. The fundamental problem with the VANET is the instability of the network that occurs due to vehicles' mobile nature, which decreases the network's efficiency. This research proposes an enhanced cluster-based lifetime protocol ECBLTR that focuses on maximising the network's stability of routing and average throughput. The Sugeno model fuzzy inference system is used for assessing the cluster head (CH) that takes residual energy, local distance, node degree, concentration, and distance from the base station as input parameters. Our enhanced routing protocol shows that the proper channel model with an efficient routing protocol enhances the link throughput of the VANET for fixed network size. Our results show an efficient selection method of CH through the fuzzy system and a 10% increase in network lifetime. Furthermore, performance evaluation also demonstrates the impact of network sizes and routing protocols on packet delivery ratio and packet loss, average end-to-end delay, and overhead transmission.

KEYWORDS: Clustering | Vehicle-to-vehicle (V2V) | Vehicular ad-hoc network (VANET) | Cluster head (CH)

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TITLE OF PAPER

Efficient Breast Cancer Diagnosis from Complex Mammographic Images Using Deep Convolutional Neural Network

COMPUTATIONAL INTELLIGENCE AND NEUROSCIENCE

UNITED STATES

W

2.9 (2022)

2023-03-02

https://doi.org/10.1155/2023/7717712



SCAN ME

ABSTRACT

Medical image analysis places a signifcant focus on breast cancer, which poses a signifcant threat to women's health and contributes to many fatalities. An early and precise diagnosis of breast cancer through digital mammograms can signifcantly improve the accuracy of disease detection. Computer-aided diagnosis (CAD) systems must analyze the medical imagery and perform detection, segmentation, and classifcation processes to assist radiologists with accurately detecting breast lesions. However, early-stage mammography cancer detection is certainly difcult. Te deep convolutional neural network has demonstrated exceptional results and is considered a highly efective tool in the feld. Tis study proposes a computational framework for diagnosing breast cancer using a ResNet-50 convolutional neural network to classify mammogram images. To train and classify the INbreast dataset into benign or malignant categories, the framework utilizes transfer learning from the pretrained ResNet-50 CNN on ImageNet. Te results revealed that the proposed framework achieved an outstanding classifcation accuracy of 93%, surpassing other models trained on the same dataset. Tis novel approach facilitates early diagnosis and classifcation of malignant and benign breast cancer, potentially saving lives and resources. Tese outcomes highlight that deep convolutional neural network algorithms can be trained to achieve highly accurate results in various mammograms, along with the capacity to enhance medical tools by reducing the error rate in screening mammograms.

KEYWORDS: Computer-aided diagnosis (CAD) | Breast Cancer Diagnosis | Deep Convolutional Neural Network | Image Analysis

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TITLE OF PAPER

A Blockchain-Based Approach for Healthcare Data Interoperability

INTERNATIONAL JOURNAL OF ADVANCES IN SOFT COMPUTING AND ITS APPLICATIONS

UNITED STATES

2.9 (2022)

W

3 GOOD HEALTH AND WELL-BEING

2023-07-01

SCAN ME

10.15849/IJASCA.230720.06

ABSTRACT

The healthcare industry faces significant challenges in patient identification and data interoperability due to the use of different electronic medical records (EMRs) and variations in patient information storage. Blockchain technology, a decentralized database that uses cryptography protocols for security and persistency, offers a potential solution to these issues. This research proposes the use of Ethereum smart contracts, a decentralized blockchain solution, to build integrated patient profiles and address interoperability issues in healthcare. The proposed system aims to improve patient data privacy and security, as well as provide a more efficient way of accessing and sharing patient information across different healthcare providers. Through a combination of literature review and case studies, this research demonstrates the feasibility and potential benefits of using blockchain technology for decentralized patient profile building in healthcare. The results of this study have the potential to enhance patient care and improve the overall efficiency of the healthcare system.

KEYWORDS:

Block chain technology | Interoperability | Patient Profile | Healthcare

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TITLE OF PAPER

Improving in-text citation reason extraction and classification using supervised machine learning techniques

COMPUTER SPEECH AND LANGUAGE

UNITED STATES

4.3 (2022)

W

2023-07-01

https://doi.org/10.1016/j.csl.2023.101526

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

In the last decade, automatic extraction and classification of in-text citations have received immense popularity and have become one of the most frequently used techniques to evaluate research. Due to the large volume of in-text citations in various digital libraries such as Web of Science, Scopus, Google Scholar, Microsoft Academic, etc., machine learning models and natural language processing techniques are being used to extract, classify, and analyze them. Typical automatic in-text classification techniques use sentiment-based classes (Positive, Negative, and Neutral). However, there are cognitive-based schemes as well that classify in-text citations based on the author's perspective. In such schemes, extracting citation reasons with high recall is challenging. To address this challenge, we have used eight citations' context and reason classes defined by CCRO (Citation's Context and Reasons Ontology) to develop a machine learning model to achieve high recall without compromising on precision. We have worked on Association for Computational Linguistics Corpus with over 7000 in-text citations, randomly annotated by experts in CCRO classes. Afterwards, an array of machine-learning models is implemented on the annotated dataset: Support Vector Machine (SVM), Naïve Bayesian (NB), and Random Forest (RF). We have used various part-of-speech (Nouns, Verbs, Adverbs, and Adjectives) as novel features. Our results show that we have outperformed the three comparative models by achieving 91% accuracy.

KEYWORDS:

Machine Learning | Computational linguistics | Natural language processing

DR. HAMEEDUR RAHMAN

ASSOCIATE PROFESSOR

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TITLE OF PAPER

Enhancing Network Intrusion Detection Using an Ensemble Voting Classifier for Internet of Things

SENSORS

SWITZERLAND

W

3.9 (2022)

2023-12-26

https://doi.org/10.3390/s24010127

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

In the realm of 6G technology, the Internet of Everything aims to connect humans and devices across various dimensions. Integrating smart healthcare, agriculture, transportation, and homes allows for seamless environmental control through touch or voice commands. However, this increased connectivity brings heightened security risks. With the metaverse connections enabled by IoT, stronger security measures are imperative. Botnet-driven attacks threaten IoT networks, necessitating anomaly detection to prevent catastrophic consequences. Our research proposes a novel classification technique, DRX, which combines Decision tree, Random forest, and XGBoost algorithms. This ensemble voting classifier significantly improves the accuracy and precision of intrusion detection systems. Experiments on NSL-KDD, UNSW-NB15, and CIC-IDS2017 datasets demonstrate superior performance with DRX, achieving accuracies of 99.88%, 99.93%, and 99.98% respectively, with notable reductions in false positive rates.

KEYWORDS:

Machine Learning | Synthetic minority over-sampling technique (SMOTE) | Network intrusion detection system (NIDS)

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TITLE OF PAPER

A Systematic Literature Review of 3D Deep Learning Techniques in Computed Tomography Reconstruction

TOMOGRAPHY

SWITZERLAND

X

1.9 (2022)

2023-12-05

https://doi.org/10.3390/tomography9060169

SCAN ME

ABSTRACT

Computed tomography (CT) is used in a wide range of medical imaging diagnoses. However, the reconstruction of CT images from raw projection data is inherently complex and is subject to artifacts and noise, which compromises image quality and accuracy. In order to address these challenges, deep learning developments have the potential to improve the reconstruction of computed tomography images. In this regard, our research aim is to determine the techniques that are used for 3D deep learning in CT reconstruction and to identify the training and validation datasets that are accessible. This research was performed on five databases. After a careful assessment of each record based on the objective and scope of the study, we selected 60 research articles for this review. This systematic literature review revealed that convolutional neural networks (CNNs), 3D convolutional neural networks (3D CNNs), and deep learning reconstruction (DLR) were the most suitable deep learning algorithms for CT reconstruction. Additionally, two major datasets appropriate for training and developing deep learning systems were identified: 2016 NIH-AAPM-Mayo and MSCT. These datasets are important resources for the creation and assessment of CT reconstruction models. According to the results, 3D deep learning may increase the effectiveness of CT image reconstruction, boost image quality, and lower radiation exposure. By using these deep learning approaches, CT image reconstruction may be made more precise and effective, improving patient outcomes, diagnostic accuracy, and healthcare system productivity.

KEYWORDS:

3D Deep Learning | Computed tomography (CT) reconstruction | Systematic literature review

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TITLE OF PAPER

A Novel Feature-Selection Algorithm in IoT Networks for Intrusion Detection

SENSORS

SWITZERLAND

W

3.9 (2022)

2023-09-28

https://doi.org/10.3390/s23198153

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCAN ME

ABSTRACT

The Internet of Things (IoT) and network-enabled smart devices are crucial to the digitally interconnected society of the present day. However, the increased reliance on IoT devices increases their susceptibility to malicious activities within network traffic, posing significant challenges to cybersecurity. As a result, both system administrators and end users are negatively affected by these malevolent behaviours. Intrusion-detection systems (IDSs) are commonly deployed as a cyber attack defence mechanism to mitigate such risks. IDS plays a crucial role in identifying and preventing cyber hazards within IoT networks. However, the development of an efficient and rapid IDS system for the detection of cyber attacks remains a challenging area of research. Moreover, IDS datasets contain multiple features, so the implementation of feature selection (FS) is required to design an effective and timely IDS. The FS procedure seeks to eliminate irrelevant and redundant features from large IDS datasets, thereby improving the intrusion-detection system's overall performance. In this paper, we propose a hybrid wrapper-based feature-selection algorithm that is based on the concepts of the Cellular Automata (CA) engine and Tabu Search (TS)-based aspiration criteria. We used a Random Forest (RF) ensemble learning classifier to evaluate the fitness of the selected features. The proposed algorithm, CAT-S, was tested on the TON_IoT dataset. The simulation results demonstrate that the proposed algorithm, CAT-S, enhances classification accuracy while simultaneously reducing the number of features and the false positive rate.

KEYWORDS:

Machine Learning | Intrusion | IoT | Feature Selection

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Dr. Numan Ali is an Assistant Professor in the Computer Games Development Department at Air University. He holds a Bachelor's degree in Computer Science, an MPhil in Computer Science, and a PhD in Computer Science, all from the University of Malakand in Chakadara, KPK. With a strong educational background and expertise in computer science, Dr. Ali brings a wealth of knowledge and experience to his role as an educator and researcher in the field of game development. His academic journey, rooted in research and practical application, underscores his commitment to advancing the field.

Research Areas

Augmented/Virtual Reality

Intelligent systems

Gaming technologies

Human computer interaction

Interactive Multimedia

	TOTAL	FY 2023
PUBLICATIONS	27	04
CITATIONS	323	94

SGDS TARGETED ---------- 01

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TITLE OF PAPER

The Effect of Adaptive Aids on Different Levels of Students' Performance in a Virtual Reality Chemistry Laboratory

EDUCATION AND INFORMATION TECHNOLOGIES

SWITZERLAND

5.5 (2022)

W

4 QUALITY EDUCATION

2023-06-17

https://doi.org/10.1007/s10639-023-11897-0

SCAN ME

ABSTRACT

In virtual laboratories, various cognitive aids are used to improve students' performance and assist them while completing experimental tasks. However, excessive use of cognitive aids in virtual laboratories can lead to a cognitive load on students which affects their performance. In this paper, we proposed the concept of adaptive aids virtual reality chemistry laboratory. User expertise, quantitatively measured in terms of errors and time spent, is used as an adaptation criterion to dynamically update adaptive aids (arrows, text or animations). The system modifies the contents of such aids for good, average, and weak students to give them the opportunity to improve their performance. In this manner, adaptive aids assist the users to perform an experiment in the proposed system correctly according to the correct procedure with high performance. For evaluation, we conducted a comprehensive user study with 59 participants from various institutions. These students were selected randomly by their teachers and contained different levels of students (i.e., weak, average, and good students). We also conducted a written quiz and based on their scores we divided them into three groups (i.e., good, average, and weak). The participants (students) were classified into three groups G1, G2, and G3 based on their expertise levels (i.e., good, average and low). Then each group conducted an experiment four times. Evaluations revealed that the proposed system consistently improved students' performance in four trials. In particular, weak students' performance greatly improved as compared to that of good and average students in terms of a variety of factors, including time and errors during the performance of experiments.

KEYWORDS: Virtual Reality | Virtual Reality Chemistry Lab | Cognitive aids | Adaptivity

DR. NUMAN ALI
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TITLE OF PAPER

The Effect of Task Specific Aids on Students' Performance and Minimization of Cognitive Load in a Virtual Reality Chemistry Laboratory

COMPUTER ANIMATION AND VIRTUAL WORLDS

UNITED KINGDOM

X

1.1 (2022)

2023-07-01

4 QUALITY EDUCATION

https://doi.org/10.1002/cav.2194

SCAN ME

ABSTRACT

Different cognitive aids (such as arrows, audio, etc.) are used in virtual laboratories for the enhancement of students' performance during their experimental tasks. However, excessive use of aids in virtual laboratories can lead to increased cognitive load, which affects task performance. In this article, we first conducted a subjective study with field experts to investigate about the practical implementation of our existing virtual chemistry laboratory. To consider the suggestions of the field experts, we propose task specific aids based virtual reality chemistry laboratory (TSA-VRCL) to minimize students' cognitive load and enhance their performance. The task specific aids consist of an arrow, animation, and audio aids that are separately rendered with each step of the experimental tasks. During evaluations, eighty students performed the experiments in four different groups using four different experimental conditions. Evaluations revealed that the proposed TSA-VRCL minimizes students' cognitive load and enhances their performance.

KEYWORDS:

Virtual Reality | Virtual Reality Chemistry Lab | Cognitive aids | Performance

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TITLE OF PAPER

The effect of image-cyclic-based guidance on user's skill enhancement in virtual assembly task

MULTIMEDIA TOOLS AND APPLICATIONS

NETHERLANDS

3.6 (2022)

W

2023-10-13

https://doi.org/10.1007/s11042-023-17175-y

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

The concept of 2 Dimensional (2D) and 3 Dimensional (3D) are represented by different bodies for diverse applications. The 2D is an old concept of image representation as it displays only the x and y axis, whereas the 3D image displays the x, y, and z axis simultaneously. The image of 3D on a screen looks like an image in the real world. With the rapid development of virtual technology, the virtual assembly task is used for a user the check the clear view, just like a real-world view. Various cognitive aids (such as change of color, arrows, etc.) are provided in virtual assembly tasks to assist users in task realization. These aids increase users' performance but lead to reduce learning because there is less cognitive load on the users. In this research, we propose the development of Image Cyclic Based Guidance (ICBG) on users' skills enhancement in virtual electric motor assembly tasks for poly-technical students who enable them to assemble the electric motor according to the correct course of action in a 3D-friendly environment without any mental load or expert. We describe the potential contribution of VEM (Virtual Electric Motor) for enhancing student learning based on ICBG, where students assist in assembling an electric motor and its different parts and accurately assemble these parts using VEM. We evaluated our proposed system through polytechnical students. During the evaluation, it revealed that ICBG showed a significant difference that the performance of students was considerably better than the others who did not use it.

KEYWORDS:

Virtual Reality | Online Distanced Learning using 3D approach | Image cyclic based guidance | Augmented Reality

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TITLE OF PAPER

A Subjective Study on the Effects of Dynamic Virtual Chemistry Laboratory in a Secondary School Education

ORBITAL: ELECTRONIC JOURNAL OF CHEMISTRY

BRAZIL

0.6 (2022)

Y

2023-04-13

http://dx.doi.org/10.17807/orbital.v15i1.18138

4 QUALITY EDUCATION

SCAN ME

ABSTRACT

Virtual chemistry laboratories (VCLs) are the alternative solutions of the physical laboratories, where students can virtually conduct their experiments with a lower cost, and in an efficient and safer way. Considering the importance of technology-enhanced learning and that of the experimental study, several VCLs have been proposed. However, the existing VCLs are static and only provide the simulation of pre-defined experiments, procedures, or safety procedures and cannot be adapted according to the students' level or new experimental tasks. In this paper, we proposed a dynamic virtual chemistry lab (DVCL) where instructors or experts are allowed to add a new chemical experiment by adding its apparatus, chemicals, glassware, and mechanism or add something new to its properties. We conducted a subjective study with field experts to investigate the effect of proposed DVCL in secondary school chemistry education. During evaluation, twenty-seven field experts were participated and evaluated the proposed DVCL with system usability scale (SUS)-questionnaire and by a simple questionnaire. The results showed that the proposed DVCL is very helpful for students' performance and mental modeling and also for effortlessly uplifting their knowledge for hands-on experiments.

KEYWORDS:

Virtual Chemistry Lab | Dynamic Virtual Learning Environment | Hands-on Experiments | Interactive learning

MR. MUHAMMAD USMAN SARWAR

LECTURER

DEPARTMENT OF COMPUTER GAMES DEVELOPMENT

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Mr. Usman Sarwar, a Lecturer at the Computer Games Development Department, brings a wealth of knowledge and expertise to his role. He holds a Master of Science in Computer Science (MSCS) from NUCES-FAST, Islamabad, and a Bachelor of Science in Computer Science (BSCS) from GCU Lahore. With his strong academic background and passion for the field, Mr. Sarwar plays a crucial role in educating and mentoring students in game development. His understanding of both theoretical concepts and practical applications enhances the learning experience for students

Research Areas

Machine Learning | IoTs | Health Monitoring | Game theory

	TOTAL	FY 2023
PUBLICATIONS	07	01
CITATIONS	396	113

SGDS TARGETED ---------- 01

MR. MUHAMMAD USMAN SARWAR

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TITLE OF PAPER

Toward explainable AI-empowered cognitive health assessment

FRONTIERS IN PUBLIC HEALTH

SWITZERLAND

W

5.2 (2022)

2023-03-09

3 GOOD HEALTH AND WELL-BEING

https://doi.org/10.3389/fpubh.2023.1024195

SCAN ME

ABSTRACT

Explainable artificial intelligence (XAI) is of paramount importance to various domains, including healthcare, fitness, skill assessment, and personal assistants, to understand and explain the decision-making process of the artificial intelligence (AI) model. Smart homes embedded with smart devices and sensors enabled many context-aware applications to recognize physical activities. This study presents XAI-HAR, a novel XAI-empowered human activity recognition (HAR) approach based on key features identified from the data collected from sensors located at different places in a smart home. XAI-HAR identifies a set of new features (i.e., the total number of sensors used in a specific activity), as physical key features selection (PKFS) based on weighting criteria. Next, it presents statistical key features selection (SKFS) (i.e., mean, standard deviation) to handle the outliers and higher class variance. The proposed XAI-HAR is evaluated using machine learning models, namely, random forest (RF), K-nearest neighbor (KNN), support vector machine (SVM), decision tree (DT), naive Bayes (NB) and deep learning models such as deep neural network (DNN), convolution neural network (CNN), and CNN-based long short-term memory (CNN-LSTM). Experiments demonstrate the superior performance of XAI-HAR using RF classifier over all other machine learning and deep learning models. For explainability, XAI-HAR uses Local Interpretable Model Agnostic (LIME) with an RF classifier. XAI-HAR achieves 0.96% of F-score for health and dementia classification and 0.95 and 0.97% for activity recognition of dementia and healthy individuals, respectively.

KEYWORDS: Artificial Intelligence | Health assessment | Decision-making process

Ms. Tanvir Fatima Naik Bukht

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Department of Computer games development
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Ms. Tanvir Fatima Naik Bukht is a highly qualified Lecturer within the Computer Games Development Department. Holding a PhD in Computer Science from Air University, she has attained a mastery of her field through rigorous academic study. Her academic journey also includes achieving a Master of Science (MS) degree in Computer Science from ISP Multan and a Master of Computer Science (MCS) from Virtual University. With this strong educational background, Ms. Tanvir brings a wealth of theoretical knowledge and practical expertise to her role as a lecturer.

Research Areas

Artificial intelligence

Digital Image Processing

	TOTAL	FY 2023
PUBLICATIONS	13	02
CITATIONS	152	94
SGDS TARGETED ---------- 02		

Ms. Tanvir Fatima Naik Bukht

Lecturer

Department of Computer games development

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TITLE OF PAPER

Efficient Breast Cancer Diagnosis from Complex Mammographic Images Using Deep Convolutional Neural Network

COMPUTATIONAL INTELLIGENCE AND NEUROSCIENCE

UNITED STATES

4.2 (2022)

W

2023-03-02

https://doi.org/10.1155/2023/7717712

3 GOOD HEALTH AND WELL-BEING

SCAN ME

ABSTRACT

Medical image analysis places a significant focus on breast cancer, which poses a significant threat to women's health and contributes to many fatalities. An early and precise diagnosis of breast cancer through digital mammograms can significantly improve the accuracy of disease detection. Computer-aided diagnosis (CAD) systems must analyze the medical imagery and perform detection, segmentation, and classification processes to assist radiologists with accurately detecting breast lesions. However, early-stage mammography cancer detection is certainly difficult. The deep convolutional neural network has demonstrated exceptional results and is considered a highly effective tool in the field. This study proposes a computational framework for diagnosing breast cancer using a ResNet-50 convolutional neural network to classify mammogram images. To train and classify the INbreast dataset into benign or malignant categories, the framework utilizes transfer learning from the pretrained ResNet-50 CNN on ImageNet. The results revealed that the proposed framework achieved an outstanding classification accuracy of 93%, surpassing other models trained on the same dataset. This novel approach facilitates early diagnosis and classification of malignant and benign breast cancer, potentially saving lives and resources. These outcomes highlight that deep convolutional neural network algorithms can be trained to achieve highly accurate results in various mammograms, along with the capacity to enhance medical tools by reducing the error rate in screening mammograms.

KEYWORDS: Breast Cancer Diagnosis | Deep Convolutional Neural Network

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TITLE OF PAPER

A Novel Human Interaction Framework Using Quadratic Discriminant Analysis with HMM

COMPUTERS, MATERIALS CONTINUA

UNITED STATES

3.98 (2022)

X

2023-11-29

https://doi.org/10.32604/cmc.2023.041335



SCAN ME

ABSTRACT

This research focuses on recognizing human interaction behaviors from static images, crucial for applications in surveillance, human-computer interaction, and social robotics. Using a Hidden Markov Model (HMM), the study develops a novel image-based method enhanced by hue, saturation, and intensity (HSI) color transformation for vibrant visualization. Gaussian filters and statistical silhouette extraction refine images, while feature extraction utilizes FAST, Oriented FAST, and ORB techniques. Quadratic Discriminant Analysis (QDA) aids in feature fusion and discrimination, facilitating effective analysis of high-dimensional data. Achieving impressive accuracy rates of 93% and 94.6% in BIT-Interaction and UT-Interaction datasets respectively, underscores the technique's success and reliability. By addressing challenges in frame enhancement, silhouette extraction, feature fusion, and classification, this approach enhances data quality, accuracy, adaptability, and reliability across diverse domains, reducing errors significantly.

KEYWORDS:

Human interaction recognition | HMM classification | Quadratic Discriminant analysis | Dimensionality reduction

Air University School of Management (AUSOM)

The Air University School of Management (AUSOM) stands as a beacon of excellence among national business schools, distinguished by its innovative teaching methods and a commitment to fostering managerial skills. Through the case-based teaching approach, AUSOM provides a conducive environment for students to sharpen their management acumen. This integration of technology, personalized learning structures, and exceptional faculty distinguishes AUSOM as a premier institution. The school's strong industry ties, facilitated by interactive workshops and seminars, offer students valuable insights and networking opportunities. AUSOM alumni hold prominent leadership positions across diverse sectors, a testament to the school's efficacy in nurturing talent. This success is a result of the collective dedication of students, faculty, administrative staff, and university management, fostering a culture of continuous learning and collaboration. AUSOM promises a transformative educational journey, equipping students not only with theoretical knowledge but also with the skills to contribute meaningfully to their professions and society at large.

FACULTY PUBLICATIONS (2023)

31

SDGS TARGETED



Department of Business Studies

Departmental Overview

The Department of Business Studies at Air University aims to be a pioneering center for innovative academic programs, equipping students to make significant contributions to organizations and society. Integrated within Air University's esteemed knowledge system, the department offers a diverse range of undergraduate and graduate programs. Positioned at the intersection of ethics, business, and technology, it prepares students to navigate and thrive in technology-driven business environments. With strong corporate partnerships and a focus on case study pedagogy, the department ensures programs remain relevant to current business needs, producing graduates ready for the competitive market. Emphasizing the importance of effective decision-making, the department provides extensive decision-making exercises and experiential learning opportunities.

The Department of Business Studies boasts a distinguished faculty dedicated to academic excellence and professional development. Leading the department is Dr. Amir Ishaque, Chair, whose expertise guides strategic initiatives and fosters a culture of innovation. Dr. Muzammel Shah, Dr. Saad Hassan, Dr. Qaiser Janjua, Mr. Imran Hameed, Ms. Fakhra Malik, Ms. Bushra Karim Mirza, and Mr. Umer Ghauri, all serve as Assistant Professors, bringing a wealth of knowledge and experience to the classroom. Their commitment to cutting-edge research and practical insights enriches students' learning experiences. Additionally, the department benefits from the expertise of Mr. Nouman Ali, Ms. Tayyba Sarfraz, Ms. Amna Aslam, and Ms. Aziz Fatima, dedicated Lecturers who contribute to the academic and professional growth of our students. Together, this dynamic faculty ensures that students receive a comprehensive education.

DEPARMENTAL PUBLICATIONS (2023)

21

SDGS TARGETED IN 2023



Dr. Amir Ishaque

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Dr. Amir Ishaque is an Assistant Professor in the Department of Business Studies with a distinguished academic background. He holds a PhD in Human Resource Management from Riphah International University, Islamabad, demonstrating his expertise in the field. Prior to his doctoral studies, Dr. Ishaque obtained an MS in Marketing from the prestigious Shaheed Zulfiqar Ali Bhutto Institute of Science and Technology (SZABIST), Islamabad. With his advanced qualifications and specialized knowledge in HRM and Marketing, Dr. Ishaque brings valuable insights and expertise to the Department of Business Studies.

Research Areas

Organizational Behavior | Employee's Attitudes and Behaviors | HRM practices

	TOTAL	FY 2023
PUBLICATIONS	47	09
CITATIONS	455	60

SGDS TARGETED ---------- 06

Dr. Amir Ishaque
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TITLE OF PAPER

The bright and dark side of humble leadership: A conservative of resource perspective

COGENT BUSINESS & MANAGEMENT

UNITED KINGDOM

3.0 (2022)

X

2023-08-01

https://doi.org/10.1080/23311975.2023.2249559



SCAN ME

ABSTRACT

Drawing on conservation of resources theory, this study explores the bright and dark side of humble leadership by examining the mediating role of project commitment and workplace deviance between humble leadership and project success. Data were collected from 315 IT employees followed by partial least square structure equation modeling (PLS-SEM) to test the hypotheses. Findings indicate that humble leadership positively effects project success through the mediation of project commitment. However, workplace deviance does not mediate the link between humble leadership and project success. Study contributes to the nascent literature by highlighting humble leadership as an effective leadership style for project success.

KEYWORDS:

Humble leadership | Workplace deviance | Project success | Project commitment

Dr. Amir Ishaque
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TITLE OF PAPER

Connecting the dots. A serial mediation of intellectual capital and organizational ambidexterity between high performance work system and innovation performance

JOURNAL OF INTELLECTUAL CAPITAL

UNITED KINGDOM

6.0 (2022)

W

2023-08-01

https://doi.org/10.1108/JIC-11-2022-0220



SCAN ME

ABSTRACT

The study aimed to explore the relationship between high-performance work systems (HPWS) and innovation performance (IP) by investigating the mechanisms of intellectual capital (IC) and organizational ambidexterity (OA) as serial mediators. Literature suggests a gap in understanding the linkage between HPWS and IP, often referred to as a "black box." To address this, the study developed a framework to theorize the HPWS-IP nexus through the mediation of IC and OA. Utilizing survey-based, multi-source, and time-lagged data, the proposed model was empirically tested. The analysis, conducted using SPSS 24 for descriptive statistics and Smart-PLS 3.32 for partial least square structural equation modeling (PLS-SEM), revealed significant direct and indirect relationships between HPWS and IP, with both IC and OA acting as serial mediators. This study contributes to the literature by examining HPWS as an antecedent of IC and OA, and IP as the consequence, filling a gap in previous research that lacked exploration of the serial mediation model involving IC and OA in the HPWS-IP relationship.

KEYWORDS:

High Performance work system | Intellectual capital | Innovation performance | Organizational Ambidexterity

Dr. Amir Ishaque
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amir.ishaque@mail.au.edu.pk

TITLE OF PAPER

Impact of Compulsory Citizenship Behavior on Employee Performance: A Mediating Role of Perceived Insider Status and Moderating Role of Psychological Hardiness. NUML International Journal of Business & Management

NUML INTERNATIONAL JOURNAL OF BUSINESS & MANAGEMENT

PAKISTAN

NOT ANNOUNCED

Y

8 DECENT WORK AND ECONOMIC GROWTH

2023-06-01

10.52015/nijbm.v18i1.162

SCAN ME

ABSTRACT

The current study investigates the relationship between compulsory citizenship behavior (CCB) and employee performance (EP) through the underlying mechanism of perceived insider status (PIS) and the moderating effect of psychological hardiness (PH). For this purpose, data were collected through a non-probability convenience sampling technique in three-time lags from 376 employees working in hotels located in Pakistan. The results support the effect of compulsory citizenship behavior on employee performance, directly and indirectly, through the perceived insider status of employees. Results also support the moderating role of psychological Hardiness weakening the negative relationship between CCB and perceived insider status.

KEYWORDS:

Compulsory citizenship behaviour | Employee performance | Affective events theory

Dr. Amir Ishaque
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TITLE OF PAPER

Unraveling the Pathways to Creative Performance: The Serial Mediation of Career Optimism and Career Commitment Between Core Self-Evaluation and Employee Creative Performance in the IT Sector

PAKISTAN JOURNAL OF HUMANITIES AND SOCIAL SCIENCES

PAKISTAN

NOT ANNOUNCED

Y

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

2023-06-01

SCAN ME

10.52131/pjhss.2023.1102.0525

ABSTRACT

Organizations seeking to innovate and gain a competitive edge must unleash creative potential in the workplace. The current study is aimed at assessing the serial mediation of career optimism and career commitment in the relationship between core self-evaluation (CSE) and employee creative performance. 458 employees from the IT sector participated in the study belonging to Rawalpindi and Islamabad. Data was collected using adopted questionnaires. SPSS PROCESS Macro was used for data analysis. The findings showed that individuals with higher levels of CSE also had higher levels of career optimism, which affects their commitment to their careers. Consequently, higher levels of career commitment have a positive impact on their ability to produce creative work. These findings highlight the need of taking career optimism and career commitment into account as sequential mediators of CSE's influence on creative performance. Furthermore, this work provides the door for future research into the underlying mechanisms and the examination of new aspects that could add to the complex dynamics of creativity.

KEYWORDS:

Career optimism | Core Self evaluation | Employee creative performance

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TITLE OF PAPER

Does Energy Efficiency Matter for Poverty Alleviation and Economic Growth? A Fresh Empirical Insight From an Asian Perspective

THE SINGAPORE ECONOMIC REVIEW

SINGAPORE

1.8 (2022)

X

2023-04-25

https://doi.org/10.1142/S0217590823440022



SCAN ME

ABSTRACT

Globally, everybody deals with poverty as a shared societal issue. It is still unclear how to investigate its causes and create new paradigms for policy, but it offers many promising directions for academic study. The use of technological innovation in this environment for social change to address poverty reduction is also an important issue. Consequently, this study investigates how effective poverty reduction may be accomplished in Asia through technological innovation and financial development. The super-efficiency data envelopment analysis model and system generalized method of moments were utilized in the present study together with data from 2010 to 2020 for an empirical estimate. The data show that different areas have effectively reduced poverty over time. However, Asia's overall effectiveness in reducing poverty is rather unevenly distributed geographically. The significance of poverty reduction in Asia is positively impacted by technical advancement and financial prosperity. The effects of globalization on the efficacy of poverty reduction are negligible. This study presents some policy insights for decision makers based on the empirical findings.

KEYWORDS:

Poverty alleviation | DEA and GMM model | Asian Perspective | Financial Development

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TITLE OF PAPER

From validation to execution: Exploring the practical implementation of the conjoint framework of quality management and high-performance work systems

HELIYON

NETHERLANDS

W

4.0 (2022)

2023-04-25

https://doi.org/10.1016/j.heliyon.2023.e16718

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

SCAN ME

ABSTRACT

Quality Management System (QMS) and High-Performance Work System (HPWS) are prominent initiatives for enhancing organizational effectiveness worldwide. However, understanding their inter-relationship in a Conjoint Implementation scenario remains unclear. Existing frameworks often lack practical validation. Rehmani et al. (2020a) introduced an Integrated Framework for QMS and HPWS in Engineering Organizations of Pakistan, yet it lacks practical validation. This study pioneers a step-by-step validation process for hybrid QMS-HPWS frameworks, aiming to provide a standard validation method for practitioners in engineering organizations and beyond.

KEYWORDS:

Quality Management System (QMS) | High-performance work system | Practical validation | Case study

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TITLE OF PAPER

Lovemarks and beyond: Examining the link between lovemarks and brand loyalty through customer advocacy in the automobile industry

PLOS ONE

UNITED STATES

W

NOT ANNOUNCED

2023-04-01

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

https://doi.org/10.1371/journal.pone.0285193

SCAN ME

ABSTRACT

The current study aims to deepen our understanding of lovemark brands and their implications, particularly within the automobile industry, where their significance is understudied. While previous research has identified various psychological and brand-related consequences of lovemarks, the underlying mechanisms remain insufficiently explored. Drawing inspiration from reciprocity theory, this research investigates the role of customer advocacy in mediating the relationship between perceived lovemarks and brand loyalty among Pakistani automobile customers. Through a survey method involving 478 respondents, structural equation modeling was employed for analysis, treating lovemarks and brand loyalty as reflective higher-order constructs. The findings underscore the significance of customer advocacy as a mediator, revealing its pivotal role in influencing the relationship between lovemarks and brand loyalty. This study contributes to the literature by shedding light on the interplay between lovemarks, customer advocacy, and brand loyalty within the specific context of the Pakistani automobile sector, offering valuable insights for both academia and practitioners in understanding and managing consumer behavior and brand relationships.

KEYWORDS:

Emotions | Behaviour | Pakistan | Decision Making | Questionnaire | Surveys

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TITLE OF PAPER

Social Entrepreneurship: An Exploration of Formal and Informal Institution Factors in Pakistan

RUSSIAN LAW JOURNAL

RUSSIAN FEDERATION

X

NOT ANNOUNCED

2023-03-01

https://doi.org/10.52783/rlj.v11i5s.982



SCAN ME

ABSTRACT

"Rethinking business" and "social business" are both ways of looking at the world's big-picture trends, and there seems to be a noticeable shift toward rethinking business and rethinking social business (Baker, 2011). Progressively, studies have been directed at businesses as having more than just an economic or Schumpeterian purpose, where entrepreneurs encourage growth and structural changes in a financial system. They also look at businesses as having a social component (Drayton, 2012). Many scholars and researchers believe that social entrepreneurs have the potential to lead the way for a more sustainable and equitable society, one that is founded on the foundation of meeting local needs and developing new market-oriented solutions (Nicholls, 2011; Urban, 2015; Weerawardena & Mort, 2006).

KEYWORDS:

Rethinking business | Social business | Entrepreneurship | Schumpeterian purpose

DR. AMIR ISHAQUE
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DEPARTMENT OF BUSINESS STUDIES
amir.ishaque@mail.au.edu.pk

TITLE OF PAPER

Impact of Inclusive Leadership on Project Citizenship Behavior: A Mediation-Moderation Mechanism of Psychological Empowerment and Trust in Leadership

JOURNAL OF POSITIVE SCHOOL PSYCHOLOGY

TURKEY

Y

NOT ANNOUNCED

2023-03-01

3 GOOD HEALTH AND WELL-BEING

https://journalppw.com/index.php/jpsp/article/view/15733/10109

SCAN ME

ABSTRACT

The current study aims to examine the impact of inclusive leadership and project citizenship behavior with mediating role of psychological empowerment. Trust in leadership moderate the relationship between inclusive leadership and psychological empowerment in such a way that, higher the degree of "trust in leadership", the relationship between inclusive leadership and psychological empowerment will more strengthen. For this purpose, data were collected from 302 participants working in project-based organizations in Rawalpindi and Islamabad and analyzed through regression analysis by using AMOS and SPSS Hayes process macro. Results revealed that inclusive leadership has a significant and positive impact on project citizenship behavior with the intervening role of psychological empowerment. Although the moderating effect of trust in leadership was insignificant in the relationship between inclusive leadership and psychological empowerment. Based on the findings, it is suggested to managers and policymakers to adopt an inclusive leadership approach, which will psychologically empower the employee, consequently, that leads to the project citizenship behavior. To the best of research efforts, not a single study investigates the impact of inclusive leadership on project citizenship behavior with mediating role of psychological empowerment to date. Additionally, the direct impact of psychological empowerment on project citizenship behavior is also a unique contribution.

KEYWORDS: Inclusive Leadership | Project Citizenship Behavior | Psychological Empowerment

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Dr. Muzammel Shah serves as an Assistant Professor and Cluster Head of Human Resource Management (HRM) at the Air University School of Management (AUSOM), Air University, Islamabad, Pakistan. He is recognized as an HEC Approved Supervisor and holds the position of Managing Editor for the Journal of Business & Economics (JBE). He actively contributes to graduate education as a member of the Graduate Evaluation Committee (GEC) and has supervised 1 PhD and 6 MS students. Dr. Shah completed his Ph.D. in Management Science from Qurtuba University of Science & Information Technology, Pakistan, in December 2018.

Research Areas

Leadership and Sustainability | HRM | Green HRM | Sustainability

	TOTAL	FY 2023
PUBLICATIONS	17	03
CITATIONS	275	92

SGDS TARGETED ---------- 06

DR. MUZAMMEL SHAH
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TITLE OF PAPER

The bright and dark side of humble leadership: A conservative of resource perspective

COGENT BUSINESS & MANAGEMENT

UNITED KINGDOM

3.0 (2022)

X

2023-08-01

https://doi.org/10.1080/23311975.2023.2249559

SCAN ME

ABSTRACT

Drawing on conservation of resources theory, this study explores the bright and dark side of humble leadership by examining the mediating role of project commitment and workplace deviance between humble leadership and project success. Data were collected from 315 IT employees followed by partial least square structure equation modeling (PLS-SEM) to test the hypotheses. Findings indicate that humble leadership positively effects project success through the mediation of project commitment. However, workplace deviance does not mediate the link between humble leadership and project success. Study contributes to the nascent literature by highlighting humble leadership as an effective leadership style for project success.

KEYWORDS:

Humble leadership | Workplace deviance | Project success | Project commitment

DR. MUZAMMEL SHAH
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TITLE OF PAPER

The desire for employability and self-exploitation: concretizing Lacan's psychoanalysis on employability

EVIDENCE-BASED HRM

UNITED KINGDOM

X

2.2 (2022)

2023-05-16

https://doi.org/10.1108/EBHRM-06-2022-0151



SCAN ME

ABSTRACT

The study addresses the overlooked dark side of commitment and employability in the contemporary workplace by developing and investigating a comprehensive theoretical framework that incorporates learning, motivation, commitment, employability, and self-exploitation. Despite the legitimacy of commitment and employability, limited research has explicitly explored their relationship and potential implications. The author conceptualizes employability as a cultural fantasy that leads to self-exploitation. Grounded in Lacan's psychoanalysis, the study utilizes a sample of 658 subjects across eight industries and employs structural equation modeling (SEM) in AMOS to test the hypothesized relationships. The findings confirm the hypothesized relationships, revealing that employability correlates with self-exploitation. Employees striving to maintain their relevance in their organizations through employability activities often find themselves exploited in the process, highlighting the complex dynamics between commitment, employability, and self-exploitation in the contemporary work environment.

KEYWORDS:

Commitment | Concretization | Learning | Employability | Psychoanalysis

DR. MUZAMMEL SHAH
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TITLE OF PAPER

Metabolic rift theory and the complexities of water conflict between India and Pakistan: A pathway to effective environmental management

JOURNAL OF ENVIRONMENTAL MANAGEMENT

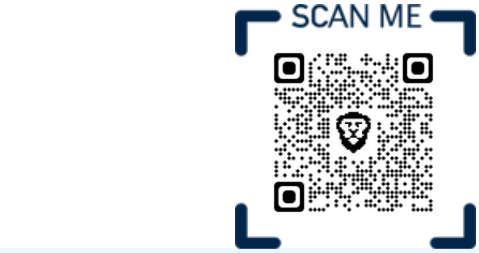
UNITED STATES

W

8.7 (2022)

2023-12-01

https://doi.org/10.1016/j.jenvman.2023.119164



SCAN ME

ABSTRACT

The exacerbation of the historical and geopolitical tensions between India and Pakistan, largely attributed to colonial legacies, is further amplified due to climate change-induced water conflicts. These environmental management issues stemming from the climate crisis are urgent, demanding innovative and collaborative solutions. The primary aim of this article is to elucidate the complexities of the water conflict between India and Pakistan and propose more effective environmental management strategies that will ultimately foster regional peace and stability. The article applies the metabolic rift theory, a sociological approach, to comprehensively explain crisis-led ecological challenges in the Indo-Pak context. By applying this theory, the article reveals that collective environmental management strategies, particularly those aimed at water resource management, can significantly mitigate the impact of climate crisis and the related climate-induced conflicts. The study also proposes a need-based approach to environmental management, stressing the importance of having integrated water resource planning (harmoniously) shared between India and Pakistan. This includes ensuring sustainable wastewater treatment, securing freshwater quality, and guaranteeing an equitable distribution and utilization of water resources between these two nations.

KEYWORDS:

Water resource management | Pakistan | India | Waste water treatment

DR. SAAD HASSAN
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Dr. Saad Hassan is an Assistant Professor in the Department of Business Studies at Air University. He holds a Ph.D. from the University of Utara Malaysia. With his academic background and expertise, Dr. Hassan brings valuable insights to the department, contributing to the academic excellence and research endeavors. As an Assistant Professor, he plays a pivotal role in imparting knowledge and guiding students in their academic journey. Dr. Hassan's research interests likely span various areas within the field of business studies, enriching the educational experience for students and contributing to the advancement of knowledge in the discipline.

Research Areas

Strategic Management | OB and Performance Management | HRM practices

	TOTAL	FY 2023
PUBLICATIONS	19	09
CITATIONS	680	116

SGDS TARGETED ---------- 06

DR. SAAD HASSAN
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TITLE OF PAPER

The bright and dark side of humble leadership: A conservative of resource perspective

COGENT BUSINESS & MANAGEMENT

UNITED KINGDOM

3.0 (2022)

X

2023-08-01

https://doi.org/10.1080/23311975.2023.2249559

SCAN ME

ABSTRACT

Drawing on conservation of resources theory, this study explores the bright and dark side of humble leadership by examining the mediating role of project commitment and workplace deviance between humble leadership and project success. Data were collected from 315 IT employees followed by partial least square structure equation modeling (PLS-SEM) to test the hypotheses. Findings indicate that humble leadership positively effects project success through the mediation of project commitment. However, workplace deviance does not mediate the link between humble leadership and project success. Study contributes to the nascent literature by highlighting humble leadership as an effective leadership style for project success.

KEYWORDS:

Humble leadership | Workplace deviance | Project success | Project commitment

DR. SAAD HASSAN
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TITLE OF PAPER

Connecting the dots. A serial mediation of intellectual capital and organizational ambidexterity between high performance work system and innovation performance

JOURNAL OF INTELLECTUAL CAPITAL

UNITED KINGDOM

6.0 (2022)

W

2023-08-01

https://doi.org/10.1108/JIC-11-2022-0220



SCAN ME

ABSTRACT

The study aimed to explore the relationship between high-performance work systems (HPWS) and innovation performance (IP) by investigating the mechanisms of intellectual capital (IC) and organizational ambidexterity (OA) as serial mediators. Literature suggests a gap in understanding the linkage between HPWS and IP, often referred to as a "black box." To address this, the study developed a framework to theorize the HPWS-IP nexus through the mediation of IC and OA. Utilizing survey-based, multi-source, and time-lagged data, the proposed model was empirically tested. The analysis, conducted using SPSS 24 for descriptive statistics and Smart-PLS 3.32 for partial least square structural equation modeling (PLS-SEM), revealed significant direct and indirect relationships between HPWS and IP, with both IC and OA acting as serial mediators. This study contributes to the literature by examining HPWS as an antecedent of IC and OA, and IP as the consequence, filling a gap in previous research that lacked exploration of the serial mediation model involving IC and OA in the HPWS-IP relationship.

KEYWORDS:

High Performance work system | Intellectual capital | Innovation performance | Organizational Ambidexterity

DR. SAAD HASSAN
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TITLE OF PAPER

Personality and humbleness. The role of HEAXCO model

SAGE OPEN

UNITED STATES

W

2.0 (2022)

2023-12-19

https://doi.org/10.1177/21582440231216172



SCAN ME

ABSTRACT

Individual differences can be found in every aspect of emotion, thinking, and behaving. The discovery of basic personality structure models was a watershed for highlighting the importance of individual differences and their outcomes. Different individuals have differences depending upon their personality; these personality dimensions are described in terms of other personality traits in a concise but complete manner. Following the intentions and outcomes of the study, two of them were conducted where; in the first one was carried out to find how the HEXACO model of personality traits will impact Humble Leadership? While the second study intended to explain the impact of Humble Leadership on employee engagement through the mediating role of felt obligations. Two hundred sixteen respondents (leaders and workers) of government sector organizations participated in the study. Results of our research indicated/suggested that Honesty–Humility, Agreeableness, Emotionality, and Conscientiousness significantly contribute to the development of Humble Leadership; however, extroverts and Openness have an insignificant and negative impact on developing a Humble Leader. The outcome of study 2 suggested that Humble Leadership and Employee Engagement significantly impact each other while Felt Obligation plays a significant mediating role in this relationship.

KEYWORDS:

Humble Leadership | Employee performance | HEXACO Model of Personality | Leadership

DR. SAAD HASSAN
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TITLE OF PAPER

Between Good Intentions And Dark Corners: Exploring The Relationship Between Organizational Citizenship And Unethical Pro-Organizational Behavior

SARHAD JOURNAL OF MANAGEMENT SCIENCES

PAKISTAN

Y

NOT ANNOUNCED

2023-06-01

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

https://doi.org/10.1177/21582440231216172

SCAN ME

ABSTRACT

Employees who are keen to uphold their organizational compete-tiveness by practicing organizational citizenship behavior (OCB) may, at some point within practical workplace settings, based on their social exchange perceptions (SEP),cross the ethical and moral boundary conditions to benefit the organization and engage in unethical pro-organizational behavior (UPB). Drawing on social exchange theory (SET), and social cognitive theory (SCT), a mediated-moderation model has been theorized to broaden our take on UPB as one of the possible downstream effects of OCB, mediated by SEP and moderated by moral attentiveness (MA). As a novel study of its kind, it is likely to have a significant contribution to the body of knowledge regarding the paradoxical nature of UPB.

KEYWORDS:

Unethical pro-organizational behavior | Organizational citizenship behavior | Social exchange perception | Moral attentiveness

DR. SAAD HASSAN
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TITLE OF PAPER

Examining The Repercussions Of Emotional Labor Among Medical Doctors - An Explanatory Sequential Mixed-Method Design

PAKISTAN JOURNAL OF SOCIAL RESEARCH

PAKISTAN

Y

NOT ANNOUNCED

2023-03-31

https://doi.org/10.52567/pjsr.v5i01.1014



SCAN ME

ABSTRACT

Emotional labor prevails in a variety of fields. However, degree of emotional labor practiced by medical professionals, during the COVID-19 pandemic, is considerably higher. This study adopts an explanatory sequential mixed-method approach, where a survey-based quantitative study was conducted on 406 doctors working across Pakistan; followed by an interview-based qualitative study, conducted on 15 doctors. Quantitative analysis reveals that surface and deep acting both lead to high emotional exhaustion and low well-being, whereas genuine emotions lead to low emotional exhaustion and high well-being. No significant impact of emotional job demands is found on well-being via emotional exhaustion. Results from qualitative study reaffirm that due to high emotional job demands, doctors tend to heavily engage in emotional labor, which leads to emotional exhaustion, and compromises their well-being. The research highlights the contextual nature of emotional labor construct and investigates lesser-explored facets of psychological and physical well-being. The study also adds to the scant mixed-method literature, specifically an explanatory sequential design entailing structural equation modeling and thematic analysis. Keywords: Emotional Job Demands, Emotional Labor, Emotional Exhaustion, Psychological/Eudaimonic Well-being, Physical Well-being, COVID-19.

KEYWORDS:

High Well being | Emotional demands | High Job Demands | COVID-19

Dr. Shaista Nasir

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Research Areas

Sustainable HRM

Dr. Shaista Nasir, serving as an IPFP Fellow in the Business Studies Department, is a prolific academic with a notable contribution to scholarly literature. With a total of five publications to her credit, Dr. Nasir has demonstrated a commitment to advancing knowledge in her field. In the fiscal year 2023 alone, she authored four publications, indicating her active engagement in research and scholarly endeavors. As an IPFP Fellow, Dr. Nasir brings valuable insights and expertise to the department, contributing to its academic and research initiatives. Her dedication to scholarly pursuits enhances the academic environment and enriches the learning experience for students and colleagues alike.

	TOTAL	FY 2023
PUBLICATIONS	05	02

SGDS TARGETED ---------- 05

DR. SHAISTA NASIR
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TITLE OF PAPER

A Strategic Framework to Design Context-Specific Trainings Programs to Improve Project Management Performance in Pakistan

JOURNAL OF TIANJIN UNIVERSITY SCIENCE AND TECHNOLOGY

CHINA

1.1 (2022)

X

2023-10-10

10.5281/zenodo.10006014



SCAN ME

ABSTRACT

This study addresses the need for Strategic Framework to Design Context-Specific Trainings to improve project management competencies. We conduct interviews with project managers to build a typology of contextualizing factors that impact on project management training in Pakistan through grounded theory approach. Using these factors, we propose a strategic framework to design context-specific training programs based on information provided by organizational needs assessment. We demonstrate the utility of such a needs assessment in a poorly studied industry sector and socio-geographic setting, among public service project managers in Pakistan, considering the training needs of project managers and the organizational capability of their workplaces. This study demonstrates the importance of contextual training for the development of training programs that are responsive to organizational capacity. The results of this study are discussed in context with projectification, building organizational capability and improving project management training, particularly in developing countries to improve project manager's competencies

KEYWORDS:

Knowledge transfer | Contextualized training | Organizational needs | Project manager competencies

DR. SHAISTA NASIR
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TITLE OF PAPER

Role of Green Construction Practices and Service Quality in Creating Client's Positive Word of Mouth

JOURNAL OF XI'AN SHIYOU UNIVERSITY

CHINA

0.77 (2022)

X

2023-03-01

https://www.xisdxjxsu.asia/viewarticle.php?aid=2214



SCAN ME

ABSTRACT

This empirical study explores the impact of green construction practices and service quality on client satisfaction, while also investigating the moderating role of Client-Project Manager's team trust. Additionally, it analyzes how customer satisfaction influences positive word-of-mouth. Conducted using a deductive approach, the study employed a survey method with a non-probability purposive sampling technique, targeting clients of construction companies like Sardar Group of Companies, Habib Construction Services, and Dascon Construction Companies in Pakistan's twin cities. With 277 responses collected, data analysis was performed using SPSS and Smart PLS. Results indicate that both green construction practices and service quality positively influence client satisfaction, with client satisfaction mediating the relationship between these factors and client word-of-mouth. Furthermore, Project Manager trust moderates the relationship between stimuli (green construction practices and service quality) and organism (client satisfaction). The study's findings offer valuable insights for top management, project managers, and marketers to enhance marketing strategies and build client trust. Limitations, including the cross-sectional time horizon and non-random sampling, provide avenues for future research.

KEYWORDS:

Green construction practices | Service quality | Client satisfaction | Client PWOM

Department of Graduate Studies

Departmental Overview

The Department of Graduate Studies at Air University, within the Air University School of Management (AUSOM), offers diverse degree programs aimed at preparing students for success in today's competitive professional landscape. Aligned with AUSOM's vision for academic excellence and innovative research, the department provides specialized programs like MS in Business Analytics, MS in Project Management, MS in Management Sciences, and PhD in Management Sciences. Supported by a faculty of esteemed scholars, students benefit from cutting-edge research methodologies and practical applications. Through rigorous academic programs and state-of-the-art facilities, the Department of Graduate Studies at Air University nurtures future leaders and scholars poised to make significant contributions to the business world.

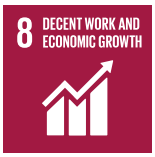
The Department of Graduate Studies boasts a distinguished faculty dedicated to academic excellence and research leadership. Led by Dr. Noshaba Batool, a seasoned academician serving as the Chair of the Department, the faculty comprises esteemed scholars and experienced professionals committed to nurturing the next generation of leaders. Dr. Aamer Hanif, an Associate Professor, brings a wealth of expertise and research acumen to the department, while Dr. Shoaib Ali, an Assistant Professor, contributes valuable insights and mentorship. Assisting in the academic journey are Assistant Professors Mr. Muhammad Faisal and Dr. Faisal Mahmood, both recognized for their contributions to scholarship and teaching. Additionally, Mr. Muhammad Rafique, a dedicated Lecturer, enriches the learning experience with his passion for education. Together, this dynamic faculty team embodies excellence in teaching, research, and mentorship.

DEPARMENTAL PUBLICATIONS (2023)

04

SDGS TARGETED IN 2023







DR. NOSHABA BATOOL

PROFESSOR
DEPARTMENT OF GRADUATE STUDIES
noshaba.batool@mail.au.edu.pk



Dr. Noshaba Batool is a distinguished Professor in the Department of Graduate Studies, possessing a PhD in Organizational Behavior/Human Resource Management from London, UK, along with a Master of Science in Business & Management from the same institution. With a rich background in business and research, Dr. Batool brings over 19 years of experience to her role, specializing in teaching and supervising research projects at both undergraduate and postgraduate levels. Her expertise equip her to guide and mentor students in their academic and research endeavor.

Research Areas

Organizational Psychology | Work-Life Balance | Organizational Citizenship Behavior

	TOTAL	FY 2023
PUBLICATIONS	21	02
CITATIONS	72	19

SGDS TARGETED ---------- 02

DR. NOSHABA BATOOL
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TITLE OF PAPER

Examining The Repercussions Of Emotional Labor Among Medical Doctors - An Explanatory Sequential Mixed-Method Design

PAKISTAN JOURNAL OF SOCIAL RESEARCH

PAKISTAN

Y

NOT ANNOUNCED

2023-03-31

https://doi.org/10.52567/pjsr.v5i01.1014



SCAN ME

ABSTRACT

Emotional labor prevails in a variety of fields. However, degree of emotional labor practiced by medical professionals, during the COVID-19 pandemic, is considerably higher. This study adopts an explanatory sequential mixed-method approach, where a survey-based quantitative study was conducted on 406 doctors working across Pakistan; followed by an interview-based qualitative study, conducted on 15 doctors. Quantitative analysis reveals that surface and deep acting both lead to high emotional exhaustion and low well-being, whereas genuine emotions lead to low emotional exhaustion and high well-being. No significant impact of emotional job demands is found on well-being via emotional exhaustion. Results from qualitative study reaffirm that due to high emotional job demands, doctors tend to heavily engage in emotional labor, which leads to emotional exhaustion, and compromises their well-being. The research highlights the contextual nature of emotional labor construct and investigates lesser-explored facets of psychological and physical well-being. The study also adds to the scant mixed-method literature, specifically an explanatory sequential design entailing structural equation modeling and thematic analysis. Keywords: Emotional Job Demands, Emotional Labor, Emotional Exhaustion, Psychological/Eudaimonic Well-being, Physical Well-being, COVID-19.

KEYWORDS:

High Well being | Emotional demands | High Job Demands | COVID-19

DR. NOSHABA BATOOL
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TITLE OF PAPER

Workplace Ostracism and Instigated Workplace Incivility:
A Moderated Mediation Model of Narcissism and Negative Emotions

PUBLIC ORGANIZATION REVIEW

NETHERLANDS

X

1.9 (2022)

2023-10-03

https://doi.org/10.1007/s11115-023-00754-w

8 DECENT WORK AND ECONOMIC GROWTH

SCAN ME

ABSTRACT

This study aims to examine the association between workplace ostracism (WO) and instigated workplace incivility (IWI). By drawing on the stressor-emotion model of counterproductive work behaviour (SEM-CWB) (Spector & Fox, 2005), the research examines the mediating role of negative emotions (NEs) and moderating role of narcissism between WO – IWI relationship. The study employs partial least squares structural equation modelling (PLS-SEM, Smart PLS-4) to analyse 300 responses taken from employees working in public sector organizations. Data were collected in two-time lags. The empirical results confirmed that WO is positively and significantly related to IWI directly as well as through the mediation of NEs. Moreover, narcissism moderates the mediated relationship in a way that the relationship gets stronger for higher level of narcissism. WO – IWI relationship with moderated mediation of narcissism and NEs has never been explored in the past. This study adds to the literature on SEM-CWB. It offers valuable insights to the public sector organizations in developing policies and norms within the organizational culture to proactively counter the adverse effects of WO and IWI.

KEYWORDS:

Workplace ostracism | Negative emotions | Narcissism | Public sector organizations

Dr. Aamer Hanif

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ahanif@mail.au.edu.pk



Dr. Aamer Hanif, an Associate Professor in the Department of Graduate Studies, brings a wealth of expertise to his role. Holding a PhD in Engineering Management from the College of E&ME, NUST, and an MS in Engineering Management from UET-Taxila, Dr. Hanif is recognized for his profound knowledge and research contributions in the field. He is a professional possessing over 15 years of teaching experience at university level. Expertise in data analytics, maintenance and operations management, project management and quality assurance.

Research Areas

Project management | Business analystics | Technology enhanced learning

	TOTAL	FY 2023
PUBLICATIONS	28	02
CITATIONS	272	59

SGDS TARGETED ---------- 02

DR. AAMER HANIF
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ahanif@mail.au.edu.pk

TITLE OF PAPER

Examining The Impact of Emotional Intelligence on Project Success in Small-Scale Aviation Projects

RADS JOURNAL OF BUSINESS MANAGEMENT

PAKISTAN

Y

NOT ANNOUNCED

2023-06-30

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

https://jbm.juw.edu.pk/index.php/jbm/article/view/122

SCAN ME

ABSTRACT

This study investigates the role of soft skills, particularly emotional intelligence, in mitigating conflicts and managing task interdependency within multidisciplinary teams in the aviation sector. While project management traditionally emphasizes technical expertise, the importance of soft skills is often overlooked. This research not only defines small-scale projects and their characteristics but also examines the contribution of soft skills to project success, while introducing task interdependence as a critical variable in time-constrained projects. Employing a quantitative research technique with a cross-sectional survey design, the study utilized purposive sampling to collect responses from project employees in selected airports of Pakistan. Multiple regression analysis was conducted on data from 275 participants involved in small-scale aviation projects. The findings reveal a relationship between emotional intelligence and project success, mediated by task interdependency. Surprisingly, conflict modes did not mediate this relationship, providing new insights into project management, particularly in small-scale aviation projects. This study, the first of its kind in Pakistan's aviation industry, underscores the importance of emotional intelligence in influencing project success and preventing conflict modes from adversely affecting project outcomes within small teams in the aviation sector.

KEYWORDS: Emotional intelligence | Conflict management | Task interdependency

DR. AAMER HANIF
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TITLE OF PAPER

Impact of supply chain robustness and resilience on firm performance: A perspective of Pakistan textile industry

BUSINESS REVIEW

PAKISTAN

Y

NOT ANNOUNCED

2023-06-26

https://doi.org/10.54784/1990-6587.1502



SCAN ME

ABSTRACT

This study investigates the impact of supply chain resilience and robustness on firm performance and also examines the significance of supply chain risk management (SCRM) in minimizing the consequences of disruptions on supply chain performance in the context of the COVID-19 pandemic. Data was gathered using convenience sampling technique through a survey from management staff (n=409) working in textile companies operating in Pakistan. Using SPSS software for data analysis, this study proposes a mediation model where risk management practices are proposed as a mediator between supply chain resilience, robustness and firm performance. The findings highlight that supply chain resilience and robustness have positive significant effect on firm performance. The results also revealed that supply chain risk management mediates the relationships between supply chain resilience, robustness and firm performance. The findings show that managers should focus more on improving supply chain risk management operations and prioritize their SC resilience and robustness competencies for better firm performance. Furthermore, this is among the few quantitative studies dealing with supply chain risk management procedures, SC resilience and robustness in the context of the Covid-19 pandemic. The research limitations have been identified and suggestions for future research have been provided.

KEYWORDS: Supply chain | Resilience | Robustness | Risk management | Firm performance

Department of Management Studies

Departmental Overview

The Management Studies Department offers BS degrees in Accounting & Finance, Aviation Management, Tourism & Hospitality Management, and Healthcare Management, aligning with global standards. The department actively facilitates student exchange programs with top universities worldwide; presently, BSAF and BSTHM students are studying in premier Turkish universities. Moreover, the BSAF program holds accreditation from esteemed global accounting associations like ACCA UK, offering significant exemptions. Engaging in MOUs with prominent organizations, the department ensures ample experiential learning opportunities, including industrial trips and seminars with industry experts. Job fairs connect students with potential employers, while entrepreneur galas foster entrepreneurial skills.

The Department of Management Sciences at Air University is a hub of academic excellence, led by Dr. Habib Ahmad as the Chair of the Department. Comprising a distinguished faculty team, including Assistant Professors Dr. Hasan Hanif, Mr. Farooq Rasheed, and Dr. Suhaib Aamir, the department offers a comprehensive educational experience. Additionally, the department benefits from the expertise of esteemed consultants, including Air Cdre (Retd) Khalee, Air Cdre Retd Salamat, Mr. Muhammad Salman A, Air Cdre (Retd) Muhammad, Mr. Jawad Zahid, and Ms. Novaira Ejaz, Mr. Mustahsan Elahi, Mr. Abdul Rafay, and Ms. Sana Farzand Ali, who bring a wealth of industry knowledge and experience to the table. With a focus on grooming future leaders in management, the department is committed to providing high-quality education and fostering a culture of academic excellence and innovation.

DEPARMENTAL PUBLICATIONS (2023)

07

SDGS TARGETED IN 2023



Dr. Suhaib Aamir

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Dr. Suhaib Aamir, an Assistant Professor in the Department of Management Sciences at Air University, brings a unique international perspective to his role. With a PhD in Travel and Tourism from Akdeniz University, Antalya, Turkey, Dr. Aamir has acquired specialized knowledge in the field. Additionally, he holds a Master of Science in Business Administration from Umeå University, Sweden, further enhancing his academic credentials. Dr. Aamir's expertise spans both academia and industry, allowing him to provide students with valuable insights and practical knowledge.

Research Areas

- Tourism and Hospitality
- Innovations/Innovative Technologies
- Multisided/Digital Platforms
- International Business

	TOTAL	FY 2023
PUBLICATIONS	20	01
CITATIONS	273	59

SGDS TARGETED ---------- 02

DR. SUHAIB AAMIR
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TITLE OF PAPER

Going Digital with Multisided-platforms: Assessing the Innovation Adoption Process from the Perspectives of Travel Agents

TOURISM AND HOSPITALITY RESEARCH

UNITED KINGDOM

W

3.5 (2022)

2023-07-01

https://doi.org/10.1177/14673584231186535



SCAN ME

ABSTRACT

Travel agents' adoption of digital technologies to digitally transform their businesses has seen a rapid surge in recent years in the tourism industry. Multisided Platforms (MSPs) have been one of those digital technologies that digitally transformed brick-and-mortar travel agents to have access to online tools and modules for searching, comparing, and booking travel content. This study examines the factors that are taken into consideration by travel agents in the three phases of the adoption process, namely, pre-adoption, during-adoption, and post-adoption phases. A qualitative study was taken up for this purpose and seventeen semi-structured interviews were conducted with international travel agents. The findings of this study were twofold. First, the findings of the study adhered to the existing factors of the diffusion of innovation (DOI) model such as relative advantage, compatibility, complexity, trialability, and observability, as crucial factors for adopting MSPs. Second, the findings of the study extended the DOI model by proposing two other factors, supportability, and integrability, which were deemed crucial by travel agents when adopting MSPs. The study shows that as part and parcel of the DOI model, travel agents by adopting MSPs get access to global content from multiple-channels and multiple-providers easily and securely. The study discusses practical and theoretical implications.

KEYWORDS: Multisided Platforms (MSPs) | Diffusion of innovation (DOI) model | Supportability | Integrability

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Mr. Farooq Rasheed is currently working as Assistant Professor at Air University Islamabad. He has completed his M Phil in Economics from Quaid e Azam University, Islamabad, and MS in Economics from Applied Economics Research Center, University of Karachi. Previously he was appointed as Lecturer at PAF Degree College, Karachi, and Lecturer at Institute of Business Management, Karachi, and Assistant Professor at PAF-KIET Karachi. He has 9 publications in journals.

Research Areas

Socioeconomic Issues | Economic Growth Modeling | Project Management | Economics

	TOTAL	FY 2023
PUBLICATIONS	19	01
CITATIONS	415	52

SGDS TARGETED ---------- 02

MR. FAROOQ RASHEED
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TITLE OF PAPER

Rule of Law and Economic Growth: An Evidence from SAARC

JOURNAL OF HISTORY AND SOCIAL SCIENCES

PAKISTAN

Y

NOT ANNOUNCED

2023-06-30

https://doi.org/10.46422/jhss.v14i1.258



SCAN ME

ABSTRACT

The growth of an economy depends on several factors. 'Rule of Law' is one the key factor that has the scope of public's protection of property and contractual rights. Available studies on growth accounting expose a limitation of literature covering the scope of rule of law. World Bank defines rule of law as how the general residents of a country abide by the rules and have confidence on the prevailing institution that manage it in the country. Usually it is reflected by access to property rights, police efficiencies, quality of contract enforcement, judiciary and the likelihood of control on crime rates. Using World Bank's annual data from 1999 to 2021 for a pool of SAARC member counties, this study attempts to test whether the rule of law impacts economic growth or not using panel least squares regression model. It is found that the capital's impact on GDP is found to be highly significant at 5% level of significance. Similarly the response of labor on GDP is also found to be significant at 5% level of significance. However the index of "rule of law" is not found significant in explaining GDP growth rate. However this doesn't means that one may not worry about improving rule of law in the economy. It is expected that as SAARC bloc is marred by the issues like poverty, corruption, political instability, etc., therefore vitality of rule of law on economic growth is not captured from the available data. In contrast "rule of law" is found significant.

KEYWORDS: Rule of law | Economic growth | SAARC | GDP

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Dr. Hasan Hanif, an Assistant Professor in the Department of Management Sciences at Air University, brings a wealth of academic achievements to his role. Holding a PhD from SZABIST Islamabad, Dr. Hanif has demonstrated a deep understanding of his field of study. His educational background also includes a Master of Science from FUUAST Islamabad and an MBA from Riphah International University, further enriching his expertise in management sciences. With a solid foundation in academia and a commitment to excellence in teaching, Dr. Hanif plays a vital role in shaping the future leaders of tomorrow within the department.

Research Areas

- Financial Integration
- Systemic Risk management
- Corporate Financial & Investment
- Decision Making

	TOTAL	FY 2023
PUBLICATIONS	17	03
CITATIONS	57	26

SGDS TARGETED ---------- 02

DR. HASAN HANIF
ASSISTANT PROFESSOR
DEPARTMENT OF MANAGEMENT STUDIES
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TITLE OF PAPER

Dynamic Modeling of Marginal Expected Shortfall under Economic Sensitivity: Empirical Evidence from Developing Economy

SOUTH ASIAN JOURNAL OF BUSINESS STUDIES

UNITED KINGDOM

X

2.4 (2022)

2023-02-13

8 DECENT WORK AND ECONOMIC GROWTH

https://doi.org/10.1108/SAJBS-11-2021-0406

SCAN ME

ABSTRACT

Systemic risk poses a significant threat to economic welfare by potentially reducing credit supply across all sectors within an economy. This study, conducted within the context of Pakistan, a developing economy, seeks to comprehensively analyze the variables driving systemic risk during both normal and crisis periods. Utilizing secondary data encompassing bank, sector, and country variables from the years 2000 to 2020, systemic risk is assessed using the marginal expected shortfall (MES) methodology. Estimation of the impact of firm, sector, and country-level variables on systemic risk is conducted through one-step and two-step system GMM techniques. The findings reveal that sector-level variables play a crucial role in explaining systemic risk dynamics alongside bank and country-level variables. Moreover, economic sensitivity influences the significance of variables across different periods, altering the direction of relationships in certain instances. This research sheds light on the multifaceted nature of systemic risk and underscores the importance of considering sector-level dynamics in risk assessment frameworks, particularly within developing economies like Pakistan.

KEYWORDS: Systemic risk | Economic sensitivity | Dynamic Model | Sector level variable

DR. HASAN HANIF
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DEPARTMENT OF MANAGEMENT STUDIES
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TITLE OF PAPER

The resilience of Shariah-compliant investments: Probing the static and dynamic connectedness between gold-backed cryptocurrencies and GCC equity markets

INTERNATIONAL REVIEW OF FINANCIAL ANALYSIS

UNITED STATES

W

8.1 (2022)

2023-12-13

https://doi.org/10.1016/j.irfa.2023.103045

8 DECENT WORK AND ECONOMIC GROWTH

17 PARTNERSHIPS FOR THE GOALS

SCAN ME

ABSTRACT

This study explores return spillovers between Islamic gold-backed cryptocurrencies and equity markets in the Gulf Cooperation Council (GCC) countries. Utilizing the QVAR method, it assesses quantile connectedness among asset classes and determines optimal portfolio weights across various economic conditions. Results indicate stronger interconnections within GCC economies compared to cryptocurrencies, with increased connections during extreme events, suggesting amplified relationships due to extreme news. Findings reveal asymmetric tail behavior in connectedness, indicating stronger relationships during extreme market conditions. Dynamic analysis highlights varied connectedness patterns over time, offering significant portfolio implications. The study recommends optimal weights for portfolio management and identifies cost-effective hedging strategies. It suggests potential risk mitigation for GCC investors by incorporating Islamic gold-backed cryptocurrencies in equity portfolios. Future research could delve into additional factors such as liquidity, market volatility, and investor sentiment's impact on asset class relationships, as well as the role of different types of news, like macroeconomic news. Further exploration could extend beyond GCC investors to examine implications for investors globally.

KEYWORDS: Gold-backed cryptocurrencies | Shariah compliance | Return spillover

DR. HASAN HANIF
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TITLE OF PAPER

The missing link in knowledge sharing: the crucial role of supervisor support-moderated mediated model

LEADERSHIP & ORGANIZATIONAL DEVELOPMENT JOURNAL

UNITED STATES

W

4.9 (2022)

2023-08-21

8 DECENT WORK AND ECONOMIC GROWTH

https://doi.org/10.1108/LODJ-04-2023-0199

SCAN ME

ABSTRACT

The current study aims to investigate the impact of supervisor support on knowledge sharing behavior, mediated by psychological well-being, psychological ownership, and altruism. Additionally, mindfulness is examined as a potential moderator in the relationship between supervisor support and psychological well-being, as well as psychological ownership. Employing a positivist research philosophy and a deductive approach, the study involved 219 employees from the telecom sector as respondents. Data was collected through self-administered questionnaires using purposive sampling techniques. Both exploratory and confirmatory factor analyses were conducted using AMOS to analyze the data and test hypotheses. The findings indicate that supervisor support significantly influences employees' knowledge-sharing behavior, mediated by psychological well-being, ownership, and altruism. Furthermore, mindfulness plays a significant moderating role in the relationship between supervisor support and psychological well-being.

KEYWORDS: Supervisor support; Physical wellbeing; Mindfulness; Psychological ownership; Knowledge sharing behavior

Dr. Habib Ahmad

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Dr. Habib Ahmad, an Associate Professor in the Department of Management Sciences at Air University, brings over a decade of combined experience in teaching, research, and corporate roles. Holding a PhD in Management Sciences with a specialization in Finance from the University of Deusto, Spain, he has authored numerous publications, including in Impact Factor Journals. Notably, he received the Erasmus Mundus Scholarship for research in Spain. Dr. Ahmad's expertise enriches the department's academic environment, aligning with its commitment to excellence in education and scholarship.

Research Areas

- Financial Vulnerability of Households
- Microfinance
- Capital Markets

	TOTAL	FY 2023
PUBLICATIONS	24	01
CITATIONS	1283	217

SGDS TARGETED ---------- 02

DR. HABIB AHMAD
ASSOCIATE PROFESSOR
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TITLE OF PAPER

Stress testing of households using micro-data: evidence from a developing country

AFRO-ASIAN JOURNAL OF FINANCE AND ACCOUNTING

UNITED KINGDOM

Y

1.0 (2022)

2023-01-01

8 DECENT WORK AND ECONOMIC GROWTH

https://www.inderscience.com/info/ingeneral/forthcoming.php?jcode=aajfa

SCAN ME

ABSTRACT

We assess the impact of income, consumption, and asset price shocks on the financial vulnerability of Pakistani households. We find 47.4% and 58.5% of households as financially vulnerable under basic living costs (BLC) and consumption-based criteria respectively. We note greater changes in the proportion of household financial vulnerability in the consumption-based approach as compared with BLC even for the same magnitude of the shock. We also note the severer impact of income rather than consumption shocks and add new dimensions to the financial vulnerability analysis by reporting results against various socio-economic characteristics of the households. Our stress testing results can be used for the development of targeted, community-specific social safety net programs and emergency cash support initiatives taken under a macroeconomic policy framework aiming at mitigating the effects of the COVID-19 external shocks. We recommend the use of household-level actual consumption expenditures in the analysis of household financial vulnerability instead of BLCs in developing countries such as Pakistan.

KEYWORDS:

Credit risk indicators | Household financial vulnerability | Stress testing

DR. HABIB AHMAD
ASSOCIATE PROFESSOR
DEPARTMENT OF MANAGEMENT STUDIES
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TITLE OF PAPER

Returns and volatility spillover between agricultural commodities and emerging stock markets: new evidence from COVID-19 and Russian-Ukrainian war

INTERNATIONAL JOURNAL OF EMERGING MARKETS

UNITED KINGDOM

W

5.1 (2022)

2023-02-06

https://doi.org/10.1108/IJOEM-02-2022-0226

8 DECENT WORK AND ECONOMIC GROWTH

SCAN ME

ABSTRACT

This study investigates the return and volatility spillover dynamics among agricultural commodities and emerging stock markets across different crises, including the COVID-19 pandemic and the Russian-Ukrainian war. The analysis employs the Diebold and Yilmaz (2012, 2014) approach to estimate these spillover effects. Findings indicate a generally weak interconnectedness between agricultural commodities and emerging stock markets, with corn being the highest transmitter and sugar the lowest. Conversely, soya bean and coffee emerge as the largest and smallest recipients of spillovers over time. Most equity indices act as net recipients of spillovers, except for select countries like India, China, Indonesia, Argentina, and Mexico throughout the sample period. Furthermore, while most commodities serve as net transmitters of volatility spillovers, coffee and soya bean stand out as exceptions. Major equity indices mostly receive volatility spillovers, except for certain countries such as India, Indonesia, China, Argentina, Malaysia, and Korea. Notably, both return and volatility spillovers intensify during crises, especially during the COVID-19 pandemic, showcasing heightened interconnectedness during periods of economic upheaval.

KEYWORDS:

commodities | Equity Market | DY spillovers | Connectedness | COVID-19

Fazaia Medical College (FMC)

Fazaia Medical College, established on 16th March, 2015 and inaugurated in December of the same year, is nestled within the secure and picturesque environment of PAF Complex E-9. The college, designed with an atrium concept of architecture, aims to foster a conducive learning environment. Boasting a highly qualified faculty with extensive experience, the college is equipped with state-of-the-art facilities including laboratories, lecture halls, tutorial rooms, library, digital resources, auditorium, and campus-wide Wi-Fi. The mission of Fazaia Medical College is to cater to the healthcare needs of both the community and PAF personnel by producing healthcare practitioners of international standards, with a focus on research and cultural and ethical norms. The college's aim is to produce medical graduates of global standards and provide cutting-edge healthcare facilities to Pakistan's populace. Through a comprehensive curriculum, students are groomed to be holistic medical professionals, with outcomes revolving around knowledge, skills, and attitude domains. Upon completion of the MBBS program, graduates are proficient in clinical practice, leadership, research, and public health advocacy. The college is under the leadership of Maj. Gen. Muhammad Tahir Khadim HI (M) ®, whose vision is to uphold the core values of respect, responsibility, integrity, honesty, and academic excellence while preparing students to lead the healthcare profession nationally and globally.



Faculty of Basic Medical Sciences

The Faculty of Basic Medical Sciences stands as a premier center for education and research, comprising six to seven departments dedicated to integrated areas of study. With a rigorous undergraduate program emphasizing broad subject competence and performance, the faculty opens new educational vistas for young learners. Multidisciplinary research and academic opportunities abound in Pathology, Anatomy, Biochemistry, Community Medicine, Forensic Medicine, Physiology, and Pharmacology. A cornerstone of our success lies in our dynamic, award-winning faculty, ensuring continuous growth and excellence in research and education through fresh ideas and energy infusion. Together with a capable administration, the faculty is committed to leading scientific innovation and maintaining high teaching and research standards. Departments under the umbrella of Basic Medical Sciences include Anatomy, Physiology, Biochemistry, Pathology, Pharmacology, Forensic Medicine and Toxicology, and Community Medicine.

FACULTY PUBLICATIONS (2023)

15

SDGS TARGETED (2023)



Department of Anatomy

Departmental Overview

The Department of Anatomy at Fazaia Medical College plays a crucial role in the medical education curriculum, offering a comprehensive range of courses including General Anatomy, Histology, Embryology, Regional Anatomy, and Neuroanatomy. With modern teaching methods aligned with Pakistan Medical Council standards, students benefit from interactive sessions, case-based learning, and practical demonstrations. The department aims to impart a thorough understanding of the human body's structure, function, and clinical relevance while upholding ethical and professional standards. Facilities include a spacious dissection hall, well-equipped anatomy museum, and a state-of-the-art histology laboratory with advanced microscopy technology. Recent enhancements, such as multimedia resources and advanced microscopes, further enrich the learning experience, ensuring students are well-prepared for their medical careers.

The Department of Anatomy at Fazaia Medical College boasts a dedicated team of faculty members committed to excellence in teaching and research. Led by Prof. Dr. Kiran Kamran as the Head of Department, the faculty includes Associate Professors Dr. Ruqqia Shafi Minhas and Dr. Hina Zaid, who bring a wealth of experience and expertise to their roles. Additionally, Assistant Professor Dr. Saima Sohail contributes to the department's academic endeavors with her specialized knowledge. The team is further strengthened by a group of talented demonstrators, including Dr. Arifa Haroon, Dr. Shams ur Rehman, Dr. Badar Akram, Dr. Saman Ali, Dr. Nida Batool, Dr. Sufia Kalsoom, Dr. Umama Khalid, and Dr. Areeba Saleem. Together, they provide invaluable support in facilitating practical demonstrations, aiding students in understanding anatomical concepts, and conducting research activities within the department. Their collective efforts ensure a rich learning experience for students.

DEPARMENTAL PUBLICATIONS (2023) **04**

SDGS TARGETED IN 2023



PROF. DR. KIRAN KAMRAN

PROFESSOR
DEPARTMENT OF ANATOMY
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Prof. Dr. Kiran Kamran, serving as the Head of Department and Professor of Anatomy at Fazaia Medical College, brings a wealth of academic and professional experience to her role. With qualifications including an M.B.B.S. from Rawalpindi Medical College and an FCPS from the College of Physicians and Surgeons Pakistan, Dr. Kamran has demonstrated a commitment to excellence in medical education. Additionally, she holds a CHPE from Riphah International Medical College, further enhancing her expertise in medical pedagogy. With two decades of teaching experience, Dr. Kamran is dedicated to providing high-quality education to medical students, fostering their understanding of anatomical concepts and preparing them for successful medical careers. Her leadership ensures the department's continued commitment to excellence in anatomical education and research.

	TOTAL	FY 2023
PUBLICATIONS	07	01

SGDS TARGETED ---------- 01

PROF. DR. KIRAN KAMRAN

PROFESSOR

DEPARTMENT OF ANATOMY

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TITLE OF PAPER

Undergraduates Medical Students Feedback on Histology Teaching and Learning Methodology

RAWAL MEDICAL JOURNAL

PAKISTAN

Y

NOT ANNOUNCED

2023-12-01

3 GOOD HEALTH AND WELL-BEING

https://www.rmj.org.pk/fulltext/27-1647401978.pdf?1701837565

SCAN ME

ABSTRACT

This study aimed to assess the effectiveness of various teaching modalities employed during histology practical sessions through feedback obtained from first and second-year MBBS students. Methodology involved the distribution of a self-administered questionnaire consisting of thirteen closed-ended questions to gather student perspectives. Data analysis was conducted using SPSS 26. Results indicated a preference among students for the Penta head method for histology slide study during practical sessions. Furthermore, a majority favored the practice of summarizing lecture content at the beginning of practical sessions and appreciated brief PowerPoint presentations outlining practical content. Students expressed a preference for drawing histological pictures in their notebooks from pre-drawn and labeled diagrams. Overall, students were satisfied with the duration of practical sessions, although many expressed a desire for revision classes and MOCK tests at the conclusion of each module before examinations.

KEYWORDS:

Histology | Undergraduate medical students | Learning methodology

DR. RUQQIA SHAFI MINHAS

ASSOCIATE PROFESSOR
DEPARTMENT OF ANATOMY
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Dr. Ruqqia Shafi Minhas, an Associate Professor in the Department of Anatomy at Fazaia Medical College, brings extensive experience and expertise to her role. Holding an M.B.B.S. from Fatima Jinnah Medical College, Lahore, and a FCPS from the College of Physicians and Surgeons Pakistan, Dr. Minhas is highly qualified in her field. Additionally, she has completed a CHPE from Riphah International Medical College, Rawalpindi, further enhancing her credentials. With 15 years of teaching experience, Dr. Minhas is dedicated to providing high-quality education to medical students, fostering their understanding of anatomical concepts and preparing them for their future careers in medicine. Her vast experience and knowledge contribute significantly to the department's academic endeavors, ensuring students receive comprehensive instruction in anatomy.

	TOTAL	FY 2023
PUBLICATIONS	11	02

SGDS TARGETED ---------- 01

DR. RUQQIA SHAFI MINHAS
ASSOCIATE PROFESSOR
DEPARTMENT OF ANATOMY
ruqqia.shafi@students.au.edu.pk

TITLE OF PAPER

Differentiation of Sclera in Chick Embryo at Various Stages of its Development- A Histological Study

PAKISTAN JOURNAL OF MEDICAL & HEALTH SCIENCES

PAKISTAN

Y

NOT ANNOUNCED

2023-06-01

3 GOOD HEALTH AND WELL-BEING

https://doi.org/10.53350/pjmhs2023171160

SCAN ME

ABSTRACT

Tobacco consumption, predominantly through cigarettes and vaporizers, induces respiratory tract irritation, fibrosis, and inflammation due to nicotine, the primary alkaloid in tobacco. This study compares the lung histology effects of cigarettes and shisha on experimental animals. Conducted over six months in collaboration with the National Institute of Health (NIH), Islamabad, by the Department of Anatomy at the Islamic International Medical College, Rawalpindi, the study involved forty mature male BALB/c mice randomly allocated to Control (C), cigarette smoke (CS), and shisha smoke (SS) groups. Following exposure for eight months, lung tissues were evaluated, and carbon-loaded alveolar macrophages were quantified. Statistical analysis revealed significant fibrosis, inflammation, and bronchiolar constriction in the SS group compared to CS. Additionally, SS exhibited more carbon-loaded alveolar macrophages than CS, indicating heightened histological effects.

KEYWORDS:

Shisha Smoke | Cigarette Smoke | Lungs Tissue | Mice and Histology

DR. RUQQIA SHAFI MINHAS
ASSOCIATE PROFESSOR
DEPARTMENT OF ANATOMY
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TITLE OF PAPER

Undergraduates Medical Students Feedback on Histology Teaching and Learning Methodology

RAWAL MEDICAL JOURNAL

PAKISTAN

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NOT ANNOUNCED

2023-12-01

https://www.rmj.org.pk/fulltext/27-1647401978.pdf?1701837565

3 GOOD HEALTH AND WELL-BEING

SCAN ME

ABSTRACT

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KEYWORDS:

Histology | Undergraduate medical students | Learning methodology

Dr Hina Zaid

Associate Professor
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Dr. Hina Zaid's extensive teaching experience spans over 14 years, during which she has demonstrated a deep commitment to fostering student learning and academic growth. Her diverse educational background, including an MPhil from AMC, NUST, Rawalpindi, and certifications in CHPE and MHPE from Shifa Tameer-I-Millat University, Islamabad, underscores her dedication to continuous professional development. With a strong foundation in medical education and a passion for anatomy, Dr. Zaid plays a vital role in delivering high-quality instruction and guiding students in understanding complex anatomical concepts. Her expertise, coupled with her enthusiasm for teaching, makes her an invaluable asset to the department, contributing to its mission of excellence in anatomical education and research.

	TOTAL	FY 2023
PUBLICATIONS	09	04

SGDS TARGETED ---------- 01

DR HINA ZAID
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TITLE OF PAPER

Differentiation of Sclera in Chick Embryo at Various Stages of its Development- A Histological Study

PAKISTAN JOURNAL OF MEDICAL & HEALTH SCIENCES

PAKISTAN

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NOT ANNOUNCED

2023-06-01

3 GOOD HEALTH AND WELL-BEING

https://doi.org/10.53350/pjmhs2023171160

SCAN ME

ABSTRACT

Tobacco consumption, predominantly through cigarettes and vaporizers, induces respiratory tract irritation, fibrosis, and inflammation due to nicotine, the primary alkaloid in tobacco. This study compares the lung histology effects of cigarettes and shisha on experimental animals. Conducted over six months in collaboration with the National Institute of Health (NIH), Islamabad, by the Department of Anatomy at the Islamic International Medical College, Rawalpindi, the study involved forty mature male BALB/c mice randomly allocated to Control (C), cigarette smoke (CS), and shisha smoke (SS) groups. Following exposure for eight months, lung tissues were evaluated, and carbon-loaded alveolar macrophages were quantified. Statistical analysis revealed significant fibrosis, inflammation, and bronchiolar constriction in the SS group compared to CS. Additionally, SS exhibited more carbon-loaded alveolar macrophages than CS, indicating heightened histological effects.

KEYWORDS:

Shisha Smoke | Cigarette Smoke | Lungs Tissue | Mice and Histology

Dr Hina Zaid
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TITLE OF PAPER

Undergraduates Medical Students Feedback on Histology Teaching and Learning Methodology

RAWAL MEDICAL JOURNAL

PAKISTAN

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NOT ANNOUNCED

2023-12-01

https://www.rmj.org.pk/fulltext/27-1647401978.pdf?1701837565



SCAN ME

ABSTRACT

This study aimed to assess the effectiveness of various teaching modalities employed during histology practical sessions through feedback obtained from first and second-year MBBS students. Methodology involved the distribution of a self-administered questionnaire consisting of thirteen closed-ended questions to gather student perspectives. Data analysis was conducted using SPSS 26. Results indicated a preference among students for the Penta head method for histology slide study during practical sessions. Furthermore, a majority favored the practice of summarizing lecture content at the beginning of practical sessions and appreciated brief PowerPoint presentations outlining practical content. Students expressed a preference for drawing histological pictures in their notebooks from pre-drawn and labeled diagrams. Overall, students were satisfied with the duration of practical sessions, although many expressed a desire for revision classes and MOCK tests at the conclusion of each module before examinations.

KEYWORDS:

Histology | Undergraduate medical students | Learning methodology

Dr Hina Zaid
Associate Professor
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TITLE OF PAPER

A Comparative Histological Study of Effects of Cigarette and Shisha Smoke on Lungs of Mice

PAKISTAN JOURNAL OF MEDICAL & HEALTH SCIENCES

PAKISTAN

Y

NOT ANNOUNCED

2023-06-01

3 GOOD HEALTH AND WELL-BEING

https://doi.org/10.53350/pjmhs2023176137

SCAN ME

ABSTRACT

The study utilized a randomized control trial design, with 40 mature male BALB/c mice randomly allocated into three groups: control, cigarette smoke-exposed, and shisha smoke-exposed. Exposure occurred twice daily, five days per week, over a period of eight months. Following the exposure period, lung tissue from the mice was dissected and evaluated under a microscope. The analysis revealed notable histological differences between the groups, with the shisha smoke-exposed mice exhibiting significantly more fibrosis, peribronchiolar inflammation, bronchiolar constriction, and carbon-loaded alveolar macrophages compared to those exposed to cigarette smoke. Statistical analysis using SPSS 20.0 confirmed the significance of these findings, with a defined threshold of statistical significance set at a p-value of 0.05. These results underscore the potentially greater detrimental effects of shisha smoke on lung health compared to traditional cigarette smoke.

KEYWORDS:

Shisha Smoke | Cigarette Smoke | Lungs Tissue | Mice and Histology

DR HINA ZAID
ASSOCIATE PROFESSOR
DEPARTMENT OF ANATOMY
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TITLE OF PAPER

Maturation assessment of Graffian follicle in female mice under immobilization, hunger and noise stress

PAKISTAN ARMED FORCES MEDICAL JOURNAL

PAKISTAN

Y

NOT ANNOUNCED

2023-10-30

https://doi.org/10.51253/pafmj.v73i5.8915

3 GOOD HEALTH AND WELL-BEING

SCAN ME

ABSTRACT

This experimental study, conducted at the Department of Anatomy & Department of Pathology, Army Medical College Rawalpindi, Pakistan, in collaboration with the National Institute of Health (NIH), Islamabad, aimed to evaluate the effects of immobilization, noise, and hunger stress on graafian follicle diameter in adult female mice from December 2013 to December 2014. Forty mice were divided into four groups: control, immobilization stress, noise stress, and hunger stress. After one month, histological examination of ovarian tissue was conducted, and graafian follicle diameters were measured. Statistical analysis using SPSS version 20 revealed significant differences between the control and stress-exposed groups, indicating the varied impacts of stressors on ovarian follicle development.

KEYWORDS:

Graffian follicle | Immobilization | Hunger | Mice | Noise | Ovary

DR. SAIMA SOHAIL

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DEPARTMENT OF ANATOMY
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Dr. Saima Sohail's expertise extends beyond her academic qualifications, as she brings a wealth of practical experience and a strong commitment to teaching excellence. With a decade of teaching experience, she has honed her skills in effectively communicating complex anatomical concepts to students. Her interactive teaching style fosters an engaging learning environment, where students are encouraged to actively participate and ask questions. Dr. Sohail's dedication to her students' academic success is evident in her approachable demeanor and willingness to provide additional support when needed. As an Assistant Professor, she plays a vital role in shaping the future generation of medical professionals, instilling in them a solid foundation in anatomy and a passion for lifelong learning. Dr. Sohail's contributions to the department are invaluable, reflecting her unwavering commitment to academic excellence and student development.

	TOTAL	FY 2023
PUBLICATIONS	05	02

SGDS TARGETED ---------- 01

DR. SAIMA SOHAIL
ASSISTANT PROFESSOR
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TITLE OF PAPER

Differentiation of Sclera in Chick Embryo at Various Stages of its Development- A Histological Study

PAKISTAN JOURNAL OF MEDICAL & HEALTH SCIENCES

PAKISTAN

Y

NOT ANNOUNCED

2023-06-01

3 GOOD HEALTH AND WELL-BEING

https://doi.org/10.53350/pjmhs2023171160

SCAN ME

ABSTRACT

Tobacco consumption, predominantly through cigarettes and vaporizers, induces respiratory tract irritation, fibrosis, and inflammation due to nicotine, the primary alkaloid in tobacco. This study compares the lung histology effects of cigarettes and shisha on experimental animals. Conducted over six months in collaboration with the National Institute of Health (NIH), Islamabad, by the Department of Anatomy at the Islamic International Medical College, Rawalpindi, the study involved forty mature male BALB/c mice randomly allocated to Control (C), cigarette smoke (CS), and shisha smoke (SS) groups. Following exposure for eight months, lung tissues were evaluated, and carbon-loaded alveolar macrophages were quantified. Statistical analysis revealed significant fibrosis, inflammation, and bronchiolar constriction in the SS group compared to CS. Additionally, SS exhibited more carbon-loaded alveolar macrophages than CS, indicating heightened histological effects.

KEYWORDS:

Shisha Smoke | Cigarette Smoke | Lungs Tissue | Mice and Histology

DR. SAIMA SOHAIL
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DEPARTMENT OF ANATOMY
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TITLE OF PAPER

Undergraduates Medical Students Feedback on Histology Teaching and Learning Methodology

RAWAL MEDICAL JOURNAL

PAKISTAN

Y

NOT ANNOUNCED

2023-12-01

https://www.rmj.org.pk/fulltext/27-1647401978.pdf?1701837565



SCAN ME

ABSTRACT

This study aimed to assess the effectiveness of various teaching modalities employed during histology practical sessions through feedback obtained from first and second-year MBBS students. Methodology involved the distribution of a self-administered questionnaire consisting of thirteen closed-ended questions to gather student perspectives. Data analysis was conducted using SPSS 26. Results indicated a preference among students for the Penta head method for histology slide study during practical sessions. Furthermore, a majority favored the practice of summarizing lecture content at the beginning of practical sessions and appreciated brief PowerPoint presentations outlining practical content. Students expressed a preference for drawing histological pictures in their notebooks from pre-drawn and labeled diagrams. Overall, students were satisfied with the duration of practical sessions, although many expressed a desire for revision classes and MOCK tests at the conclusion of each module before examinations.

KEYWORDS:

Histology | Undergraduate medical students | Learning methodology

Department of Community Medicine

Departmental Overview

The Community Medicine Department is dedicated to its vision of becoming a leading force in Public Health and Primary Care through interdisciplinary research and education. Our mission encompasses conducting impactful research, delivering quality education, and equipping healthcare professionals with the skills to address community health needs. With a focus on disease prevention and health promotion, we aim to instill in students a holistic understanding of population health issues. Through field visits, surveys, and research, we enhance student skills and prepare them for real-world challenges. Our well-qualified faculty is committed to teaching, service, and research, fostering a supportive learning environment. Looking ahead, we aim for accreditation and expansion of programs to further our mission of excellence in public health education and research.

The Community Medicine Department at our institution is fortunate to have a team of highly qualified and dedicated faculty members. Leading the department is Professor Dr. Rukhsana Khan, who brings extensive experience and expertise to her role as the Head of Department. Assisting her in leadership and academic endeavors are Associate Professors Dr. Arshia Bilal and Dr. Juwayria Omar, both renowned for their contributions to public health education and research. The department further benefits from the expertise of Assistant Professors Dr. Zille Huma Mustehsan and Dr. Mahwish Akhtar, who play pivotal roles in delivering quality education and conducting impactful research. Additionally, the department is supported by a team of demonstrators including Dr. Asifa Afzal, Dr. Nida Khailq, Dr. Sheharyar Khan, and Dr. Iffat Noreen, who contribute to the teaching and training of students in various aspects of community medicine.

DEPARMENTAL PUBLICATIONS (2023)

07

SDGS TARGETED IN 2023



DR. MAHWISH AKHTAR

DEMONSTRATOR
DEPARTMENT OF COMMUNITY MEDICINE
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Dr. Mahwish Akhtar, a Demonstrator in the Community Medicine Department, is a dedicated educator with a diverse academic background. Holding an M.B.B.S. from Rawalpindi Medical College and an MSc in Community Health & Nutrition from AIOU, affiliated with Kings College London, U.K., Dr. Akhtar possesses a comprehensive understanding of both clinical medicine and public health principles. With five years of teaching experience, she has honed her skills in effectively imparting knowledge and fostering student learning. Dr. Akhtar's expertise in community health and nutrition enriches the department's educational endeavors, equipping students with vital insights into preventive healthcare and population health management. Her commitment to excellence in teaching and her passion for public health make her a valuable asset to the department's academic community.

	TOTAL	FY 2023
PUBLICATIONS	03	02

SGDS TARGETED ---------- 01

DR. MAHWISH AKHTAR
DEMONSTRATOR
DEPARTMENT OF COMMUNITY MEDICINE
mahwish.akhtar@mail.au.edu.pk

TITLE OF PAPER

Morphological types of anemia and its association in geriatric population

PAKISTAN JOURNAL OF PATHOLOGY

PAKISTAN

Y

NOT ANNOUNCED

2023-07-26

https://doi.org/10.55629/pakjpathol.v34i2.730



SCAN ME

ABSTRACT

This cross-sectional descriptive study, conducted at Combined Military Hospital, Multan, Pakistan, aimed to determine the prevalence and morphological types of anemia in geriatric patients at a tertiary care hospital. Over six months, 175 elderly patients aged 50 to 80 years underwent blood tests for Complete Blood Picture and RBC morphology. Excluding those on immunosuppressive therapy or recent blood transfusions, the study found anemia in 23.43% of patients, with normocytic anemia being most common (75.61%), followed by macrocytic (19.51%) and microcytic anemia (4.88%). The majority (51.43%) of patients were aged 50 to 65 years. This research underscores the significant prevalence of anemia among older individuals, highlighting the necessity for comprehensive screening and management strategies in geriatric care.

KEYWORDS:

Anemia | Elderly Population | Normocytic | Macrocytic | Microcytic

DR. MAHWISH AKHTAR
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TITLE OF PAPER

Energy Drink Consumption and Eating Habits among Students of a Public Sector University in Islamabad, Pakistan

PAKISTAN JOURNAL OF PUBLIC HEALTH

PAKISTAN

Y

NOT ANNOUNCED

2023-09-23

3 GOOD HEALTH AND WELL-BEING

https://doi.org/10.32413/pjph.v13i3.1178

SCAN ME

ABSTRACT

Energy drinks are popular among young adults, often marketed with promises of improved metabolism and energy levels. This cross-sectional study aimed to explore the relationship between Energy Drink (ED) consumption, dietary habits, and motivations among Air University (AU) students. Surveying 103 students aged 19-25 (52 males, 51 females), data revealed that 31% reported consuming energy drinks, with 62.5% not restricting consumption to special occasions. Non-consumers demonstrated greater awareness of energy drink side effects and made healthier dietary choices compared to ED consumers. Analysis utilized SPSS version 23, employing the chi-square test to assess associations between ED consumption and dietary habits. The findings underscore the need for further examination of the impact of energy drink consumption on dietary patterns and overall health, particularly among the youth demographic targeted by marketing campaigns. Understanding motivations behind energy drink consumption can inform interventions aimed at promoting healthier lifestyle choices among young adults.

KEYWORDS:

Energy Drinks | Non-energy drinks consumers | Air university | Dietary habits

Dr. Asifa Afzal

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Dr. Asifa Afzal, a Demonstrator at our institution, brings a wealth of knowledge and experience to her role in medical education. She obtained her M.B.B.S. degree from Quaid-e-Azam Medical College, Bahawalpur, laying a solid foundation in clinical medicine. Additionally, she pursued further academic advancement by completing a Master's in Public Health (MPH) from Sarhad University of Science and IT, Peshawar (Islamabad Campus), specializing in public health and epidemiology. With four years of teaching experience, Dr. Afzal has demonstrated her commitment to shaping the next generation of medical professionals. Her expertise in public health equips her to contribute significantly to the curriculum, particularly in areas related to community medicine and preventive healthcare. Dr. Afzal's dedication to her students' learning and her passion for promoting public health initiatives make her a valuable asset to the teaching faculty.

	TOTAL	FY 2023
PUBLICATIONS	02	02

SGDS TARGETED ---------- 01

Dr. Asifa Afzal
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TITLE OF PAPER

Cognitive Development in Bottle Versus breastfed Children up to Two years: A Comparative Study from Islamabad

PAKISTAN ARMED FORCES MEDICAL JOURNAL

PAKISTAN

Y

NOT ANNOUNCED

2023-06-21

3 GOOD HEALTH AND WELL-BEING

https://doi.org/10.51253/pafmj.v73i3.8143

SCAN ME

ABSTRACT

The objective of this cross-sectional analytical study was to assess the proportion of exclusively breastfeeding and its association with cognitive development in children up to two years old. Conducted at the Outpatient Department of Pediatrics, Pakistan Air Force Hospital, Islamabad, from January to August 2019, the study recruited mothers of children under two years via systematic sampling. Data was collected through interviews using a semi-structured questionnaire. Cognitive development was assessed in various domains, including communication, fine motor, gross motor, problem-solving, and personal social skills. Among 192 children, only 40.1% were exclusively breastfed. Feeding practices significantly impacted overall cognitive development ($p<0.002$) and specifically influenced communication ($p<0.006$), fine motor ($p<0.022$), gross motor ($p<0.001$), and problem-solving skills ($p<0.011$) in children under two. Notably, exclusive breastfeeding correlated with better cognitive development ($p<0.003$). These findings underscore the importance of breastfeeding practices in early childhood development and highlight the need for interventions promoting exclusive breastfeeding to enhance cognitive outcomes in young children.

KEYWORDS:

Breast feeding | Cognitive development | Feeding Practices

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TITLE OF PAPER

Challenges Faced By Students And Faculty During Online Classes And Examinations–Finding A Way Forward

JOURNAL OF PEOPLES UNIVERSITY OF MEDICAL & HEALTH SCIENCES

PAKISTAN

NOT ANNOUNCED

Y

3 GOOD HEALTH AND WELL-BEING

2023-03-31

http://doi.org/10.46536/jpumhs/2023/13.01.401

SCAN ME

ABSTRACT

The traditional classroom learning model has rapidly shifted to online teaching since the onset of the COVID-19 pandemic in 2020, leading to the closure of educational institutions worldwide and affecting over a billion students. This study aims to evaluate the advantages and drawbacks of online learning and examination methods and provide recommendations for enhancement. The research involved 421 students and 220 faculty members from Fazaia Medical College, as well as other schools and colleges in Rawalpindi and Islamabad. An online survey using simple random sampling was conducted, with separate Google forms for students and teachers. Results indicate that 71.3% of students prefer on-campus classes, with 23% not taking online classes seriously. During online exams, over 50% of students faced internet connectivity issues and difficulty accessing exam content. Additionally, 46% of participants reported the absence of institutional protocols causing stress. More than half of the teachers preferred conducting online classes from home, while 25% felt inadequately trained for online teaching. The study concludes that students encounter challenges such as the lack of institutional protocols and access to electronic devices, while teachers face difficulties due to insufficient training and student engagement issues in online classes.

KEYWORDS: Online | Teaching | Learning | Challenges | Merits & demerits

DR. ARSHIA BILAL

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Dr. Arshia Bilal's rich educational background and extensive teaching experience make her a valuable asset to the medical community. Her qualifications include an M.B.B.S. from Karachi Medical & Dental College, indicating a strong foundation in medical sciences, followed by FCPS certification from the prestigious College of Physicians & Surgeons in Pakistan, demonstrating her advanced expertise in a specialized medical field. Furthermore, her dedication to professional development is evident through her attainment of a CHPE from Riphah International University (RIMU), showcasing her commitment to enhancing healthcare education practices. With over 15 years of teaching experience, Dr. Bilal has honed her skills in imparting knowledge, mentoring aspiring healthcare professionals, and contributing to the advancement of medical education standards.

	TOTAL	FY 2023
PUBLICATIONS	14	02

SGDS TARGETED ---------- 01

DR. ARSHIA BILAL
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TITLE OF PAPER

Comparison of spectrum of omicron strain with previous strains of SARS - CoV 2 in Islamabad, Pakistan

RAWAL MEDICAL JOURNAL

PAKISTAN

Y

NOT ANNOUNCED

2023-06-30

https://www.rmj.org.pk/?mno=93019



SCAN ME

ABSTRACT

Objective: This study aimed to compare the clinical manifestations of Omicron phase versus previous strains of Covid-19 infection in a tertiary care hospital in Islamabad, Pakistan. Methodology: A descriptive cross-sectional study was conducted at PAF Hospital, Islamabad, from April to August 2022. The study cohort comprised 385 patients, with 167 diagnosed with the Omicron strain and 218 with strains other than Omicron. Symptom frequencies were documented using a predefined questionnaire. Results: The most prevalent symptoms among non-Omicron strains included fever (92.7%), olfactory dysfunction (82.1%), taste disturbance (81.2%), sore throat (74.3%), and lethargy (74.3%). Conversely, in the Omicron strain group, fever (91.6%), sore throat (80.8%), lethargy (78.4%), odynophagia (73.7%), and cough (70.7%) were predominant.

KEYWORDS:

Covid-19 | Corona virus | SARS-CoV 2 | Omicron | Otorhinolaryngology

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TITLE OF PAPER

Challenges Faced By Students And Faculty During Online Classes And Examinations–Finding A Way Forward

JOURNAL OF PEOPLES UNIVERSITY OF MEDICAL & HEALTH SCIENCES

PAKISTAN

NOT ANNOUNCED

Y

3 GOOD HEALTH AND WELL-BEING

2023-03-31

http://doi.org/10.46536/jpumhs/2023/13.01.401

SCAN ME

ABSTRACT

The traditional classroom learning model has rapidly shifted to online teaching since the onset of the COVID-19 pandemic in 2020, leading to the closure of educational institutions worldwide and affecting over a billion students. This study aims to evaluate the advantages and drawbacks of online learning and examination methods and provide recommendations for enhancement. The research involved 421 students and 220 faculty members from Fazaia Medical College, as well as other schools and colleges in Rawalpindi and Islamabad. An online survey using simple random sampling was conducted, with separate Google forms for students and teachers. Results indicate that 71.3% of students prefer on-campus classes, with 23% not taking online classes seriously. During online exams, over 50% of students faced internet connectivity issues and difficulty accessing exam content. Additionally, 46% of participants reported the absence of institutional protocols causing stress. More than half of the teachers preferred conducting online classes from home, while 25% felt inadequately trained for online teaching. The study concludes that students encounter challenges such as the lack of institutional protocols and access to electronic devices, while teachers face difficulties due to insufficient training and student engagement issues in online classes.

KEYWORDS: Online | Teaching | Learning | Challenges | Merits & demerits

DR. JUWAYRIA OMAR

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Dr. Juwayria Omar is an Assistant Professor whose qualifications and teaching experience underscore her expertise in the medical field. She earned her M.B.B.S. degree from Punjab Medical College in Faisalabad, providing her with a solid foundation in medical sciences. Building on this foundation, Dr. Omar pursued a Master of Public Health (M.P.H.) degree from Sarhad University of Science and IT, Islamabad Campus, further enhancing her understanding of public health principles and practices. Additionally, she obtained a Certificate in Healthcare Professional Education (CHPE) from the National University of Medical Sciences (NUMS), reflecting her commitment to advancing medical education. With 7 years of teaching experience, Dr. Omar brings a wealth of knowledge and pedagogical skills to her role, contributing to the academic and professional development of future healthcare professionals. Her diverse educational background and teaching experience make her a valuable asset in the medical education landscape.

	TOTAL	FY 2023
PUBLICATIONS	10	01

SGDS TARGETED ---------- 01

Dr. Juwayria Omar
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TITLE OF PAPER

Comparison of Pre and Post Vaccinated Covid-19 Antibody titers in General Population

BMC

PAKISTAN

Y

NOT ANNOUNCED

2023-03-13

https://www.bmcjms.org/index.php/bmcj/article/view/99



SCAN ME

ABSTRACT

This study aimed to assess changes in anti-SARS-CoV-2 IgG levels among the general population one year post-immunization. A total of 18,610 individuals from rural and urban areas were enrolled, and IgG antibody quantities were measured using ELISA. The results revealed comparable levels of anti-SARS-CoV-2 IgG at 5–8 months post-immunization for both vaccines, while BBIBP-CorV exhibited lower IgG concentrations. Furthermore, a significant increase in IgG levels was observed nine months post-vaccination, indicating potential asymptomatic infections. Following booster doses, anti-SARS-CoV-2 IgG levels surged, with antibodies beginning to rise approximately five days post-boost and peaking around the fourteenth day. These findings highlight the dynamics of IgG antibody response post-vaccination and underscore the importance of booster doses in enhancing immunity against SARS-CoV-2.

KEYWORDS: SARS-CoV-2 | IgG antibody | mRNA

DR. IFFAT NOREEN

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Dr. Iffat Noreen, serving as a demonstrator, brings a fresh perspective to the academic realm with her recent qualification from Shifa College of Medicine in Islamabad. While her teaching experience spans 2 months, her enthusiasm and passion for imparting medical knowledge reflect a promising start to her career in education. Dr. Noreen's role as a demonstrator allows her to actively engage with students, facilitating their learning process and fostering an environment conducive to academic growth. Despite her limited experience, Dr. Noreen's dedication to her students' success and her continuous pursuit of excellence underscore her potential as a valuable asset to the academic community.

	TOTAL	FY 2023
PUBLICATIONS	01	01

SGDS TARGETED ---------- 01

DR. IFFAT NOREEN
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TITLE OF PAPER

Correlation of Serum Chromo gran in A with HbA 1c and eGFR in Different Groups of Type 2 Diabetic patients

PAKISTAN JOURNAL OF MEDICAL AND HEALTH SCIENCES

PAKISTAN

Y

NOT ANNOUNCED

2023-03-17

3 GOOD HEALTH AND WELL-BEING

https://doi.org/10.53350/pjmhs2023175110

SCAN ME

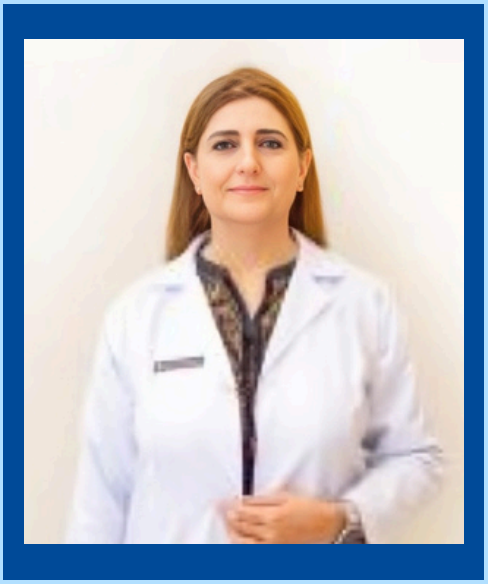
ABSTRACT

The study investigates the correlation between serum chromogranin A (CgA) levels and HbA1c and estimated glomerular filtration rate (eGFR) in different groups of type 2 diabetic patients, categorized by urinary Albumin-Creatinine Ratio (ACR). Conducted as a cross-sectional comparative analysis, 116 patients were enrolled through probability convenient sampling at LGH-Lahore's Chemical Pathology Department. Urine samples were analyzed for ACR, and laboratory parameters, including urinary albumin, serum creatinine, and HbA1c, were measured using respective methods. Statistical analysis using SPSS v.24 revealed normal eGFR distribution, contrasting with non-normal distributions for ACR, HbA1c, serum creatinine, and serum CgA levels. No significant differences in mean HbA1c values were found among the categorized groups. The study provides insights into potential associations between serum CgA levels and diabetic complications, contributing to understanding and managing type 2 diabetes.

KEYWORDS: Diabetic Nephropathy; Estimated Glomerular Filtration Rate; Type-2 Diabetes; Serum Chromogranin-A

DR. ZILLE HUMA MUSTEHSAN

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Dr. Zille Huma Mustehsan, an Assistant Professor, boasts a diverse educational background and extensive teaching experience. She holds an M.B.B.S. from Nishtar Medical College, Bahauddin Zakariya University, Multan, followed by an M.D. acquired in the United States of America. Furthering her academic pursuits, Dr. Mustehsan obtained an M.P.H. from the University of Maastricht, Netherlands (NaUKMA, Kiev, Ukraine campus), demonstrating her commitment to global health education. Additionally, she holds a CHPE from the Pakistan Institute of Medical Sciences (PIMS) SZABMU. With nine years of teaching experience, Dr. Mustehsan brings a wealth of expertise and knowledge to her role, shaping the minds of future healthcare professionals and contributing significantly to medical education.

	TOTAL	FY 2023
PUBLICATIONS	12	01

SGDS TARGETED ---------- 01

DR. ZILLE HUMA MUSTEHSAN
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TITLE OF PAPER

Challenges Faced By Students And Faculty During Online Classes And Examinations–Finding A Way Forward

JOURNAL OF PEOPLES UNIVERSITY OF MEDICAL & HEALTH SCIENCES

PAKISTAN

NOT ANNOUNCED

Y

3 GOOD HEALTH AND WELL-BEING

2023-03-31

http://doi.org/10.46536/jpumhs/2023/13.01.401

SCAN ME

ABSTRACT

The traditional classroom learning model has rapidly shifted to online teaching since the onset of the COVID-19 pandemic in 2020, leading to the closure of educational institutions worldwide and affecting over a billion students. This study aims to evaluate the advantages and drawbacks of online learning and examination methods and provide recommendations for enhancement. The research involved 421 students and 220 faculty members from Fazaia Medical College, as well as other schools and colleges in Rawalpindi and Islamabad. An online survey using simple random sampling was conducted, with separate Google forms for students and teachers. Results indicate that 71.3% of students prefer on-campus classes, with 23% not taking online classes seriously. During online exams, over 50% of students faced internet connectivity issues and difficulty accessing exam content. Additionally, 46% of participants reported the absence of institutional protocols causing stress. More than half of the teachers preferred conducting online classes from home, while 25% felt inadequately trained for online teaching. The study concludes that students encounter challenges such as the lack of institutional protocols and access to electronic devices, while teachers face difficulties due to insufficient training and student engagement issues in online classes.

KEYWORDS: Online | Teaching | Learning | Challenges | Merits & demerits

Department of Pathology

Departmental Overview

The Department of Pathology at Fazaia Medical College, Air University, stands as a beacon of excellence in teaching, research, and public service within the realm of pathology. With a steadfast vision to lead nationally, the department prioritizes four core disciplines: Chemical Pathology, Histopathology, Microbiology, and Hematology. Boasting modern facilities such as spacious laboratories and a museum, it provides an enriching environment conducive to both learning and practice. Through comprehensive diagnostic services offered at PAF hospital labs, including safe blood transfusion and component therapy services, the department ensures the delivery of quality healthcare. Its curriculum objectives are designed to equip students with a broad spectrum of knowledge, skills, and attitudes essential for proficient pathology practice. Through practical demonstrations and hands-on experiences, they develop vital skills in microscopy, laboratory procedures, and diagnostic interpretation.

The Pathology Department at Fazaia Medical College is enriched by a team of distinguished faculty members who bring a wealth of expertise and experience to their roles. Leading the department is Prof. Dr. Brig Rizwan Hashim (R), an esteemed academician and seasoned pathologist, serving as the Head of Department. Assisting him in academic and research endeavors is Dr. Bushra Anwar. Alongside her, Dr. Col Shahzad Azam (R), also an Associate Professor, brings a wealth of practical knowledge and academic acumen to the department. Supporting the faculty are a cadre of dedicated demonstrators including Dr. Bushra Anam Ali, Dr. Aleena Hussain Rana, Dr. Shafaq Khadija, and Dr. Hunain Habib, each contributing their expertise to the educational mission of the department. Together, this cohesive team fosters an environment of academic excellence and research innovation, preparing the next generation of physicians to navigate the complexities of pathology with confidence and proficiency.

DEPARMENTAL PUBLICATIONS (2023)

02

SDGS TARGETED IN 2023



DR HUNAIN HABIB

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Dr. Hunain Habib is a dedicated Demonstrator at the Pathology Department of Fazaia Medical College, Air University. With a solid academic background, including an MBBS from Army Medical College and FCPS II training in Chemical Pathology from AFIP, Dr. Habib brings a wealth of expertise to his role. His passion for pathology is evident in his commitment to providing expert diagnostic and consultative services, particularly in chemical pathology. Dr. Habib's teaching experience spans 1.5 years, during which he has demonstrated exceptional skill in delivering lectures and mentoring medical students. He is actively invo--lved in research endeavors, contributing to pioneering projects and presenting his findings at esteemed conferences like the Pakistan Association of Pathologists (PAP) Conference. Dr. Habib's dedication to continuous learning is reflected in his participation in professional development programs.

	TOTAL	FY 2023
PUBLICATIONS	03	02

SGDS TARGETED ---------- 01

DR HUNAIN HABIB
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TITLE OF PAPER

Evaluation of Adjusted Calcium levels in patients of Chronic Renal failure with Hypo-albuminemia

PAFMJ

PAKISTAN

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NOT ANNOUNCED

2023-04-17

3 GOOD HEALTH AND WELL-BEING

https://doi.org/10.51253/pafmj.v73i2.6534

SCAN ME

ABSTRACT

This cross-sectional study aimed to compare adjusted calcium levels with ionised calcium in chronic renal failure patients with hypoalbuminemia to assess their calcium status accurately. Conducted at the Department of Chemical Pathology and Endocrinology, Armed Forces Institute of Pathology, Rawalpindi Pakistan, from Mar 2020 to Jan 2021, the study included 304 individuals aged 18 to 90 years, of both genders. Participants were categorized into stages of chronic renal failure based on estimated glomerular filtration rate. Serum total calcium, urea, and creatinine were analyzed using ADVIA 1800R Clinical Chemistry Auto Analyzer, while ionized calcium was analyzed on Cobas b221 blood gas and electrolyte analyzer. Results revealed that 42.5% of participants had stage-5 and 33.3% had stage-4 chronic kidney disease. Hypocalcemia was observed in 37.3% of participants, while 57.2% had normocalcemia, and 4.9% had hypercalcemia based on ionized calcium concentration. Additionally, 57.5% had an albumin concentration between 20-29g/L. Cohen's Kappa statistical analysis indicated that adjusted calcium was a poor predictor of the correct calcium status of patients with hypoalbuminemia.

KEYWORDS:

Ionized calcium | Adjusted calcium | Chronic renal failure | Hypoalbuminemia

Dr Hunain Habib
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TITLE OF PAPER

A survey of Growth hormone stimulation test efficacy for workup of short stature in a Referral laboratory

PAFMJ

PAKISTAN

Y

NOT ANNOUNCED

2023-04-18

https://doi.org/10.51253/pafmj.v73i2.7906



SCAN ME

ABSTRACT

This cross-sectional survey aimed to evaluate the effectiveness of growth hormone (GH) stimulation tests in diagnosing GH deficiency as part of the short stature workup. Conducted at the Diagnostic Endocrine Section of the Department of Chemical Pathology & Endocrinology, Armed Forces Institute of Pathology (AFIP), Rawalpindi Pakistan, the study spanned from Aug 2020 to Jan 2021. A total of 129 individuals aged 2-16 years were included in the study. Through a comprehensive assessment of medical history, clinical data, and biochemical parameters, GH deficiency was determined for short stature evaluation. Results indicated that 59% of the participants were boys and 41% were girls, with a majority falling below the 3rd percentile for height. Notably, a significant proportion of individuals with a bone age difference of more than 2 years were found to be below the 3rd percentile. GH stimulation tests, particularly post-Levo Dopa administration, were performed in 78.46% of patients, revealing inadequate response in 37.4% of cases. Furthermore, the adequacy of response to GH stimulation tests improved as the percentile for height declined, suggesting a potential correlation between GH deficiency and stature percentile.

KEYWORDS:

Growth hormone stimulation tests | Short stature | Height percentile

Department of Medical Education (DME)

Departmental Overview

The Department of Medical Education (DME) at Fazaia Medical College is committed to enhancing medical training and professionalism through faculty development, curriculum improvement, student assessment, and research. DME fosters critical thinking skills and problem-solving abilities among medical professionals while organizing workshops on various educational methodologies and topics such as patient safety and life sciences. Collaborating regionally, DME extends its network to enrich educational practices. Future plans include implementing innovative learning methods and sustaining faculty development initiatives. With an experienced team covering diverse medical specialties, including surgery, medicine, gynecology, pathology, psychiatry, pediatrics, and radiology, DME aims to shape the future of medical education at both undergraduate and postgraduate levels.

The Department of Medical Education (DME) at Fazaia Medical College operates under a structured framework led by Maj.Gen. Muhammad Tahir Khadim HI (M) as the Patron and Brig (R) Prof. Rizwan Hashim as Director. Dr. Tahira Ayub and Dr. Marium Sohail serve as Assistant Directors, with Dr. Sohail also leading the Assessment & Exam Cell. The faculty includes Brig (R) Dr. Ashfaq Ahmad Javed, Brig (R) Dr. Farooq Dar, Brig (R) Manzar Zakaria, and Brig (R) Rashid Qayyum as Professors. Dr. Tallat Najeeb heads as Professor and HOD ENT, while Associate Professors like Dr. Asma Shabbir and Dr. Bushra Anwar, alongside Assistant Professors Dr. Shahida Awais and Dr. Sobia Waqas, contribute significantly to DME's educational objectives. Together, this diverse team of experienced professionals and educators ensures the effective implementation of medical education strategies.

DEPARMENTAL PUBLICATIONS (2023)

02

SDGS TARGETED IN 2023



MAJ.GEN.MUHAMMAD TAHIR KHADIM HI (M)

PATRON DME

DEPARTMENT OF MEDICAL EDUCATION



Major General Muhammad Tahir Khadim HI (M) ®, with his extensive qualifications including MBBS, MCPS, FCPS, FRCP, ADV.DIP HPE, and a Ph.D., serves as the Principal of Fazaia Medical College and holds the esteemed position of Patron of the Department of Medical Education. With a distinguished military background and a wealth of experience in medical education and leadership roles, he plays a pivotal role in guiding the strategic direction of the medical education programs at FMC. His leadership fosters a culture of excellence and innovation, ensuring the highest standards of medical education and training for students and faculty alike. As a respected figure in the medical community, his vision and guidance are instrumental in advancing the mission of the Department of Medical Education and upholding its commitment to professionalism and excellence.

	TOTAL	FY 2023
PUBLICATIONS	80	02

SGDS TARGETED ---------- 01

MAJ.GEN.MUHAMMAD TAHIR KHADIM HI (M)

PATRON DME

DEPARTMENT OF MEDICAL EDUCATION

TITLE OF PAPER

Mobile Biosafety Level (BSL) 2 Laboratories Deployment: Strengthening the Diagnostic Facilities in Pakistan with Emerging Public Health Challenges and the Way forward

JOURNAL OF BIOSAFETY AND BIOSECURITY

NOT MENTIONED

Y

4.3(2022)

2023-04-17

https://doi.org/10.1016/j.jobb.2023.05.002



SCAN ME

ABSTRACT

The availability of mobile laboratories can expedite the on-spot detection of pathogens, monitor their presence in specific populations, and prompt health authorities to take immediate action. However, existing biosafety and biosecurity guidelines may not fully address the demand for managing mobile units during infectious disease outbreaks in remote areas. This study aims to assess current limitations and develop and implement biosafety and biosecurity guidelines, along with protocols for operating, securing, and responding to mobile biosafety level 2 laboratories. A comprehensive plan was formulated considering the Global Health Security framework, including the development of biosafety and biosecurity protocols tailored to the needs of remote areas. By enhancing diagnostic and epidemiological capabilities, particularly in light of the COVID-19 pandemic, mobile laboratories can effectively address public health threats, contributing to the containment of outbreaks and safeguarding both public health and the economy.

KEYWORDS:

Biorisk Management | Mobile BSL 2 Laboratories (MBSL2 Laboratories) | Outbreak Response

MAJ.GEN.MUHAMMAD TAHIR KHADIM HI (M)

PATRON DME

DEPARTMENT OF MEDICAL EDUCATION

TITLE OF PAPER

National Cancer Registry of Pakistan: First Comprehensive Report of Cancer Statistics 2015-2019

JOURNAL OF THE COLLEGE OF PHYSICIANS AND SURGEONS--PAKISTAN

NOT MENTIONED

1.0 (2022)

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2023-03-17

3 GOOD HEALTH AND WELL-BEING

10.29271/jcpsp.2023.06.625

SCAN ME

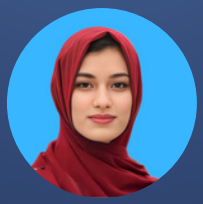
ABSTRACT

The availability of mobile laboratories can expedite the on-spot detection of pathogens, monitor their presence in specific populations, and prompt health authorities to take immediate action. However, existing biosafety and biosecurity guidelines may not fully address the demand for managing mobile units during infectious disease outbreaks in remote areas. This study aims to assess current limitations and develop and implement biosafety and biosecurity guidelines, along with protocols for operating, securing, and responding to mobile biosafety level 2 laboratories. A comprehensive plan was formulated considering the Global Health Security framework, including the development of biosafety and biosecurity protocols tailored to the needs of remote areas. By enhancing diagnostic and epidemiological capabilities, particularly in light of the COVID-19 pandemic, mobile laboratories can effectively address public health threats, contributing to the containment of outbreaks and safeguarding both public health and the economy.

KEYWORDS:

National Cancer Registry | Health Research Institute - NIH | Islamabad





Laraib Fatima
Author & Editor

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