



CITY UNIVERSITY
OF SCIENCE AND INFORMATION TECHNOLOGY



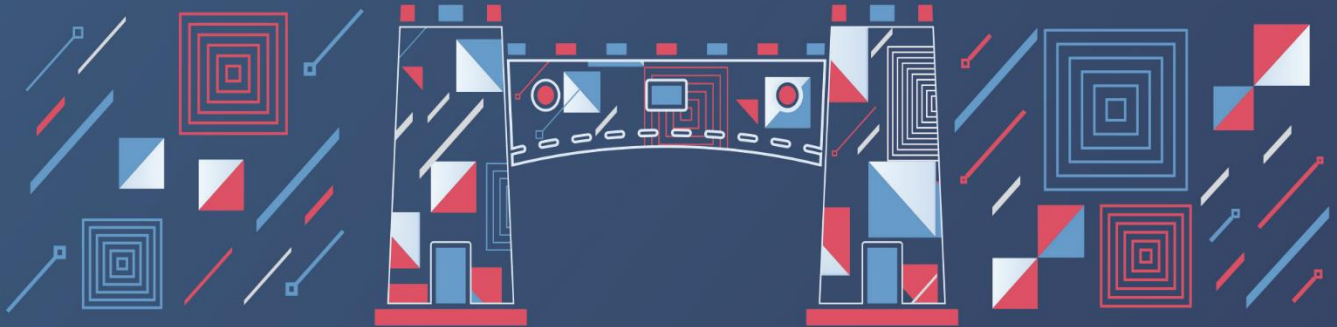
Directorate of Science & Technology
Khyber Pakhtunkhwa

5TH

INTERNATIONAL CONFERENCE

ON EMERGING TRENDS IN ENGINEERING,
MANAGEMENT & SCIENCES (**ICETEMS-2023**)

Dec 20th-21st, 2023

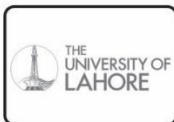


ABSTRACT BOOK

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Message by the Conference Chairman

Prof. Dr. Muhammad Abid,

Vice Chancellor,

City University of Science and IT, Peshawar, Pakistan



On behalf of the 5th International Conference on Emerging Trends in Engineering, Management and Sciences (ICETEMS-2023), jointly organized by City University of Science and Information Technology Peshawar, and Karakoram International University, Gilgit, in partnership with Bahria University, The University of Lahore, FATA University, Directorate of Science & Technology-KPK and Women University Swabi. I am pleased to welcome all the delegates and participants from across the globe. It is a real honor and privilege for me to serve as the Chair of this conference. ICETEMS has really brought together a tremendous and rich diversity of authors and speakers from universities, government and industry around the globe to share ideas and new perspectives on a wide range of communications, engineering and computing research and technologies, addressing new technical and business issues essential to advancing today's engineering and technological environments.

The popularity of ICETEMS as the premier forum for communications, engineering, business and computing research has started to grow. The ICETEMS has already become a prominent forum, where researchers and practitioners openly exchange ideas and report progress in the exciting area of communications and networking. This year, ICETEMS will deliver a stimulating, informative and delightful program. We greatly value the participations and look forward to the insightful vision and thoughts of the invited speakers. Thanks also go to the distinguished professors, invited talks and participants. I would like to extend my most sincere congratulations to the authors and speakers for their contributions. It is their efforts and vision which provided the impetus to put together this outstanding technical program. The excellence and success of ICETEMS would not have been possible without the support of our sponsors. We greatly appreciate all our sponsors and well-wishers. It is my great honor and pleasure to accept the responsibilities and challenges of Conference Chair. I hope that the conference will be stimulating, informative and enjoyable to all who attend it.

Message by the Conference Co-Chairman

Engr. Prof. Dr. Attaullah Shah,
Vice Chancellor,
Karakoram International University, Gilgit, Pakistan



I am pleased to inform you that City University of Science and Information Technology, Peshawar and Karakoram International University, Gilgit is jointly arranging the subject conference in partnership with Bahria University, The University of Lahore, FATA University, Directorate of Science & Technology- KPK and Women University Swabi. on December 20-21, 2023 at City University of Science and Information Technology, Peshawar.

The first conference of the series was held in Dec 2014, at Pak China Friendship Centre Islamabad, where more than 70 research papers were presented in addition to invited talks and keynote speeches by the delegates from US, UK, Sweden, Qatar, Malaysia, Hong Kong, Russia and Pakistan. In second conference, there were about 100 research papers and was held in December 2016 at City University of Science and Information Technology, Peshawar, while the third conference of the series was held in October 2018 at City University of Science and Information Technology, Peshawar with participation of approximately 200 participants from across the globe. the 4th conference was even a much bigger event held in October 2021 at City University Peshawar, hosted more than 250+ research papers.

The mission of the ICETEMS conferences is to facilitate communication between multidisciplinary teams, especially those involved in engineering, management and Sciences to share their research on the emerging trends in these areas with special reference to Pakistan. Governor KPK, Chief Minister KPK, Federal and provincial ministers, other national & international delegates and functionaries of the Federal and KPK Governments are expected to join at the conference.

Your presence at the conference will be a great honor for us and will motivate the faculty, students and delegates.

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MANAGEMENT SCIENCES

UNRAVELING THE IMPACT OF CORPORATE GOVERNANCE ON KSE-100 FIRMS' RESILIENCE IN THE AGE OF COVID-19

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Abstract: The background of this study stems from the need to understand the impact of corporate governance (CG) on the performance of firms listed in the KSE-100 Index, both before and after the COVID-19 pandemic. The primary objective was to assess whether CG practices significantly influence firm performance and to compare this impact in two distinct periods. In pursuit of these objectives, a comprehensive research methodology was employed, including data collection from the Pakistan stock exchange website and the State Bank of Pakistan (SBP) publications. Panel data was used to analyze the information from 69 non-financial firms listed on the Pakistan Stock Exchange. The data covered a range of CG characteristics, financial measures, and the pre-and post-COVID-19 periods. The research adopted an event study approach, employing standard t-tests and Ordinary Least Square (OLS) methods to investigate the effects of COVID-19 on CG and firm performance. The study variables included financial performance indicators such as Return on Assets (ROA) and Return on Equity (ROE), as well as various CG factors such as board size, independence, gender diversity, and audit committee characteristics. The results of the study offered valuable insights. CG was found to have a significant impact on the financial performance of the KSE-100 Index, with a specific emphasis on the positive influence of audit committee meetings. However, the study also revealed the nuanced nature of these relationships, as some CG factors did not demonstrate significant impacts. In conclusion, this research underscores the dynamic nature of CG's influence on firm performance, especially during the challenging period of the COVID-19 pandemic. The findings highlight the importance of prudent financial management, liquidity, and dividend policies in enhancing financial outcomes. This study provides a foundation for future research into the evolving effects of CG and its role during economic turbulence, offering valuable guidance to businesses seeking to improve their financial performance. It represents a valuable contribution to both academia and the corporate world, aiding in the pursuit of sound corporate governance practices and better financial results.

Keywords: Corporate Governance, Financial Performance, COVID-19, KSE-100 Index

DEALING WITH THE DISPUTES: LESSONS FOR DISPUTES RESOLUTION IN BUS RAPID TRANSIT (BRT) PROJECT, PESHAWAR

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Abstract: Disputes arise in all areas of life and need timely resolution. Unresolved disputes lead to conflicts, complexities, and court cases. The government of Khyber Pakhtunkhwa launched an urban mobility project to facilitate people of Peshawar but being an old and densely populated city, the project team came across many hurdles during the construction phase of the project. This research was carried out to understand how the project team tackled the disputes, facilitated the affected people, and overcome the hurdles. For this purpose, a qualitative research study was conducted where thirty open-ended questions in the form of interviews were asked from the project team and the affected persons. The results show that most of the disputes were resolved with the help of negotiations while in a few cases the disputing sides moved to the court for litigation. Thus, it is concluded that negotiation is the most cost effective and sustainable solution to resolve disputes, reach a compromise and finally a win-win solution.

Keywords: Dispute Resolution, Negotiation, Bus Rapid Transit

REVEALING EMPLOYEE PERFORMANCE THROUGH JOB STRESS AND WORK OVERLOAD UNDER THE MODERATION OF EMOTIONAL INTELLIGENCE

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Abstract: The role of an academician is not only to impart knowledge but also include effective teaching, academic advising, and development of the curriculum. The purpose of this study is to investigate the impact of Job Stress and Work overload on Employee Performance with the moderating role of Emotional Intelligence. The research was conducted among academic staff 350 questionnaires were circulated out of which 220 were received back and the response rate was 63%. SPSS 20 was used for data analysis by applying certain relevant techniques. Primary data was collected through a structured questionnaire, supplemented by relevant secondary data from credible sources to ensure theoretical validity. The study reveals that Emotional Intelligence plays a crucial role in mitigating the negative impact of Job Stress and Work Overload on employee performance. It emphasizes the significance of Emotional Intelligence as a key factor in determining success and psychological well-being. Importantly, the research acknowledges that the complete elimination of Job Stress in any organization is impractical; however, it underscores the importance of managing Job Stress to enhance overall employee performance. Results showed that Job Stress is negatively related to Employees' Performance. However, Work Overload is not related to Employees' Performance but Emotional Intelligence is positively related to Employees' Performance. Moreover, Emotional Intelligence moderates the relationship between workplace Job Stress and Employee Performance. Contrary to expectation Emotional Intelligence does not moderates the relationship between work overload and Employees' Performance. Thus, the study provides implications at the academic and managerial levels of universities.

Keywords: Emotional Intelligence, Job Stress, Employee Performance, Work Overload, Academic Staff

IMPACT OF FINTECH ON THE FINANCIAL PERFORMANCE OF PAKISTANI BANKING SECTOR: A COMPARATIVE STUDY OF ISLAMIC AND CONVENTIONAL BANKS

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Abstract: FinTech is an emerging technology which fundamentally changed the way of banking. The link between FinTech and banks got the attention of many scholars. In this regard, the purpose of this study is to examine the impact of FinTech on the financial performance of Islamic and conventional banks of Pakistan for a period of five years comprising of 2018 to 2022. Four Islamic banks and all the conventional banks except micro finance banks are chosen as a sample for this study. The analysis of the current study will be based on the independent variable Fintech (Internet banking, Mobile banking and ATM transactions) and dependent variable financial performance (Return on Assets, Return on Equity and Earnings per Share) of both banking systems. The researcher will collect quantitative data as per the quantifiable nature of the study which will be collected from the annual reports of the concerned banks and state bank of Pakistan website. Linear model of panel data regression will be used to derive the empirical results from the analysis of FinTech and banks' financial performance. Moreover, (t-test) will be used to compare the financial performance of Islamic and conventional banks. The outcomes of the current study will contribute updated theoretical information to the existing literature which will be useful for future research scholars to use such information as a reference material in future studies. Additionally, this study will shed light on the importance of financial technology from both customers and banks perspectives.

Keywords: FinTech, Financial Performance, Islamic Banking, Conventional Banking, Pakistani Banking Sector

IMPACT OF COST MANAGEMENT PRACTICES ON FIRM PERFORMANCE: A STUDY OF PAKISTAN'S MANUFACTURING SECTOR

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Abstract: Cost management and profitability are the backbone of every organization. Cost management is a common approach used by managers to maximize the shareholder's wealth. It is an important element of overall business success and effective management, which helps the management to accurately forecast the cost before the process. The study aimed to examine the impact of cost management practices on firm performance in the manufacturing sector. Direct material (DM), Direct Labor (DL), Operating expenses (OE), and Factory overhead (FOH) were selected as the independent variable while Return on Assets (ROA) was used as a proxy for performance i.e. dependent variable. Fifteen firms from the manufacturing sector were selected for five years from 2017 to 2021. Panel data was collected through a simple random sampling technique. Results show that direct material and direct labor has a positive significant impact on firm performance. However, operating expenses and Factory overhead were found insignificant. The study concludes that direct labor and direct material are the major cost factors to reduce the cost and a source of profit maximization.

Keywords: Cost Management Practice, Direct Labor, Direct Material, Factory Overhead, Firm performance

THE EFFECT OF CORPORATE GOVERNANCE ON DIVIDEND PAY-OUT POLICY; (A STUDY OF NON-FINANCIAL SECTORS OF PAKISTAN)

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Abstract: The study aims to evaluate the impact of corporate governance on dividend policy of a firm. The purpose of the study is to investigate the relationship of corporate governance with dividend policy on Pakistani Non-Financial sector. It directs the managers towards company's objectives and aim in a way through which they add more value to the company and also give benefit to the stakeholders for long run. Non-Financial sector of Pakistan was selected for the study and forty-two (42) firms all selected from 14 sectors (3 firms from each sector), by convenience-based sampling technique. Dividend payout is used as a proxy for dividend policy which is the dependent variable of the study, while Board size, board Independence, and Director's remuneration were selected as independent variables. Firm size and leverage were the controlled variables of the study. Data was collected from annual reports of every firm and then analyzed on E-views by using the ARDL Regression model. Empirical results show that Board size has a positive and significant relationship with dividend payout; while Directors' remuneration has an inverse effect on the dividend payout ratio and board Independence had no such effect

Keywords: Board Size, Board Independence, Director's Remuneration, Dividend Policy

THE COMPARISON BETWEEN ISLAMIC AND CAPITALISTIC CONCEPT OF ECONOMY AND MARKET: A CONCEPTUAL STUDY

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Abstract: Amid adverse economic crises around the globe specifically in developing countries, it is obligated for practitioners and scholars to work extensively on different economic systems prevailing in the world to uncover their pros and cons. Accordingly, this paper is designed to compare the Islamic and capitalistic view of market and economy to highlight the weaknesses in the prevailing capitalist economic system and how the Islamic economic system can help to overcome such weaknesses. This paper is based on logical arguments supported by literature to compare the two economic systems in terms of comparing the foundational factors of economic system including capital mobilization, risk sharing, resource accumulation and distribution, information asymmetry, and governance system etc. The main differences between the two economic systems include regulation, valuation, information asymmetry, and consideration of risks. This paper is more feasible from a practical perspective and suggests the policy makers to consider Islamic economic system as an alternate of Capitalism.

CRITICAL FACTORS AFFECTING LABOUR PRODUCTIVITY IN CONSTRUCTION INDUSTRY

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Abstract: Construction industry is one of the most crucial and challenging industry in world. It directly affect the economy of the country. Labour productivity play an important role in completion of any construction project within budget and time limit .Construction projects are engaged with the risk poor labour productivity. Hence it is important to identify the factors affecting labour productivity in order to ensure success of the project. The research paper aim to find essential factors that affect labour productivity and rank them according to their effect on project efficiency. A questionnaire survey was done in which 115 respondents and 5 sites were visited to collect data. The data is statically analyzed by SPSS and weighted average is used. The results show material shortage, large crew size, poor site management, design changes, are the top key factors that affect the productivity. Stakeholder can consider this study for productivity improvement. It is recommended that material should be provided on time, there should be less changes in design at the time of execution, and labour should be paid on time in order to achieve significant productivity.

FINTECH-BASED FINANCIAL INCLUSION AND RISK-TAKING BEHAVIOUR OF FINANCIAL INSTITUTIONS: EVIDENCE FROM SOUTH ASIA

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Abstract: Fintech innovations are undergoing rapid changes and gaining importance daily in the global financial sector, contributing to the facilitation of financial inclusion initiatives by financial institutions (FIs). These technological advancements are expected to enhance the financial system's stability and mitigate key stakeholders' risk propensity. However, a requirement persists for additional empirical evidence to validate the significant impact of fintech-based financial inclusion (FinFI) on the risk-taking tendencies of financial institutions (FIs) active in South Asian nations and the considerable differences in the relationship between fintech-based financial inclusion and the risk-taking behavior of financial institutions among the different countries in South Asia. While extensive research regarding fintech, financial inclusion, and financial institutions exists in various regions worldwide, there is a notable scarcity of studies focusing on South Asian countries such as Pakistan, India, Bangladesh, Nepal, and Sri Lanka. This study aims to bridge this gap by investigating fintech-based financial inclusion and the risk-taking behavior of financial institutions in South Asian countries over five years spanning from 2017 to 2021. The research paper encompasses two key variables: fintech-based financial inclusion as the independent variable and financial institutions as the dependent variable. The study's sample consists of fintech users from five South Asian countries: Pakistan, India, Bangladesh, Nepal, and Sri Lanka. Additionally, the data collection process employed the convenience sampling method. However, other countries like Bhutan, Afghanistan, and Maldives are not included in the study population due to a lack of data. Additionally, for quantitative data collection, we have utilized datasets from reputable sources, including the World Development Indicators, Global Financial Development, and Global Financial Inclusion databases. Panel data analysis is a statistical methodology used to examine and analyze the dataset of multiple entities observed over several periods. We measured the FinFI and assessed its role in reducing the risk-taking behaviour of financial institutions. The validity of our findings has been ascertained through a series of rigorous robustness tests.

Keywords: Financial technology, financial inclusion, fintech-based financial inclusion, risk-taking behavior, financial institutions, South Asia.

KHAN MODEL OF MANAGEMENT – A QUANTIFIABLE APPROACH

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Abstract: A common perception about management is that; it is mostly abstract, theoretical, and conceptual textual in nature, hence measured qualitatively. However, this newly developed ‘Khan Model’ present a quantifiable version of applied management and its outcomes. A logical, viable and outcomes-based model is the need of the hour for performance assessment and appraisal of both managers and business computation rather than the qualitative-based approaches. The objective of this research is to move forward from a theoretical-based approach of management to a viable, quantifiable and practical-based approach to management. The Research Methodology used in the present research is Exploratory and Qualitative in nature. The result of this research study is the development of quantifiable management model. This research presents a holistic and progressive development of management scenario, thus concluding on the benchmark performance assessment of management of businesses. The design and development of the Khan Model of Management is the most innovative, quantifiable and viable management practical model as compared to the past perception that management is only theoretical or conceptual based. It is always preferred to have a quantitative or numeric result rather than an adjective qualitative statement. The best performance of managers can lead businesses to the most effective and efficient system of performance which require quantifiable assessment. The two main characteristics of managers can lead to the highest productivity, thus lowering rejection and rework in production and provision. Such progression can lead to the best business performance. The best performance of any business is a hallmark of managers’ achievement for which they are held responsible and rewarded.

Keywords: Management, Theoretical approaches to management, Quantifiable approach to management, Khan Model of Management.

EMPIRICAL STUDY OF MARKET PERFORMANCE: CONSIDERING SUSTAINABILITY-BASED MARKETING ASSETS (CORPORATE REPUTATION AND CUSTOMER SATISFACTION) THROUGH SUSTAINABLE COMPETITIVE ADVANTAGE IN PAKISTANI CONTEXT

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Abstract: This paper studies the market performance in the presence of sustainable competitive advantage as a mediator considering sustainability-based marketing assets (corporate reputation and customer satisfaction). Data was collected from the customers (N=360) of hotels/restaurants by using Likert scale (from 1= strongly disagree to 5 = strongly agree). Primarily the present research is conducted to study the association among the corporate reputation, customer satisfaction, sustainable competitive advantage and market performance in Pakistani's context in hotels/restaurants industry. The present study is carried out via questionnaire-based survey from individuals who are the customers of hotel/restaurants in Pakistan. AMOS V23 software is used to perform structural equation modeling technique. According to the results of the current research, sustainable competitive advantage mediates the relationship between corporate reputation and market performance partially, and also mediates between customer satisfaction and market performance partially. The results of this research are useful for service industry and help the marketing personnel in developing marketing strategies to attract a large number of customers toward service industry. This study adds practical value to the literature on corporate reputation, customer satisfaction, sustainable competitive advantage and market performance. Other than this, according to knowledge of authors, sustainable competitive advantage was not studied between sustainability-based marketing assets and market performance as a mediator before this study.

Keywords: Corporate Reputation, Customer Satisfaction, Sustainable Competitive Advantage, Market Performance.

IMPACT OF FAMILY WORK CONFLICT AND WORK-FAMILY CONFLICT ON WORK-LIFE BALANCE, ASSESSING THE INTERMEDIATE EFFECT OF MANAGER CONSTRUAL EFFECT AND ORGANIZATIONAL CONTROL MECHANISM

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Abstract: The purpose of the study was to understand how “Family-Work Conflict” and “Work-Family Conflict” impact the “Work-Life Balance” of employees working in the software industry of Karachi, Pakistan. The novel aspect of the study was the manager construal effect and organizational control mechanism and how it related uniquely to this relation. A quantitative, deductive research approach is applied to this research. Data is collected through non-probability and convenient sampling techniques and the selected sample size was 351 for this study. The data was evaluated via SMART PLS software. Questionnaires were sent to various employees working at different companies electronically through Google Forms. Work-family conflict is found to have a significant impact on the Work-Life balance of employees. Family-work conflict has an insignificant effect on Work-Life Balance. Our chosen moderator also had an insignificant impact on the relationship between our independent variables and our dependent variable and the same is the case for our mediator. The study has been conducted at a small scale in 30 companies, most of which are situated within the territory of Karachi. The generalizability of the study is therefore limited. Further inter-city research is needed. Moreover, the study is based on the subjective views of the respondents about the firms they work in. It is therefore suggested that future studies should focus on the development of measures which assess the variables with even more objectivity.

Keywords: FWC: Family Work Conflict, WFC: Work-Family Conflict, WLB: Work-Life Balance, MCE: Manager Construal Effect, OCM: Organizational Control Mechanism

NEXUS BETWEEN BANK COMPETITION AND LIQUIDITY CREATION: TIME SERIES STUDY FROM THE PERSPECTIVE OF PAKISTAN

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Abstract: The current study examines the nexus between bank competition and liquidity creation by conventional banks in Pakistan. To investigate this relationship, we conducted a time series analysis on a quarterly data set of Conventional Banks in Pakistan from 2004 to 2022. The Lerner Index of Bank Competition is measured using the translog cost function, and the liquidity creation is measured using the Catfat model of liquidity creation. The regression technique was used to test the relationship between the constructs. The findings suggest that bank competition positively impacts the bank's liquidity creation, which means that the rise in bank competition increases liquidity creation. The study's findings align with the 'stability hypothesis,' in which banks increase their deposits and lending activities when competition is high in the market, boosting the liquidity creation by conventional banks in Pakistan. The evidence suggests that pro-competitive policies in the Pakistan banking industry can enhance liquidity provision by banks. Policymakers should use the monetary policy rate to control liquidity creation, as extensive liquidity creation results in higher risk.

Keywords: Bank Competition, Liquidity Creation, Monetary Policy

ASSESSING MACROECONOMIC RESILIENCE AND SOVEREIGN RISK: AN ORDERED PROBIT ESTIMATION OF EMERGING MARKET ECONOMIES PARTICIPATING IN THE BELT AND ROAD INITIATIVE

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Abstract: This study presents a contrasting perspective on the debt trap diplomacy narrative, proposing that the primary impetus for an increased debt burden lies not with China but rather with the domestic factors within the host countries. Additionally, it offers insights to bolster the reputation of the Belt and Road Initiative (BRI) by emphasizing the improvement of transparency and the effective management of macroeconomic factors that contribute to the escalation of country risk. The objective of this research is to examine the factors influencing a nation's sovereign risk by assessing ratings provided by the three major rating agencies for 52 countries participating in the Belt and Road Initiative (BRI). The primary goal is to highlight that the economies of borrowing nations, particularly Emerging Market Economies (EMEs), play a significant role in escalating the debt burden and worsening country risk. The study utilizes a sample covering the period from 2013 to 2020. To achieve the objective, this paper employs panel data estimation through an ordered Probit approach. The examination reveals that inflation, reserve ratio, current account deficit, and exchange rate volatility are key factors contributing significantly to the sovereign risk of Emerging Market Economies (EMEs). Upon thorough examination, it has been determined that, due to escalating indebtedness coupled with frail macroeconomic fundamentals, the emerging economies are poised to encounter significant debt challenges, a decline in creditworthiness, and ultimately, elevated sovereign risk.

Keywords: Sovereign risk, Debt, Models with panel data, External debt, BRI

THE VALUE RELEVANCE OF ENVIRONMENTAL, SOCIAL, AND GOVERNANCE DISCLOSURE: EVIDENCE FROM LISTED COMPANIES OF PAKISTAN

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Abstract: The purpose of this study is to examine the value relevance of financial and non-financial information in publicly listed companies in Pakistan. A panel sample of 35 companies was selected for the analysis from 2010-2020. Ohlson (1995) model was modified with the incorporation of ESG disclosure score to test the value relevance of environmental, social, and governance disclosure of companies. The examination of value relevance came up with the evidence that book value per share is not value relevant, earnings per share is positively and significantly value relevant while ESG disclosure score is negatively and significantly value relevant for listed companies in Pakistan. The findings of the study reveal that ESG disclosure has been taken as a negative factor in the valuation of the company and investors consider ESG activities to be achieved at the cost of shareholders. The study contributes to the knowledge of the value relevance of financial and non-financial information for decision-making. The top-level administrators and leaders may use the findings of this study in the decision-making of their organizations regarding the dedication of resources to ESG activities along with gaining investor confidence and helping them in the formulation of effective disclosure strategies. This study used a comprehensive score of ESG disclosure which brought an opportunity for future studies to test the value relevance of dimensions of ESG separately for clearer insights into value relevance results.

Keywords: Value Relevance, Environmental, Social and Governance Disclosure, Corporate Social Responsibility

BUSINESS STUDENTS' PERCEPTION TOWARDS ONLINE AND TRADITIONAL LEARNING IN UNIVERSITY OF PESHAWAR

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Abstract: This exploratory study endeavors to examine the business students' perception towards e-learning and traditional learning. Sample of the study comprises of such students from University of Peshawar, Pakistan who had two years or more learning experience on university campus. Open ended interview of the respondents were audio recorded. Respondents' interviews were coded and qualitatively analyzed statistically, putting the students' perceptions in percentages relation to gender, age, previous knowledge of computers, attitudes to new technology, learning styles and the way of implementing e-learning at university. Advantages and disadvantages of e-learning were categorized in a qualitative content analysis. The main conclusion from the study was that the majority of the students having a positive perception towards online learning system and Further, student's academic performance, computer/ Laptop ownership, computer proficiency and frequency of computer use were found to have positive and significant correlation with students' perception towards e-learning. Strategy of implementing the e-learning system at the university was more important in influencing students' perceptions. These findings might be of interest to academicians, university administrators, and policy makers involved in planning, developing and implementation of future e-learning strategies in Pakistan and other developing countries.

WORKING PAPER ON IMPACT OF PERCEIVED RISKS AND PERCEIVED BENEFITS ON ADOPTION OF DIGITAL FINANCE

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Abstract: Despite the numerous benefits of digital finance, the adoption rate of digital finance is relatively low compared to other economies of the world. According to the Global Findex Database (2021), digital payment made is highest in developed countries like Denmark, with 100%. While in developing countries, China has made 86% payment digitally. Unfortunately, in South Asia, Pakistan has the second lowest, with 18%, depicting a grim picture of the adoption of digital finance. Though there is a huge need to promote digital finance in Pakistan, people are still reluctant to use digital finance. Generally, many people still prefer traditional financial transactions due to perceived risks and uncertainties associated with digital finance. Previous research concluded that security risk, performance risk, social risk, time risk, financial risk and psychological risk have a significant negative impact on the use of digital finance. Additionally, the decision to adopt digital finance is not only dependent on perceived risks but also on perceived benefits and consumers adopt digital finance when the expected benefits outweigh the expected risks. In this context, Ryu (2018) found that economic benefit, convenience and seamless transactions are important drivers in the acceptance of digital finance. Besides this, the literature suggests that individuals' attitude toward digital finance plays a significant role in predicting the adoption of digital finance. Similarly, attitude has been identified as a key predictor of intention. Therefore, it is crucial to investigate the influence of perceived risks and perceived benefits on attitude towards adoption of digital finance. Additionally, in this study, financial literacy has been taken as a moderator between the attitude towards digital finance and the intention to adopt or continue using digital finance. The data will be collected through a structured questionnaire from 384 respondents from users and non-users in order to assess differences in perception. Partial least squares structured equation modeling (PLS-SEM) will be used to analyze the proposed model on Smart PLS. The study will contribute valuable insights to the growing body of literature on the digital finance landscape by emphasizing the importance of perceived risks and benefits in shaping individuals' decisions. Furthermore, the significance of financial literacy as a moderator highlights the need for targeted educational efforts to enhance consumers' financial literacy and promote safer and more informed adoption of digital financial services.

Keywords: Perceived benefits, Perceived Risks, Digital finance, Attitude towards digital finance, financial literacy

**DEALING WITH THE DISPUTES: LESSONS FOR DISPUTES
RESOLUTION IN BUS RAPID TRANSIT (BRT) PROJECT,
PESHAWAR**

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Abstract: Background: Disputes arise in all areas of life and need timely resolution. Unresolved disputes lead to conflicts, complexities, and court cases. The government of Khyber Pakhtunkhwa launched an urban mobility project to facilitate people of Peshawar but being an old and densely populated city, the project team came across many hurdles during the construction phase of the project. Aim/Objectives: This research was carried out to understand how the project team tackled the disputes, facilitated the affected people, and overcome the hurdles. Methods: For this purpose, a qualitative research study was conducted where thirty open-ended questions in the form of interviews were asked from the project team and the affected persons. Results: The results show that most of the disputes were resolved with the help of negotiations while in few cases the disputing sides moved to the court for litigation. Conclusion: Thus, it is concluded that negotiation is the most cost effective and sustainable solution to resolve disputes, reach a compromise and finally a win-win solution.

Keywords: Dispute Resolution. Negotiation, Bus Rapid Transit

THE CAUSAL RELATIONSHIP BETWEEN GROSS NATIONAL HAPPINESS AND ECONOMIC GROWTH IN PAKISTAN

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Abstract: This study aims to investigate the bidirectional causal relationship between gross national happiness (GNH) and economic growth from 2003 to 2022. This study uses the Autoregressive Distributed Lag (ARDL) approach to analyze the dynamic links between Gross National Happiness (GNH) and Economic Growth. In this research, exogeneity-related issues that impede accurate results are addressed. Economic Growth can be used to forecast changes in happiness, which can also predict economic growth. It implies more intricate connections between happiness and economic growth than previously realized. The unit root test certified all the variables stationary at first difference therefore VAR and ARDL both can be used for analytical finding and analysis. Here ARDL has been used for interpretation and two separate equations have been structured by taking economic growth and happiness as dependent respectively. The result shows that real GDP growth has a positive impact on gross national happiness. The p-value for each of these variables is significant because it is less than 0.05. However, the parameter's magnitude, 0.112407, indicates that gross national happiness will rise by an index of 0.112407 for every 1% increase in real GDP growth. On the other hand, the study also shows that real GDP growth and gross national happiness are positively correlated. They are considering that the P value is below 0.05. For every unit increase in the gross national happiness index, real GDP growth is expected to increase by 1.303793 percent, according to the parameter magnitude of 1.303793. The bidirectional impact of GNH and Economic Growth is validated, underscoring the significance of considering both factors in policy formulation. According to a study that found a positive association between economic growth and gross national happiness, an expanding and successful economy positively impacts the population's overall well-being. Similar to this, because of their positive interactions, happy and satisfied people have a positive impact on the growth of the economy. The results of this study open the door for further research in this field by improving our comprehension of the intricate relationships between economic dynamics and other measures of social well-being. Keywords: Gross National Happiness, Economic Growth, Human Development, Auto-regressive Distributive Lag, Bidirectional Causation, Granger Causality, Exogeneity, Vector Auto-regressive

Keywords: Gross National Happiness, Economic Growth, Human Development, Autoregressive Distributive Lag, Bidirectional Causation, Granger Causality, Exogeneity, Vector Autoregressive

DIGITAL TRANSFORMATION IN HUMAN RESOURCE MANAGEMENT

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Abstract: This study was based on Digital transformation and its linkages to Human resource management. In today's corporate world business processes are complicated and require comprehensive planning towards digital transformation. This study focused on the use of digital applications in human resource management. Data collected from the corporate sector of Pakistan.

Keywords: Digital Transformation, HRM

ROLE OF CELEBRITY BRANDING ON CONSUMER BUYING BEHAVIOR AND ITS EFFECTS

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Abstract: The purpose of this study was basically to find out the role of celebrity branding in advertising campaigns and do assess the viewer's reaction to such advertisements. In order to assess the relation of the independent variables in this study are Decision Making, Brand Value, and Attractiveness. The use of celebrities for promoting and advertising a product or a service is a very old and popular advertising campaign. Internationally the celebrity branding market is a multi-billionaire dollar industry. Their involvement in advertising sets the standards of the product. The overall design of the study is revolving around the variables of the study are Impact of celebrity branding, consumer buying behavior, advertising. Over here the quantitative research technique is going to be used to effectively analyze the data. Population Primary data is been collected from the different respondents from all across Peshawar City. The Target audience was mostly the youth and the working-class people as they have a wider interest in the life of celebrities and they keep themselves up to date with the latest trends and fashions, So that's why they have a better sense of understanding of the content which is been presented by the celebrities. The sample unit will be the Citizens of Peshawar City. The Sample Universe is going to be different areas of Peshawar City i.e. Dalazak Road, University Road, Town, Cantonment, etc. The Sample Size consists a total of 222 respondents. After analyzing the overall findings, the study concludes that there is a very strong relationship between the variables which are being tested in the study only the factor Attractiveness has shown an insignificant effect on celebrity branding, The Rest of the relationship is found positive between the independent variable decision making, brand value with the dependent variable Celebrity branding in advertising. This explicitly shows that decision-making, and brand value, is going to bring positive effect in the advertisement campaign by branding a celebrity in it whereas the Attractiveness factor is not considered important by the viewers of the advertisement. Celebrities in the modern marketing world have significant effects on the consumer's mind. The involvement of celebrities in advertising campaigns has shown a strong relationship with consumer purchase intentions. Hence it is concluded that celebrity branding is explicitly going to bring a positive relationship with the brand.

Keywords: Decision Making, Brand Value, Attractiveness

CONNECTING THE DOTS: ANALYZING THE IMPACT OF WORKPLACE OSTRACISM ON KNOWLEDGE SHARING BEHAVIOR WITH THE MEDIATING ROLE OF SOCIAL LOAFING AND MODERATING ROLE OF EMPLOYEE EMPOWERMENT

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Abstract: Investigating the influence of workplace ostracism on knowledge sharing behavior among employees in Pakistan's telecommunications sector is critical, given its potential to cause detrimental effects both for individuals and organizations. This study aims to explore the direct effect of workplace ostracism on knowledge sharing as well as consider social loafing as a possible mediator and employee empowerment as a moderator in this relationship. This research intends to explore the interconnections between knowledge-sharing behavior and workplace ostracism within the Pakistani telecommunications industry. To achieve this, we will investigate how social loafing may mediate the effects of these two variables while also exploring whether employee empowerment serves as a moderator in their relationship. A convenience sampling approach will be employed to collect data from employees in the telecommunications sector. A cross-sectional design, gathering information at a single time point, will offer an insight into the relationship explored by this study. Rigorous statistical analyses such as correlation and regression analysis are intended to help evaluate formulated hypotheses; these methods may provide evidence for or against specified relationships. The aim is that these activities will allow us to reach our established research goals. The research findings are expected to shed light on the dynamic of workplace ostracism and knowledge sharing behavior within the telecommunications industry in Pakistan. Moreover, this study intends to uncover potential mediating and moderating factors that could influence these relationships. By providing key findings from the research results, academics and practitioners alike will be able to gain useful insights into how best to reduce workplace ostracism and encourage more effective knowledge-sharing within this tough industry. Ultimately, the expected outcome is an improved capacity for employees to exercise power over their work environment for increased productivity.

Keywords: Workplace Ostracism, Knowledge Sharing Behavior, Social Loafing, Employee Empowerment.

THE IMPACT OF INTELLECTUAL CAPITAL ON ORGANIZATIONAL PERFORMANCE : A CASE OF PRIVATE SECTOR UNIVERSITIES IN PESHAWAR

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Abstract:

The theory Resource Base View (RBV) supports the idea. This states that for sustainable competitive advantage an organization must have rare and inimitable internal resources (David, 2001). HC is the only competitive edge that a firm can possess with no imitable character. The results in the study quantified the theory by showing a strong relationship of IC with OP. However, the scope of study can be further analysed studying the role of management philosophy and organization culture as mediators to its full or partial impact on the phenomena. From a myriad of literature on IC, it is proved that intangible assets which include inter alia soft skills & human capital spurs the rate of economic growth and catapults the organization to the highest pedestal of growth. This study shed light on the important role of faculty apart from admin staff as human capital (HC) in shaping the performance of universities. Universities with a vision of quality education need to focus on faculty as one pivotal IC. The HC needs to be developed further for reaping full benefits. An empirical study with a sample of 300 students from private sector universities Peshawar was conducted. Adapted questionnaire was used to collect data, which was then analysed using regression techniques. The findings show a strong relationship between several dimensions of human capital such as teacher job experience, effective teaching methods and professional skills with the key indicator of organizational performance such as student satisfaction, admissions boost and good ranking.

Keywords: Human Capital, Intellectual Capital, University Performance

FACTORS EFFECTING CONSUMER INTENTION TO BUY COUNTERFEITS. A STUDY OF PESHAWAR REGION

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Abstract:

The purpose of this study is to identify the variables that lead consumers in the Peshawar market to purchase counterfeit goods. In particular, it looks at how consumer attitudes about the financial and hedonistic advantages of buying counterfeit goods as well as their personal traits such as materialism, self-image, and perceived future social status affect their propensity to buy counterfeit goods. Five brands in five distinct product categories were chosen and used for the study based on an earlier investigation. The current survey involved about 200 participants who completed the self-administered questionnaire. The study hypotheses were tested using multiple regression analyses. The findings showed that consumer propensity to acquire counterfeit goods was significantly predicted by past purchases, affordability, and personal traits. The majority of antecedents significantly influenced the desire to acquire counterfeit goods, with the exception of attitude toward the hedonistic benefits of doing so. The primary conclusions imply that people are merely prepared to purchase fake goods. Consumer affordability appears to be a genuine problem that has to be fixed. To elucidate these results, larger sample sizes and more extensive geographic coverage are required in future research. Keywords: Counterfeit luxury brands, Product market, Consumer intention

Keywords: counterfeit luxury brands, product market, consumer intention

DEVELOPING AND VALIDATING AN INTEGRATED SUSTAINABILITY DISCLOSURE INDEX FOR PAKISTAN STOCK EXCHANGE KSE 100 LISTED FIRMS

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Abstract: Several studies have developed indices to measure ESG or CE or SDGs, the details of which are given in Appendix A. Some of the indices measures CSR only or CE only, while others measure CSR and SDG, but none of the indices measures the ESG, CE and SDG in a single index. The indices made in Pakistani context have not included the conditions and parameters stipulated in the CCG 2019. Moreover, the research for development of an inclusive sustainability index to cover all aspects of sustainability is also lacking. Several such indices have been developed at the national levels like India, Indonesia and Saudi Arabia. These indices are based on TBL approach that cater to ESG but do not address CE or SDGs. So, this study, will be focused on filling this gap through developing an integrated sustainability disclosure index (ISDI) that will include ESG, CE, and SDG performance and will also include the regulatory requirements of SECP and PSX. Moreover, there are not many studies that evaluate the impact of all three aspects of sustainability (ESG, CE and SDGs) performance on the firms' financial performance. The study will also evaluate the impact of ESG, CE and SDGs performance on the firms' financial performance.

Keywords: sustainability ESG Index SDGs Circular Economy

**THE EFFECT OF CORPORATE GOVERNANCE ON DIVIDEND PAY-
OUT POLICY; (A STUDY OF NON-FINANCIAL SECTORS OF
PAKISTAN)**

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Abstract: The aim of the study is to evaluate the impact of corporate governance on dividend policy of a firm. Non-Financial sector of Pakistan is selected for the study and forty-two (42) firms all selected from 14 sectors (3 firms from each sector), by convenience-based sampling technique. Dividend pay-out is used as a proxy for dividend policy which is dependent variable of the study, while Board size, board Independence and Director's remuneration were selected as independent variable. Firm size and leverage were the controlled variables of the study. Data was collected from annual reports of every firm and then analysed on E-views by using ARDL Regression model. Empirical results show that Board size has a positive and significant relationship with dividend pay-out; while Directors remuneration has inverse effect on the dividend pay-out ratio and board Independence had no such affect.

Keywords: Corporate Governance, Dividend Policy, ARDL

**EMPOWERING ACADEMIA: THE IMPACT OF DISCLOSURE
STIGMATIZED IDENTITY ON PERFORMANCE OF ACADEMIA,
MEDIATED BY PSYCHOLOGICAL EMPOWERMENT AND
PERCEIVED ORGANIZATIONAL SUPPORT AS A MODERATOR**

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Abstract: This study explores the intricate connection that exists in the academic domain between psychological empowerment, academic performance, disclosure of a stigmatized identity, and the moderating effect of perceived organizational support. This empirical study explores the dynamics of identity disclosure and provides information about how it affects academic performance. Utilizing a broad sample of academic staff and faculty members from different universities, the study uses a methodology to gather quantitative data. The empirical findings reveal a multifaceted relationship between stigmatized identity disclosure, psychological empowerment, and academic performance. The study's results demonstrate that stigmatized identity disclosure significantly impacts academic performance. Individuals who disclose stigmatized aspects of their identity experience both positive and negative effects on their performance. For some, disclosure can be a catalyst for growth and empowerment, it may lead to increased academic performance. These effects are partially mediated by psychological empowerment, suggesting that how individuals perceive and internalize their disclosed identity plays a pivotal role in shaping their academic outcomes. Furthermore, the moderating effect of perceived organizational support is a critical dimension of this research. The study uncovers that the level of support perceived from the academic institution can exacerbate the impact the relationship between psychological empowerment on performance. Higher levels of perceived organizational support mitigate the negative consequences of identity disclosure, promoting psychological empowerment and ultimately enhancing academic performance. These findings have significant implications for academic institutions, suggesting that fostering an inclusive and supportive environment can empower individuals to thrive academically, regardless of their stigmatized identities.

Keywords: Disclosure Stigma, Psychological empowerment, Perceived organizational support and Academic performance.

FACTORS AFFECTING EMPLOYEE TURNOVER INTENTIONS A CASE STUDY OF PAKISTAN INTERNATIONAL AIRLINE

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Abstract: The objectives of this study are to discover and examine the important thing elements that substantially contribute to worker turnover intention inside Pakistan global airways, and to assess the power of the causal courting between recognized elements and turnover intentions of personnel working inside the T.G.S and Engineering branch of PIA. The goal populace for this have a look at was the personnel at the Pakistan International airlines (PIA) headquarters in Islamabad. The goal population includes 1,180 personnel on the Islamabad Station, specifically 590 from the Technical floor help division and 590 from the Engineering branch. The populace became divided into two strata, ensuing in a sample length of one hundred fifty personnel. The structured interview conducted, consists of three elements. The primary part identifies potential respondents as employees of the Technical ground support division and Engineering department at PIA. Diverse statistical techniques, such as descriptive information, component evaluation, reliability evaluation, and correlation evaluation, might be hired to research the gathered facts. Finding: Strong Positive Correlation between Job Satisfaction and Retention: The study indicates a significant positive correlation among higher job satisfaction levels and reduced turnover intentions. This suggests that personnel satisfied with their roles are more willing to live in the enterprise. Findings screen that a great variety of personnel view the opportunities offered by the company as highly favorable, thus reducing their intentions to leave. This indicates the enterprise's potential to keep team of workers thru promising potentialities. Interpersonal relationships inside the workplace are diagnosed as a crucial element in reducing turnover intentions. personnel reporting strong, supportive relationships at paintings reveal a decrease probability of leaving. The research highlights that personnel who perceive a clear course for profession development in the agency show off lower turnover intentions. This indicates that a dependent career improvement plan undoubtedly influences retention. The study examines underscores the significance of competitive compensation and benefits in reducing turnover intentions. Personnel who experience thoroughly compensated are much less probably to do not forget to leave. High levels of organizational commitment are found to be associated with decreased turnover intentions. This signifies that employees committed to the company's goals and values are more likely to stay.

Keywords: Human Capital

THE NEXUS BETWEEN ACCESSIBLE TOURISM AND SUSTAINABLE DEVELOPMENT OF THE COMMUNITIES

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Abstract: Accessible tourism holds significant potential in Pakistan, which is widely regarded as one of the favorite destinations for travelers. To further enhance its appeal and inclusivity, the need to cater to the requirements of all tourists, including those with specific access needs, has become apparent. Meanwhile, local communities in the northern regions of Pakistan heavily depend on tourism to meet their socio-economic needs, making it vital to assess the potential transformative impact of accessible tourism on their sustainability and long-term prosperity. While previous studies have explored the impact of conventional tourism on local communities, there remains a notable gap in research regarding the specific effects of accessible tourism. This study aims to investigate the influence of accessible tourism on the sustainable development of local communities, encompassing economic, socio-cultural, and environmental aspects. The conceptualization of accessible tourism proposed by Villa et al. (2015) forms the basis for exploring its potential impact in Pakistan and its relationship with the sustainability of local communities across different dimensions. In a two-stage data collection process, the study gathers information through separate questionnaires. The first stage focuses on the perspectives of both local and international tourists concerning accessible tourism and destination image. Subsequently, the second stage involves well-informed local residents and small business owners in tourist areas to evaluate the impact of accessible tourism on various aspects of sustainable community development and measure the overall sustainability of local communities. The sample size comprises 320 respondents. The findings of this study reveal a significant relationship between the dimensions of accessible tourism and its impact on the sustainability of local communities. Notably, the results highlight the positive moderating role of destination image, indicating that a favorable image of the destination enhances the impact of accessible tourism on community sustainability. In conclusion, this research sheds light on the importance of accessible tourism in Pakistan and its potential to foster sustainable development in local communities. By understanding the implications of accessible tourism on different dimensions of community sustainability and the moderating effect of destination image, policymakers, and stakeholders can formulate strategies to promote inclusive tourism practices that benefit both tourists and local communities alike.

Keywords: Accessible Tourism, Sustainable Community Development, Destination Image

ASSESSING THE INFLUENCE OF YOUTUBE ADS ON BRAND PERCEPTION AND PURCHASE INTENTION IN KARACHI, PAKISTAN

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Abstract: The primary objective of this study is to ascertain the impact of pertinent factors—specifically, irritability, informativeness, entertainment, and trendiness—on the advertising value of YouTube. Additionally, the research aims to investigate whether these YouTube ad value factors exhibit variations based on demographic factors. Purpose of this study is to to elaborate the relevant factors like irritability, informativeness, entertainment and trendiness that affects the advertising value of YouTube, to check that YouTube and its factors differ according to demographics, and to determine the effect of YouTube ads value on purchase intention. The selected sample size for this study was 384 individuals, comprising members of the general public who actively use and spend time on YouTube. The questionnaire employed a Likert rating scale and encompassed a total of 40 questions. Data analysis was conducted using SPSS software version 23 and SmartPLS-3. The findings of the study revealed that age has insignificant impact on all three factors (informativeness, irritability and entertainment) because p values are greater than 0.05. Education has insignificant impact on informativeness and entertainment. However, education has significant impact irritability because (0.008p <0.05). Gender has also insignificant impact on all three factors (informativeness, irritability and entertainment). Income has significant income all three factors (entertainment, irritability and informativeness). Entertainment has significant impact on YouTube advertising value because (0p<0.05). Also, Informativeness has significant impact on YouTube advertising value because (0p<0.05). Irritability has significant impact on YouTube advertising value because (0.012p<0.05). Lastly, YouTube advertising value has significant impact on purchase intention because (0p<0.05). The study provides valuable insights to marketing professionals engaging in designing and implementing social media marketing strategies. It is strongly advised to explore additional factors in YouTube advertising to comprehensively assess their impact on consumers' purchasing intentions. The research findings underscore the crucial importance of marketers focusing keenly on the irritability aspect of advertisements

Keywords: Purchase Intension, Youtube Ads, Youtube Advertising, social media advertising, Purchase Behaviour

UNLEASHING THE POTENTIAL: EXPLORING HOW PROTEAN CAREER ORIENTATION SHAPES ACADEMIC CAREER SUCCESS THROUGH THE MEDIATION OF PSYCHOLOGICAL CAPITAL

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Abstract: Most people seek success in their career due to the prominent role of career in shaping their lifestyle from the first day they started working with organization. However, some people feel unsuccessful in their career. Hence, the main purpose of this study is to investigate the mediating role of psychological capital (PsyCap) between protean career orientation (PCO) and career success. Further, this study is quantitative in nature based on primary data which were collected from full-time lecturers teaching in Sudanese public universities. Out of the 250 self-administrated questionnaires, 209 were returned for final analysis. The data obtained were analysed by using the Smart-PLS 3.2.6 software techniques. Besides the context of this study, another uniqueness of this study was with the model in which career success was assessed as a formative construct. However, in the past studies, it was assessed as a reflective construct. The findings indicated that PsyCap was not only an important predictor of career success in the academic atmosphere, but it also played a positive mediator between PCO and career success.

Keywords: Academics' career success, psychological capital, positive psychology, and protean career orientation

ANALYZING THE ROLE OF ENVIRONMENTAL FACTORS ON SUSTAINABLE PUBLIC HEALTH (CASE STUDY OF PAKISTAN)

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Abstract: Higher carbon dioxide emissions are causing damage to the various elements of the environment such as the atmosphere, water, and land which are directly connected to human health and have a bad impact on human health so higher willingness to pay to protect their human health expenditures. Based on this assumption, the study examines the people's attitude towards health expenditure as the natural environment has higher CO₂ emissions. The current conducted for Pakistan uses a 1995 to 2020 data set extracted from WDI (World Development Indicators) and analyzes data based on the least square regression method. This study aims to find out how environmental factors affect public health and to analyze the components influencing health expenditures. The result shows that CO₂ emissions have a positive impact on the expenditures of health, while population density, carbon emissions from transport and inflation positively influence health expenditures in a country. The GDP per capita has a negative influence on carbon emissions. The greater the GDP per capita the less will be healthcare issues and expenditures and air pollution. This study is helpful for policy making. The government needs to adopt air quality standards and empower its residents by providing better healthcare services. The policy makers can suggest policies to reduce carbon emissions for provision of better health care facilities of the community and to reduce health expenditure due to negative externality effect of carbon emissions.

Keywords: Willingness-to-pay; Health expenditures; Environmental protection; Health condition; CO₂ emissions; Population density; Pakistan.

WORKING PAPER ON IMPACT OF PERCEIVED RISKS AND PERCEIVED BENEFITS ON ADOPTION OF DIGITAL FINANCE

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Abstract: Financial institutions are facing challenges in the acceptance of digital financial services. The study identifies factors contributing to the behavioral intention to adopt digital finance for non-users and the behavioral intention to continue using digital finance for existing users. It has identified obstacles, which are labeled as perceived risks, and promoters, which are labeled as perceived benefits. More specifically, the impact of dimensions of perceived risk and perceived benefits on attitude toward digital finance has been analyzed, which, in turn, leads to the intention to adopt or continue using digital finance. Additionally, the moderating role of financial literacy has been taken between attitude toward digital finance and intention to adopt or continue using digital finance. The research methodology of this study is inspired by research onion developed by Saunders et al., 2007. The data will be collected through a structured questionnaire from 384 respondents from users and non-users in order to assess differences in perception. Partial least squares structured equation modeling (PLS-SEM) will be used to analyze the proposed model on Smart PLS. The study will contribute valuable insights to the growing body of literature on the digital finance landscape by emphasizing the importance of perceived risks and benefits in shaping individuals' decisions. Furthermore, the significance of financial literacy as a moderator highlights the need for targeted educational efforts to enhance consumers' financial literacy and promote safer and more informed adoption of digital financial services.

Keywords: Keywords: Perceived benefits, Perceived Risks, Digital finance, Attitude towards digital finance, financial literacy

IMPLEMENTATION OF LEAN SIX SIGMA IN THE TEXTILE SPINNING SECTOR

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Abstract: The textile industry is a crucial component of global manufacturing and faces increasing pressure to improve operational efficiency. Implementing Lean Six Sigma (LSS) methodologies has the potential to minimize waste, enhance product quality, and bolster competitiveness. This research includes a comprehensive literature review on LSS, identification of critical processes in the textile spinning sector, and assessment of current practices. The ultimate goal is to provide valuable insights that assist textile spinning companies in optimizing operations and reducing waste. Key objectives encompass examining the principles and methodologies of Lean Six Sigma and their applicability to the textile spinning industry. Data collection and analysis will identify bottlenecks, thus paving the way for implementing LSS strategies. Through successful LSS implementations, this research will extract lessons and best practices to fit the needs of textile spinning companies. Ultimately, this research aspires to be a catalyst for transformation within the textile spinning sector, empowering companies to survive and thrive in an increasingly competitive global market and contribute to broader sustainability goals through waste reduction.

Keywords: Textile industry, Lean Six Sigma (LSS), Operational efficiency, Waste reduction.

SHARED LEADERSHIP AND PROJECT SUCCESS: ROLE OF TEAM PERFORMANCE AND DEGREE OF AUTONOMY IN PROJECT TEAMS

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Abstract: Despite its shown effectiveness in project management, researchers have not given shared leadership the same empirical and theoretical attention as heroic, transactional, or transformational leadership. This study explores the influence of shared leadership on project success, precisely in software development project context. The research work additionally investigates the mediating role of degree of autonomy and team performance. Data were collected from 266 team members working on software development projects in Pakistan and was analyzed by the means of SPSS and SmartPLS through Structural Equation Modeling. It was found that shared leadership has positive influence on project success and degree of autonomy and team performance mediated this relationship. As hypothesized, it was also found that the degree of Autonomy successfully mediated the relationship between Shared Leadership and Project Success. The study discussed in details the theoretical and managerial implications. The current research work delivers a theoretically useful framework for understanding the success and usefulness of shared leadership in software development project teams. Specifically, the current results recommend the importance of considering team performance and the appropriate degree of autonomy in relation (used as mediators) to shared leadership processes. The primary limitation of the current research work is that it focuses on the project environment in Pakistan and keeps only its national context in consideration. The results of this study should be taken with caution because it involves the responses from such respondents who are either working currently on software development projects or they have worked recently on such project as a project team member.

Keywords: Shared Leadership; Degree of autonomy; Team performance; Project success; Software Development Projects.

DEVELOPMENT OF A NATIONAL OPERATIONAL MODEL FOR BUSINESSES' IMPROVEMENT BASED ON ISO MANAGEMENT SYSTEM (IMS) STANDARDS CERTIFICATION IN PAKISTAN

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Abstract: This National Operational Model for Businesses' Improvement is based on the ISO Management System (IMS) Standard Certification. The model comprises 13 major factors (main business improvement areas) and 69 elements (sub-improvement areas). This model is the outcome of a mega national research project based on the analysis of secondary data collected from the world literature review in phase 1. This secondary data analysis provides convincing evidence that IMS standard certification has a positive impact on the performance of commercial businesses. In Phase 2, the national primary data was collected through a reliable and valid survey questionnaire from all chambers of commerce and industries of Pakistan. Multiple rigorous analysis tests were performed on this national data using various software tools to check and validate the comprehensive results. This primary data provides conclusive evidence that IMS standards certification significantly improves businesses' performance, thus supporting the conclusion drawn from secondary data analysis. In comparative performance analysis, the national primary empirical data shows that IMS standards-certified companies outperformed the non-IMS standards-certified companies in phase 3. The second vital outcome of the national-level research project. Consequently, it serves as convincing evidence for non-ISO-certified companies to go for IMS standards certification. Based on the secondary and primary data conclusion, an operation model was developed for businesses' improvement based on IMS standards certification for Pakistan. The overall conclusion is that implementing this national business improvement model based on IMS standards certification can contribute to the national GDP through prosperity, competitiveness, and survivability of the businesses.

Keywords: management standards, survey analysis, ISO, business performance, quality certification

UNLEASHING THE POTENTIAL: EXPLORING HOW PROTEAN CAREER ORIENTATION SHAPES ACADEMIC CAREER SUCCESS THROUGH THE MEDIATION OF PSYCHOLOGICAL CAPITAL

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Abstract: Most people seek success in their career due to the prominent role of career in shaping their lifestyle from the first day they started working with organization. However, some people feel unsuccessful in their career. Objective: Hence, the main purpose of this study is to investigate the mediating role of psychological capital (PsyCap) between protean career orientation (PCO) and career success. Method: Further, this study is quantitative in nature based on primary data which were collected from full-time lecturers teaching in Sudanese public universities. Out of the 250 self-administrated questionnaires, 209 were returned for final analysis. The data obtained were analysed by using the Smart-PLS 3.2.6 software techniques. Besides the context of this study, another uniqueness of this study was with the model in which career success was assessed as a formative construct. However, in the past studies, it was assessed as a reflective construct. Result: The findings indicated that PsyCap was not only an important predictor of career success in the academic atmosphere, but it also played a positive mediator between PCO and career success. The paper closed with implications and conclusion.

Keywords: Academics' career success, psychological capital, positive psychology, and protean career orientation

AN ASSESSMENT OF BANKS EFFICIENCY AND PERFORMANCE OF BANKING SECTOR OF PAKISTAN BY USING CAMELS RATING FRAMEWORK

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Abstract: A sound and well-functioning financial sector is considered necessary for the economic development and prosperity of a country. Banking industry serves as the backbone of the financial sector that accumulates saving from surplus economic units in the form of deposits and provides it to deficit economic units in the form of advances. Banking industry provides support to economy and industries in specific time of recessions and economic crisis. So, it is of great importance to intensely observe the performance of the banks and their obedience with the regulatory requirements. The core aim of research study was to fulfill the research objective that is “To evaluate the bank efficiency and performance of the banking sector in Pakistan by applying CAMELS approach”. To fulfill this research objective, researcher has employing two-pronged strategy: first, to analyze the soundness and financial strength of banking sector by using the CAMELS Rating framework and second, is to check the impact of CAMELS approach on banking sector performance in terms of Efficiency by formulating Regression equation. The Internationally accepted CAMELS framework is comprised of rating parameters used to access banking sector performance. It is used to evaluate the overall condition of the commercial banks operating in Pakistan and identify its financial, managerial and operational strength and weaknesses. It includes six important components which includes; Capital, Assets, Management, Earning, Liquidity and Sensitivity to market risk. Ratings is assigned to these components on the scale of 1 to 5 and that is a base for composite rating that also ranged from 1 to 5. For this purpose, those banks are included which are listed on Karachi Stock Exchange. It is observed that almost all large banks are on the top of the list that shows their better performance as compare to the small banks. The top 5 Banks are Meezan bank, NBP, MCB, HBL and UBL. These are nationalized banks of Pakistan except Meezan bank. Only one small bank that is JS Bank is included in top 10 banks. While the results of the OLS method based on CAMELS ratios has shown that asset quality, Earning and liquidity have significant predictability.

Keywords: Capital Assets Management Earning Liquidity Sensitivity (CAMELS) rating system, Efficiency Ratio, performance of Banks, Banking industry of Pakistan.

MATHEMATICS & COMPUTATION

UNSTEADY MAGNETOHYDRODYNAMIC CONVECTIVE FLUID FLOW OF OLDROYD-B MODEL CONSIDERING RAMPED WALL TEMPERATURE AND RAMPED WALL VELOCITY

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Abstract: This paper examines unsteady magnetohydrodynamic (MHD) convective fluid flow described by the Oldroyd-B model using ramped wall temperature and velocity simultaneously. The fluid flow is closed to an infinite vertical flat plate immersed through a porous medium. Laplace transformation is used to find solutions of momentum and energy equations. Afterwards, the Nusselt number and skin friction coefficient are obtained. A parametric study is performed to investigate the effects of ramped velocity and temperature (at wall) on the considered fluid flow model.

Keywords: Oldroyd-B fluid; porous medium; MHD; Laplace transform technique MSC: 76D03; 76S05; 76W05; 76M25

ON COMPUTATION OF MOPOLYNOMIAL AND TOPOLOGICAL INDICES OF MOBIUS OCTAGONAL NETWORKS

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Abstract: In this article, the focus is on computing the M-polynomial for three types of fractal networks: M'obius octagonal networks Q_n , linear octagonalquadrilateral networks $L_n^{8,4}$, and M'obius octagonal-quadrilateral network $Q_n^{8,4}$. The general form of the M-polynomials is utilized to calculate various degree-based topological indices for these networks. Additionally, graphical representations in both 2D and 3D are provided for the M-polynomial and certain topological indices of the specified networks.

Keywords: M-polynomial, Topological Index, Fractal M'obius Octagonal Networks, Fractal M'obius Octagonal-quadrilateral Networks

TOPOLOGICAL CHARACTERIZATION OF SILICON-CARBON MOLECULAR STRUCTURES WITH RESPECT TO NEIGHBORHOOD MOLECULAR DESCRIPTORS AND ENTROPY MEASURES

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Abstract: Graph theory is critical in the modeling and design of chemical networks. Physicochemical properties, chemical activity, thermodynamic properties as well as biological activity are all determined using graph theory in chemical applications. These properties can be described using molecular descriptors, which are graph invariants. A simple graph in which atoms indicate vertices and bonds indicate edges of underlying chemical structure is said to be molecular graph. The molecular descriptor is a number or a sequence that describes the chemical, physical, and biological elements of a network for a specific structure. QSPRs/ QSARs, which provide a perception into sentient effects based on chemical structures, are commonly studied using molecular descriptors. The graph entropies with molecular descriptors by Shannon's entropy notion become the information theoretic quantities for computing the structural information of chemical graphs and complicated networks. Entropy measures of graph are used in an extensive range of applications, including chemistry, biology, and discrete mathematics. This paper is composed of study of silicon carbide structures $Si_2C_3 - I[\bar{p}, q]$ and $Si_2C_3 - II[\bar{p}, q]$, and computation of some degree based novel molecular descriptors such as; Neighborhood version of hyper Zagreb index, Neighborhood Zagreb index, Neighborhood version of second Zagreb index, Neighborhood version of forgotten topological index and modified neighborhood version of forgotten topological index. Also we compute entropies of the above mentioned indices by making a relation of degree based molecular descriptors. We also compared the results both numerically and graphically for different values of \bar{p}, q for both structures.

Keywords: Graph theory, Molecular structures, Topological Indices

ENUMERATION OF SOME MOLECULAR DESCRIPTORS IN ZINC BASED METAL ORGANIC FRAMEWORKS (MOF)

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Abstract: Metal organic frameworks (MOFs) are special types of pliable chemical materials that have a significant amount of surface area, an unusual form, and a surprising amount of pore space. Metal ions and organic ligands make up their composition. MOFs play a vital role in a variety of processes, including heterogeneous catalysis, heterogeneous gas purification and division, environmental concerns, biocompatibility, toxicity, and biomedical applications. These structures have drawn attention of the researchers from all around the world as a result of their expanding use in many scientific fields. Zinc-based MOFs have a variety of uses in the biomedical industry, including drug delivery, biosensing, and cancer imaging, which has led to a recent increase in their popularity. A graph invariant called a topological index or molecular descriptor provides a numerical number to describe the structure of a graph. In this paper, two MOF networks are topologically modeled via connection numbers, and some novel molecular descriptors viz. AL1, AL2, AL3, AL4, AL5, AL6, AL7 and AL8 are computed for them. We also compared the results both numerically and graphically for both the networks. In order to investigate the prediction potential of these considered indices, we have tested them against the experimental physico-chemical properties of the Octane Isomers by correlating the experimental and computed values and developing linear regression models.

Keywords: Graph theory, AL indices, connection numbers, Metal Organic Frameworks

MOLECULAR TOPOLOGICAL MODELING OF TWO-DIMENSIONAL CORONENE FRACTALS STRUCTURES

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Abstract: The benzenoid compound known as coronene exhibits great potential for utilization in various domains, such as organic chemistry, materials science, and pharmaceuticals. This research work presents a thorough comprehension of the structural behavior of coronoid molecules, which belong to a particular type of fractal configuration named the Zigzag Hexagonal Coronene Fractal. To evaluate significant physicochemical properties, we utilize topological indices for different two-dimensional chemical structure networks or graphs. Analytical expressions are derived in this research based on a broad spectrum of connection numbers-based topological descriptors for molecules based on coronene, which can be utilized to calculate their physicochemical properties, such as entropy, the enthalpy of vaporization, boiling point, and the acentric factor. The findings of this research work provide a detailed understanding of the distribution patterns of vertices and edges within the molecule's skeleton, which might eventually lead to the development of high-quality nanomaterials with remarkable optical and electronic properties. Due to their potential for practical applications in these fields, these materials have attracted the attention of material scientists and synthetic organic chemists, making them a fascinating area for future exploration and development.

Keywords: Graph theory, Coronene Fractal Structures, Topological Indices

VARIOUS RESISTANCE DISTANCE INDICES OF BIPARTITE GRAPHS WITH RESPECT TO DIAMETER TWO AND THEIR SHARP BOUNDS

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Abstract: Graph theory plays vital role in modelling and design of variety of networks including electrical, chemical, social and computer networks. With electric networks being ubiquitous in our daily lives ranging from small integrated circuits to large scale power systems, they can easily be presented as graphs, where edges represent connections and vertices represent electric nodes. Resistance distance is concept developed from electric networks. Considering importance of resistance distance calculation in different circuits, in this paper we will consider one of the important types of graphs i.e bipartite graphs with diameter two and calculate their resistance distance indices (RDI). The term resistance distance is used because of physical interpretation, where each edge in a graph G assumed to have a unit resistor. This study includes determining the sharp upper and lower bounds of bipartite graph with given diameter. Basic concepts of graph theory and electric networks are used to obtain required results. We also introduced a new version of resistance distance based topological index named as multiplicative eccentric resistance Harary index and also calculated its bounds.

Keywords: Graph theory, Resistance distance, Bipartite graphs, electric circuits, Kirchhoff index

MATHEMATICAL MODEL OF SMOKING WITH HIGH-ORDER POLYNOMIAL PERTURBATION

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Abstract: Background: Everyone in the world is affected by the social habit of smoking because it is a global problem. It is a major cause of lungs and throat cancer, mouth cancer, heart attack, high blood pressure problems, bad breath, stained teeth, and infectious diseases like COVID-19. Typically, casual smoking occurs socially or to relieve stress. Several factors like peer pressure, fear of failure, and many other factors contribute to the development of smoking habits among university students. Identifying these factors is necessary to promote the discontinuous use of the habit and prevent the appearance of new smokers. This will enable the researchers to formulate policies, plans, and programs to control the development of new smokers. In this regard, many researchers considered mathematical models for describing various infectious diseases, including smoking but they have only discussed the deterministic approach to formulating a smoking model and did not discuss the stochastic behavior in their models. Objective: This study aims to examine the effects of the dynamic stochastic smoking model on smoking behavior. Methods: The principle of mass action is used to formulate the mathematical model in the form of ordinary differential equation. The existence and uniqueness of the model are also discussed. In order to determine a global threshold level of smoking, the persistence ($R_0^S > 0$) and extinction ($R_0^S < 0$) of the smoking model are examined. The numerical calculations are performed using Milstein's method as a means of supporting the reliability of the theoretical results. Result: As a result of these findings, it is found that intricate noise factors play a passive role in the temporary dynamics of the smoking model because of their complex nature. Conclusion: The stochastic model gives more realistic results as compared to the deterministic model.

Keywords: Smoking model, Stochastic model, General incidence, Stationarity, Ergodicity, and Extinction.

BIOCONVECTION FLOW OF A MICROPOLAR FLUID WITH HEAT AND MASS TRANSFER: A GENERALIZED MODEL WITH NON-SINGULAR AND NON-LOCAL KERNEL

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Abstract: Bioconvection flows occur in working fluids where the growth of microorganisms is subject to convective flows. Understanding the flow behavior of these fluids is important for many biological and environmental processes, such as the purification of water, drug delivery, and microbial ecology. In this paper, the bioconvection flow of a micropolar fluid with heat and mass transfer over a vertical flat plate is considered. The problem is formulated in terms of partial differential equations and then extended to a non-integer order Atangana-Baleanu (ABC) derivatives approach with a non-singular and non-local kernel allowing for the memory effects of the system. The exact solutions are obtained using the Laplace transform technique, satisfying the governing equations and imposed boundary and initial conditions. The present obtained general solutions are shown graphically. The magnitude of the resistance to flow is higher in the case of a micropolar fluid than that in the case of a Newtonian fluid. **RESULTS:** The results show that in modeling the thermal boundary layer flow when both the viscosity and thermal conductivity are temperature dependent, the Prandtl number must be treated as a variable to obtain realistic results. As the thermal conductivity parameter increases, it promotes higher velocities and higher temperatures in the respective boundary layers. Engineering interest quantities are also calculated and shown in tabular form.

Keywords: Micropolar fluid, Bioconvection, Heat and Mass transfer, Fractional model

EXACT SOLUTIONS FOR TWO-DIMENSIONAL SECOND-GRADE FLUID FLOW IN A CHANNEL: A FRACTIONAL MODEL WITH NON-SINGULAR KERNEL

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Abstract: Background: In the two-dimensional flow (TDF) of a fluid, the flow characteristics are the function of time and two rectangular space coordinates . To deal with TDF problems, especially via exact analysis, is of course a challenging task due to complex mathematics calculations. This difficulty further increases if TDF is considered with heat and mass transfer. Various researchers studied two dimensional flow of second grade fluid in different aspects but there is no such study in which they consider heat and mass transfer. Aims/ Objective: The two dimensional MHD free convection flow of second grade fluid is considered between two parallel plates in this study. The conjugate effect of heat and mass transfer on flow in a porous media is also taken into account. Results: It is evident from the results that velocity is decreasing with the increasing values of the Hartmann number and shows a converse behavior for the porous media parameter. An important parameter in this study is the fractional parameter, which the non-integer order of the derivatives, the velocity shows variations for different values of this parameter which is termed as a memory effect of the fluid flow. Method: The concept of Caputo-Fabrizio fractional derivatives is used to fractionalize the non-dimensional model. The obtained fractional partial differential equations are solved simultaneously using the Laplace and Fourier sine transforms jointly and are presented in terms of fractional functions. The obtained results are plotted using the computational software and the effect of various embedded parameters are shown.

Keywords: Two-Dimensional Flow; Second-grade fluid; Caputo-Fabrizio Fractional Derivatives; Exact solutions; Heat and Mass Transfer; Special Functions.

MAGNETOHYDRODYNAMIC FREE CONVECTION FLOW OF VISCOELASTIC DUSTY NANOFLUIDS BETWEEN ROTATING POROUS PLATES

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Abstract: The aim of the present study is to report the results associated with the Couette flow of viscoelastic rotating dusty nanofluids between rotating porous plates. Due to rotation, the nanofluid and dust particles have complex velocities, which is the sum of primary velocity and secondary velocity. Furthermore, in this study, transformer oil is taken as a base fluid due to its enormous applications in power engineering and industrial sciences. Transformer is one of the crucial element that requires high-level condition monitoring to ensure continuous power supply. Therefore, an effort is made to improve the critical features of the transformer oil by suspending Nanodiamond and Aluminium oxide nanoparticles. The governing equations for the above flow regime is modeled and formulated in terms of partial differential equations. The non-dimensional partial differential equations are then solved by using the Poincare-Light Hill technique. The impact of different parameters on the temperature and velocity profiles are shown graphically. Skin friction and Nusselt number are calculated and presented in a tabular form. The velocity of nanofluid is shown to decrease with increasing magnetic field and suction parameter. It is worth noted that the heat transfer rate of Transformer oil is enhanced by for nanoparticles and for Nanodiamond particles, when the volume fraction of and Nanodiamond nanoparticles is raised from to

Keywords: Dusty fluids, suction and injection, nanoparticles, Transformer oil, Aluminium oxide, Nanodiamond, Light Hill technique.

AN ANALYSIS OF BLOOD FLOW IN A VERTICAL CYLINDER WITH MAGNETIC PARTICLES AND HEAT TRANSFER USING TIME FRACTIONAL ANALYSIS: APPLICATIONS IN HEALTH SCIENCES

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Abstract: Many researchers have begun using magnetic particles for medical applications in recent years. It's because magnetic particles have special properties. The researchers have applied them for different medical techniques, including MRI, drug delivery, and hypothermia. A cylindrical domain along with magnetic particles is studied in this article in order to investigate the flow of blood in that domain. Further, the magnetic field is perpendicular to the flow of blood. Free convection is the cause of the blood flow and the gradient of external pressure is the reason for the blood flow. Using classical order PDEs, the problem has been modeled as a dynamical system. A dimensionless model can be obtained by applying suitable dimensionless variables to the derived model first and then fractionalizing it using the Caputo fractional derivatives after converting the derived model into a dimensionless model. It is used Stefest's algorithm to compute the inverse Laplace transform. Different parameters, such as Grashof number, time relaxation, fractional parameter, and magnetic field, are shown graphically. Increases in the Grashof number are associated with an increase in the velocity profile, while the magnetic parameter the blood velocity, and the particle velocity are correlated with a decrease in the velocity profile. It appears that using a magnetic field during surgery can be helpful for controlling blood flow. It is also observed that adjusting the relaxation time parameter may also be helpful to avoid tissue damage during surgeries.

Keywords: Maxwell fluid; Magnetic field; Two-Phase Flow; Magnetic particles; Heat transfer.

BACKWARD BIFURCATION OF MATHEMATICAL MODEL FOR PSITTACOSIS IN HUMAN AND POULTRY WITH VACCINATION

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Abstract: Humans are commonly infected with Psittacosis through pet birds, ducks, and turkeys, which has been associated with poultry. Psittacosis disease is an endemic disease. Psittacosis disease continuously causes outbreaks in different countries like Japan in 2001, Netherlands in 2007, Sweden in 2013, New South Wales in 2014 etc. This not only effect the poultry population but also human population. We originate and investigate a deterministic epidemiological model explaining Psittacosis infection transmission dynamics between humans and poultry, along with vaccine effects on humans. Disease modeling is carried out using ordinary differential equations (ODEs). Next-generation matrix methods is used to calculate the reproduction number, which is entirely dependent on parameters related to human populations. Stability analysis of both the disease free equilibrium and the endemic equilibrium are conducted. The analysis reveals that the model exhibits the phenomenon of backward bifurcation, where a stable disease free equilibrium coexists with a stable endemic equilibrium when the reproduction number is less than unity. The more sensitive parameters are found to be responsible for the further propagation of Psittacosis disease while the less sensitive parameters rarely contribute to the spread. Using the model, numerical simulation shows that vaccination results in effective disease control and infection is reduced when the recovery rate increases.

Keywords: Mathematical modelling, Sensitivity Analysis, Stability Analysis, Reproduction Number, Numerical Simulation

UNSTEADY HYDROMAGNETIC FLOW OF VISCOUS FLUID WITH HEAT AND MASS TRANSFER IN A ROTATING FRAME: A TIME- FRACTIONAL MODEL

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Abstract: The current paper aims to explore the unsteady hydromagnetic free stream fluctuating flow of a Newtonian viscous fluid that conducts electrically in a rotating media. The effects of chemical reactions and absorption of heat are also considered in this work. The governing equations of the model are expressed in terms of partial differential equations. The equations are made dimensionless by using proper dimensionless variables. The exact solutions for the dimensionless velocity, temperature, and concentration profiles are acquired by utilizing Laplace Transformation. Distinct parameters' effects are displayed graphically and discussed as well. Their influence has been portrayed in the table and also discussed. It has been noticed that for a more significant value of Hall current, the primary velocity falls near the plate and increases as the fluid goes far from it.

Keywords: MHD, Hall Effect, Heat and Mass Transfer, Caputo-Fabrizio derivative, Heat Absorption, Chemical Reaction.

A MODIFIED TIME FRACTIONAL MODEL OF ELECTRO-OSMOTIC FLOW OF COUPLE STRESS FLUID IN A CHANNEL

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Abstract: Couple Stress Fluid (CSF) is the non-Newtonian fluid includes a new material constant responsible for couple stress and the lubricant viscosity. This material constant comes with the 4th order spatial derivative term, and due to this higher order derivative term in the momentum equation, this fluid (CSF) is comparatively less investigated even in terms of classical derivative. Furthermore this fluid has many applications in industries such as synthesis of lubricants and solidification of liquid crystals. Objectives: This research aims to study the fractional model of CSF, based on the modified Atangana–Baleanu fractional derivatives. MABC definition is a new definition and very rarely used in literature. CSF with the impact of electro-osmosis is allowed to flow between two vertical parallel plates one of which is moving with constant velocity. The external pressure gradient is also applied. This type of flow situations is usually called as generalized Couette flow. Method: More precisely the above flow regime is first formulated in classical (PDEs) and then non dimensionalized using suitable dimensionless variables. The non-dimensional PDEs are then fractionalized using modified definition of ABC derivative. Exact solutions to the problem are obtained using the joint application of Laplace and finite Fourier sine transforms. The obtained results are shown graphically for various parameters on velocity and temperature profiles. Result: It is observed that by increasing the electro-osmotic parameter the fluid velocity also increases. Results of engineering interest quantities skin friction and Nusselt number are also calculated numerically and shown in tabular form. Conclusion: Fractional model is more realistic as compare to classical model.

Keywords: couple stress fluid , electro-osmotic flow parameter, modified Atangana-Baleanu Caputo fractional derivative,

ROTATING FLOW OVER A VERTICAL RIGA PLATE WITH RAMPED HEATING: APPLICATIONS IN TRANSFORMER OIL

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Abstract: Electromagnetohydrodynamic flows of Casson nanofluid with ramped wall temperature along a vertical Riga plate in a rotating frame are examined in the present study. Nanofluids are crucial in the rate of heat transfer. In the current study, transformer oil is used as the base fluid due to its extensive applications in engineering. A graphene nanoparticle is added to the transformer oil base fluid in order to increase the rate of heat transfer. Moreover, this study takes into account the impacts of radiation, chemical reactions, and porous media. The current flow regime is described by a set of partial differential equations. A system of equations with boundary conditions can be simplified by using variables with no dimensions. Temperature, concentration, and velocity distributions are computed using the Laplace transform method. This paper presents a physical discussion and graphic representations of how different physical parameters affect velocity, temperature, and concentration profiles. Based on the findings, 4% graphene nanoparticles significantly improve the rate of heat transfer from transform oil to 7.88% in the case of ramped wall temperatures (RWT) and 7.88% in the case of isothermal wall temperatures (IWT). By increasing thermal conductivity and oxidation resistance in the transformer oil, graphene nanoparticles extend the lifetime of transformers, ultimately resulting in a better heat dissipation and decreased degradation. Keywords Casson fluid, EMHD, Thermal radiation, Chemical species, Porous Media, Exact Solution

Keywords: Casson fluid , EMHD, thermal radiation, porous medium, chemical species, exact solution

EXACT SOLUTIONS FOR THE FLOW OF TIME FRACTIONAL MODE OF TERNARY NANOFLUIDS : APPLICATIONS IN CEMENTITIOUS MATERIALS

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Abstract: Concrete reinforced with steel has made remarkable progress in the construction industry since it was introduced as a structural material. By adding nanoparticles, cementitious materials become self-healing, more durable, stronger, easy to clean, rapid compaction and fire-proof. Nano-titanium dioxide, nano-alumina, nano-clay, nano-zinc oxide, nano-titania nanotubes (TNT's), and nano-magnesium oxide are some of the nanoparticles that could be used to accomplish these tasks. This paper examines the mathematical problem, modeled for ternary nanofluids, generalized by means of Caputo-Fabrizio time fractional derivatives, and its theoretical applications in cementitious materials. The problem is solved using the Laplace transform. Graphene, silver, and copper nanoparticles are added to water (base fluid) to increase the binding strength of cement. Moreover, the effect of velocity, temperature, and concentration profiles shows variation, which is called the memory effect. It has been shown that adding silver, graphene, and copper nanoparticles to cement can enhance its binding strength. In addition, different effects related to graphene, silver, and copper nanoparticles are discussed. Different embedded parameters are graphically represented and discussed.

Keywords: Ternary nanofluid; Cementitious material; Binding strength; Time fractional model; Exact solutions

TIME FRACTIONAL ANALYSIS OF UNIORT PHENOMENA BASED ON CHEMICAL KINETICS

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Abstract: In the fields of biotechnology and bioengineering, mathematical modelling is an essential instrument for research and development. Knowledge of the kinetic characteristics of the enzymes involved in specific processes is required to construct kinetic models of biochemical networks. This research aims to understand the kinetics of uniport transport through a live cell's cell membrane. This phenomenon is modeled in terms of classical ordered coupled non-linear ODEs under the law of mass action. Then the classical model is generalized with Caputo fractional derivative. The graphical solutions are achieved via a numerical scheme, and the simulations for the model are carried out through the computational software MATLAB. The effect of a fractional parameter is shown for the concentration of different species. Additionally, the impact of different forward and backward reaction rates is also shown through different graphs and discussed in detail. It is noticed that forward rates speed up the reaction while backward rates slow down the phenomenon and take more time to vanish. It is concluded from the present research that a lack of carrier protein slow down the transport of substrate through the cell membrane of the living cell.

Keywords: Uniport phenomena; chemical kinetics; Caputo fractional derivative; numerical solutions

EFFECTS OF SOLAR THERMAL RADIATION ON THE MHD THREE-DIMENSIONAL FILM FLOW OF MAXWELL HYBRID NANOFLUID OVER AN INCLINED SWIRLING DISK WITH CHEMICAL REACTION

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Abstract: In the present age, energy resources are an important ingredient of the economic development of any developing country. On the other hand, fossil fuels that meet a large proportion of the world's energy requirements are depleting over time. Solar energy systems play an important role in the production of renewable energy that converts solar energy into useful energy. Despite its high operating cost, solar energy is the best option in terms of its environmental protection and future provision. Due to its increasing demand, this article investigates the effects of solar radiation, heat sources, and chemical reactions on the three-dimensional film flow of Maxwell hybrid nanofluids over an inclined spinning disk in terms of heat and mass transport. The hybrid nanofluid comprised of graphene oxide and copper particles mixed with pure water. The film flow in a rotating inclined frame is elucidated by a mathematical structure involving nonlinear partial differential equations. These equations are reduced to a more simplified form using similarity variables that result in a system of nonlinear ordinary differential equations. In fact, it is tedious or impossible to find analytical solutions for a system of nonlinear ODEs. To this end, we have exploited a robust numerical scheme namely Runge-Kutta-Fehlberg's fourth-fifth order (RKF-45) with a shooting frame in MATLAB to solve the proposed flow problem in a rotating system. The surrogate model is used in various scenarios, to evaluate the effects of different physical parameters on the film flow profiles. Additionally, the solution is supported by comparing the outcomes with those available in the literature. For further precision, the solution is also compared using a built-in function in MATLAB (BVP4C).

MATHEMATICAL MODELING AND OPTIMAL CONTROL OF CORRUPTION DYNAMICS: A FRACTIONAL APPROACH WITH JURY INFLUENCE

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Abstract: A global issue of corruption affects many countries in which citizens lose their rights, the community's confidence in government authorities is diminished, there is a lack of peace and security, resources are misallocated, and employment is terminated due to corruption. Although many countries have attempted to control corruption through various measures, the problem persists. In this research article, the authors propose and analyze a compartmental mathematical model of corruption transmission called the model. The model divides the population into five compartments based on their natural features and tracks the transmission dynamics of corruption within and between these compartments. The next-generation technique is used to find reproduction number. The authors investigate the stability of the model by analyzing its behavior at the corruption-free and endemic equilibrium points. They find that the model is locally and globally asymptotically stable at the corruption-free equilibrium point when the basic reproduction number, and at the endemic equilibrium point when. Lastly, a numerical solution is found for the AB fractional model. Numerous graphs are plotted to illustrate how various embedded parameters affect the model, such as fractional parameter. Then, the model was extended to optimal control, and some numerical simulations with and without optimal control are also performed to verify the theoretical analysis using MATLAB.

Keywords: Mathematical model, Transmission dynamics, AB fractional derivative, sensitivity analysis, Optimal control strategies, Numerical simulations

ENHANCING MEDICAL ULTRASOUND IMAGING THROUGH FRACTIONAL MATHEMATICAL MODELING OF ULTRASOUND BUBBLE DYNAMICS

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Abstract: Background: The classical mathematical modeling of ultrasound acoustic bubble is so far using to improve the medical imaging quality. A clear and visible medical ultrasound image relies on bubble's diameter, wavelength and intensity of the scattered sound. A bubble with diameter much smaller than the sound wavelength is regarded as highly efficient source of sound scattering. Objectives: The dynamical equation for a medical ultrasound bubble is primarily modeled in classical integer-order differential equation. Method: Then a reduction of order technique is used to convert the modeled dynamic equation for the bubble surface into a system of incommensurate fractional-orders. The incommensurate fractional-order values are calculated directly, by using Riemann stability region. Results: On the basis of stability, the convergence and accuracy of the numerical scheme is also discussed in detail. It has been found that the system will remain stable and chaotic for the incommensurate values $\alpha_1 < 0.739$ and $\alpha_2 < 2.80$, respectively.

Keywords: Acoustic, Stability analysis, Chaos, Incommensurate fractional-orders, Synchronization, Constant ultrasonic speed

MULTIDIMENSIONAL HYDROMAGNETIC FLOW OVER A CURVED STRETCHED SURFACE

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Abstract: Background: This present work is concerned with the viscous fluid flow over a curved stretching sheet. Curved stretching surfaces are used in industries for molding ceramics and polymer sheets. Aims And Objectives: A two-dimensional variable magnetic field is applied on curved linearly stretched surface. For this purpose the conventional Navier Stokes equations of fluid dynamics are coupled with Maxwell equations related with magnetic strength dynamics. Method: The modeled system, in the form of partial differential equations (PDEs), is transformed into a system of ordinary differential equations (ODEs) through a suitable transformation. The numerical solution of the transformed system of (ODEs) is obtained by using parametric continuation method (PCM). For the validity of the present scheme, the numerical results are compared with the results of bvp4c MATLAB package. It seems that both the numerical results are in a very good agreement with each other. Results: The physical quantities of interest like the fluid velocity, skin friction coefficient and magnetic skin depth are obtained and discussed under the influence of dimensionless curvature and magnetic parameter. Conclusion: It has been observed that turbulence effect in the velocity is controlled by increasing magnetic strength.

Keywords: Navier Stokes Equations, Maxwell equation, Magnetic strength, bachelor number

ATANGANA-BALEANU FRACTIONAL MODEL OF CASSON FLUID WITH WO₃ NANOPARTICLES: APPLICATIONS IN TRANSFORMER OIL

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Abstract: Power transformers show important part in power and electrical activities and enhancing its efficiency is essential. The heat produced in different parts of the oil based transformers is a vital problem to report. Temperature growth is a complex engineering problem that occurs due to rough distribution of initial oil flow because of convective heat transfer. This heat growth can be reduced by adding some well-known nanoparticles in the based oil. The causal fluids having dispersed nanoparticles are said to be nanofluids. In this article Casson fluid is considered as Transformer base oil. It is observed that by adding WO₃ nanoparticles in transformers based oil thermal performance of the transformers have been improved up to 4% as compared to transformer oil without nanofluid. Analysis of well-known fractional derivative Atangana-Baleanu has been made also, closed form solutions are acquired by means of the Laplace and Hankel transforms and discussed graphically and the impact of appropriate parameters on velocity field is shown in plots and examined.

Keywords: Casson fluid, Nanoparticles, Laplace and Hankel transform,

STOKE'S FIRST PROBLEM FOR CASSON FLUID BETWEEN TWO SIDE WALLS OVER AN INFINITE PLATE

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Abstract: Many researchers studied the Casson fluid and obtained the solutions by using exact analytical methods or numerical methods under different boundary conditions. After a thorough review of the related literature, there have been no investigations on the effect of side walls on Casson fluid when the velocity is given on the boundary. 2. In this article, the unsteady flow of Casson fluid between two side walls normal to the plate is studied by using Fourier finite and infinite sine transform techniques. The bottom plate was subjected to impulsive motion to the fluid at the time Exact solutions have been established, which satisfy the governing equation and appropriate boundary and initial conditions. The obtained results are reduced to those solutions consequent to the flow over an infinite plate, when and Newtonian fluid by making Casson parameter Keeping in view the measure velocity value and shear stress in the middle of the channel, being not to be affected due to side walls, the required time to attain the steady-state and the distance between the side walls in such conditions is calculated graphically.

Keywords: Side walls, Stokes first problem, Casson fluid, Exact solutions.

THE MATHEMATICAL MODELLING OF A COMPUTER VIRUS PROPAGATION WITH STOCHASTIC PHENOMENON

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Abstract: A computer virus is a malicious program that copies itself and spreads throughout a computer network. As a result, files can be deleted, data corrupted, and personal information stolen from computer systems. There is a need to demonstrate the importance of identifying the threshold and implementing effective strategies to eliminate viruses from the network. Therefore, the present study aims to solve the above mentioned issue by providing a mathematical model. The analysis of this model will help to provide measures for improving the security and integrity of computer networks, safeguarding against cyber threats that could potentially harm individuals, businesses, and organizations. The model is derived in terms of ordinary differential equations. Furthermore, unlike the previous virus propagation models, the stochastic effect is considered in present model. The positivity and uniqueness of the model are checked, and the extinction and persistence theorems are proved using Ito's method. A threshold () determines the spread of a virus. If the threshold <1 , the virus will eventually disappear from the network. Conversely, if the threshold exceeds >1 , the virus will continue to persist in the network. For the numerical solution RK-4 method is used. The effect of various parameters on the virus propagation is shown through graphs. The results show that by decreasing the contact rate , the propagation of virus will be reduced, as shown in figure for the stability of the computer network. To show the graphical solution of deterministic and stochastic behavior in each figure. The stochastic model gives more realistic results as compared to the deterministic model.

Keywords: Computer malware, stochastic differential equations of white noise, stochastic runge-kutta scheme.

UNSTEADY AND INCOMPRESSIBLE MAGNETO-HYDRODYNAMICS BLOOD FLOW IN AN INCLINED CYLINDRICAL CHANNEL

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Abstract: In the current study, the blood flow through an inclined cylindrical tube subjected to an external magnetic field is evaluated. The blood flow has been considered under the consequences of a transverse magnetic field. Previously the mathematical model was solved by using caputo-fabrizio(CF) fractional order derivatives with a non-singular kernel which has the limitations like it fails to satisfy the fundamental theorem of fractional calculus. Whereas, in the present study Adomian Decomposition Method (ADM) which is suitable for all types of linear and non-linear differential equations is used. The flow of magnetized blood in an inclined cylindrical tube has been studied by using ADM. An external magnetic field and an oscillating pressure gradient drove the blood flow. ADM algorithm has been developed and used to find the Adomian solution. Computer software MATHEMATICA has been used to visualize the influence of various flow characteristics such as Hartmann number (Ha), different radial locations and angle of inclination on the Adomian velocity. Due to the Lorentz effect and central radial location, the results show that the magnetic field diminishes the velocities of blood. Meanwhile, progressive inclination angle enhanced the blood flow.

Keywords: MADM, ADM, MHD, MRI, LSM, GM, AB, VIM, FEM, HPM

EXACT ANALYSIS OF BLOOD FLOW WITH SYSTOLIC AND DIASTOLIC PRESSURE THROUGH A HEATED VERTICAL CYLINDER: A FRACTIONAL MODEL

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Abstract: This paper investigates the flow of blood under the action of magnetic field and systolic and diastolic pressure through oscillating vertical cylinder. The blood is considered as a second-grade fluid. The effect of temperature and concentration on the blood flow is also considered. The present blood flow regime is modelled in terms of partial differential equations. The classical partial differential equations are then fractionalized by using the definition of Caputo-Fabrizio. The solutions of momentum, energy, and concentration equations are obtained by the joint application of Laplace transform and Hankel transform. The effects of various dimensionless parameters such as thermal and mass Grashof numbers, Prandtl number, Hartman number, and fractional parameter on blood velocity, temperature, and concentration profiles are discussed. It is noticed that the blood flow retards for the increasing values of magnetic parameter and Prandtl. number.

Keywords: Heat transfer, Mass transfer, Integral transforms, Second-grade fluid, Caputo-Fabrizio

A TIME FRACTIONAL MODEL OF COUPLE STRESS CASSON FLUID BETWEEN TWO PARALLEL PLATES WITH HEAT AND MASS TRANSFER

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Abstract: This study investigates the flow of unsteady couple stress Casson fluids with heat and mass transfer between two parallel plates. More precisely, the objective of this thesis is threefold. Firstly, this study investigates the time fractional analysis of couple stress Casson fluid flow using modified Fick's and Fourier's laws. Secondly, the first problem is generalised by considering the porous medium and the variable temperature and concentration on the boundary. Thirdly, Considering the significance of nanoparticles, gold nanoparticles are introduced to the magnetised base fluid (blood), and isothermal and ramped wall conditions are imposed on temperature and concentration profiles. The physical regime for all the above three problems is expressed in terms of PDEs, and then suitable dimensionless variables are employed to obtain a system of non-dimensionalized PDEs. The Caputo time fractional derivatives are used to obtain the fractional model from the classical model using modified Fick's and Fourier's laws. All the above models are solved by the joint application of Laplace and finite Fourier sine integral transforms. In addition, limiting cases are developed by substituting the values of some embedded parameters equal to zero in the general solutions and comparing them with published work. The parametric influence of embedded parameters is expressed graphically and physically for all three profiles, i.e., temperature, concentration, and velocity. The results shows that the fluid's velocity is a decreasing function of the magnetic parameter and Schmidt number and an increasing function of the porosity parameter, thermal, and mass Grashof numbers. It is also worth noting that, unlike the classical model, the present study provides various solutions in the range of α in-between. $(0, 1]$, which might be useful for the experimental and numerical solvers to compare their results. Skin fraction, Sherwood, and Nusselt numbers are also calculated. The addition of nanoparticles increases the heat transfer rate of blood upto 36%, which is very effective in hyperemia treatment.

Keywords: Variable Temperature and Concentration, Porous Medium, Laplace and Fourier transforms, Fractional Derivative

FREE CONVECTION FLOW OF SECOND GRADE DUSTY FLUID BETWEEN TWO PARALLEL PLATES USING FICK'S AND FOURIER'S LAWS: A FRACTIONAL MODEL

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Abstract: Vegetable oils are currently being investigated as potential environmentally friendly sources for cutting and transformer insulation oils. Mineral oils are commonly used as cutting and transformer insulation fluids; however, their use comes with the potential for soil contamination. Vegetable oils could offer a more suitable alternative for these tasks, although advancements in their cooling and insulation capabilities are necessary. The objectives of this thesis are multifaceted. Firstly, it explores the natural convection flow of second-grade (SG) viscoelastic dusty fluid. Secondly, the study delves into the behaviour of the viscoelastic dusty fluid under variable temperature and concentration conditions, taking the particle energy equation into account. Thirdly, the research focuses on the viscoelastic nanofluid (palm oil) within a porous medium with suspended Al_2O_3 nanoparticles to enhance heat transfer for cutting applications. Lastly, the study examines hybridised nanofluid (palm oil) situated between inclined plates, subject to ramped wall conditions. The physical phenomena of the flow regime for all four of the above problems are modelled in terms of partial differential equations (PDEs). In contrast to previously published work, the governing equations of the fluid flow are transformed into a time-fractional model from their constitutive equations before dimensionalization. Caputo's definition is employed to fractionalize all the above problems with modified Fick's and Fourier's laws (FFL). The non-dimensional fractionalized equations are solved through the joint application of Laplace and Fourier sine transforms (LFFST). However, Zakian's numerical approach is employed to find the final solution. Furthermore, limiting cases are developed to validate the presented problems. The impact of different embedded physical parameters on the profiles of temperature, concentration, and velocity is calculated using Python software and visualised through graphs. Quantities of engineering interest, including skin friction, Nusselt number, and Sherwood number, are tabulated. Under the ramped-type temperature conditions, an increase in heat transfer rate of 31.05% was observed.

Keywords: second grade fluid, Fick's and Fourier laws; Laplace and finite Fourier sine transforms; transformer oil; Palm oil; hybrid NPs

PRABHAKAR FRACTIONAL APPROACH TO THE CONVECTIVE HEAT TRANSFER IN CASSON FLUID WITH GENERALIZED FOURIER'S LAW

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Abstract: The prime aim of the article is to analyze the influence of convective transfer of heat during the flow of Casson fluid flowing unsteadily, via a plate oscillating in its own plane with generalized shear stress and Fourier law. The generalized fractional model of the equations given in ordinary derivative is obtained by the utilization of the new Prabhakar fractional order derivative. The system of Partial Differential Equations which governs the velocity and temperature classes are changed into a system of linear ordinary differential equations by applying a specific integral transform i.e. the method of Laplace transform. The essential results of the Prabhakar fractional derivative, fractional model of the system and implementation procedure are explained briefly. The impacts of different parameters on the constituent equations of the problem are graphed to visualize the relation of the dimensionless parameters with the fluid's temperature and velocity. The heat transfer rate of the fluid decelerates with higher estimates of Prandtl number and fractional parameters of Prabhakar. The motion of fluid accelerates with higher estimates of the fractional parameters of Prabhakar and Grashof number Gr.

Keywords: Casson fluid, Prabhakar fractional approach, Laplace transform, exponential heating

TOPOLOGICAL INDICES FOR CERTAIN ANTI-TUMOR AND ANTI-COVID DRUG

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Abstract: The new coronavirus disease, COVID-19 pandemics devastated human life globally and brought about social and economic woes. More than 41.3 million individuals have been infected globally, and as of October 22, 2020, more than 1,133,000 people have died from this disease. Although there is no any perfect medicine discovered to cope with this pandemic, the medical practitioners tried their best to lower its effect by using some antibiotics like Hydroxychloroquine, Hyaluronic Acid-Curcumin Conjugates and Camptothecin-Polymer Conjugate IT-101. The physico-chemical properties of these antibiotics depend on their chemical/ molecular structure. Therefore, it is very important to predict the topology of these structures to well understand their properties. The subatomic structure of chemical substances, as well as, their mathematical model, is connected to chemical graph theory. On the other hand, the molecular descriptors predict chemical compounds' physical characteristics; they are also useful to study chemical structures to reveal their hidden topology. This access has been broadly applicable to the domains of healthcare, bioinformatics, and cheminformatics. Several qualities of matter and matter-energy such as, entropy, enthalpy, melting point of accumulation, and enthalpy of dehydration of chemical compounds can be computed with the aid of these topological indices. In this paper, we have computed the first Zagreb index, the forgotten topological index, and the modified version of forgotten topological index, the second Zagreb index and the Hyper Zagreb index of several chemical compounds which are used as anti-tumor and anti-covid drugs viz. Hydroxychloroquine, Hyaluronic Acid-Curcumin Conjugates and Camptothecin-Polymer Conjugate IT-101. These computed indices are useful to predict certain physical characteristics, like the common enthalpies of formation and vaporization.

Keywords: Graph theory, Topological indices, Molecular structure, Drugs

COMPARATIVE EFFICACY OF K-BANHATTI AND ZAGREB TYPE TOPOLOGICAL DESCRIPTORS IN QSPR ANALYSIS OF NOVEL ANTI-DIABETES DRUG MOLECULES THROUGH REGRESSION MODELS

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Abstract: The topological indices (TIs) offer quantitative structure information on medicinal compounds, which can be used to forecast or create correlations with the molecules' biological activity, physicochemical features, and toxicity. Through their assistance in the discovery and optimization of possible therapeutic candidates and their provision of efficient means for conducting experimental research, these studies play a significant role in the early stages of drug development. The use of topological indices and regression analysis can help us better understand drug behavior and contribute to the development of tailored drugs. The main focus of this study is to investigate the efficacy of K-Banhatti and Zagreb type degree based topological indices in QSPR analysis of a comprehensive set of medications used for diabetes type-I and type-II disease. The K-Banhatti and Zagreb type degree based topological indices are computed for 14 anti-diabetes drug molecules. By leveraging these topological indices, we developed QSPR regression models to predict the physicochemical properties of the understudy drugs. The results show that, these topological indices are highly correlated with the physicochemical properties of anti-diabetes drugs. Furthermore, the comparative analysis revealed that, for all the considered properties except enthalpy of vaporization, Zagreb type indices outperform K-Banhatti indices with high predictive ability. Hence it can be concluded that the Zagreb type indices are the best alternatives to theoretically predict the properties of anti-diabetes drugs. This theoretical analysis can help chemists in their right choice of the topological indices to predict the properties of anti-diabetes drugs without going into laborious experimentation, and can also help synthesizing new drugs. Keywords: Graph theory, Drugs, Topological Indices, QSPR analysis

Keywords: Graph theory, Drugs, Topological Indices, QSPR analysis

COMPUTATIONAL ASPECTS OF IMPORTANT BIOCHEMICAL NETWORKS , HYPERTREE AND ITS CORONA PRODUCT WITH RESPECT TO SOME NOVEL ECCENTRIC AND DEGREE BASED MOLECULAR DESCRIPTORS

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Abstract: Hypertree has a great importance in biochemical networks for growth of microorganism, such as bacteria and viruses. Quantitative structure-activity relationship (QSAR) represents quantitative correlation of biochemical structural features called as molecular descriptors and pharmacological activity as response endpoints. Topological index is a molecular descriptor extensively used to study QSAR of pharmaceutical to assess their molecular characteristics by numerical computation. Meanwhile, the topological indices are numerical functions which are used to predict the growth rate of such microorganisms. Theoretical assessment of microorganism, such as bacteria and viruses help to expedite the vaccine design and discovery process by rationalizing the lead identification, lead optimization and understanding their mechanism of actions. In this article, some novel eccentric and degree based topological features of two important biochemical networks (hypertree and it's corona product) are obtained on h-level and derived formulas for them. Based on the obtained topological features, the biochemical properties of these networks are investigated.

Keywords: Biochemical networks, Hypertree, Corona product, Topological feature

STUDY OF ANISOTROPIC COMPACT STELLAR STRUCTURES IN MODIFIED GENERAL THEORY OF RELATIVITY

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Abstract: This talk is based on the comprehensive study of compact stellar objects filled with anisotropic matter in the context of modified gravity. The generalization of general relativity allows the presence of non-linear terms in the action of functional theory. We proceed with our work by considering the static spherically symmetric spacetime in the interior and the static spherically symmetric metric in the exterior regions of the star. Further, we use the physically viable non-singular solutions to examine the configuration of static spherically symmetric structures. The values of unknown constants in the metric potentials are determined through matching conditions of the interior and exterior spacetimes. We investigate the graphical behavior of various physical quantities to determine the viability of compact stars. Moreover, the stability of the proposed compact stars is investigated through different methods. It is found that the compact stars studied in this theory are viable and stable, as all the required conditions are satisfied.

Keywords: Modified Gravitational theory; Compact Objects; Viability Conditions and Stability Analysis

COUETTE FLOW OF VISCOELASTIC DUSTY FLUID PASSED A POROUS OSCILLATING PLATE IN A ROTATING FRAME ALONG WITH HEAT TRANSFER

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Abstract: This investigation is performed to study the effect of suction/injection on Couette flow of dusty viscoelastic fluid passed over the porous oscillating vertical plate in a rotating frame. The influence of heat transfer is also considered. Usually, suction/blowing is used to control the fluid flow in the channel that's why this worth noting effect is considered. The fluid velocity is considered along the x-axis due to the oscillations of the right plate. The thermal effect on the flow due to the heated right plate is also considered. The fluid and dust particles have complex velocities as a result of the rotation, which are the sum of primary and secondary velocities. To, convert the aforementioned physical phenomenon into mathematical form, partial differential equations are used for modeling the subject flow regime. Appropriate nondimensional variables are employed to non-dimensionalize the system of governing equations. With the assistance of assumed periodic solutions, the system of partial differential equations is reduced to a system of ordinary differential equations which is then solved by the perturb solution utilizing Poincare-Lighthill perturbation techniques. The engineering interest quantities, the Nusselt number, and skin friction are also determined. The impact of various parameters on skin friction, viscoelastic fluid, and dust particle velocity profiles is also investigated. On both the velocity and temperature distributions, the effect of uniform suction/injection is investigated. It is worth mentioning that suction controls the boundary layer to grow unexpectedly even in the resonance case. The obtained solution is also valid in the case of injection.

Keywords: Couette flow, Two-Phase MHD flow, Porous Plates, Poincare-Lighthill Perturbation Technique.

FREE CONVECTION MHD FLOW OF FRACTIONAL NANOFLUIDS THROUGH A POROUS MEDIUM WITH UNIFORM HEAT SOURCE AND HEAT FLUX

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Abstract: Muhammad Adnan, Sami Ul Haq, Asad Khan* Department of Mathematics, Islamia College Peshawar, Peshawar 25000, Khyber Pakhtunkhwa, Pakistan. *Corresponding author email: asadkhan.mathicp@gmail.com Abstract In this article, the free convection flow of nanofluids taking into consideration the MHD effect over a vertical infinite plate and through a porous medium is examined. The ambient external agent did not affect the system, i.e., the heat source is uniform and constant. Boussinesq approximation, momentum, and continuity equations formulate the governing equations. The developed governing equations are solved with the use of the Caputo-Fabrizio fractional operator and the technique of Laplace. Nanofluids' velocity and temperature are set in precise form. Such solutions fulfill all initial and boundary requirements. The impact of fractional parameters on heat transmission and fluid movement is highlighted and debated graphically. Compared to ordinary nanofluids, the increase in heat transfer in these flows for fractional nanofluids is greater. In addition, using fractional models, we can select the fractional parameters to achieve a good consensus on both experimental and theoretical findings. The results obtained are represented in terms of physical parameters to give physical significance to the provided governing equations. Moreover, when the strength of the magnetic field and the permeability of the porous medium number turn zero in this paper, the general solution obtained reduces the literature to special cases.

Keywords: Porosity, MHD, Laplace transformation, Nanofluids, Caputo-Fabrizio.

Topological Aspects and Statistical Evaluation of Molecular Structures with Applications in the Treatment of Breast Cancer

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Abstract: Research is continuously being pursued to treat cancer patients and prevent the disease by developing new medicines. However, experimental drug design and development is a costly, time-consuming, and challenging process. Alternatively, computational and mathematical techniques play an important role in optimally achieving this goal. Among these mathematical techniques, topological indices (TIs) have many applications in the drugs used for the treatment of breast cancer. TIs can be utilized to forecast the effectiveness of drugs by providing molecular structure information and related properties of the drugs. One can easily identify the most effective drugs for treatment through an in-depth investigation of the degree-based TIs. In addition, these can assist in the design and discovery of new drugs by providing insights into the structure-property/ structure-activity relationships. In this article, a Quantitative Structure-Property Relationship (QSPR) analysis is carried out using some novel degree-based molecular descriptors and regression models to predict various properties (such as boiling point, melting point, enthalpy, flashpoint, molar refraction, molar volume, and polarizability) of 14 drugs used for the breast cancer treatment. The molecular structures of these drugs are topologically modeled through vertex and edge partitioning techniques of graph theory, and then linear regression models are developed to correlate the computed values with the experimental properties of the drugs to investigate the performance of TIs in predicting these properties. The results confirmed the potential of the considered topological indices as a tool for drug discovery and design in the field of breast cancer treatment.

Keywords: Graph theory, Molecular descriptor, QSPR analysis, regression models

EXPLORING PHYSICO-CHEMICAL PROPERTIES OF HIV/AIDS DRUGS USING NEIGHBORHOOD TOPOLOGICAL INDICES OF MOLECULAR GRAPHS

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Abstract: This study, investigates the efficacy of neighborhood degree-based topological indices in the modeling of drug properties pertinent to HIV/AIDS. By representing molecular structures as graphs, we delve deep into atom-level environments, uncovering intricate relationships between local topological attributes and theoretical characteristics. Through meticulous Quantitative Structure-Property Relationship (QSPR) analysis, we establish robust correlations between these indices and drug properties. This breakthrough augurs predictive insights in the realm of pharmaceutical research, reducing the need for exhaustive experimentation. Our research underscores the pivotal role played by neighborhood-degree-based topological indices in advancing drug discovery, offering a powerful tool that resonates with chemists and industry professionals. It marks a transformative step in the trajectory of pharmaceutical development, promising to redefine and enhance the future of drug design and innovation.

Keywords: Graph Theory, Neighbourhood polynomial

ENGLISH
&
APPLIED
LINGUISTICS/
SOCIAL SCIENCES

SALIENCE PATTERN IN THE SELECTED POEMS OF ESL TEXTBOOKS IN PAKISTAN: AN ECO LINGUISTIC PERSPECTIVE

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Abstract: The present research explores the salience pattern in the primary level English textbooks in Pakistan. The study employs one category of Stibbe's framework (2015) i.e. Salience pattern to five poems and concludes that nature is given salience or foregrounding through various linguistics techniques such as transitivity, personal pronouns, sense image and individualization. The finding reveal that the language used in the text help in the sustainability of natural environment as the text conveys a bio centric approach rather than an anthropocentric approach which focuses upon human's interest only. The text represents nature as an active being and describes its intrinsic worth and thus communicates a beneficial discourse. Hence, the text could encourage the young readers to take care of nature in their daily lives .The study recommended that the textbook writers should follow the Eco linguistics principles prior to design the English textbooks for students.

Keywords: Salience pattern, eco linguistics, transitivity, bio-centric approach, anthropocentric approach

ADVOCATE OF RACISM: AMERICAN NEWSPAPERS AND THE REPORTING OF BLACK MURDERS

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Abstract: The present study is a rigorous exploration of the inherent ideologies of newspaper discourse and the subjugation of readers to the said ideologies. The American newspapers: The New York Times, USA Today and Washington Post are used to select 30 articles, 10 per newspaper, for creating three corpora of 25,561 words in total. The software AntConc 3.5.9 is used to generate the wordlist, N-Grams and concords of the corpora. LancsBox 6.0 is used to annotate the corpora to mark it for all the parts of speech using Whelk. The articles collected are on incidents of black murders committed by white police officials in the years 2014-2021. These articles are analyzed in light of Critical Discourse Analysis and the Ideological Square Model proposed by Van Dijk in which he defines two distinctions “US” and “THEM” and how they are achieved through discourse. In the findings, it is uncovered that certain lexical items play a significant role in the construction of a desired discourse. These include nouns, verbs and adjectives. They abet the discourse in manipulation of the news. The deliberate omission of the ethnic identity of the victims in Washington Post and use of neutral verb “die” for naturalizing the crime makes it a racist and partial reporter of crimes, specifically black murders in white the perpetrators are white police officials. New York Times and USA Today incline more towards pro-black discourse.

Keywords: Corpus-based analysis, ideology, racism, CDA, ideological square

SOCIAL CONTEXT AS A SOURCE OF TEACHING-LEARNING PROCESS: A QUALITATIVE STUDY IN DISTRICT MOHMAND KHYBER PAKHTUNKHWA, PAKISTAN

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Abstract: Social interaction exerts an immense impact on the process of teaching and learning. A student cannot educationally survive in a social vacuum. The holistic and overall development can only occur in a vital and potent social environment. This qualitative study aimed to investigate how social context affects the overall development of students. This study highlighted the role of teachers and peers in the classroom, as well as the role of society outside the school, in fostering the learning and socialization process of the students. A case study as a method of inquiry was employed to gain an in-depth understanding of the problem. The purposive sampling technique was used for the collection of data through semi-structured interviews. The total number of respondents was fifteen; five teachers who were well versed in the field of education and social work, and ten students who were the topper of five public sector schools in the Secondary School Certificate (SSC) examination, 2022. The collected data was properly reduced by elimination of redundancy and thematically analyzed. This study revealed that society has have the grave effects on the socialization of the students. The interaction of teachers, their teaching techniques, their cooperative behavior, the impact of ICT on students, proper utilization of leisure time, and morality as a master value were revealed by the teacher respondents of the study. The students' reflections were about their social ordeals, skills of social relation, learning disability, coping with stress, and some cooperation as well as some grievances from society. Deficient communication skills and negligent teaching practices can contribute to the expansion of learning disabilities in students within an oppressive classroom environment. The study recommends that home-school relationships and parental involvement should be given due importance.

Keywords: Mohmand, KP, Social Interaction, Students, Home-School Relationship

PUBLIC DISCOURSE AROUND TRANSGENDER: A MEDIA DISCOURSE ANALYSIS (A CASE STUDY OF GUL CHAHAT)

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Abstract: A variety of international and regional mechanisms guard the rights of transgender individuals. In addition, many incidents of extreme violence against transgender people reflect anger and aggression toward a group of people who do not adhere to traditional norms surrounding gender. The research focuses on a single example, that of Gul Chahat, a transgender individual, to achieve this purpose. This inquiry goes into the personal obstacles faced by Gul Chahat, who transitioned from being seen as a woman to being seen as a male to acquire male characteristics (Muawiyah, Dressing Sense, Dominant tone). The data being analyzed is sourced from Facebook and is divided into two categories: Gul Chahat's Personal Issues and Social Media Reactions to the videos she published on her Facebook account. These films serve as the study material. The current study illustrates the particular obstacles faced by the transgender community in Pakistan's KP province, highlighting the importance of addressing these issues in order to ensure their constitutional and legal rights. Gul Chahat's videos bring light on many narratives prevalent in Pakistan, notably in KP. In conclusion, while many people may not quickly accept her based on her previous videos, a few viewers express significant support for the themes discussed by Chahat.

Keywords: Transgender, Facebook, Viewer's responses, Gul Chahat

THE FIGURES OF SPEECH IN TWENTY PAKISTANI PRINT ADVERTISEMENTS

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Abstract: The current paper bases the research upon the twelve figures of speech based on Perrine's theory (1969), namely: metaphor, simile, personification, synecdoche, metonymy, symbol, allegory, overstatement, apostrophe, paradox, understatement, verbal irony. This research paper is conducted by applying the qualitative and quantitative methodology. The researcher took twenty Pakistani print advertisements randomly from different media like electronic newspapers, TV channels and magazines. The result shows that there are only six figures of speech used in the print advertisements, they are: hyperbole, metaphor, personification, apostrophe, simile and synecdoche. The most dominant and frequently occurred figure of speech is hyperbole among the given twenty advertisements. This dominance in certain figures of speech always occurs to attract customers as well as audience towards the product.

Keywords: Advertisement, figures of speech, functions of figures of speech

GENDERLECT OF TRANSGENDER: CONVERSATIONAL ANALYSIS

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Abstract: The primary goal of this research project is to differentiate genderlect of man and woman over transgender. For this purpose eighteen interviews of transgender were analyzed under the light of six set of features given in the theory of genderlect by Debora Tannen (1990). Language of transgender was examine keeping all the features in mind. It was found that not only those features stated by Tannen are present in the language of transgender but also some other features were discovered. Therefore, the work adds to the evaluative understanding of the language of transgender people. It sums up that how the language of transgender people is different from the language of other genders. And what where the new things which transgender people have in their language.

Keywords: Genderlect, transgender, features, A1-A8, Z1-Z, reasons, conversational analysis.

REPRESENTATION OF VISUAL GRAMMAR IN POLITICAL CARICATURES: THE CASE OF PAKISTAN DEMOCRATIC MOVEMENT

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Abstract: Caricatures are considered as a mean of communication in a humorous or satirical way. In the contemporary times, they have become a part of print media more specifically newspapers. The reason behind drawing these editorial cartoons or caricatures is to convey a message to the audience in a humorous way. The present study aims to find out the representation of visual grammar in political caricatures related to PDM (Pakistan Democratic Movement) started in February 2022 and ended in June 2022. The aim of the study is to highlight the relation between socio-semiotics and computational graphics that convey meaningful picture for its effectiveness. For the analyses the study employs Visual Grammar as a framework given by Kress and Leeuwen in 2006 which makes it qualitative in nature. The data is collected through purposive sampling. The result of the study shows that caricatures follows all the metafunctions given by Kress and Leeuwen through the characters and their relation with the sociosemantics which cannot necessarily be the part of cartoons. The study emphasis on the computational graphics in terms of their facial features through one identifies the character and representation of political condition during PDM. The study reveals that all the characters represented in the selected caricatures present the desired representational, interactional and compositional meanings. All meta-functions are used for a specific purpose: Representational meaning focuses on the representation of Pakistan Democratic Movement through characters while interactional meaning bridges the concept and readers interpretation through images. Moreover, compositional meaning is referred as the arrangement of linguistic and non-linguistic features in an image.

Keywords: Semantics, Pakistan Democratic Movement, Political Caricatures, Visual Grammar

EXPLORING “BIOTERRORISM” IN THE POST 9/11 GOTHIC LITERATURE: A STUDY OF WORLD WAR Z

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Abstract: Aim of the Study: This research looks into the use of the term "World War Z" in post-9/11 gothic fiction. Through zombie mash-up fiction, the research represents this cultural junction, applying thematic analysis and conspiracy theories to shed light on the objectives of socio-political discourses in the year after 9/11. Methodology: First, the researcher studies include World War Z as a disruptive counter-discourse to investigate suggested socio-political issues as representations of bioterrorism in literature. Findings & Conclusion: Bioterrorism is becoming increasingly popular in mythology and fiction, reflecting socio-political themes. World War Z by Max Brooks shows historical events, figures, settings, records, and belief systems as reflections of bioterrorism, implying socio-political themes.

Keywords: World War Z, World War, Fiction, bioterrorism, themes, zombie.

DECONSTRUCTING ISLAMOPHOBIA IN JOHN UPDIKE'S TERRORIST

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Abstract: Contemporary global misconception of Islamic ideology prompted the present study. This study discusses the existing debates on racism and its development in the form of Islamophobia. It attempts the textual analysis of Updike's *Terrorist* (2006) incorporating Derrida's deconstruction theory into Fredrickson's concept of "racism as scavenger ideology" to find how racism is exercised by manipulating Islamic ideas and beliefs in the selected text. Fredrickson concept of "racism as scavenger ideology" proposed that racism expands by its ability to 'scavenge' and employ "ideas and values from other sets of ideas and belief in special socio-historic context" which, when taken as subject matters in the literary texts, happen to formulate new ideas and beliefs. The study also explores the underlying perceptions of the selected text that delineate the identity of Islam and Muslims through bias and prejudice. Focusing the origin of racism and its contemporary development into Islamophobia, the present study is limited to the analysis of the text to accentuate the role of literature in shaping explicit ideologies. This selection bears significance with regard to contemporary misconceptions about Muslims as a race and Islam as a manipulative religion. The study concludes that edifice of racism rests on religion as the focus of this novel is to overturn Islamic faith and position Americans at a supreme point. This study considerably attempts to form an approach that might change the worldwide misconstruction of Islam and Muslims in the field of American literature. Key Words: Racism; Islamophobia; Deconstruction; Scavenger Ideology; Terrorist

Keywords: Diaspora; Expatriate; South Asian Women Writers; Anxiety; Authorship

AN ANALYSIS OF MIND IN PRESCHOOLERS THROUGH SOCIAL CONSTRUCTIVISM

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Abstract: This study is based on Vygotsky's constructivism theory. Vygotsky constructivism theory is about social interaction, the theory considers learning as a social and communicative process. The study aims to highlight the importance of social interaction and application of different techniques and strategies that help preschoolers during their learning. The scaffolding technique within Zone of Proximal Development (ZPD) helps in cognitive development of the child making the learning process more active. This study also highlights how social constructivism theory enhances the cognitive ability of a child and emphasizes that social factors enhance the cognitive ability of preschool children. Case studies and systematic participant observations were employed in this study and this research is qualitative in nature. Vygotsky theory of social constructivism helps the students to enhance their cognitive abilities.

Keywords: social constructivism, scaffolding, the Zone of Proximal Development, systematic participant observation, cognitive abilities, preschoolers

FOUCAULT'S BIO-POWER OF STATE: A COMPARATIVE ANALYSIS BETWEEN BRAVE NEW WORLD AND THE REAL CAPITALIST WORLD

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Abstract: The present study explores how Aldous Huxley's *Brave New World* (1932) presents a State controlled systematic manipulation and psychological conditioning of individuals through Hypnopaedia and Soma. This paper adopts a comparative analysis, comparing the aforementioned means of mass conditioning used in the novel with the techniques used by the real-world capitalist states. It further delves into the nature of physical and mental manipulation of mass subjects in fiction compared with the reality. The analysis is conducted in lieu of Foucauldian notion of Biopower, which characterizes the exertion of political power over populations, effectively reducing them to mere instruments of social control. The findings reveal that the rapid development and scientific progress observed in the modern world has made it possible for the states to use the fictional means of mass conditioning in the real world. The subconscious conditioning through mass media and the pervasive use of psychotropics are the real-world manifestations of Huxley's prophecies. Hence, it implies a trajectory towards the dystopia that he has predicted in his dystopian science fiction novel *Brave New World*.

Keywords: Aldous Huxley, *Brave New World*, Bio-Power, World State, dystopia, manipulation, conditioning

CHANGING WORLD ORDER, GROWING USA-INDIA STRATEGIC ALLIANCE AND IMPLICATIONS ON PAKISTAN

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Abstract: Pakistan and India have been on loggerheads since their inception owing to various reasons, which include Kashmir, Siachan, Sir Creek issues, water resources, etc. Both states have gone through three full-fledged wars and a couple of limited wars as well. These were the reasons that both states established nuclear deterrence in 1974 and 1998, respectively, which is still growing exponentially. This presumed hostility has different structural, historical, and individual reasons, and its intensity is also growing with the advent of the currently changing world order. In the same way, the nature of relations between Pakistan and India seems to be transforming mainly due to three main reasons: first, the rise of China through her Belt and Road Initiative (BRI) and its flagship project, the China-Pakistan Economic Corridor (CEPC) in Pakistan. Secondly, the emerging regional cooperation between India and the USA, which Pakistan perceives as a threat to its security, Lastly, the domestic policies of leadership, especially after the arrival of Indian Prime Minister Narendra Modi in 2014 and his hostile policies against Pakistan, This article argues that the currently changing world order is drifting the USA and India closer to each other in strategic domains, which in turn may have serious strategic, economic, and diplomatic implications for Pakistan. Meanwhile, this research paper attempts to explore: 1) the nature of the changing world order; 2) the drivers of the USA-India strategic alliance; and 3) its strategic, economic, and diplomatic implications for Pakistan. This article uses structural realism as a theoretical framework while applying the qualitative method along with primary data, including elite interviews, and secondary data consisting of books, journals, articles, etc.

Keywords: USA, India, implications, changing world order, Pakistan

TRADE LIBERALIZATION AND SECTORAL PERFORMANCE IN PAKISTAN

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Abstract: This research study aimed to investigate the relationship between Trade liberalization and sectoral performance in Pakistan. Two sectors have been taken for analysis, the Agricultural sector, and Industrial sectors. The dependent variables have been set as the value-added growth of the two sectors of Pakistan. The independent variables of the study were Trade liberalization (TL), Real Exchange Rate (EXR), Foreign Direct Investment (FDI), and Inflation (INF). The data was time series and have been taken from World Development Indicators (WDI) from 1976 to 2018. In this study, the unit tests revealed the series integrated into different orders therefore the appropriate method for analysis was ARDL as suggested by the literature. within ARDL, the bound test approved long-run integration in both models therefore short term and the long-term result are taken into consideration. The results demonstrated that trade liberalization is found significant in the short run only for two higher lags. The real exchange rate found insignificant and inflation in Foreign Direct Investment found significant in the short run. While in the long run, only Foreign Direct Investment found positively significant in putting an effect on Agricultural Value Added Growth. On the other hand, Industrial value-added growth resulted in Significant short-run negative effects of Trade Liberalization and Real Exchange Rate in the short run. Similarly, Inflation is also found positive and significant effect on Industrial value-added growth, while Foreign Direct Investment has been significant in higher lags. The long-run coefficients of the Industrial value-added growth model found to be significant for all independent variables. Trade Liberalization, Foreign Direct Investment is positive and Real Exchange Rate, Inflation is negative in the long run. ARDL bound testing also reveals error correction terms which explain the speed of adjustments in the long run. In the Agricultural Value, Added Growth model the error correction term is significant and negative showing 18.6% convergence speed while in the Industrial Value-Added Growth model it shows 23% convergence speed. All the necessary diagnostic tests did not show any serious econometric problem along with stable results. This research is an important contribution in to the literature and joining stone in understanding the free trade impacts on the economy.

Keywords: Trade Liberalization, Sectoral performance, Autoregressive Distributive lag, Agricultural value added, Industrial Value added

PAKHTUNWALI: A DOUBLE-EDGED SWORD FOR PASHTUN WOMEN

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Abstract: Pashtunwali, the unwritten code of honor and conduct that governs the lives of Pashtun people, has been the subject of much debate and controversy, particularly about its impact on the lives of Pashtun women. While some view Pakhtunwali as a system that protects and empowers women, others argue that it restricts their freedom and autonomy. This paper explores the complex and contradictory nature of Pakhtunwali, examining how it empowers and disempowers Pashtun women. The researcher employs the Theory of Recognition to evaluate the Pashtun women's identity under the umbrella of Pashtunwali. Furthermore, the close reading method is used to appraise and analyze the role of women in Pakhtunwali, examining both the expectations placed on them and the protections they enjoy. The research explores the challenges faced by Pashtun women in reconciling the demands of Pakhtunwali with their own aspirations and desires, while the central argument is that Pakhtunwali is a double-edged sword for Pashtun women. On the one hand, it provides them a sense of security and belonging and reinforces their importance to the community. Contrarily, it can also be used to justify violence against women, and it can limit their freedom to make choices about their own lives. The research is important as it calls for a more nuanced understanding of Pakhtunwali, which recognizes its positive and negative aspects. It also argues that Pashtun women must be given a voice in shaping the future of Pakhtunwali to ensure that it is a code that upholds the rights and dignity of all Pashtun people.

Keywords: Pashtun Women, Pakhtunwali, Feminism, Gender Roles

Investigating the Factors affecting the Social Support and Academic Resilience of Undergraduate University Students

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Abstract: Social support and academic resilience pave way for effective learning among students while enhancing their skills and competencies to continue their higher education despite varied challenges. This current research focused on the role of background factors which influence social support and academic resilience traits among university students. Social support mitigates the stressful academic situations for students and academic resilience ensure efficient completion of academic tasks despite of difficulties faced by them. The cross-sectional survey design was used to collect responses from participants on adapted scales of social support and academic resilience. The data were collected from university students (n=600). The reliability and validity of adapted scales were ensured. The findings of the study revealed that there was no significant difference among social support and academic resilience based on their gender, age, enrolled program, semester, job status and locale. However, a significant difference in informational support was found among students based on their discipline. The findings further identified that students from sciences received better informational support as compared to students from other disciplines. This infers that background factors influence students' social support and academic resilience as several social and personal factors contribute to students' motivation to complete their study program.

Keywords: Informational Support, Esteem Support, Motivational Support, Venting Support.

**HEALTH
SCIENCES/
BIOLOGICAL
SCIENCES**

EVALUATION OF COMPATIBILITY OF MOXIFLOXACIN WITH SELECTED EXCIPIENTS USED IN THE FORMULATION OF NANOPHARMACEUTICALS

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Abstract: Excipients are chemical substances that can interact with each other and with active pharmaceutical ingredients, thus affecting characteristics of the final dosage form. Selection of excipients for the preparation of nanopharmaceuticals is very critical because there are more chances of physical and chemical interactions. This study is designed with the aim to investigate the possibility of any chemical or physical interaction between moxifloxacin hydrochloride and selected excipients (polymers and surfactants) used in the formulation of polymeric nanoparticles. Samples were prepared using the binary mixture approach and then stored under stress conditions ($40 \pm 2^\circ\text{C}$ and $75 \pm 5\%$ RH) for 90 days. The compatibility studies were carried out by visual observations, HPLC-UV, XRD and FTIR analysis. No visual changes were observed in any of the samples, drug content of the samples was within the range of 98 – 100.37%. FTIR spectra remained unaffected, and all the characteristic XRD peaks were present which indicated that the drug was compatible with the excipients used. The results of this investigation confirm that moxifloxacin hydrochloride is compatible with the selected excipients, and the polymeric drug nanoparticles can be formulated without any stability issues.

COMPARING DIABETIC RETINOPATHY IN TYPE I AND TYPE II DIABETES PATIENTS AT A TERTIARY HOSPITAL SCREENING CLINIC

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Abstract: Diabetic Retinopathy (DR), a vision-threatening complication associated with diabetes, is a prevalent concern in Pakistan due to low socioeconomic status hindering proper diagnosis and treatment. Early detection through DR screening is vital since most individuals remain asymptomatic until the disease has progressed. The study aimed to determine the prevalence of DR in Type I and II diabetic patients attending the DR screening room at Allied Hospital Faisalabad. Among the 86 patients (43 in each group), the average age was 43.98 years for Type I and 52.30 years for Type II diabetes. A majority of patients were employed, and oral treatment was the primary regimen. Good diabetes control was observed in a significant portion of patients. Notably, 34.9% of patients had DR, with a higher proportion in Type II (46.5%) compared to Type I (23.3%). This study provides essential insights into the prevalence of DR in different diabetes types in the region.

Keywords: Diabetic retinopathy, Type I diabetic patients, Type II diabetic patients, Tertiary hospital screening clinic

THE EFFECT OF ECONOMIC GROWTH, SUSTAINABLE DEVELOPMENT GOALS AND GOVERNMENT EFFECTIVENESS ON LIFE EXPECTANCY

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Abstract: Background This paper examines the mediating effect of achieving the targets of Sustainable Development Goals (SDGs), and the moderating role of Government Effectiveness on the relationship between Economic Growth and Life Expectancy. Methods Overall, data for 194 countries was extracted from World bank open data portal for the latest available year for Life expectancy, Government Effectiveness and Economic growth, while data for SDGs was extracted from sustainable development report 2023. Results The mean of Life Expectancy was 71.62 ± 0.54 years, the Economic Growth was $\text{US\$}25145.23 \pm 1953.93$, mean SDGs index were 67.46 ± 0.79 , and mean Government Effectiveness was $47.67 \pm 2.08\%$. A higher Life Expectancy was significantly associated with higher Economic Growth ($B=0.249$, $p<0.001$), improved Government Effectiveness ($B=0.018$, $p=0.043$) and higher coverage of SDGs index ($B=0.041$, $p<0.001$). Economic Growth had a significant direct positive effect ($B=0.3144$, $p<0.001$), a significant indirect positive effect through Sustainable Development Goals index ($B=0.6296$, $p<0.001$) and the moderator effect of government effectiveness is significant in the relationship between GDP per capita PPP and life expectancy ($p<0.001$). and a significant total positive effect ($B = 0.7368$, $p<0.001$) on Life Expectancy. Conclusion Life expectancy can be significantly improved through focusing on the economic growth of the country and the citizens, while achieving the targets of SDGs and effective government structures are important factors that can add value to life expectancy of the population. Stakeholders and state leaders need to implement measures for improving economic growth, SDGs, and government effectiveness integratively to achieve the desired targets of life expectancy in a country. The findings of this study provide useful insights for the governments, and relevant stakeholders by providing empirical evidence of the links between the studied variables.

Keywords: Keywords: Life Expectancy, Government Effectiveness, Economic growth, Sustainable Development Goals, SDGs, mediation, moderation.

IMPACT OF FEAR OF COVID -19, BURNOUT AND SOCIAL SUPPORT ON TURNOVER INTENTION IN LAB PROFESSIONALS DURING CORONA PANDEMIC

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Abstract: The COVID-19 pandemic is a world health emergency having serious impacts on public health in general and the healthcare professionals in specific. The aim of this study was to find the impact of fear of COVID-19 on Turnover Intention along with the mediator role of burnout, and the moderator role of social support in laboratory professionals in Khyber Pakhtunkhwa province of Pakistan. Method: Data was collected through an online questionnaire consisting of 30 items in total for this cross sectional study. Participants included 300 laboratory professionals including 87% males while 76% of the participants were in the age range in between 18 to 25 years. Result: Fear of COVID-19 showed statistically significant positive association with Turnover Intention while this relation was partially mediated by Burnout. The results also revealed that Social Support as a whole did not moderate the relationship between Fear of COVID-19 and Turnover Intention ($\beta = -0.01$, $t = -0.15$, $p < 0.88$). However, it can be inferred that, when Social Support is inside the interval $[-14.64, 5.27]$, the slope of Fear of COVID-19 is within the significant range ($p < 0.05$). Conclusion: In conclusion, Turnover Intention in lab professionals can be significantly reduced through the implementation of interventions for reducing fear and avoiding the factors creating Burnout. The results are useful for the managers and leaders for the creation and implementation of intervention programs to reduce the detrimental psychological impacts of Fear of COVID-19 on laboratory professionals to achieve a sustainable workplace environment in their organizations. Keywords: Fear of COVID-19, Turnover intention, Burn out, Social Support, Lab professionals

Keywords: Fear of COVID-19, Turnover intention, Burn out, Social Support, Lab professionals

PREVALENCE AND ANTIMICROBIAL SUSCEPTIBILITY PATTERNS OF SALMONELLA TYPHI AND ESCHERICHIA COLI IN DRINKING WATER OF SUB-DIVISION HASSAN KHEL PESHAWAR

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Abstract: Background: Globally outbreaks of water-borne diseases are extensively threatening public health. In Pakistan, various reports confirmed different diseases regarding drinking water including typhoid fever, diarrhea, urinary tract infection, anemia, and kidney failure. The causative agents associated with diseases are Salmonella typhi and Escherichia coli. S. typhi and E. coli both are gram-negative rod-shaped bacteria spreading through contaminated drinking water by the fecal-oral route due to non-hygiene and poor sanitation environments. Both bacteria are emerging Multi-Drug Resistant (MDR) organisms, increasing morbidity & mortality rates. Aims/Objectives: The current study was designed to evaluate the presence of S. typhi and E. coli in the drinking water of Sub-Division Hassan Khel Peshawar. Further, to determine MDR bacteria from water screening ESBL-producing bacteria, and detect heavy metals in drinking water. Method: 100 drinking water samples were collected from different drinking water sources aseptically, from the studied area from September 2020 to September 2021 at a research laboratory of Abbottabad University of Science and Technology. The collected water samples were inoculated on Salmonella Shigella Agar and Eosin Methylene Blue Agar. Bacterial Identification was done using gram staining and biochemical tests. Muller-Hinton agar was used for the determination of antibiotic resistance. Furthermore, the analysis of heavy metals (cadmium, copper, and lead) was done by atomic spectrometry. Results: The overall prevalence of S. typhi and E. coli was 22 and 52% respectively in drinking water. Most of these S. typhi were resistant to AMP (90.9%), followed by S (45.4%) SFX, SXT (40.9%), CRO, CXM, FEP, CAZ (31.8%), AMC, CIP (27.3%), C, TE (22.7%). While all isolates were 100% sensitive to AZM. Of 22 S. typhi isolates 7(31.8%) were ESBL producers. Furthermore, out of 52 isolates of E. coli, most were resistant to AMP (82.6%), followed by S (44.2%) SFX (42.3%), TE (34.6%) C, SXT (32.7%), CRO, CXM, FEP, CAZ (30.7%), AMC (26.9%) and CIP (21.1%). While all isolates of E. coli were 100% sensitive to AZM. 16 (30.7%) E. coli isolates were ESBL producers. Furthermore, overall out of 100 drinking samples, heavy metals were detected in 72% samples. Copper was the most common metal found in 61.0% of samples followed by lead and cadmium 55.0% and 48.0% respectively.

Keywords: Prevalence, Antimicrobial Susceptibility Patterns, Salmonella Typhi, Escherichia Coli.

COMPARATIVE ANALYSIS OF ANTIBIOTIC RESISTANCE PATTERN OF KLEBSIELLA SPECIES AFTER COVID-19 PANDEMIC

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Abstract: The Klebsiella spp are Gram negative, encapsulated, non-motile, facultative, anaerobic, lactose-fermenting bacteria. The antibiotic resistance is already very high and due to COVID-19 it is further increases to the alarming level, which could cause serious problem on the health care system of the country. The misuse of antibiotics, self-prescribed medication, and wide use of antibiotics due to COVID-19 and shortage of drugs are some of the most common causes for the development of antibiotic resistance in Pakistan. A total of 65 drinking water samples were collected from different areas of district Peshawar Pakistan and were cultured on MacConkey Agar media for selective isolation of Gram-negative lactose fermented Klebsiella spp. Initially morphological identification was done in order to identify the Klebsiella spp among the isolated lactose fermented bacteria (E.coli, Citrobacter and Enterobacter). We performed Gram staining for the conformation of Gram positive or Gram negative bacteria. We noticed that all the samples were Gram negative bacteria, in which 32 samples shaped rod form and red in color, which means they were Klebsiella spp. Different biochemical tests (Catalase test, Citrate test and motility test) were performed for the detection of Klebsiella spp. All the 32 samples were positive for catalase and citrate and were non-motile. Disc diffusion test was performed for the determining the antibiotic resistant pattern of Klebsiella spp isolates. Thirteen different antibiotics were used; Ampicillin, Gentamicin, Amikacin, Cefotaxime, Polymyxin B, Tobramycin, Ciprofloxacin, Ceftazidime, Imipenem, Ceftriaxone, Meropenem, Levofloxacin and Ofloxacin. Total of 72% showed resistant to all of the mentioned antibiotics. 16% samples showed sensitivity to Meropenem. 12% samples showed sensitivity to Gentamicin, Amikacin, Cefotaxime, Imipenem, Meropenem, levofloxacin and Ofloxacin. The current study isolated the Klebsiella spp from drinking water samples and determined the antibiotic resistance pattern after COVID-19. Molecular level study could help us to evaluate those genes which are making the bacteria resistant. Samples should be collected from different cities of Pakistan to check the resistivity pattern of Klebsiella spp across Pakistan.

Keywords: Antibiotic resistance pattern, Klebsiella Spp, COVID-19

IMPACT OF COVID-19 PANDEMIC ON ANTIBIOTIC SUSCEPTIBILITY PATTERNS OF SALMONELLA TYPHI ISOLATES FROM DRINKING WATER OF PESHAWAR

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Abstract: Enterococcus enterica a Gram-negative bacterium called Typhimurium can endure inside of cells. The public's health is seriously at stake because of it. It has been linked to a number of illnesses, the majority of which are spread by tainted food and water. Especially in vulnerable groups, S. Typhi infections can cause anything from self-limiting gastroenteritis to severe systemic infections that can be fatal. It's essential to comprehend S. Typhi's antibiotic susceptibility patterns for effective infection treatment and control. This study's main objective was to investigate how the ongoing COVID-19 pandemic affected S. Typhi's treatment susceptibility. The study was conducted in Peshawar, Pakistan, where S. Typhi incidence have increased. 50 drinking water samples were collected from various sources during a three-month period, from January 2023 to March 2023, to ensure accurate results. The widely used Open Epi calculation method was used to determine the sample size, which took statistical considerations into account and guaranteed a representative sample. We looked into the isolates of S. Typhi's susceptibility to antibiotics using the Kirby Bauer disc diffusion method. This method, which is frequently applied, involves placing antibiotic discs on a plate with agar inoculated with bacterial isolates and evaluating the inhibitory zones to determine susceptibility. The bacteria were also correctly identified and categorised using the Analytical Profile Index (API), a fast biochemical diagnostic method. The results of this study were alarming: S. Typhi was isolated and identified phenotypically in 66.66% of the samples gathered. Out of the 60 samples, S. Typhi was found in significant numbers, indicating that the pathogen is present in Peshawar's drinking water sources. This reveals a possible threat to the public's health and highlights the significance of early detection and targeted therapies. The discovery of S. Typhi in Peshawar's drinking water sources raises worries about the quality and safety of the water supply. Concerns about the quality and security of the water supply have been raised by the detection of S. Typhi in Peshawar's drinking water sources. The importance of stringent monitoring and control measures is also emphasised in order to stop further transmission and outbreaks. The findings of this study have significant effects on how antibiotic prescriptions are written. As the prevalence of multidrug-resistant organisms rises, it is crucial to minimise the development of further resistance by understanding the patterns of antibiotic susceptibility.

Keywords: COVID-19, Salmonella typhi, Antibiotic SUSCEPTIBILITY

ASSESSMENT OF COST AND QUALITY OF LIFE IN COMPLETE HEART BLOCK PATIENTS; A COST UTILITY ANALYSIS

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Abstract: Complete heart block (CHB) or third-degree atrioventricular block is widely recognizing severe cardiac disease wherein the patient experiences abnormal heart rhythm, lack of conduction through the atrioventricular node (AVN) and disconnection of atria and ventricles. This study evaluated the financial burden and quality of life (QALY) in complete heart block patients using a prevalence based societal perspective. Methodology: A total of 200 participants with complete heart block were approached. Economic burden questionnaire (EBQ), EuroQol 5D-5L (EQ-5d-5l) and visual analogue scale (VAS) were used for data collection through semi structured interview from inpatients and their attendants at cardiac rehabilitation center HMC. The EBQ include all kinds of cost such as direct cost, and indirect cost. Comparison of cost was made between the pacemakers DDDR and VVIR using independent sample t-test, while linear regression model was made to identify the main predictors of total cost. The EQ5D-5L and visual analogue scale was administered for the assessment of quality of life of patients at the time of admission and after pacemaker therapy. Mean QALY gained were calculated for DDDR and VVIR pacemakers. Results: The average total cost of complete heart block was Rs 397788.2 i.e., equal to Rs 1431.87 US\$ (1US\$=277.81). Direct and indirect cost elements of Rs 376902.62 and 20885.58 were consequently observed. There is a significant difference in the direct and indirect cost of CHB. The direct cost 94.8% was contributed to the bulk of the total cost. While the indirect cost was 5.2%. The bulk of the direct medical cost was constituted to the cost of the permanent pacemaker PPM (65.97%). The mean cost per QALY gained with DDDR and VVIR were 659605.3647 and 515047.9184 respectively. There is significant difference in the cost/QALY gained with DDDR as compared to VVIR, however, the QALY gained is almost similar. The results of linear regression analysis show that the four variables are the strong predictors ($p<0.05$) and significantly correlated with the higher cost of CHB; PPM status, Attendant's absenteeism, patient's monthly income and number of days at hospital. Conclusion: Complete heart block is an expensive disease in Pakistan, measures to reduce direct and hospitalization related cost could significantly reduce the cost of illness to the patients and their family.

Keywords: QALY: Quality Adjusted Life Years, HMC: Hayatabad Medical Complex, DDDR: Dual-pacing, Dual-Sensing, Dual-Response, Rate Adaptive, VVIR: Ventricular Pacing, Ventricular Sensing, Inhibition Response.

BIODEGRADATION OF LOW DENSITY POLYETHYLENE PLASTIC BY STAPHYLOCOCCUS SPECIES ISOLATED FROM WASTE DISPOSAL SOILS.

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Abstract: Polyethylene (PE), a polymer of ethylene, consists of a long chain backbone of carbon and hydrogen which are linked covalently to each other and are derived from petrochemicals. Polyethylene has a wide range of applications, and it is widely used due to its low cost, ease of production, versatility, and durability. This research explores the biodegradation of low-density polyethylene by *Staphylococcus* species isolated from waste disposal sites. The current research is carried out to identify LDPE degrading *Staphylococcus* species from waste disposal soil and to determine biodegradative capability of *Staphylococcus* species, and characterize LDPE films via SEM and FTIR. In current research, total 20 soil samples were collected from 5-15 cm depth of different waste disposal sites using sterile forceps and were transferred in sterile zipper bags to Health Sciences Department, City University Peshawar. 1gm of soil samples were then dissolved in 9mL of sterile distilled water to make a stock solution. Serial dilution was performed and inoculated on mannitol salt agar (MSA) media followed by sub culturing to get pure bacterial isolates. A total of 4 bacteria were identified, i.e., *Staphaures* and 3 different species of *staphylococcus* bacteria. UV radiations were provided to the new plastic to get the points of bacterial attachment for the degradation of bacteria and the plastic was placed in plates for 90 days incubation period where we could see the plastic degradation. The initial weight of the plastic film as well as the new weight after 90 days of treatment were recorded. As a result, *Staphaureus* has caused the most degradation. The initial weight of the plastic was 0.00745gm while the weight after 90 days was recorded 0.08577gm after loss with the carbonyl index of 0.8686gm which can be confirmed in scanning electron microscope (for morphological changes) and FTIR (for physical changes). The results of this study suggest that some bacterial isolates can break down LDPE. The biodegradation of LDPE films is confined to the surface, is ongoing, time-dependent, and rather slow.

Keywords: Low density Polyethylene, *Staphylococcus* spp, *Staphaureus*, SEM, FTIR, UV

COMPARATIVE STUDY OF THE PROPERTIES OF ALGINATE AND CITRIC ACID BASED TARO GUM HYDROGEL FILMS

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Abstract: Significant advancements have been made in recent decades in the field of hydrogels as functional biomaterials. Due to their unique properties, including porosity, mechanical strength, interfacial dynamics, and biocompatibility, they suggest widespread potential applications. This study investigated and compared the characteristics of hydrogel films fabricated using two methods. Taro gum (*Colocasia esculenta*) extract, primarily composed of polysaccharides, was used as the starting material. Alginate and citrate taro hydrogels were synthesized using a one-pot solvent casting method and a two-pot carboxymethylation method, respectively. Alginate hydrogel films were prepared with various ratios of taro gum extract and alginate solution to optimize their properties. Both the degree of grafting and the swelling ratio of the hydrogels were calculated. The synthesized hydrogel films were characterized using UV/visible, FTIR, XRD, and Raman spectroscopy. Scanning electron microscopy (SEM) was employed to analyze the three-dimensional structural pattern resulting from grafting and crosslinking. The biocompatibility of the hydrogels was assessed by measuring their degree of hemolysis. Alginate hydrogel films exhibited significantly lower hemolysis compared to citrate-based hydrogels, suggesting their suitability for drug delivery applications. Furthermore, the antibacterial activity of the hydrogels was evaluated against four different bacterial cultures. Both types of hydrogels effectively inhibited the growth of gram-positive bacteria. Notably, the hydrogels are biodegradable while maintaining high stability. The concentration of alginate and the degree of carboxymethylation were identified as the most significant factors influencing the properties of the hydrogels.

Keywords: Carboxymethylation, Citric acid, Sodium alginate, and Taro gum extract

DESIGNING AND GREEN SYNTHESIS OF NOVEL NANOMATERIALS FOR THE REMOVAL OF BIOLOGICAL AND NON-BIOLOGICAL POLLUTANTS FROM AQUEOUS MEDIUM

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Abstract: Industrialization and urbanization have now become major factors in damaging different segments of the environment. Biological (bacterial/ Fungi) and non biological (dyes, heavy metals) pollutants are being released by thousands of industries on regular basis in a huge amount that are now a serious threat to health of living beings. Besides development of new products, researchers are now more concerned regarding the removal of these pollutants from environment. For the purpose, synthesis of novel nanomaterials for the removal of toxic pollutants, dyes, pathogens and free radicals from aqueous medium has become a challenge. Treatment of different industrial effluents using different classes of nanomaterials have been focused. Designing and synthesis of these materials using green methods have been preferred, as these methods have gained attention in material sciences for being their sustainable potential. Employing green methods, recently we have synthesized metal nanoparticles (Ag, ZnO), bimetallic nanoparticles including Cu-Ag, and novel-franklinite (ZnFe_2O_4). In addition, nanocomposites such as Cu-Ag/SDS, $\text{V}_2\text{O}_5/\text{TiO}_2/\text{g-C}_3\text{N}_4$, $\text{TiO}_2/\text{WO}_3/\text{V}_2\text{O}_5$ and cellulose/ MoS_2/GO have been synthesized. Characterization of these materials has been carried out employing different analytical techniques including UV-visible, FTIR, SEM, EDX, and SEM. Nanomaterials were found having size less than 100 nm with different but suitable morphology required for enhanced pollutant removal, biological and radical scavenging efficiency. These nanomaterials have been further tested for their catalytic potential for the removal of different dyes and organic pollutants. Results revealed that in most of the cases the percent removal of pollutants was recorded more than 90% in time lesser than reported previously in different studies. Antioxidant activity was also evaluated through free radical (DPPH and ABTS) scavenging assays and nanomaterials were found having almost 80% scavenging potential. Pathogen removal potential was also determined in terms of antibacterial, antifungal activity studies. All the synthesized materials exhibited strong catalytic and biological activities. It is therefore suggested that synthesis of these materials should be attempted by the researchers to explore their potential applications in different fields of science followed by their applications for the betterment of lifestyle.

Keywords: Nanoparticles, nanocomposite, dye degradation, radical scavenging, organic pollutant

OXICAMS AS BIOACTIVE LIGANDS IN RU(II) ARENE ANTICANCER COMPLEXES

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Abstract: Bio-organometallics is an excellent platform to provide drug like properties. In last decade, extensive studies has been carried out to design metal arene based metallodrugs. RAPTA and RM175 type complexes are among the most popular examples of half sandwich organometallics. RAPTA-C has ability to overcome metastasis in-vivo and preferably bind to histone proteins of the nucleosome. However, RM175 demonstrated invitro anticancer activity similar to cisplatin. The small structural variation in the organometallic complexes can dramatically change the biological profile and alter the reactivity towards cellular targets. The coordination of bioactive ligand with the metal center may enhance the biological potential due to synergetic effects. The use of anti-inflammatory agents as ligand in Ru arene scaffold may result enhanced anticancer activity. The oxicams are well known anti-inflammatory properties and Ru(II) arene scaffold has cancer reducing potential. Therefore, conjunction of the oxicams and ruthenium arene will result enhanced anticancer properties. Herein, the oxicam derivatives were combined with Ru(II) cymene to isolate organometallic complexes under inert set of conditions. The synthesis was further confirmed using different analytical techniques, using $^1\text{H}\{^{13}\text{C}\}$ NMR, MS and elemental analysis along with single crystal x-rays crystallography. The isolated compounds were further evaluated for their invitro anticancer potential against different human cell lines.

Keywords: metal based drugs, anticancer agents, ruthenium arene complexes

POTENTIAL OF RHIZOSPHERIC FUNGI TO REDUCE COPPER AND LEAD TOXICITY IN TRITICUM AESTIVUM L.

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Abstract: Plants have adapted to various heavy metals and environmental situations during anthropogenic evolution. The most common heavy metal contaminants are lead (Pb) and copper (Cu), which can be found in both natural and industrial settings. Microorganisms play a crucial role in the biotransformation of heavy metal-contaminated environments. In this study, four rhizospheric fungus strains were extracted from *Parthenium hysterophorus* and tested for their tolerance to lead and copper. These strains were selected for their ability to promote plant growth under heavy metal stress. When inoculated to *Triticum aestivum* L. under heavy metal stress, the fungal isolates NMG, Ng, N6, and NB showed promising results in the form of increased secondary metabolites. Different concentrations of specific heavy metals (Pb25, Pb75, Cu100, Cu200, Pb25+Cu100, and Pb75+Cu200g/mL) were applied to wheat plants. The plants exposed to metal stress without microbial inoculation displayed a reduction in growth. However, when rhizospheric fungal inoculation restored plant growth and development, showed the symbiotic relationship between the fungus and the host plant roots under heavy metal stress conditions. The isolates have the ability to transform HMs, making them unavailable for plant uptake and accumulation, which prevents harm to plants. Apart from their bioremediation properties, some isolates can create secondary metabolites like IAA, GA, ABA, H₂O₂, Electrolytic leakage, SA, lipid, DPPH, flavonoids, phenols, and proteins, which can stimulate plant growth and make them suitable for use as bio-fertilizers and bio-remediating agents in areas with high levels of heavy metal contamination.

Keywords: Bioreduction, Bioremediation, Heavy metals uptake (lead, copper), Heavy metal tolerance. Rhizospheric fungi, *Triticum aestivum* L.

AN APPROACH TO MINIMIZE THE ADVERSE EFFECTS OF VALPROIC ACID IN ANIMAL MODEL OF EPILEPTOGENESIS

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Abstract: The objective of this study was to investigate whether a combination of a sub-therapeutic dose of valproic acid (VPA) and metformin could prevent VPA-induced toxicity in an animal model of epilepsy. Valproic acid is a commonly prescribed antiepileptic drug known for its efficacy in controlling seizures. However, prolonged VPA use is linked to hepatotoxicity and cognitive impairment. To address these concerns, the study explored the potential benefits of combining a sub-therapeutic dose of VPA with metformin. Metformin has shown antiepileptic properties and memory-enhancing effects, suggesting a promising synergistic approach. We aimed to determine whether this combination could effectively manage epileptic seizures while mitigating the adverse effects associated with VPA treatment alone. The research was conducted using a pentylenetetrazole (PTZ)-induced kindling model of epilepsy in mice. The experimental design involved administering a sub-therapeutic dose of VPA (100 mg/kg) and metformin (200 mg/kg) in combination. Seizure scores were evaluated to assess the effectiveness of the treatment. Memory function was tested using a passive avoidance test. Genotoxicity was measured using an alkaline comet assay. The combination of the sub-therapeutic dose of VPA and metformin demonstrated promising results. Seizure scores were reduced, indicating improved seizure control with the combination therapy. Remarkably, the combination therapy enhanced memory function, in contrast to using VPA alone. The alkaline comet assay revealed decreased genotoxicity with the combination treatment compared to higher-dose VPA alone. The study concludes that the combination of a sub-therapeutic dose of VPA and metformin holds significant potential in preventing VPA-induced toxicity in an animal model of epilepsy. This novel therapeutic approach not only improves seizure control but also enhances memory function and mitigates genotoxicity and hepatotoxicity associated with VPA treatment. The findings suggest a promising strategy for managing epilepsy while minimizing adverse effects, offering a safer and more effective treatment option for patients. This research opens up new possibilities for optimizing epilepsy treatment and improving patient outcomes.

Keywords: Epilepsy, Valproic Acid, Metformin, Genotoxicity, Hepatotoxicity

EFFECT OF CARDIAC REHABILITATION PROGRAM ON KINESIOPHOBIA AND FUNCTIONAL CAPACITY IN OPEN HEART SURGERY

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Abstract: Open heart surgery is the major surgical procedure which is the most frequently conducted in general hospitals. Kinesiophobia and functional capacity are greatly compromised after open heart surgery. Cardiac rehabilitation helps in secondary prevention and minimizes different risk factors of cardiovascular disease. Objective: To determine the effect of cardiac rehabilitation program on kinesiophobia and functional capacity after open heart surgery. Methodology: A quasi experimental study was conducted at Rehman medical institute, Peshawar. Sample size was calculated as 45 by using G power, both male and female patients of aged 50 to 70 years underwent open heart surgery were selected through nonprobability purposive sampling technique from July 2021 to February 2022. Patients having any neurodegenerative disease, disorder of stance and gait, drug intoxication were excluded. Pre and post assessment after a week after was done using scale Tampa scale of kinesiophobia-11 for kinesiophobia and 6 minutes' walk test for functional capacity. Phase 1 cardiac rehabilitation program was used as an intervention after open heart surgery. Paired t test was applied to determine the mean difference in a group pre and post interventional. SPSS version 23 was used to analyze the data. Results: The Mean age of the patients was 59.71 ± 5.01 years. The results showed the significant improvement in kinesiophobia (28.96 ± 4.67 versus 21.76 ± 3.51), Conclusion: The study concluded that cardiac rehabilitation programs have significant effect on kinesiophobia and functional capacity after open heart surgery.

Keywords: Cardiac Rehabilitation; Functional Capacity; Kinesiophobia; Open Heart Surgery.

MOLECULAR CHARACTERIZATION OF MITOCHONDRIAL tRNA LEUCINE GENE IN EPILEPTICS PATIENTS FROM DISTRICT PESHAWAR, KHYBER PAKHTUNKHAWA

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Abstract: Epilepsy is a neurologic disorder of brain characterized by simultaneous seizers for shorter time affecting of involuntary parts of the body Mitochondrial or genomics DNA genes mutation link to the epilepsy directly affect brain regularities that can lead to epilepsy or to other genetic conditions which can cause seizures. This cross-sectional study was conducted to find out the mutational analysis of mitochondrial transfer tRNA Leucine gene (MT-TL1) in epileptics from district Peshawar Khyber Pakhtunkhwa. Convenient sampling technique was adopted. Questionnaire was filled from patients and three ml blood sample was collected in EDTA tube. Using sample size calculation formula $n = \frac{p(1-p)z^2}{d^2}$ the samples size was calculated by using p (prevalence) =4% (0.04), d (margins of error) =5% (0.05), z; confidence level=95% (1.96) which will provide a sample size of (n=19) gDNA Mini Kit Blood (WizPrep) was used for mitochondrial DNA extraction. Specific primers picked from literature forward and reverse premier were used. The amplified PCR product run on 2% agarose gel electrophoresis. After confirmation of bands the amplified product clean through cleaning process for Sanger sequencing. No mutation was found in all 19 samples of MT-TL1 Leucine tRNA gene ranged from 3212- 3365bp. Our study concludes that epilepsy is common in males as compared to female. Epilepsy is more prevalent at age group of 10 to 20 years. Our study recommends that not just mitochondrial gene but also other genomic DNA should be studied for mutational analysis. Further studies with a larger number of patients are needed to assess the baseline information about mutation analysis of MT-TL1 gene.

Keywords: *Epilepsy, Myoclonal Epilepsy, Mitochondria DNA (mt-DNA) and Transfer RNA Leucine gene MT-TL1*

ABNORMALITIES IN SERUM ELECTROLYTES IN DF, DHF AND DSS AS PROGNOSTIC INDICATORS FOR DENGUE SEVERITY: A COMPARATIVE MODEL

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Abstract: The source of dengue infection is the dengue virus. It consists of a single positive-stranded RNA virus, or Flavivirus can transmit to mosquitoes. There are 4 different types of serotypes of the dengue virus has been discovered, found variation based on the genetic makeup. To determine clinical correlation of serum electrolytes in DF, DHF and DSS. The study was designed at the Department of Microbiology, University of Haripur and conducted at the Department of Pathology, Civil Hospital Laboratory in New Township darband. The isolated Data such as data (Age, sex, Areas, Medical history, and dengue-related questions were interpreted through IBM SPSS 2.0 by applying specific tests such as One-way ANOVA, Mean, and Std. deviation. About 250 positive patients were included in the study for diagnosis, whom 146 were Male and 104 were Female. The M \pm SD of severity level in DF and DHF patients was 120.5 \pm 53.3, Variance=2841.18, CI95% 1.960, and P=0.001. The Comparative Analysis of DF and DHF symptoms between group DSS (576), df (1), MS (576), F (0.52978) and p=0.478. Whereas within groups DSS (15221.5), Df (14), MS (1087.25), F (0.52978) and p=0.478. The M \pm SD of severity level in DF and DSS patients was 118.4 \pm 59.5, Variance=3551.96, CI95% 1.960, and P=0.001. The M \pm SD of dengue serological markers such as 20 \pm 9.26, Variance=85.824, and CI95% 1.960. The M \pm SD of Na⁺ in DF 132.4 \pm 3.8, DHF 129.5 \pm 2.5, DSS 119.5 \pm 2.5. K⁺ in DF 3.38 \pm 0.32, DHF 2.97 \pm 1.01, DSS 2.4 \pm 0.93. Ca⁺ in DF 8.81 \pm 0.53, DHF 7.82 \pm 1.2, DSS 6.36 \pm 0.57. Mg⁺ in DF 1.39 \pm 0.71, DHF 1.39 \pm 0.41, DSS 1.62 \pm 0.31. Po₄ in DF 3.47 \pm 0.53, DHF 2.21 \pm 0.62, and DSS 2.34 \pm 0.31. It was concluded that dengue shock syndrome patients were found highly affected by serum electrolytes, so we need to focus on the replacement and treatment of serum electrolytes.

Keywords: Dengue virus, Civil Hospital, Serological Markers, Abnormal Serum Electrolytes, Clinical manifestation

ASSESSMENT OF BIOCHEMICAL AND HEMATOLOGICAL PARAMETERS IN CUPPING THERAPY. A PROSPECTIVE COHORT STUDY

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Abstract: The word Hijama is derived from Arabic means to suckle and restore to normal state of internal equilibrium. A prospective cohort study was carried out at MLT lab of the City University of Science and Information Technology, Peshawar. Statistically positive changes in biochemical parameters such as ALT, ALP, SBR, Uric acid, Cholesterol, Triglyceride HDL, LDL and VLDL respectively and there Mean, Standard deviation is (30.14 ± 4.613 , 27.15 ± 4.624 , 172.79 ± 43.171 , 172.79 ± 43.171 , 1.36 ± 0.3193 , 1.045 ± 0.3106 , 5.450 ± 0.8280 , 4.827 ± 0.7257 , 149.68 ± 30.591 , 157.64 ± 29.086 , 78.85 ± 10.114 , 147.07 ± 13.422 , 16.53 ± 3.726) and Probability value is (<0.001 , <0.001 , 0.019 , 0.005 , <0.001 , <0.001 , <0.001 , <0.001 and <0.001 respectively), Some of the biochemical parameters have not statistically significant variations in before and after cupping therapy such as total protein, Urea and Creatinine and there Mean, Standard deviation is (60.70 ± 18.040 , 60.66 ± 18.063 , 28.01 ± 4.047 , 27.70 ± 4.489 , 0.9300 ± 0.25324 , 0.9221 ± 0.28844 and there probability value is (0.37 , 0.124 and 0.083 respectively). Also some of the hematological parameters fluctuated in before and after cupping therapy such as WBCs count, RBCs count, Hemoglobin Level, Platelets count and coagulation cascade such as PT and APPT and there Mean, Standard deviation is (5.15046 ± 9.7525 , 5.81314 ± 11.9800 , 4.1650 ± 0.81126 , 4.3500 ± 0.80880 , 195038.10 ± 40175.079 , 196485.71 ± 40364.949 , 12.624 ± 1.357 , 12.959 ± 1.1920 , 12.15 ± 1.521 , 10.25 ± 1.321 , 31.50 ± 2.135 and 28.43 ± 1.191 respectively) and Probability value is (<0.001 , <0.001 , <0.001 , <0.001 , <0.001 and <0.001 , respectively). This study concluded that the cupping therapy have positive impact on biochemical and hematological parameters and also potential physiological influence in human body. This study contributes to the existing literature to understand base line information of cupping therapy and their correlation with different profiles.

Keywords: Cupping Therapy, Alanine aminotransferase, Alkaline Phosphatase, Serum Bilirubin, High Density Lipoprotein, Low Density Lipoprotein and Very Low-Density Lipoprotein.

MATHEMATICAL MODELS IN ONCOLOGY AND TREATMENT STRATEGIES

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Abstract: This presentation explores the transformative role of mathematical models in cancer. Our objective is to improve the efficacy of cancer treatment approaches by delineating tumor dynamics and the evolution of drug resistance. We thoroughly review treatment approaches by integrating mathematical frameworks, enabling us to identify the most effective interventions. The results contribute to the enhancement of treatment schedules and provide valuable insights into new therapeutic approaches. This talk represents a pivotal advancement in integrating theoretical knowledge with actual implementations, which can potentially transform cancer research and therapy.

Keywords: Mathematical Modeling; Oncology;

EMERGING MUTATIONS IN SPIKE AND OTHER STRUCTURAL PROTEINS OF SARS-COV-2

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Abstract: The structural proteins, spike (S), nucleocapsid (N), membrane (M), and envelope (E), of severe acute respiratory syndrome (SARS-CoV-2) play a critical role in attachment to replication and virulence. Many potential drugs have been recommended against structural proteins which have also been applied as vaccines. However, recently a large number of genomes have been sequenced from different geographical regions with a significant number of variations. Therefore, the current study was aimed to find variations in the structural proteins. This is the first comprehensive study in which we screened 2,95,000 complete genomes in the global initiative on sharing all influenza data (GISAID), submitted from December 2021 to December 2022. The sequence analysis shows 4725 non-synonymous mutations in S, 627 mutations in M, 259 mutations in E, and 1631 mutations in N protein respectively. Variations have been detected in the entire coding regions, among which the most frequently occurring mutations in S protein are D614G (n=2,66,513), A222V (n=59,697), L18F (n=28,015) and that of M protein are; T175M (n=1286), D3G (n=968), L17I (n=621), A2V (n=463), and A2S (n=460). The most commonly circulating variants in E gene/protein include, S68F (n=419), P71S (n=264), and L73F (n=218). Similarly, the N protein also harbored the most common variants which include R203K (n=82,570), G204R (n=81,858), and A220V (n=39,729). The frequency of N501Y (n=4362) in S determines a tight interaction of CoV-2 RBD with ACE2. These wide ranges of mutations in structural proteins may affect not only the therapeutic efforts but also the vaccine's efficacy and diagnostics specificity. We suggest that geographically strain-specific variations should be investigated for effective drugs, vaccines, and the antibodies combinations. Alternatively, immune-boosting compounds might be very useful for successful eradication of CoV-2 infections.

Keywords: COVID 19, SARS - nCoV, SARS-CoV 2, Coronaviruses

AI/Computer Science

CROWD COUNTING BASED ON NEURAL NETWORK

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Abstract: The overall population of the world has multiplied in the last ten years. Given the worrisome rate of population growth, it is crucial to study and compared the patterns of crowds and their conduct as a whole. The study of crowd phenomena from a social, psychological, and technical perspective has drawn the interest of researchers from variety of fields, including machine learning and field of social science. The development of system that support the automatic comprehension and analysis of crowd behaviour heavily relies on computer vision techniques. Many massive events needs estimations and measurements through machine learning its possible to make it easy for crowd analysis. The key aim of this study is to compare different crowd counting and crowd labeling Machine learning algorithms, namely Convolution Neural Network, Residual Network, Weakly Supervised Transformer Architecture, and Convolutional Sparse Regression Network, on the Hajj Footage and ShanghaiTech datasets taken from UCI data repositories for crowd scenarios at end develop an application for crowd counting. The Convolution Neural Network and Residual Network algorithms has been used for crowd labeling and were trained and tested on a labeled Hajj Footage dataset. The WSTA and CSRnet algorithms has been used for crowd counting and were trained and tested on an unlabeled ShanghaiTech dataset. Evaluate the algorithms based on the evaluation metrics of accuracy, and MAE ensures the highest level of confidence in the results obtained. In this study, experimental analysis conclusively demonstrated that the findings of the study show that crowd labeling the Resnet model outperforms than CNN and crowd counting the CSRnet model outperforms than WSTA. Our resolute research validates that CSRnet outperformed, producing the lowest MAE of about 11.03 on the crowd-counting ShanghaiTech dataset. CSRnet was selected for usage in the application as the algorithm with superior efficiency and the lowest error rate after thorough analysis. At the end, an application has been developed that offers crowd count information"

Keywords: crowd counting, CNN, CRnet

ANALYSIS OF OVERSAMPLING MACHINE LEARNING TECHNIQUES ON IMBALANCED DATASET

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Abstract: Machine learning frequently faces problems with imbalanced class distribution, especially for text datasets. In order to improve classifier performance on unbalanced text data, this study compares various oversampling techniques. The study focuses on three distinct datasets: Bio-assay, Spam Filtering, and Credit Card Fraud Detection. The implementation and evaluation of several oversampling methods, such as random oversampling, adaptive synthetic, synthetic minority over-sampling for nominal and continuous features, borderline synthetic minority over-sampling technique, support vector machine synthetic minority over-sampling technique, and K-Means synthetic minority over-sampling technique. As a performance metric, accuracy is used to evaluate how well these techniques perform. The experimental findings show that various oversampling strategies can successfully balance unbalanced text datasets. The Support Vector Machine and the Border- line Synthetic Minority Over-Sampling Technique Methods using the Synthetic Minority Over-Sampling Technique routinely perform better in terms of accuracy than other techniques. The dataset's unique properties and the issue at hand, however, determine which oversampling technique should be used.

Keywords: Class Imbalance, Over Sampling, SVM, SMOTE

A DIRECTION-AWARE MULTICAST MECHANISM TO REDUCE CONTROL OVERHEAD IN MANETS

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Abstract: The utilization of mobility nodes has witnessed a rise, necessitating the need for rapid, efficient, and secure data transmission. An Optimizing Rebroadcast Mechanism for Minimizing the Control Overhead in Mobile Ad-hoc Networks (ORMMCO), a protocol that divides nodes into three regions and determines multiple paths based on the shortest distance, often leads to issues such as delayed packet delivery, packet loss, and packet flooding on the network when a node unexpectedly leaves the region without prior notice. To address these concerns and ensure network stability, A Direction-aware Multicast Mechanism to Reduce Control Overhead in MANETS (DMMTCO) proposes a solution that establishes multiple pathways among nodes that all share the same direction. To assess the performance of DMMTCO, a simulated network environment was created, and 42 iterations were conducted. Compared to ORMMCO, DMMTCO exhibited a significant improvement in network performance, achieving a 63% enhancement. Additionally, DMMTCO saved 98 packets from being lost and demonstrated a 42 ns reduction in delay compared to ORMMCO. In a congested network scenario, DMMTCO outperformed ORMMCO by 25% in terms of efficiency. In summary, the DMMTCO protocol offers a solution to address the challenges posed by ORMMCO in terms of delayed packet delivery, packet loss, and packet flooding. Through the establishment of multiple pathways with consistent directions, DMMTCO improves network performance, reduces packet loss, and minimizes delays.

Keywords: Multicast, direction-aware, MANETS, packet flooding, network overhead.

A SUPERVISED MACHINE LEARNING-BASED SOFTWARE DEFECT PREDICTION APPROACH TO ENHANCE THE DEVELOPMENT PROCESS

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Abstract: Software defects are common in the industry, where prediction in the initial stages of the development cycle remains critical. The existing body of knowledge includes several prediction strategies using various machine-learning techniques. These strategies enable a development team to predict defective or imperfect artifacts during software development, which ensures the delivery of the software products within the stipulated time. Software complexity is increasing at an exponential rate that raises the probability of defects, accordingly. This work investigates the performance of Support Vector Machines (SVM) for the prediction of software defects using a well-known dataset, i.e., PC3. To evaluate performance, this paper takes into account precision, recall, and accuracy as metrics. As demonstrated in the simulation results, SVM outperforms the other eminent machine learning algorithms.

Keywords: Software, Software defect, ML, Supervised Learning

LINK PREDICTION USING KNOWLEDGE GRAPH WITH GRAPH NEURAL NETWORK

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Abstract: This research presents an innovative approach to improve link prediction across various domains using Knowledge Graphs (KGs) such as FreeBase, WordNet, WikiData, and Yago. KGs provide structured representations of real-world information, enabling the inference of missing relationships and dependencies between entities. Link prediction is crucial in fields like recommendation systems and social networks, where it estimates potential connections within a network based on its observed structure. However, previous research has faced challenges such as cold start problem, contextual information, ethical concerns, sparsity, imbalanced data, and noise. This study introduces novel link prediction algorithms designed for deployment on diverse KGs, utilizing various neural network models. The results provide valuable insights for enhancing recommendation systems, refining predictions in social networks, and advancing knowledge base completion tasks. This work contributes significantly to information retrieval, semantic web development, and personalized content recommendation by leveraging the synergy between Knowledge Graphs and state-of-the-art neural networks.

Keywords: Link Prediction, Knowledge graph, Social networks

AUTOVISION: AN AUTOMATIC MACHINE LEARNING TOOL FOR COMPUTER VISION TASKS

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Abstract: Computer Vision (CV) is a subset of Artificial Intelligence (AI), primarily driven by deep learning techniques. This field equips computers to interpret the visual world, with applications like image processing, self-driving cars, smart city solutions, and some healthcare systems like advanced ultrasound machines. The CV tasks require good background knowledge for interpretation, which is sometimes laborious. In this connection, we present AutoVision, designed to empower both beginners and experts of CV to perform various tasks. AutoVison provides a user-friendly web application, enabling seamless implementation of CV tasks. The central challenge we address is twofold: the inherent complexity of CV tasks, which is difficult for beginners, and the diversity of techniques and applications, which can pose difficulties even for field experts. This study renders essential tools and knowledge more accessible. This study may help practitioners to efficiently develop CV tasks.

Keywords: Computer Vision, AI, Machine Learning, Deep Learning, Image Processing

CITY CAR PARKING

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Abstract: With urban populations expanding worldwide, many cities are grappling with a shortage of parking spaces. This has led to an array of problems including increased traffic congestion, air pollution, driver frustration, and loss of productivity. Circling endlessly in search of an elusive parking spot has become a daily ritual for drivers in dense downtowns. To address this critical issue, this thesis presents the development and testing of a novel website designed to help drivers easily locate and reserve available parking in cities. The website aims to leverage technology to optimize the utilization of existing parking infrastructure. Extensive testing of the website in simulated urban environments demonstrated considerable improvements in parking spot identification times and substantial reductions in parking-related circling and congestion compared to conventional parking approaches. User surveys also showed a high level of satisfaction with the ease of finding parking using the website. The promising results indicate that implementing such a digital smart parking system could significantly enhance parking availability, reduce traffic congestion near parking facilities, improve driver experiences, cut emissions from circling, and support more livable and sustainable transportation in crowded urban centers. This thesis provides an exemplar methodology for designing, evaluating and validating the benefits of website-based parking solutions for cities facing parking shortages.

Keywords: Car parking, city area, ESP32, Sensors

STITCHER

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Abstract: The Stitcher is a Flutter-based mobile application designed to connect tailors and customers. It provides a comprehensive platform for both tailors and customers to interact and collaborate on clothing customization and order management. The system offers a user-friendly interface that simplifies the process of placing online stitching order, tracking orders, and managing tailoring tasks. The Stitcher application encompasses a wide range of features and functionalities. Customers can create personalized accounts, browse through a catalog of clothes designs, provide measurements, and specify fabric preferences. Additionally, customers can track the progress of their orders and receive notifications on status updates, ensuring a smooth and transparent workflow. Tailors get benefit from the Stitcher application by gaining access to a web panel that allows them to efficiently manage customer orders. They can view and accept orders, track measurements and record fabric details. The system provides tools for a comprehensive order history, enabling tailors to streamline their operations and enhance customer satisfaction.

Keywords: Mobile Application, Stitcher Application, Online Stitching Order, Tracking Order, Online Payment

A VIRTUAL DRESSING ROOM TO ENHANCE ONLINE PURCHASE SYSTEM

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Abstract: Dressing remains one of the basic necessities of every human being. Readymade stitched dresses are preferred, as they are comparatively cheaper. A number of garments outlets facilitate customers with a wide variety of dresses. However, it is a time-consuming activity to reach out these outlets, which restrict a customer from finding quality products with cheaper prices. Moreover, a customer finds it hard to find a product of his or her own choice. Additionally, trying each and every product in an outlet also remains a tedious job. To overcome these issues, this work presents an online solution, namely, Virtual Dressing Room (VDR) that aims to ensure outlets online, thereby, enhancing the availability of different products quickly. VDR provides a three-dimensional model of the human body that can be used to try different dresses in an outlet according to the body size of a customer. This work even enables a customer to try dresses from other country, which relieves a customer from outlets visits and provides ease of shopping. The customers can view and try garments onto the virtual model that is built in accordance with the specifications provided by the customer. This application will help the customers as well as the outlet owners by providing easy steps for selling and buying dresses online.

Keywords: Virtual Dressing, Online Purchase, Virtual Dressing Room, Online Dressing

ML-BASED MODEL FOR BRAIN TUMOR CLASSIFICATION

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Abstract: Recent technology development plays an important role in the medical field for early identification and classification of different diseases that cause death and brain tumor is one of the major diseases which causes death. Brain tumors grow when unregulated and undesired cells begin to grow fast and continuously. When therapy is started early on, there are some prospects of survival. Adults and children are the most commonly affected. In this situation, classification is extremely important. People's lives can be ruined by a single mistake. The main point of making a planned treatment is to make an accurate diagnosis of a brain tumor, and examining the correct grade and type of tumor also improves life expectancy. There are various image classification techniques such as Magnetic Resonance Imaging (MRI), Computed Tomography Scan (CT), and Ultrasound image (UI) are used to detect tumors in the human brain but especially MRI images are used in this work. Using MRI a very large set of data was generated, which raise the question mark on qualitative measurement of the data. As a result, a complete computer-assisted diagnostic system (CAD) is required to prevent human death by diagnosing tumor kind, size, and grade at an early stage. In the realm of brain tumor diagnosis, the newly adopted technique of automation has resulted in a breakthrough. Different methods of automated brain tumor detection are proposed in this study. Using all of the strategies and then selecting the best from the others depending on the outcomes. Convolutional Neural Network (CNN), VGG16, VGG19, MobileNet, ResNet101, Xception, and EfficientNet are some of the approaches and architectures that have been compared in this study. Implement all of the methodologies and architecture to automatically extract all of the critical information and attributes, then pick the best one for brain tumor categorization. The outcomes that we achieved from the techniques are CNN is 94.8%, Xception is 77.91% EfficientNet accuracy is 71.82%, InceptionV6 is 73.09%, VGG16 56.09%, VGG19 36.04%, and ResNet101 accuracy is 71.57%.

Keywords: Brain Tumor, Machine Learning, Classification

COMPARATIVE ANALYSIS OF SIMULATION TOOLS FOR CLOUD COMPUTING ENVIRONMENTS: AN IN-DEPTH EVALUATION OF FEATURES, CAPABILITIES AND LIMITATIONS

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Abstract: Cloud computing is an adaptable and effective solution for a communal collection of computer resources and applications. Cloud simulation tools are required to analyze the behavior of systems under different settings. These tools possess the capability to effectively model, simulate, and analyze the fundamental operations of the cloud environment, hence enabling academics, developers, and companies to make well-informed and rational choices. Nevertheless, the task of identifying the best appropriate cloud simulator for particular research needs is a significant obstacle. This study provides a thorough examination of 33 distinct cloud simulators, with the objective of aiding readers in the selection of the most suitable tool for their technique. It also facilitates the comparison of the architecture, strengths, limitations, and supported models of the most often used cloud simulators. The purpose of this study is to provide significant insights to researchers and academics in the area of cloud computing, aiding them in selecting an appropriate simulation tool that aligns with their individual requirements. The research reveals that Java is used as the programming language in 42.42% of simulators. Furthermore, 90.91% of simulators make use of different operating systems, 63% provide documentation, 87% give energy modeling, and 75.75% include a cost model. Based on a thorough evaluation of 33 simulators, we have determined that the top-performing simulators are CloudSim, CloudAnalyst, and Greencloud.

Keywords: Cloud Computing, Cloud Simulators, CloudSim, Simulator Features, Selection of Simulator

Augmented Reality Applications for Individuals with Special Needs: A Review

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Abstract: Aging is a natural phenomenon and ensuring the quality of life for individuals with special needs presents a growing challenge of concern for society and government. For an intergenerational society, there is a demand for technology-driven assistance systems to promote comfort and an improved quality of life. Ambient Assisted Living (AAL) leverages the benefits of comfort and autonomy with minimal interaction with ambient systems, while Ambient Intelligence incorporates context-aware technologies and pervasive computing to enhance healthcare, mobility, navigation, shopping, interaction, and collaboration. The emergence of mobile and smartphones has opened up opportunities for providing services to the elderly, promoting portability and pervasiveness with minimal interaction. This paper reviews the AAL, Ambient Intelligence, smart homes, and their integration with mobile technology and or smartphones. The existing solutions and their impact on individuals with special needs are also discussed in detail. This paper is intended to assist researchers and industrial scientists seeking to address real-world challenges in the domain of Ambient Assisted Living.

Keywords: Augmented Reality (AR), Ambient Assisted Living (AAL), Smart homes

Location semantic strategy for the privacy of vehicles in a vehicular network using location services

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Abstract: Location Based Services (LBS) provides various facilities such as real-time location and traffic information, traffic congestion prediction, etc. A vehicle shares its actual geographical location with LBS to get the nearest location of interest. Likewise, vehicle drivers release the semantics of the visited location (eg, shopping mall, hospital, restaurant, etc.) to the service provider. An adversary may capture the location data to analyze sensitive information about vehicle drivers, which creates various types of dangers such as physical harassment, social defamation, property loss, blackmailing, etc. Location privacy is one of the core problems while using location services for the nearest location of interest. Traditional location privacy schemes take the help of pseudonym-changing protocols for location hiding in the road network. Such as mix zone creation, usage of the silent period, path perturbation, location obfuscation, etc., where vehicle changes their pseudonyms. The main concern of these techniques was to conceal the actual positions of vehicles while communicating with LBS. However, they did not give attention to the semantic information of the visited location of vehicles. There is a need for an efficient framework that addresses the mentioned issues and problems. In this research, we introduced a novel approach for location privacy of vehicle drivers taking the help of location semantics while using location services. We use the concept perturbation policy in integration with a deep learning approach for hiding the actual geographical location as well as the semantic information of the nearest location of interest. Our main objectives in this research are: The design of a privacy scheme that prevents the leaking of sensitive information of vehicle drivers, integration of Deep Learning (DL) with an obfuscation mechanism, and reduction of the impact of perturbation policy on the location service utility. The preliminary results verify that the proposed scheme is efficient regarding location protection, anonymity set size, location service utility, and reduces location traceability compared with existing schemes.

Keywords: Location Privacy, VANETs, LBS, location semantics, deep learning.

A COMPREHENSIVE COMPARATIVE ANALYSIS OF VARIOUS NEURAL NETWORK-BASED MODELS FOR BRAIN TUMOR DIAGNOSIS – AN EMPIRICAL APPROACH

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Abstract: Recent technological developments play a vital role in early identification and classification of different deadly diseases. Brain tumor is one of the major causes of deaths around the globe. Brain tumor refers to fast and continuous growth of unregulated and undesired cells. Magnetic Resonance Images (MRI) are the most widely used for detection of such tumors. However, extraction of information from these images is a critical issue. To this end, various models have been proposed in the literature, where Convolutional Neural Network (CNN), Visual Geometry Group 16 (VGG16), InceptionV3, and DenseNet are found efficient. This paper performs a comprehensive empirical analysis of the aforementioned models for the detection of brain tumors. Simulation results show that CNN achieves the strongest and VGG16 exhibits the weakest performance, based upon the confusion matrix, in detection of brain tumors from the given MRIs among the selected set of models.

Keywords: Machine learning, Brain Tumor Identification, Brain Tumor Classification, Convolutional Neural Network, Magnetic Resonance Images.

NETWORK RESOURCE MANAGEMENT THROUGH ASTUTE LINK SELECTION MECHANISM IN WIRELESS COMMUNICATION

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Abstract: With the increasing proliferation of wireless communication networks, efficient management of network resources is imperative for ensuring optimal performance and user satisfaction. The network components play a crucial role in utilizing resources efficiently and the design of the network is also imperative for getting maximum performance. The multiple frequencies, ambient noises, and clumsily designed network degrade the data transmission which ultimately debauches the performance of wireless networks. To address all these issues a robust mechanism for network resource management, through the astute link selection is proposed for wireless communication environment. This mechanism works in two phases, initially, it would select the shrewd wireless link from available connections whilst, in the second phase, it would test the capacity of the network component in terms of time consumption for providing the best link, Duplicate Packet handling, and Energy utilization. The performance of the proposed mechanism is compared with other algorithms such as Hopfield Neural Network (HNN), Radio Resource Management (RRM), and Deep Q-Network (DQN), by conducting simulation in NS2. The outcome shows that the proposed method has utilized only 18% of energy whereas HNN, RRM and DQN utilized 58%, 28% and 93% respectively.

Keywords: Resource management, wireless communication, data transmission, network components

SUSTAINABLE DEVELOPMENT GOALS (SDGS)

REDUCING THE ENVIRONMENTAL IMPACT OF AGRICULTURE SECTOR IN PAKISTAN THROUGH HYBRID SOLAR-POWERED IRRIGATION SYSTEM

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Abstract: This research paper addresses the challenges posed by Pakistan's heavy reliance on fossil fuel-based energy consumption, particularly within the agriculture sector. Despite notable progress in other sectors transitioning to renewable energy, the agriculture sector is not progressing at the same pace and is facing a severe energy shortage. The study aims to identify areas for improvement and propose measures to reduce dependence on costly fossil fuel-based energy. Using the Veda-TIMES modeling approach, the research develops scenarios considering energy demand and fossil fuel consumption in agriculture. Two scenarios, the reference, and solar hybrid technology scenarios, highlight key areas for improvement. Water pumps are identified as critical areas where informed decisions and technological advancements can alleviate energy shortages and reduce greenhouse gas emissions. Aligned with the Sustainable Development Goals (SDGs), the paper emphasizes the significance of Affordable and Clean Energy (SDG 7) and Climate Action (SDG 13). Transitioning to sustainable energy sources in agriculture can enhance accessibility, and affordability, and contribute to reducing GHG emissions. The study offers tangible solutions rooted in renewable energy technologies, advocating for a sustainable and resilient future. By integrating hybrid solar-powered irrigation systems, Pakistan can achieve energy efficiency, cost-effectiveness, and environmental sustainability in agriculture. This research provides a comprehensive analysis of Pakistan's energy challenges and proposes actionable recommendations. Embracing renewable energy and aligning with the SDGs and the Paris Agreement will enable a greener and more sustainable agricultural system, contributing to socio-economic development and global climate change mitigation efforts.

Keywords: SDGs, Water Pumps, GHGs, Veda-TIMES, Hybrid Solar

MEASURING PAKISTAN'S ACHIEVEMENTS TOWARDS SUSTAINABLE DEVELOPMENT GOAL 3; GOOD HEALTH AND WELLBEINGCT

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Abstract: Background: The United Nations member countries have adopted the SDGs to transform our world by tackling multiple challenges faced by mankind and as their main objective to eradicate poverty, safeguard the environment, and ensure the health and well-being for all people. SDG 3 is a standalone goal to endorse "healthy lives and promoting well-being for all ages". Objectives: The present study was aimed to investigate the indicator-based national progress over time towards SDG 3 and highlight the gaps in achieving its targets in Pakistan for the 2030 agenda. Methods: Quantitative time series data related to the targets and indicators of SDG 3 in Pakistan was extracted from online resources including SDG tracker and BS (Bertelsmann-Shifting) index. The data was described and explored using exploratory analysis. Results were presented in a clear and visually appealing way using tables and graphs for better understanding and clarity. Results: Pakistan has an overall score of 48.3 in 2022 in SDG 3, having an overall sustainability achievement score of 59.34, and the country ranks 125th among all the ranked countries. According to the recent data, Pakistan has Universal Health Coverage (UHC) index score of 45 in 2019 and has a positive trend in improving its overall score. Conclusion: It is a matter of serious concern for the government, policymakers, and people to improve the conditions where the goal score and indicator values of SDG 3 are low. There is a dire need to increase awareness and facilities to access quality health facilities which may also be easily accessible affordable to prevent and reduce illness, mortalities and sustain a healthy life.

Keywords: Sustainable Development Goals, SDGs, SDG 3, Universal Health Coverage, Good Health and Well-being.

GREEN SILVER OXIDE NANOPARTICLES FOR REMEDIATION OF CHROMIUM TOXICITY IN INDUSTRIAL WASTEWATER: AN ECO-FRIENDLY AND SUSTAINABLE SOLUTION

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Abstract: Chromium (Cr) is one of the heavy metals (HMs) that is known to be a widespread environmental contaminant and a potential toxin that may adversely affects the human health across the globe. Green nanotechnology has recently received a lot of attention for developing the eco-friendly, low-cost, and sustainable materials for the efficient removal of persistent contaminants from wastewater. The current work was carried out to assess the ability of silver oxide nanoparticles (AgO-NPs) synthesized from the local spreader plant *Trianthema portulacastrum* to remove Cr ions from industrial effluent. These NPs were also characterized by some well-known high-tech techniques including Scanning Electron Microscopy (SEM) with Energy Dispersive X-ray (EDX) spectroscopy; SEM-EDS spot analysis, elemental mapping, X-ray diffraction (XRD), and Fourier Transmission Infrared Spectroscopy (FTIR). The sorption properties of AgO-NPs were examined in terms of contact time, adsorbent dose, pH, and initial Cr concentration in the solution. Different kinetic and isotherm models were successfully employed to delineate the Cr sorption equilibrium results. The Langmuir isotherm and pseudo-second-order kinetic models were well fitted the experimental data as compared to all other models showing that the Cr sorption was attributed to monolayer sorption and chemisorption process, respectively. AgO-NPs achieved the highest sorption (50 mgg⁻¹), at pH~5, an optimal adsorbent dose of 1 gL⁻¹, the initial Cr concentration level of 30 mgL⁻¹, at the 2h of contact time. These findings support the use of AgO-NPs to remove liquefied chromium from industrial effluents. Furthermore, the nanomaterial slurry loaded with Cr can be reused in the variety of industrial processes, including chrome recovery and silver electroplating activities. A suggested application of a sustainable and eco-friendly technology in industries dealing with hazardous metals like chromium (Cr) and silver (Ag) released as environmental contaminants. It aims to conserve time and resources in material production/extraction and foster industrial symbiosis within these sectors.

Keywords: Green nanotechnology; Clean water and sanitation (SDG-06), Wastewater treatment; Isotherm modelling

THE ROLE OF TOTAL QUALITY MANAGEMENT AND STRATEGIC KNOWLEDGE MANAGEMENT IN HEALTHCARE

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Abstract: In the rapidly evolving healthcare landscape, delivering high-quality patient care is crucial, especially in countries like Pakistan. The healthcare sector faces unique challenges in meeting growing demands for quality services while optimizing resource utilization. The literature implores that Strategic Knowledge Management (SKM) and Total Quality Management (TQM) are critical for any healthcare organization offering quality service. However, in Pakistan, SKM and TQM are not widely practiced in healthcare. This research aims to investigate the level of SKM within the context of Pakistan's healthcare system. The study employs a quantitative research design to comprehensively explore the SKM level using stratified random sampling. Through empirical examination, the results aim to provide insights into how SKM contributes to shaping and enhancing quality performance within the unique context of Pakistan's healthcare system. By providing evidence-based strategies and contextually relevant insights, the study aims to contribute to ongoing efforts to improve patient satisfaction, operational efficiency, and overall healthcare quality in the country.

Keywords: Healthcare, TQM, Patients, Strategic Knowledge Management, SKM

CONSUMER WILLINGNESS TO PAY FOR IMPROVED DRINKING WATER IN DISTRICT BUNER

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Abstract: This study investigates households' willingness to pay for better water systems, clean water availability, and water quality in Gadaizi tehsil, District Buner, Pakistan. This research aims to shed light on various aspects of water quality, health impacts, and socioeconomic factors influencing households' ability to pay for superior water services. This research will also look into waterborne infection and water purification methods residents utilize to mitigate the risk of water pollution. Utilizing a mixed-method approach with a structured questionnaire, data from 62 households were collected. SPSS was used for data analysis. Findings reveal awareness of water contamination issues, primarily attributed to marble industries. Most households use untreated water, employing boiling, chemicals, or candle filters. Water purification methods are influenced by media exposure and higher income. Common waterborne diseases, such as typhoid and diarrhea, are treated in private hospitals. Consumer willingness to pay for better water systems depends on income, education, and media exposure, although 76% of households do not use any water purification method. 84% of households are willing to adopt a private sector-provided system. Overall, the study highlights the necessity for public health initiatives and a thorough understanding of socioeconomic issues to guide political choices for better water delivery.

Keywords: Household income, Source of water, Water quality, willingness to pay

Integral Sliding Mode based voltage control for a TSR-MMPT Wind-Fed PMSG with Boost Converter

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Abstract: In recent times, there has been a renewed interest in the adoption of renewable energy sources (RES) due to the depletion of conventional fossil fuels. This trend has also been accelerated due to economic considerations and pollution awareness among the scientific community and society at large. There are many renewable technologies for e.g., photovoltaic solar, solar concentrator, biomass, tidal energy, geothermal and wind, etc. It is a well known fact that the roughly 70 percent of the earth's surface is composed of oceans and seas. In these places the average wind speed and availability of wind are much greater than on land. We can convert this wind energy into electrical power using appropriate power electronic converters. The most critical among these conversion tools is the DC-DC converter. The conversion of the available wind power into useful power is dependant on the maximum power point tracking (MPPT) technique utilized. Optimal Tip Speed Ratio (TSR) is one of the methods employed. However, we need a controller with robust tracking and fast convergence capability to achieve the desired power point. Since the wind speed is variable and the motor connected to the wind turbine suffers from time variant behavior and uncertainty in parameter values, it is logical to employ control methods with such characteristics. In this paper, we propose an integral sliding mode controller to regulate the output voltage because it performs effectively in presence of parameter uncertainty and bounded disturbances. In fact sliding mode control makes the wind energy system parameter insensitive, which is especially preferred for offshore deployment given the remote nature of the system. Simulations have been performed on matlab/simulink to show that performance of TSR-MPPT has improved along with discussion of appropriate results.

Keywords: Tip Speed Ratio, Sliding Surface, Boost converter, Sliding coefficients, Duty Cycle

CIRCULAR ECONOMY AND SUSTAINABLE DEVELOPMENT GOALS: A CASE OF BANKING INDUSTRY OF A DEVELOPING COUNTRY

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Abstract: This study aims to examine the role of the Pakistan banking industry in the transition towards a circular economy (CE) and implementation of the SDGs. This study uses the quantitative content analysis technique on 75 annual reports of 25 Pakistani banks. Data has been collected from websites and annual reports of concerned banks incorporating CE practices and SDGs in their annual reports. The content analysis findings depict that most firms have reported CE practices and SDGs. The results further report that CE practices and SDGs reporting has a positive impact on firm financial performance using different proxies such as return on equity (ROE) and Tobin's Q. Although there are studies conducted on SDGs and CE, however, this is the first study that has analyzed the linkage of CE practices and SDGs, emphasizing the role of Pakistan's banking industry. This study provides important insights for the regulators, policymakers, State Bank of Pakistan, commercial banks, and stakeholders in Pakistan's banking. The study has the originality in exploring and examining the ever-investigated dimensions of CE practices and SDGs in the banking industry of Pakistan.

Keywords: Circular Economy, Sustainable Development Goals (SDGs), Reporting, Banking Sector, Pakistan

ANALYZING THE INFLUENCE OF GOVERNMENT EFFECTIVENESS, HEALTH EXPENDITURE, AND SDGS ON LIFE EXPECTANCY IN PAKISTAN: EVIDENCE FROM TIME SERIES

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Abstract: Life expectancy is one of the fundamental health metrics, significantly impacts economic growth and other key indicators within a country, while health expenditures, government effectiveness and Sustainable Development Goals (SDGs) are integral components of the national and global policies. Aims: This study aims to investigate the influence of government effectiveness, health expenditure, and SDGs on life expectancy in Pakistan. Methods: Time series data from 2000 to 2020 for Pakistan was systematically analyzed for this purpose. Cointegration analysis was conducted to assess the long-term cointegration of all variables. Additionally, a causality test was rigorously employed to explore the short-term relationship between Government effectiveness, health expenditure, SDGs and life expectancy. Results: The findings from the Johansen Cointegration test unequivocally establish the existence of cointegration among all variables in the long term. Moreover, the results of the Granger causality test suggest a unidirectional causality from Government effectiveness, health expenditure, and SDGs to life expectancy in the short term. The confirmation of a long-term relationship among these variables and a short-term relationship highlights the significance of investing in healthcare services in Pakistan. Hence, advocating for increased investments in the health sector and a higher allocation of the national budget by the government for health expenditures in Pakistan is imperative. Conclusion: Enhancing health expenditure, strengthening Government effectiveness, and meeting SDGs objectives are needed on priority to raise the life expectancy of the population of Pakistan. This study also yields significant policy implications including advocating for the strategic implementation of health expenditure and targets of SDGs to enhance human capital and the welfare of the population, as evidenced by increased life expectancy.

Keywords: Government Effectiveness, Health Expenditure, SDGs, Life Expectancy, time series data

ENGINEERING & TECHNOLOGY

EVALUATION OF MACHINE LEARNING MODELS FOR PREDICTING SMART GRID PARAMETERS

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Abstract: Machine learning and deep learning algorithms have become indispensable tools for addressing prediction challenges in time series data, with a particular focus on efficiently managing and forecasting energy production, especially in the integration of renewable energy sources into smart grids. In this study, two distinct machine learning models, Gated Recurrent Units (GRUs) and Long Short-Term Memory (LSTM), are implemented to predict solar power generation for the upcoming year. The models are trained and evaluated using real-time solar power production data spanning a year, and performance metrics like Mean Absolute Error (MAE) and Mean Squared Error (MSE) are utilized for assessment. The findings indicate that the LSTM model outperforms the GRU model in terms of accuracy. Additionally, the predictions are further enhanced using a proposed hybrid model, Convolutional Neural Network Autoencoder LSTM (CNN AE-LSTM), which excels in capturing intricate patterns and long-lasting correlations in time-series data. In particular, the Hybrid Autoencoder LSTM model yielded a lower RMSE of 0.132 for daily power generation parameter and also a lower RMSE of 0.0877 for grid-connected power generation parameter. This research underscores the potential of machine learning techniques, particularly the CNN AE-LSTM approach, in advancing the integration of renewable energy resources into smart grids, contributing to the development of more efficient and environmentally friendly power systems.

Keywords: Renewable Energy, Smart Grids, Time Series Forecasting, LSTM Model

APPLICATION OF ROBUST CONTROL IN POWER ELECTRONIC DC-DC CONVERTER

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Abstract: The power electronic converter is the main power processing unit connected to the energy source, which helps to connect with the traditional power system. So, the stability conditions and performance of power electronic is widely studied, aiming at certifying the high quality in conversion and high performance when the Micro Grids are focus to uncertainties due to measurements, electrical variables and unmodelled dynamics. For this reason, this study presents the suggestion and estimation of robust controllers which will based on linear programming and Chebyshev's theorem, in order to improve the performance of a typical structure of multi-stage converters present in direct current (DC) systems. In such electric power distribution systems, point-of-load converters act as a constant power load, which presents a destabilizing nonlinear effect to their supply voltage. In this the robust controllers estimated overcome the negative incremental impedance instability problem due to Constant Power Load, which bases a high hazard of instability in interconnected converters. So, the robust controllers calculated confirm robust control performance and stability with a negligible performance degradation related to a conventional controller when the cascaded converter system is subjected to parametric uncertainties. The control methodologies evaluated are applied in both DC-DC Buck converters, assessments on the performance of the control methodologies evaluated are conducted. This study proposes the applications of robust control method in power electronic converter, the construction usually occurs in DC power distribution system. The purpose of this work is to improve the performance of system, as well as to certifying robust stability and overcoming instability difficulties caused by constant power load and dynamic interface of power converter.

Keywords: DC-DC Converter, Controlling, Power Convertors, Robust Control and Constant Power Load.

INVESTIGATION OF OPTIMAL RATIO OF HYBRID FIBER CONCRETE WITH STEEL AND POLYPROPYLENE FIBERS FOR ENHANCED COMPRESSIVE STRENGTH

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Abstract: This research investigates the optimization of compressive strength in Hybrid Fiber Reinforced Concrete (HFRC) by exploring the combined effects of steel and polypropylene fibers. Compressive strength is a critical parameter for assessing the structural integrity and load-bearing capacity of concrete. The primary objective is to determine the optimum combination of steel and polypropylene fibers to enhance the compressive strength of hybrid fiber concrete. Additionally, we aim to understand the effects of different fiber ratios on concrete strength. We conducted a series of experiments, varying the percentages of steel (SF) and polypropylene (PP) fibers in the concrete mixture. These experiments were designed to evaluate the impact of different fiber ratios on the compressive strength of the composite. Our study revealed a noticeable pattern that an increase in steel fiber (SF) and polypropylene fiber content enhanced compressive strength. It exhibited an increase up to 0.6% quantity of polypropylene fiber and 3% steel fiber, after which there was a diminishing trend with higher polypropylene fiber content. At this ratio, the peak improvement in compressive strength was a remarkable 42% increase compared to conventional concrete (CS). The results of this study provide valuable insights into the optimization of hybrid fiber concrete for enhanced compressive strength. The findings underscore the importance of selecting the right combination of steel and polypropylene fibers to achieve superior concrete strength. These advancements have the potential to significantly improve the load-bearing capacity and structural performance of civil engineering applications.

Keywords: Hybrid fiber concrete, steel fiber, polypropylene fiber, optimal ratio, compressive strength

DOCUMENT IMAGE ENHANCEMENT BASED ON HEURISTIC ALGORITHM

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Abstract: Preserving the integrity of vital documents by preventing degradation caused by unfavorable storage conditions and inadequate contrast is a significant concern. In this regard, various image enhancement techniques are employed to enhance information clarity for human observers. This paper introduces a novel heuristic algorithm to enhance the document image quality. A comparative analysis based on the structural similarity index measure (SSIM) of the proposed novel heuristic algorithm with the existing image enhancement methods, i.e., histogram equalization (HE), log transformation (LT), and Automated power law transformation (APLT) is presented. The simulation results show that the novel heuristic algorithm is better at enhancing the document image quality compared to the existing algorithms, i.e., HE, LT, and APLT.

Keywords: HE, LT, APLT, Heuristic algorithm, SSIM

TO INVESTIGATE AND COMPARE THE MARSHALL PROPERTIES OF TWO SOURCES OF AGGREGATE USING ASPHALT PENETRATION GRADE 60/70

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Abstract: The increasing global traffic volume and harsh environment are leading to pavement deterioration, particularly in areas with congested traffic. The use of weak aggregate in road construction has resulted in increased stress levels on the bitumen surface, leading to common issues like fatigue cracking and permanent deformation. Flexible pavements are being built worldwide, but the cost of assessing and rehabilitating them affects pavement life. This challenge urges experts and researchers to enhance pavement efficiency. To understand pavement failure mechanisms in heavily congested traffic areas, standard experiments were conducted on HMA samples using Margalla Hills Islamabad and Palai Malakand aggregates. Conventional samples with Margalla Hills aggregate percentages ranging from 3.5% to 5.5% were prepared, and Marshall Properties were tested. Modified samples, incorporating Malakand Palai aggregate, were also tested with the same percentage range. Comparing Marshall Properties, it was observed that Margalla Hills aggregate outperformed Palai aggregate. The comparison involved Marshall Stability, Flow, Bulk Specific Gravity, Theoretical Specific Gravity, Air Voids, Voids in Mineral Aggregate, and Voids Filled with Asphalt. To address Rutting (Permanent deformation), the use of strong and durable aggregate is recommended. All laboratory tests were performed according to AASHTO, ASTM, and BS standards.

Keywords: HMA, Rutting, Marshall Mix Design, Deformation.

MODEL STUDY OF CABLE STAYED RETAINING WALL

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Abstract: Retaining walls are unit engineering structures used to maintain soil and facilitate traffic flow between locations. They require transportation of raw materials but can be fabricated as hinged cable stayed RCC panels. In this study, a 450mm x 450mm steel box is fabricated with one side hinged, and sand backfill is applied to apply active lateral earth pressure. The reaction at the top of the wall is measured using a proving ring. The height of the wall or backfill is determined using a surcharge load in four steps of 25kg, 50kg, 75kg, and 100kg. The theoretical active thrust and reaction at the top of the wall for cable tension are formulated. A steel structure app called "Frame" is used to analyze the reaction and tension in the cable in the wall.

Keywords: Retaining Wall, fabrication, backfill, proving ring, RCC

EVALUATION OF TRIP GENERATION IN SINGLE GATED COMMUNITY IN URBAN AREA USING TRIP GENERATION MODELS

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Abstract: Single gated communities in urban areas for safe living have limited outdoor access that requires forecasting of future traffic for its smooth operations. During the peak hour, vehicle trips should be forecasted, which is to be used to study the congestion analysis at the provided gate. The objective of this study is to forecast future traffic by estimating trip generation in a single gated community. Trip generation models such as linear regression and poisson regression models have been used for forecasting trips during the peak hour. Three types of trips such as work based trips, shopping trips, social/recreational trips models were considered to predict number of trips. Work based trips depend on the workers departing in peak hour and it doesn't depend on household size or income level, whereas shopping trips and social/recreational trips depend on household size and income level. Analysis carried out in the study area indicated that number of trips are influenced by influenced family size, income level. In case of linear regression model, increase in household size from 2 to 8 people, the number of shopping trips are increased by 40%, social/recreational trips are increased by 17.8% and increase in income from 75 thousand to 5 lacs, number of shopping trips are increased by 675%, social/recreational trips are increased by 234%. In case of poisson regression model, increase in household size from 2 to 8 people, number of shopping trips are increased by 4.4%, social/recreational trips are increased by 9.29% and increase in income from 75 thousand to 5 lacs, number of shopping trips are increased by 19%, social/recreational trips are increased by 104%. So, greater the number of people in the house and higher income level, more number of trips will be generated.

Keywords: Trip generation, Single gated community, Linear Regression Model, Poisson Regression Model.

EFFECT OF BENTONITE ON MECHANICAL AND DURABILITY PROPERTIES OF FLY ASH CONCRETE

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Abstract: The objective of this research paper is to investigate the effect of bentonite on the mechanical and durability properties of fly ash concrete. Specifically, this study aims to evaluate the influence of different proportions of bentonite on the mechanical and as well as durability properties. Additionally, the study aims to compare the performance of fly ash concrete with and without bentonite and to identify the optimal proportion of bentonite that results in the best overall performance. The study is conducted using a mix design of fly ash concrete with varying proportions of bentonite (0%, 5%, 10% and 15%) as an additive, keeping the constant (25%) quantity of Fly-ash. The concrete samples are tested for compressive strength, flexural strength, and splitting tensile strength at different curing ages, such 28 and 56 days. The durability properties of the concrete are evaluated using tests such Acidic Attack Resistance Test by Immersion of Samples in 5% solution of Sulfuric Acid (H_2SO_4) and for Alkali Attack Resistance samples were immersed in 5% solution of Sodium Sulphate (Na_2SO_4). The results of this research will contribute to a better understanding of the effect of bentonite on the properties of fly ash concrete. The findings can be used to inform decisions about the use of bentonite as an additive in fly ash concrete mix design to improve its mechanical and durability properties. The research may also have broader implications for the use of sustainable materials in concrete production. It Shows enhancement in mechanical properties of concrete with the 10% Bentonite along with 25% Fly-Ash. While investigating durability properties we witnessed the betterment at 5% Bentonite and 25% Fly-Ash.

Keywords: Bentonite, Fly-Ash Concrete, Acidic and Alkali Attack Resistance

OPTIMIZING ELECTRIC VEHICLE CHARGER PERFORMANCE USING ROBUST NONLINEAR CONTROL TECHNIQUES FOR GRID TO VEHICLE APPLICATION

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Abstract: Efficient integration of grid-to-vehicle (G2V) and vehicle-to-grid (V2G) technology is crucial for sustainable plug-in hybrid electric vehicles (PHEVs) charging. The paper proposes a control strategy for a PHEVs system that integrates a photovoltaic (PV) based renewable energy system (RES) and battery-based energy storage systems (ESS). To efficiently utilize the photovoltaic system, an artificial neural network (ANN) is employed to determine the maximum power points (MPPs). To tackle destabilizing chattering affect a bi-directional power converter and current fed converter is used respectively. Two control strategies, super twisting sliding mode control (STSMC) and integral terminal sliding mode control (ITSMC) have been designed for PHEVs to minimize chattering phenomena. An improved grey wolf optimization (I-GWO) algorithm enhances control gains. Simulations in MATLAB/Simulink compare controller performance, and real-time assessment employs a hardware-in-the-loop (HIL) setup with C2000 Delfino and MCU F28379D Launchpad. This methodology provides insights into real-world EV charging and energy utilization.

Keywords: PHEV, MPPT, ANN, I-GWO, HIL

INTELLIGENT ANFIS-BASED ROBUST NONLINEAR MPPT ALGORITHM FOR PV SYSTEM

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Abstract: The growing interest in solar energy in modern distribution energy networks is accelerating due to its environmentally friendly attributes. The output power of photovoltaic (PV) modules demonstrates nonlinearity in response to varying environmental conditions. Enhancing the efficiency of the PV system is achievable by improving the performance of the controller employed for maximum power point tracking (MPPT). Since a PV array is a nonlinear system, employing a nonlinear controller is more appropriate to achieve MPPT and effectively manage system nonlinearities amidst dynamic environmental changes, hence the use of a robust nonlinear controller becomes essential. The effectiveness of MPPT in a PV system relies on the accuracy of the reference for the peak power voltage. For obtaining stable and dependable output power from a PV panel, an efficient mechanism for reference generation is essential. Therefore, this paper introduces an intelligent method for MPPT based on the adaptive neuro-fuzzy inference system (ANFIS). The proposed ANFIS-based MPPT provides an exceptionally swift dynamic response with high accuracy. The interface between the source and the load is employed by a buck-boost converter which assures quick adaptations to variations in operating conditions. The generated reference for peak power voltage by ANFIS is tasked to the proposed nonlinear controllers for tracking. A robust nonlinear condition-based super twisting sliding mode controller (CST-SMC) has been designed to effectively achieve MPPT. The proposed controller is evaluated using the MATLAB/Simulink platform and validated through hardware in the loop (HIL) real time testing environment. Simulation results affirm that the proposed controller demonstrates rapid and precise tracking. A comparative analysis with super twisting sliding mode control (STSMC), ANFIS control and classical perturb & observe controller is included to illustrate the performance of the proposed controller, particularly in response to sudden changes in environmental conditions.

MICROSTRUCTURAL AND COMPRESSIVE STRENGTH INVESTIGATION OF SUGAR CANE BAGASSE ASH AS PARTIAL REPLACEMENT OF CEMENT IN CONCRETE

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Abstract: The cement industry, known for its substantial carbon emissions, produces approximately half a ton of carbon dioxide per ton of cement. Addressing this environmental concern involves advocating for the utilization of waste products as an alternative material to replace cement. This approach aims to enhance or maintain concrete properties without compromising the desired structural characteristics, offering a sustainable solution to mitigate environmental impact. Bagasse ash, a by-product of sugarcane burning, is proposed as a cement replacement due to its ability to increase early strength and decrease permeability, ultimately enhancing concrete strength and durability characteristics. In an experimental study assessing the compressive and microstructural properties of concrete at 28 and 56 days, it was observed that replacing cement with bagasse ash resulted in increased strength, particularly evident with a 10% replacement.

Keywords: Bagasse ash, concrete, compressive strength

PECTIN-BASED HYDROGELS FUNCTIONALIZED WITH NANOPARTICLES FOR ENHANCED DEGRADATION OF DYES

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Abstract: The demand for wastewater dye degradation arises from the environmental and health hazards associated with the discharge of untreated or inadequately treated dye-containing wastewater. Efforts to address dye degradation involve the development and implementation of efficient treatment processes. The review intends to reveal pectin-based hydrogels functionalized with nanoparticles as an innovative approach for the enhanced degradation of dyes in wastewater treatment. This combination leverages the unique properties of both pectin and nanoparticles to create a highly effective and environmentally friendly solution. Pectin being biodegradable is environmentally friendly. In form of hydrogels, the three-dimensional networks of pectin can absorb and retain large amounts of water, creating an effective medium for dye degradation. Pectin possesses functional groups, such as carboxyl groups, that can interact with nanoparticles and enhance their stability within the hydrogel matrix. Nanoparticles, incorporated into the pectin-based hydrogel, can enhance the degradation of dyes through advanced oxidation processes. It creates a synergistic effect. The hydrogel matrix provides a stable environment for the nanoparticles, preventing their agglomeration and can selectively adsorb dye molecules. Besides all, the hydrogelnanoparticle composite may be designed for multiple applications, allowing for the easy recovery and reuse of the materials.

Keywords: Pectin, hydrogels, cross-linking, wastewater, adsorption, dye degradation

CHALLENGES IN THE IMPLEMENTATION OF PROJECT MANAGEMENT OFFICE (PMO): A CASE STUDY OF HEALTH CARE CONSTRUCTION PROJECT

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Abstract: In the present global environment, projects in the business and industries are becoming complex and highly competitive which requires organizational restructuring and improvising business models. Implementation of the Project Management Office (PMO) has emerged as a strategic response to the critical business challenges. The project management office (PMO) is a centralized management structure that standardizes project-related governance processes and facilitates the sharing of resources, tools, methodologies, and techniques. However, this fast-growing concept of PMO in the world of project management has its own challenges and several factors need to be considered while implementing a successful PMO. This case study explores the challenges of implementing PMO in the Health care construction project. A qualitative research methodology is adopted through semi-structured interviews with four PMO Managers who were part of the transition from External PMO to In-house PMO and played a pivotal role in its implementation. The case study highlights the challenges of implementing In-house PMO such as opposition from key stakeholders, inadequate planning in transition from External to In-house PMO, lack of PMO expertise in the organization, communication gap among team members, non-co-operative behaviour from External PMO members and conflicting priorities. In a nutshell, the primary reason for devastating consequences was the improper planning of change management during transition phase. It was further suggested that the change should be gradual, iterative and incremental moving from Supportive PMO towards Controlling PMO. The analysis of this study will be helpful for organizations aiming to implement a PMO.

Keywords: Project Management Office, Health Care, Construction Projects, Project Management Institute

THE INNOVATIONS IN CONSTRUCTION SAFETY: A REVIEW

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Abstract: Due to environmental concerns and the potential for accidents, construction safety has consistently ranked as a significant priority. Many individuals are of the opinion that employment in the construction industry carries a substantial risk of disease and injury for its workforce. Recent advancements in technology have yielded innovative equipment and methodologies capable of elevating safety standards on construction sites. This review study encompasses emerging technologies such as Building Information Modeling (BIM), safety management software, drones, robotics, artificial intelligence (AI), sensors, wireless networks, wearable technology, and geographic information systems (GIS) that contribute to enhancing construction safety. The integration of the Internet of Things, robotics, and artificial intelligence has the potential to reduce construction costs by up to 20%. Engineers can deploy miniature robots within structures under construction, utilizing virtual reality goggles to monitor progress through cameras. Companies are leveraging AI to design safety systems for worksites, employing it to monitor real-time interactions among workers, equipment, and various elements on the job site. This enables timely notifications to managers about potential issues related to productivity, safety, and construction. Despite predictions of substantial job losses, it is not anticipated that AI will replace human workers.

Keywords: Innovations in construction, Construction Safety, Artificial Intelligence, BIM, HSE

LEAKAGE CURRENT ANALYSIS OF POLYAMIDE NANOCOMPOSITE INSULATORS UNDER THE IMPACT OF UV RADIATION AND DC ELECTRICAL STRESS

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Abstract: This work presents extensive research on polymeric insulators, specifically polyamide (Nylon) nanocomposites, with a focus on how UV radiation and DC electrical stress impacts to cause material degradation. A comparison with conventional ceramic insulators highlights an investigation into how polymeric insulators age in the environment. Modern insulation technologies that incorporate nanotechnology developments are also discussed, with a focus on the role of UV radiation as a major environmental stress. The main goal is to analyze the DC leakage current in polyamide nanocomposite insulators exposed to UV radiation and DC electrical stress. The study investigates different loading percentages of ZnO nanofillers in insulators. The research seeks to assess the insulator's performance before and after aging using a DC Leakage Current Analysis technique using a specialized UV chamber to simulate controlled weathering. The main technique for evaluating the effectiveness of polyamide nanocomposite insulators in the analysis is DC leakage current. Using a dedicated UV chamber, we apply controlled weathering to the insulators. DC leakage current is an important parameter that is measured after aging to determine how UV radiation and DC electrical stress affect the insulator's electrical characteristics. According to the study, the well-dispersed ZnO nanofillers in the composite improve the insulator's resistance to the deteriorating effects of UV radiation. Nanocomposites containing 3% weight percent ZnO perform particularly well. The study investigates how UV radiation and DC electrical stress affect DC leakage current, highlighting the nanocomposites' potential for electrical insulation applications. This study emphasizes the significance of nanocomposite technology in determining the resistance of polyamide insulators to environmental stresses. When UV radiation and DC electrical stress are combined, the study's emphasis on DC leakage current analysis provides important new insights into the applicability of these innovative materials and demonstrates how well they work to extend the life and durability of insulators that are essential to electrical systems.

Keywords: High Voltage, nanocomposites, Insulators, leakage current

OPERATIONAL DATA ANALYSIS OF WIND FARM TRANSFORMERS WITH ONAN COOLING ACCORDING TO IEC 60076-7:2005

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Abstract: This study focuses on the operational data analysis of wind farm transformers utilizing Oil Natural, Air Natural (ONAN) cooling, following the guidelines outlined in IEC 60076-7:2005. It is pertinent to calculate the top oil performance for optimal performance. This paper aims to determine the top oil temperature (ToT) by fitting measured data based on load and ambient temperature. Moreover, this research has conducted error analysis between measured and calculated oil temperatures and has calculated the maximum overload factor to ensure safe operation under varying conditions. Additionally, recommendations are made for model improvement for achieving maximum efficiency. The operational data, including power, no-load losses, load losses, and mass distribution, is analyzed using Python. A mathematical model, adhering to IEC 60076-7:2005 recommendations, is developed to predict top oil temperature based on load and ambient conditions. The model is validated by comparing predicted and actual top oil temperatures. Top oil temperature is calculated for measured load conditions, yielding approximately 27.07°C for a load factor of 0.6. Error analysis shows a maximum error of 24.7°C and an average error of 5°C. Recommendations for model improvement include fine-tuning constants and enhancing data collection. The maximum overload factor is calculated to be 1.2, ensuring safe operation below 100°C. The calculated top oil temperatures demonstrate the dependability of wind farm transformers under varying conditions. The model's accuracy is confirmed through error analysis, aligning with global norms. Besides, the study emphasizes the significance of accurate top oil temperature prediction for optimal transformer performance, contributing to improved reliability and durability. Finally, this research aims to enhance the understanding of wind farm transformer behavior through operational data analysis. The accurate prediction of top oil temperature and error analysis validate the model's applicability. Incorporating IEC 60076-7:2005 guidelines ensure alignment with global standards. Future work may involve validating the model with extensive field data and investigating additional environmental variables for further accuracy. Overall, this study contributes to advancing wind farm transformer performance and the reliability of renewable energy systems.

Keywords: Wind farm transformers, top oil temperature, maximum overload factor, Oil Natural Air Natural (ONAN)

IMPLEMENTING OUTCOME-BASED EDUCATION FOR QUALITY ENGINEERING GRADUATES IN PAKISTAN

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Abstract: This research paper explores the imperative role of implementing Outcome-Based Education (OBE) and specialized assessment methodologies aligned with the Washington Accord (WA) 2012 program outcomes within the domain of engineering education. The heightened interest of prominent multinational corporations in assessing the global competence of graduates, vis-à-vis established educational benchmarks, underscores the significance of this endeavor, particularly concerning international recruitment endeavors. The WA, a meticulously crafted accord tailored for engineers, revolves around the concept of mutual recognition of tertiary-level qualifications in engineering, spanning member countries. It commendably acknowledges the substantial equivalence in the accreditation of engineering qualifications. Adding a contextual perspective, it is essential to acknowledge that the Pakistan Engineering Council (PEC) had already initiated efforts related to quality assurance and accreditation in the realm of engineering education. PEC, entrusted with the pivotal role of regulating and accrediting engineering programs and institutions in Pakistan, diligently ensured that these entities met well-defined standards and quality benchmarks. Periodic assessments and evaluations were conducted by PEC to guarantee the delivery of high-quality education, all in adherence to specified criteria and guidelines. Nevertheless, it's crucial to recognize that the precise application of Continuous Quality Improvement (CQI) methodologies may vary among different institutions and organizations, PEC included. This variability is inherent in the multifaceted educational environment, as each entity customizes its approach in alignment with its distinct context. The integration of CQI principles and practices typically operates within the broader framework of quality assurance and accreditation processes within educational institutions. In this paper, we introduce a comprehensive approach that examines each Program Outcome (PO) as a central focus, accompanied by precise performance criteria. This method offers readers a transparent means of objectively evaluating whether students have met these criteria. Consequently, it supports the seamless implementation of Continuous Quality Improvement (CQI) within the program, ultimately contributing to the production of high-quality engineering graduates in Pakistan.

Keywords: Outcome-Based Education (OBE), Washington Accord (WA) 2012 ,Engineering education, Quality assurance Accreditation Continuous Quality Improvement (CQI) Program Outcomes (PO) Specialized assessment Engineering graduates Pakistan Engineering Council (PEC)

EFFECT OF EPOXY ACRYLIC MODIFIED FIRE-RETARDANT COATING ON POST-FIRE MECHANICAL PROPERTIES OF CONCRETE

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Abstract: Fire-related incidents present significant challenges to the structural integrity of concrete, resulting in a substantial decline in its mechanical properties. Concrete, being a widely utilized construction material, demands the preservation of its structural performance after exposure to fire to ensure the safety and longevity of structures. Fire-resistant coatings play a pivotal role by acting as effective thermal barriers, safeguarding concrete surfaces, alleviating direct temperature exposure, and retarding the damage caused by elevated temperatures within the concrete matrix. This research aims to evaluate the impact of fire-resistant coatings on the mechanical properties of concrete subjected to extreme heat conditions. Concrete specimens were subjected to temperatures of 600 °C and 800 °C, followed by subsequent air cooling to room temperature. The study focused on assessing the compressive strength of concrete samples, both with and without the application of fire-resistant coatings, following exposure to high temperatures. Results: The results showed a significant disparity in post-fire compressive strength between the coated and uncoated specimens. After exposure to temperatures at 600 °C and 800 °C the compressive strength of concrete coated with Epoxy Acrylic fire-retardant increased by 30.3% and 95.4% compared to concrete without fire coating. Conclusion: This indicates the epoxy acrylic modified fire-retardant coating's substantial ability to effectively mitigate the loss of compressive strength in concrete after fire exposure.

Keywords: Fire Coating, Epoxy Acrylic Coating, Intumescent coatings, Concrete surface protection, Compressive Strength

INVESTIGATION FOR OPTIMAL HYBRID CONCRETE BLENDED WITH POLYPROPYLENE AND STEEL FIBER TO ENHANCE STRUCTURAL PERFORMANCE

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Abstract: Hybrid Fiber Reinforced Concrete (HFRC) is a subject of significant interest for its potential to enhance concrete tensile strength. This study investigates the influence of polypropylene (PPF) and steel fibers on HFRC performance. Aims & Objectives: The aim is to understand the impact of varying fiber content and analyze the observed trends. The objective is to identify the optimal PPF and steel fiber ratios for improving split cylinder tensile strength in HFRC. Methods: A comprehensive experimental program involving a total of 35 combinations was conducted using different HFRC mixtures, incorporating PPF (ranging from 0.2% to 1%) with 0.2% increment and steel fibers (0.25%, 0.5%, 0.75%, 1%, 1.5%, 2% to 3%). Subsequently, split tensile strength tests (ASTM C 496/C 496M) were performed. Results: The influence of increasing PPF content alongside steel fibers on tensile strength is significant. A substantial 51% enhancement was observed compared to control specimens. Notably, HFRC mixtures with 0.4% to 0.6% PPF and 0.75% to 3% steel fibers exhibited the most substantial improvements. However, there was a decrease in tensile strength when 1% PPF was combined with 1% steel fibers. Conclusion: This research emphasizes the importance of precise fiber ratio adjustments in HFRC to achieve optimal tensile strength, offering insights into material science and construction practices. By understanding the right combination of fibers, we can design stronger and more durable structures for various engineering applications such as bridge construction, and roadway infrastructure.

Keywords: HFRC, Polypropylene, Split tensile strength, Fiber

ENVIRONMENTAL AND ECONOMIC ASSESSMENT OF COLLECTIVE RECYCLING WASTE PLASTIC IN ASPHALT ROAD CONSTRUCTION: A CASE STUDY OF PAKISTAN (ISLAMABAD)

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Abstract: Pakistan leads South Asia in mishandled plastic, with an annual production of 55 billion plastic bags, the majority of which ends up in municipal sewers, landfills, or trash cans. Annually, Pakistan generates approximately 30 million tons of solid waste, with plastics comprising nine percent of this total. This surge in plastic waste contributes to a growing environmental crisis, causing harm to marine ecosystems, endangering human health, disrupting food supply chains, and contaminating the air, water, and land. The Pakistani government reports that on a daily basis, the country produces about 87,000 tons of solid waste, primarily concentrated in major urban centers. Karachi, Pakistan's largest city, alone generates over 13,500 tons of municipal waste every day, underscoring the ongoing challenge of urban waste management in major cities. This study offers a comprehensive economic and environmental analysis of Pakistan's inaugural 'Plastic Road' project, which involved the innovative use of recycled plastic waste in the construction of recycled asphalt pavement (RAP). This plastic-waste RAP was inaugurated on December 12, 2021, and constitutes a one kilometer stretch of Islamabad's Ataturk Avenue (major arterial); funded by the Coca-Cola (beverage company), and the Capital Development Authority (CDA). The dry process method was utilized to integrate plastic bottles into the pavement, offering a more durable and environmentally beneficial solution. This project played a significant role in addressing plastic waste issues, as plastic is inherently hazardous and non-biodegradable. As documented in the literature, a standard plastic bag may take up to 500 years to decompose, while a plastic bottle can persist for approximately 300 years. This project demonstrated substantial cost savings in addition to delivering environmental and performance benefits. Cost estimates indicate that one kilometer of plastic road costs 21 million Pakistani Rupees (2021 estimates) in total, as opposed to approximately Rs. 50 million Pakistani Rupees required for conventional asphalt roads. This study highlights that plastic roads are not only cost-effective but also environmentally friendly. Constructing pavements from plastic waste offers an economical approach to infrastructure development while promoting a sustainable method for managing and disposing plastic waste. Keywords: Plastic Waste, Recycling, Green Environment, Asphalt Pavement

Keywords: Plastic Waste, Recycling, Green Environment, Asphalt Pavement

A NOVEL APPROACH FOR QUALITY OF SERVICE BASED COST MINIMIZATION IN A COGNITIVE RADIO NETWORK

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Abstract: This paper presents a novel real-time scheduling algorithm that integrates orthogonal frequency division multiplexing (OFDM) technology and water-filling power allocation to optimize quality of service (QoS) and reduce operational costs in cognitive radio networks (CRNs). CRNs face challenges such as changing channel conditions, imperfect spectrum sensing, and primary user interference. The algorithm dynamically adapts to these conditions, efficiently utilizes spectrum resources, and minimizes costs for operators, all while preserving or enhancing QoS for users. Simulations validate the algorithm's superior performance compared to sensing-only and leasing-only strategies, making it a valuable contribution to CRN research and deployment.

Keywords: CRN, Spectrum sensing, Spectrum leasing, Optimal power allocation, CRN operator's cost minimization.

EXPERIMENTAL INVESTIGATION OF LOCAL SCOUR AROUND BRIDGE PILES

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Abstract: One of the most significant causes of bridge failures in the 21st century is predominantly because of the scouring phenomenon. Due to recent changes in climate, the probability of floods has significantly increased and as such causes a major threat to the existing infrastructures of which bridges are of vital importance. In the recent past, Pakistan has suffered devastating floods due to the changing climate, and as such this study aims to calculate the scour phenomenon around the Kabul River Bridge on the M-01 Motorway near District Charsadda. In-situ conditions are experimentally modeled by taking a soil sample to ascertain the grain size distribution around the Kabul River Bridge. In-situ conditions are modeled in the laboratory flume using representative scaled-down pier sizes and shapes. Flood Frequency Analysis by Log-Pearson Type-III distribution is carried out to calculate discharges for various recurrence intervals in order to calculate different scour depths using HEC-18 equations. To reduce the scouring effect, the wired mesh is surrounded around the piers to calculate its damning effect on scour depths. Lastly, the resulting scour depths calculated from laboratory results are analyzed against the existing bridge pier depths to ascertain their susceptibility to failure. Preliminary results showed circular pier showing less scour as compared to the other shaped piers. Further experiments using different diameter wire-mesh enhanced piers resulted in significant scour reduction ranging from 30 to as far as 50% with variation attributed to different pier geometries and wire-mesh diameters.

Keywords: Bridge pile, local scour, flow altering.

SUBSTITUTE MATERIAL FOR SUSTAINABLE CONCRETE PRODUCTION

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Abstract: Substitute Material For Sustainable Concrete Production” Ammad Khan, Zain Imran Awan, Sanan Muazzam, Hafiz Um-E-Aimen Sami, Rozi Khan Student Of Civil Engineering Department, City University Of Science And Information Technology, 25000 Peshawar, Pakistan. 2023 ABSTRACT: This study aims to find sustainable alternatives to Portland cement, a key component of concrete that significantly contributes to CO₂ emissions and poses environmental challenges. The study focuses on utilizing waste concrete powder (WCP) to replace a portion of cement in concrete without compromising its compressive and split tensile strength. The study tested four concrete samples, including a control sample and those with varying percentages of WCP replacements. The slump test showed that the 20% WCP replacement maintained reasonable workability and acceptable water absorption, while dry density did not differ significantly among samples. However, higher WCP percentages resulted in increased impurities, potentially affecting material strength. The compression test revealed that the 20% WCP mix exhibited the smallest decrease in strength over different aging periods, while split tensile strength improved at around 25% WCP replacement but decreased at higher and lower percentages. Scanning Electron Microscope analysis indicated irregular particle shapes, weak C-S-H bonds, and excessive porosity in the WCP mixes, which may affect workability, durability, and permeability. X-ray Diffraction results showed the presence of Al, Fe, and Si along with significant amorphous material in the binary concrete mixtures. The bonding between cement and WCP was weak, and porous structures facilitated oxygen and silicate molecule attack, further weakening the bond. This study also highlights the importance of finding sustainable alternatives to Portland cement and careful determination of optimal WCP replacement to mitigate potential negative effects on the environment and promote SDGs 11, 12, 13, and 15, which focus on sustainable cities and communities, responsible production and consumption, climate action, and life on land, respectively.

Keywords: Substitute material, sustainability, recycled concrete waste, microstructural properties

OPTIMIZATION OF SELF CURING CONCRETE BY USING POLYETHYLENE GLYCOL (PEG) ADMIXTURE

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Abstract: Concrete is one of the most usable construction materials for the entire world today, and this is because of its rapid strength gain and durability. The strength and durability of concrete depends upon the several factors like weather, concrete mix ratio, types of aggregates and some other physical and chemical properties of concrete and the reactions between the different elements of cement called the hydration reaction. For complete hydration reaction, we need optimum amount of water to complete the hydration reaction. Curing may be done with several methods, one of which is the use of self-curing agents in the concrete. This research aims to study the effect of chemical curing agents on the behavior of self-curing concrete. The chemical agent which is used in the investigation is poly-ethylene glycol (PEG) 400. The investigation also has ambitions to give reimbursements to the environment and to make the concrete environment friendly. The investigation includes the compressive strength, the split tensile strength, density, and ultrasonic pulse velocity (UPV) tests. The results of self-cured concrete were appreciably good, parallel to the conventionally cured concrete. For producing internal-curing concrete trail dosage of 0.7%, 0.9%, 1.1% and 1.3% of PEG-400 by weight of cement was used and tested. The optimum percentage was 0.9% by the weight of cement. Using self-curing concrete can contribute to sustainable development goals by improving Industry, Innovation, and Infrastructure (Goal 9) in the SDGs goal No 9, then the investigation especially archives the target No. 9.1. by making the projects economical. The investigation has a great tendency toward the promoting responsible consumption and production (Goal 12) in which then the target 12.1 is achieved which is the efficient use of natural resources, and the investigation tries to use the water in its need if we can do alternative to the use of water it is good. In the (Goal 13) climate change, the results of investigation play a great role to reduce the chances of droughts, and protecting land resources (Goal 15), water is the need of every greenery on the land and if we have to grow the crops then we need a fertile land, and in the absence of lack of water it is not possible to have good fertile land, the investigation specially achieved this goal also.

Keywords: self-curing, PEG-400, environment, compressive strength

INVESTIGATION OF DC LEAKAGE CURRENT OF HIGH TEMPERATURE AND HIGH HUMIDITY STRESSED POLYAMIDE NANOCOMPOSITES FOR CABLE AND MOTOR INSULATIONS

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Abstract: In the field both cable and motor insulation are being exposed to stresses like high temperature, high humidity and high voltage. These stresses can effect the organic nature of polyamide which direct influence the insulation properties. 2. Aims/Objectives The aim of the research paper is to design an optimal high temperature and high humidity resistant nanocomposite insulation. 3. Methodology The methodology of the research work is using solution casting for sample fabrication, the accelerated hydrothermal aging using ASTM F1980-16 standard. The measurement of the leakage current using resistive method. 4. Results The leakage current was measured using resistive method. The leakage current was in the range of mAs. The lowest leakage current was in the case of nanocomposite having 3 % nanofillers in it. 5. Conclusion It was concluded the nanocomposite of polyamide showed better performance than Neat polyamide up to some % filler loading. it was due to the high surface energy of nanofillers resulting in lower surface degradations. 1 line Keywords: high voltage, insulation, nanocomposite, degradation, stresses

Keywords: high voltage, insulation, nanocomposite, degradation, stresses

SEISMIC ANALYSIS OF A REINFORCED CONCRETE STRUCTURE IN PESAHWAR AND AZAD-KASHMIR REGIONS BY UNIFORM BUILDING CODE (UBC-97) AND MODERN BUILDING CODE (IBC-09)

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Abstract: In history, so many lives were lost due to natural disasters specifically due to Earthquakes. October 2005, earthquake was detrimental in this regard as almost 8000 people lost their lives as well as loss of socio-economic values throughout the country. There is a dire need to understand the seismicity of the active regions of Pakistan as well as the structural response to earthquakes occurred. Building Code of Pakistan BCP is co-related with UBC-97 code, which divides the seismic zones region based on peak ground accelerations (PGA). However, there are better approaches available for the estimation of seismic loading for building structures i.e. ASCE-07 and IBC- 2009. The study uses compares the classical (UBC-97) approach and the modern building code approach (ASCE-07 and IBC-2009) for estimation of seismic loading as well for the structural response of the buildings for Peshawar and Muzaffarabad region. A symmetrical 9 Floors of a reinforced concrete structure is selected and analyzed by Gravity load analysis and seismic analysis, Gravity load analysis is for validity of 2D frames model analyze by SAP-2000 with manual analyses and design method of ACI code, then the structure is analyzed by using Equivalent static lateral force method from UBC-97 code and as well as from ASCE 7-05 (IBC-09) and dynamic response spectrum analysis from UBC-97 and ASCE 7-05 (IBC-09). 2D frame models results shown in graphs in terms of variation in shear at each column, moments at each joint and deflection or lateral story drift at each story level from both seismic design codes Results show the seismic demands obtained from modern building code is economical and well understandable but the classical code gives a conservative value for seismic demands, Modern building code defines all the seismic parameters extensively and explicitly due to actual recorded and calculated seismic ground motion parameters at each location or site. Hence, the dynamic analysis from ASCE-07/IBC-09 gives an understandable value for structural parameters and is safe for the design of RCC structures.

Keywords: Spectral Acceleration, Seismic Hazard Analysis, Peshawar Region, ASCE-07/IBC-2009

THE SOLUTION TO THE LOAD-SHEDDING, EFFICIENT AND STABLE SOLAR ENERGY IN PAKISTAN

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Abstract: Nowadays, Pakistan is facing very severe energy crisis. This crisis poses immense difficulties for a common citizen as well as hinders the industrial growth. The dependence of fossil fuel extends beyond 80% with 50% of the needs being met by the indigenous gas reserves. 30% of the needs are being fulfilled by oil imports which puts considerable burden on country's economy. As the gap between the production and consumption widens due to increased consumption and limited local resource, the situation is becoming worse. With the projected global decrease in the fossil fuel availability, the situation could become dire in a matter of few years. To overcome the problem of energy shortage, some efficient stable renewable energy resources must be explored. Among different alternative energy resources, solar energy is abundantly available in the country. Nature has gifted Pakistan with abundance of sunshine almost whole year and throughout the country. If 0.25% of only Baluchistan (about 0.1% of Pakistan) is covered with solar panels with an efficiency of just 20%, enough electricity would be generated to cover all of Pakistani demand. This depicts an ideal situation for the country to look into the solar energy as an alternative to fossil fuels. Yet, there is very little work being done in this area in Pakistan. The research in photovoltaics (organic and inorganic) is almost non-existing. Organic Photovoltaics (OPV), in spite of their promising ease in manufacturing, suffer from the issues of low efficiency and limited temporal stability. We are addressing three most important current issues in the polymer solar cell technology that are related to the efficiency, transport, and lifetime in our research. The approaches being used are all non-traditional with a potential of highly impacting the field.

THINKING BEYOND PZT; GIANT PIEZO-RESPONSE IN PMN-PT THIN FILMS

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Abstract: Lead zirconate titanate (PZT) is widely used piezo-electric material for wide range of applications in general and for Piezo-MEMS devices in particular which are commonly used for sensors and actuators applications. An alternate to PZT is Lead Magnesium Niobate-Lead titanate (PMN-PT). This material shows superior piezoelectric response compared to PZT. The Performance of piezo-MEMS devices could be enhanced dramatically by incorporating this material in the device structure. During the talk, recent developments in the field of PMN-PT based Piezo-MEMS devices will be discussed.

Keywords: Piezoelectric, MEMS, Thin films

IMPROVING THE PERFORMANCE OF AQUEOUS ZINC-ION BATTERY THROUGH STRUCTURAL MODIFICATION OF HYDRATED VANADATE WITH LANTHANUM

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Abstract: The study investigates La-pre-inserted hydrated vanadium pentoxide (LaVOH) as a cathode material for aqueous zinc-ion batteries (AZIBs), aiming to improve interlayer spacing and battery performance. During hydrothermal synthesis, chemically pre-inserting trivalent La-ions alters the local atomic environment, enhancing the cycling stability and carrier mobility of hydrated vanadium oxide (VOH). LaVOH's nanowire morphology presents a more open packing structure than VOH. This structural change facilitates rapid electron transfer and Zn^{2+} diffusion by enlarging lattice spacing and reducing electrostatic attraction forces between zinc ions and the host crystal. As a result, LaVOH exhibits a high capacity of 410 mAh g⁻¹ at 500 mA g⁻¹ and demonstrates improved long-term cycling stability at 4000 mA g⁻¹, surpassing VOH with capacity retention of over 80% across 3000 cycles. The introduction of La-ions mitigates structural degradation and fosters subsequent electrochemical processes.

Keywords: Zn-ions; Batteries; Hydrated vanadate

UTILIZATION OF CEMENT MORTAR AS LOAD BEARING MATERIAL FOR AFFORDABLE HOUSING

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Abstract: Pakistan is going through a phase of population explosion, the rapid increase in population numbers across all the landscapes of the country has posed serious threats in terms of meeting the basic needs of the people. In this context, the Naya Pakistan Housing Scheme intends construction of 5 million houses to meet the basic requirements of communities with very low income. The research is aimed at proportioning of mortar with cement and sand by adding some admixtures of an optimum percentage (SBR). The study conducted utilized 5% of SBR in the mortar samples by weight of cement through a process of trial sampling for attaining the optimum amount (SBR). The behavior of the specimens was tested for compression, tension as well as for material density. The tests conducted showed promising results in terms of mortar as load bearing material for single story units specialized for its use in the affordable housing project. The cost reduction is about 25% if the material is used on full scale for the construction. The material revealed a compressive strength within the range of 450 to 700psi which is in the proximity of fourth-class bricks. The tensile capacity of the mortar so developed is four times (100psi) than that of adobe structures (25psi) and two times that of brick masonry (50psi).

Keywords: Affordable housing

RISKS IDENTIFICATION BETWEEN THE PRODUCTION DEPARTMENT AND WAREHOUSE/STORE

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Abstract: In a manufacturing environment, warehouse is critical in ensuring seamless operations. Industries have automated the interaction through different digital means. However, persistent issues between warehouse and production department leads to different quantitative and qualitative risks. These diverse risks can be systematically mitigated, once they are identified and quantified. This research investigates and analyzes the risks associated with the receiving and distribution of products between storage facilities/warehouses and production department in a Pakistan manufacturing environment. The research emphasizes on preventive and predictive approach. Supply chain and productive objectives can only be achieved through efficient coordination and collaboration among different organizational functions and key processes. The research employs literature review, and questionnaire for data collection. The data will be tested for reliability before analyzing it through Relative Importance Index (RII). Results include the identification and quantification of different types of risks primarily associated with warehouse and production interaction. The results lead to recommendations for process improvements. The approach significantly enhances productivity, reduces waste, and improves customer satisfaction.

Keywords: Supply Chain Management, Warehouse Operations, Risk Analysis, Process Improvement, Efficiency Enhancement.

SUSTAINABLE ECOSYSTEM SERVICES AND VALUATION OF ARTIFICIAL FOREST

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Abstract: Forests provide various services for human society and the environment. Interaction with nature significantly influences the ability to deal with problems like biodiversity loss and climate change. Scientific interest in ecosystem services and human well-being has grown to indicate its essential role in affecting sustainability. There is always a demand for forest resources and ecosystem services, even in times of financial crisis or conflict. However, due to the growing demand for furniture and medium-density fiberboard (MDF) industries, the demand for wood logs cannot be satisfied through natural forests. These artificial forests take 6-7 years, which causes cashflow problems for small farmers. Recent studies show that artificial forests can also be a source of seasonal crops. This study focuses on the district Charsadda, Khyber Pakhtunkhwa, where artificial forests are in demand. The data regarding the latest trends in artificial forests is collected from a literature review and is coupled with field visits. The available data is scrutinized through statistical tools. The results provide valuable insights into combining different seasonal products, which can be used in Artificial forests.

Keywords: Artificial Forest, Sustainability, Ecosystem, Forest, Seasonal Products

COMPLEXITIES OF DIRECTIONAL SURVEYS IN DRILLING: A DATA-DRIVEN INVESTIGATION

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Abstract: Directional drilling is significant in exploring and extracting oil and gas resources. It involves steering the wellbore along a planned trajectory to maximize reservoir access and productivity. However, its complexity and uncertainty are amplified due to several diverse parameters. This amplification implies that the success of directional drilling operations in real-time necessitates a comprehensive grasp of multiple drilling parameters. This research identifies and quantifies the parameters by establishing a relationship between drilling and MWD (Measurement While Drilling) parameters. Historical parameters data and the respective decisions are analyzed to show the intricate relationship between decisions and parameters. The results include the most and least significant parameters required for prompt and sound decisions. This research outcome facilitates precise trajectory control, enhancing oil well completion efficiency. This innovative approach has the potential to transform directional drilling practices, resulting in cost savings, reduced drilling times, and heightened accuracy, thereby contributing to the overall success of oil and gas operations.

Keywords: Drilling Parameters, Measurement While Drilling, Drilling Operations, Decision-making, Oil and Gas

FACTORS INFLUENCING CUSTOMER SATISFACTION IN PAKISTAN E-COMMERCE

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Abstract: E-commerce is changing the business landscape globally. It offers business gateways to all organizations, especially to small and medium enterprises (SMEs), irrespective of transnational boundaries. It provides flexibility, access, and diverse products and services to customers through innovation, value addition, sustainable practices, and economic growth. However, in Pakistan, e-commerce is more technology-inclusive rather than improving operations and forwarding the benefits to the customers. In Pakistan, several online platforms exist, but very few offer quality services, resulting in disenfranchising customers from e-commerce platforms. This study highlights Pakistan's rapidly expanding e-commerce market, emphasizing its substantial growth potential concerning customer satisfaction. Data is collected from the available literature to identify different factors associated with e-commerce customer satisfaction. The collected data is subjected to various statistical tools for analysis. The results indicate the most frequent and least frequent factors related to customer satisfaction concerning e-commerce experience. These factors are guiding principles for the e-commerce platform to enhance customer satisfaction and improve value-addition operations.

Keywords: E-Commerce, Customer Satisfaction, Quality Service, Online Shopping, Quality Management

EXPLORING THE LATEST WHEEL CHAIR TECHNOLOGIES AND APPLICABILITY IN PAKISTAN

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Abstract: Wheelchairs are crucial equipment for people with impairments, providing movement and independence. However, restricted access and affordability of cutting-edge wheelchair technologies prevent total mobility. The improved mobility fosters independence and contributes to an enhanced quality of life by enabling participation in social activities, education, career opportunities, and community events. However, in Pakistan, these technologies are very much rare in Pakistan. This research will explore advanced wheelchair technologies and their potential effect on improving mobility and quality of life for people with mobility disabilities in Pakistan. The study intends to address this issue by exploring the landscape of wheelchair technologies available in Pakistan, evaluating their usability and accessibility, and finding adoption challenges. A mix of primary and secondary data will be used for this study. An in-depth look at the most recent global breakthroughs in wheelchair design, materials, and assistive technology, as well as their possible applicability in the Pakistani context, will be systematically reviewed and assessed. The findings of this research underscore the transformative potential of integrating modern wheelchair technologies into the lives of individuals with mobility impairments in Pakistan, making them more productive for the family, society, and country.

Keywords: Wheelchair, Mobility, Productivity, Disability, Assisted Devices

DEVELOPMENT & EVALUATION OF A VIRTUAL REALITY-BASED GAME ENVIRONMENT FOR TRAINING OF TUNNEL CONSTRUCTION PROFESSIONALS

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Abstract: Virtual reality (VR) has rapidly gained traction in industries such as medical and automotive for immersive applications, particularly in assembly and maintenance. In the context of Architecture, Engineering, and Construction (AEC) education, VR serves as a valuable tool aimed at augmenting the learning experience and capabilities of users. Professional training is integral to skill development within organizations, empowering personnel with current critical skills to enhance workability and productivity. Traditional professional skills training often relies on 2D lecture-based methods, utilizing paper or PowerPoint presentations for content visualization. This approach, characterized by lengthy and repetitive lectures, tends to diminish trainees' engagement and interest. In the domain of tunnel construction, professionals require specific training for the assembly of Tunnel Boring Machines (TBMs) on-site. Given that TBM components are transported in pieces to the construction site, efficient assembly and operational readiness are crucial. This research focuses on the development of a VR-based gaming environment for TBM assembly, leveraging the Unity 3D game engine. The VR training system integrates a 3D TBM model with an interactive simulation of a tunnel construction site. The efficacy of this VR-based training system was compared to traditional paper-based training through experiments involving 48 volunteers in two rounds. Feedback was gathered through a post-experiment TBM-Assembly Performance Questionnaire, and differences were statistically analyzed using a nonparametric Wilcoxon signed-rank test. Results indicated superior performance of the VR-based training medium compared to the traditional paper-based method. Assessment of participants' psychomotor skills at the experiment's conclusion utilized a seven-item Psychomotor Skills Assessment Questionnaire (PSAQ). Furthermore, the usability of the VR-based assembly training environment was validated using a System Usability Scale, yielding a high score indicative of satisfactory usability. This study demonstrates the potential of VR as an effective and engaging platform for professional skills training in complex assembly tasks, offering improved performance and user satisfaction compared to conventional methods.

Keywords: Virtual Reality, 3D Immersive Training, Human-Machine Interaction, tunnel boring machine, assembly training, system usability scale

REVOLUTIONIZING DAIRY PRODUCTION: A COMPREHENSIVE ANALYSIS OF INDUSTRY 4.0-BASED OPTIMIZATION STRATEGIES IN YOGURT FILLING SYSTEMS

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Abstract: The research paper explores a paradigm shift in yogurt and flavor-filling systems with a focus on Case-IV, introducing a circular conveyor belt configuration. Departing from linear setups, Case-IV unifies yogurt and flavor filling processes at a single point, prioritizing processing time optimization. The innovative system incorporates a Fanuc LR Mate 200ic robotic arm, NFC technology, and diverse conveyor belts, enhancing precision and operational efficiency. The architecture integrates established principles with cutting-edge technologies, marking a significant leap forward in yogurt-filling optimization. A mathematical model, pivotal for operational excellence, is developed, encompassing cup filling and movement along the conveyor belt. The model incorporates indices, parameters, and decision variables, contributing to a comprehensive optimization framework. The research aims to redefine operational and technological landscapes, benchmarking against established methodologies, and pushing the boundaries of efficiency in yogurt filling processes.

Keywords: Fully Flexible Machine, Parallel Machine Scheduling, Combinatorial Optimization, Scheduling and Sequencing, Yogurt Filling Machine.

COMPARISON OF LIVE LOAD DISTRIBUTION FACTORS FOR THE DESIGN OF SIMPLE SPAN HIGHWAY BRIDGES IN PAKISTAN

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Abstract: The "S/D" Method used for the Distribution Factor (DF) of Moment & Shear was introduced in the 1930s in the AASHTO LRFD Specifications. However, when applied using the Finite Element Method (FEM), it has been found to be unrealistic and uneconomical for our design purposes. In response to this issue, AASHTO LRFD 1994 developed new Load Distribution Factor (LDF) equations as a result of the NCHRP 1226 projects. These equations are based on detailed studies using the Finite Element Method (FEM) and provide a more accurate representation of the real conditions in our bridge design. On the other hand, WPCPHB 1967 uses Live Load Modals taken from a British code (1937), which shows that each girder cannot have the same portion of load effect with increasing span, making it unsafe for realistic bridge design. Additionally, the WPCPHB (1937) loading condition is lower than all the loads, which does not represent truck loading in Pakistan, making it an unsafe method for the realistic design of short span length bridges. Over time, traffic flow and traffic loads have changed, and the same applies to AASHTO LRFD, which also does not represent the actual truck loading condition in Pakistan, as it uses HL-93 loading. The highway loading modal-93 (HL-93) is too conservative for simple span highway bridges in Pakistan. Consequently, utilizing these codes in Pakistan for simple span highway bridge construction leads to losses in the country's economy due to uneconomical projects and overdesign, both during construction and later in maintenance.

Keywords: Distribution Factor (DF), Finite Element Method (FEM), Load Distribution Factor (LDF), Bridge design.

MODERNIZING WAREHOUSING IN PAKISTAN: THE ROLE OF INDUSTRY 4.0 TECHNOLOGIES

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Abstract: A warehouse is a critical component of any organization's supply chain. Recent studies show the integration between Industry 4.0 and warehouse management. Industry 4.0 has integrated the Internet of Things (IoT), sensor networks, cloud computing, big data analytics, robots, cyber-physical Systems, and Artificial Intelligence (AI), bringing about a profound transformation. This paper looks at the significance of such technologies for improving organizational performance, particularly warehousing and supply chain management. The literature review offers a summary of the primary components of Industry 4.0, which include Decision Support Systems (DSS), Radio Frequency Identification (RFID), the Internet of Things (IoT), Autonomous Mobile Robots, Blockchain, Cloud Computing, and Augmented Reality. These technologies have revolutionized the operation of a warehouse by increasing efficiency, reducing errors, and enhancing real-time decision-making. This research seeks to investigate how implementing I4.0 technologies affects the competitiveness of storage facilities in Pakistan. The research methodology includes primary data collection through interviews with experts with experience in warehousing strategies and industry 4.0 technologies. The collected data will be statistically analyzed to assess the implementation level of different I4.0 technologies along with challenges and benefits. The results will systematically provide valuable insight into warehouse management in relation to different adopted I4.0 technologies. **Keywords:** Industry 4.0, Warehouse Management, Supply Chain Management, I4.0 Technologies, Storage Facilities

Keywords: Industry 4.0 Technologies, Warehouses, IOT, Robots, CPS, AI, Cloud computing, Big data, Sensor networks, Warehouse strategy outputs.

ENHANCING ANTIVIRAL THERAPIES THROUGH OPTIMIZED NONLINEAR CONTROL OF HUMAN IMMUNODEFICIENCY VIRUS DYNAMICS

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Abstract: Human Immunodeficiency Virus (HIV) is a formidable viral agent that targets the human immune system, compromising its ability to safeguard the body against infections and illnesses. Identified as a lentivirus, HIV instigates a prolonged and intricate infection that poses significant challenges in understanding infectious diseases, emphasizing the ongoing necessity for comprehensive research and effective treatment strategies. Its a very complex virus that severely compromises human immune systems, making disease understanding challenging and highlighting the need for additional research and improved treatment options. To better grasp the evolution of the virus, scientists have intricately designed mathematical models focusing on unraveling the intricate interactions among healthy helper T-cells, infected helper T-cells, and viral load. This paper presents various types of controllers, putting a special spotlight on two as sliding mode control (SMC) and super-twisting sliding mode control (STSMC). These controllers are crafted with a clear goal to minimize infected helper T-cells and decrease the viral load while maximizing the count of healthy helper T-cells. The controllers performance has been finely tuned using a genetic algorithm focused on minimizing integral time absolute error. Mathematical analysis includes Lyapunov stability criteria to ensure the stability of these controllers. Simulations conducted using MATLAB/Simulink allow thorough performance comparisons between control strategies.

Keywords: Human Immunodeficiency Virus, super-twisting sliding mode control, genetic algorithm, hardware-in-loop

THE EXPERIMENTAL STUDY OF SHAPE PARAMETERS OF AGGREGATE ON HOT MIX ASPHALT

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Abstract: In asphalt pavements, aggregate characteristics particularly shape parameters have a viable impact on the durability of the asphalt mixtures. To design more robust pavements that can endure the strains of traffic, environment, and ageing by having a better insight into the relationship between particulate shape and pavement reliability, this study focused on practically assessing the influence of aggregate shape parameters on the performance of hot mix asphalts. Three aggregate samples from Marghalla, Ubhan Shah and Sargodha have been taken and subjected to shape parameter determination and its influence, Marshall Stability and Flow test and wheel cracking tests to determine the impact of specific shape on long-term performance and effectiveness of asphalt pavements. The results demonstrate that the mix prepared from the spherical shape of aggregate from Marghalla shows higher rutting depth and marshal stability. The mix prepared from the spherical aggregate of Sargodha shows the highest marshal stability of 1165 Kg among the three samples but has the lowest rutting depth of 6.63mm. The mix prepared from the Spherical aggregate of Ubhan Shah indicated the lowest marshal stability, 6.67 mm rutting depth. This means that mix made from spherical aggregates are responsible for higher marshal stability and rutting depth in hot asphalt and improves the performance and durability as compared to the flat and elongated shape as in Sargodha and Ubhan Shah Asphalt aggregate.

Keywords: Pavement design, Stability, durability, Asphalt, Aggregate, Rutting

EXPERIMENTAL STUDY OF DISCHARGE CAPACITY OF CURVED TRAPEZOIDAL LABYRINTH WEIR

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Abstract: The study focuses on the effectiveness and cost-efficiency of Curved Trapezoidal Labyrinth Weirs (CTLW) as a solution to enhance discharge capacity without increasing structure width. The investigation aims to comprehend the impact of geometry on the discharge coefficient. Two distinct flow conditions at the crest of CTLW were employed to assess their influence on discharge capacity (Q) and the coefficient of discharge (cd). Dimensional analysis revealed that the discharge coefficient of CTLW relies on dimensionless parameters, specifically cd and H_t/P . The results indicate a substantial increase in water depth on the upstream side of the channel with an increase in discharge, both in free flow and submerged flow conditions. Notably, flow conditions emerge as the most significant factor affecting the discharge coefficient. The results show that in free flow conditions, an increase in H_t/p to 0.92 led to a decrease in the coefficient of discharge to 0.42. Conversely, in submerged flow conditions, an increase in H_t/P to 0.92 resulted in a reduction of the coefficient of discharge to 0.36. This paper contributes to existing knowledge by exploring the impact of flow conditions on the discharge coefficient of curved trapezoidal labyrinth weirs.

Keywords: Labyrinth weir, discharge coefficient, Geometric, submersion stages

OPTIMIZING THE PHOTOCATALYTIC EFFICIENCY OF RhB DYE DEGRADATION THROUGH THE STRATEGIC DESIGN OF MoS₂/WO₃ HETEROSTRUCTURES

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Abstract: MoS₂/WO₃ heterostructures with two distinct molar ratios (1:1 and 1:4). A successful "bottom-up" assembly yielded heterostructures in both spherical and flaky shapes. Structural, morphological, compositional, and bandgap characterizations were comprehensively investigated through XRD, EDX, SEM, UV-Visible spectroscopy, and FTIR analysis. These analyses provided valuable insights into the agglomerated MoS₂/WO₃ heterostructures, shedding light on their potential for photocatalytic applications. Subsequently, the prepared heterostructures were assessed for RhB photodegradation under solar light irradiation. The photocatalytic efficiency of MoS₂/WO₃ composites was notably high, reaching 91.41% and 98.16% for 30 minutes of irradiation with molar ratios of 1:1 and 1:4, respectively. Similarly, for 60 minutes of exposure, the % efficiency of 1:1 MoS₂/WO₃ heterostructures was 92.68%, while for 1:4, it reached 98.56%. Further, during 90 minutes of exposure, the % efficiency was 92.41% for 1:1 and 98.48% for 1:4 composites. Impressively, these heterostructures exhibited stability over three cycles, affirming their potential for various photocatalytic applications in the future.

Keywords: MoS₂, SEM, XRD, Heterostructures, Photocatalysis

HEALTH INFORMATICS FOR SYNDROME BASED EPIDEMIC PRE-EMPTION

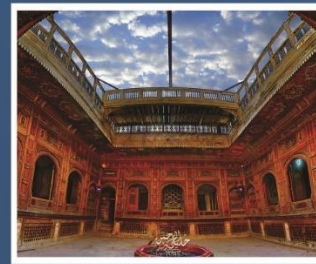
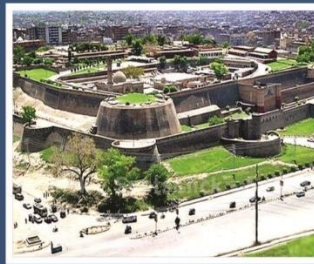
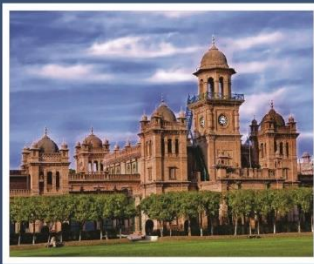
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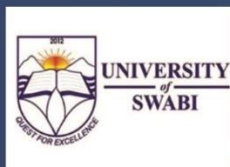
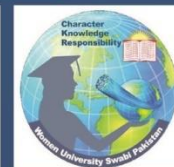
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Abstract: Health is an important factor in the social and economic development of Pakistan. The Global Human Development report ranked Pakistan 152nd out 189 (GHD 2019). To improve this ranking, it is important to identify the health issues faced by the Pakistan and its economic burden. Importantly, communicable disease place an extraordinary burden on those afflicted by the disease, their families, communities, and on government budgets. With more than 40% of its population urban, the risk of communicable disease and potential epidemic / pandemic is significant. Although, Government of Pakistan has implemented infection control measures, these measures are limited to conventional approaches of screening and isolation, social distancing, Household quarantine and School closure etc. These approaches however have had limited success as there has been outbreaks of diseases. Moreover, conventional strategies cost hugely in economic terms because of seizure of economic activity. An effective strategy to counter an epidemic is to detect outbreaks as early as possible in order to provide the best response and treatment, as well as improve the chances of identifying the source. Over the past several years, in developed countries, there has been an emergence of Infectious disease informatics; real time surveillance systems for monitoring illness patterns to enable health officials to identify and localize disease outbreaks. These systems use information routinely collected in patient care and available at the time of the patient's interaction with his /her healthcare provider. Any signs of a disease outbreak are then brought to the attention of authorized public health officials so that they can efficiently intervene to prevent spread or other exposure. The surveillance systems are based on mechanisms of effective information collection, dissemination / reporting and information interpretation / analysis. These mechanisms, to be effective, must be tailored made according to local conditions. Infectious disease informatics, once implemented and operational, can significantly improve the quality, efficiency, safety, and cost effectiveness of detection, control and mitigation of epidemics and infectious diseases by supporting the health officials to; plan control strategies; define populations at risk; develop emergency health response administrative hierarchy; rapidly mobilize mass immunization programs ; allocate important epidemic response resources; estimate the requirements to control the epidemic (drugs, vaccine, human resources, transport, financial resources) ; identify and ensure competent laboratory support ; coordinate and communicate with general public and health care community; strategize post-epidemic scenario. The proposed health informatics model will not only contribute towards improving the quality of life in Pakistan but will contribute towards improving the efficiency, quality, and safety of people and enhance the reputation of our country.

Keywords: Health Informatics, Epidemic Surveillance , Ontologies, domain modeling, Epidemic Preemption



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