**2nd IMCEET-2024/Keynote-001**

# INNOVATION OF FLUX SWITCHING MACHINE: DESIGN VARIATION REVIEW

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**ABSTRACT:** Flux Switching Machine (FSM) have been gaining interest over the last few decades due to their numerous advantages such as high torque density, high speed capability, ease of control, low vibration and low acoustic noise compared to conventional competing machine. In addition, the structure itself provides favorable thermal management due to the location of PMs on the stator as well as passive and hence robust rotor structure which is suitable for high-speed applications. However, this machine is found to produce high cogging torque, high leakage current and complexity in flux weakening capability design. Many researches focus on tackling these limitations but there is limited review dedicate on the design variation of this kind of machines. This paper attempts to review the latest design variation in conventional Permanent Magnet Flux Switching Machine (PMFSM), Field Excitation Flux Switching Machine (FEFSM) as well as Hybrid Excitation Flux Switching Machine (HEFSM), which is the combination of both permanent magnet and field excitation. The review includes various armature slot and rotor pole analysis including stator structure, rotor structure and special structure with different approach to reduce drawback in conventional FSM. Besides various inner rotor and outer rotor topologies as well as double stator structures are also analyzed. The motivation of this review is to identify the potential research areas and gaps that the FSM could be more focus especially for industrial applications as well as transportation. Besides, design possibility in employing several structure to another structure to increase performances of the FSM is also emphasized. In conclusion, based on the literature review, 65% of FSM design is focusing on inner rotor structure while partitioned stator were the least at 11%.

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**2nd IMCEET-2024/Keynote-002**

# DEVELOPMENT OF 10 KW FRANCIS TURBINE GENERATOR AT KSK, UET, LAHORE

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**ABSTRACT**: Digital safe spaces represent virtual sanctuaries aimed at fostering supportive and respectful environments for women encountering various forms of abuse, discrimination, or harassment in the online realm. These spaces serve not only as platforms for empowerment but also underscore the pivotal role of digital technologies in democratization efforts. By providing forums for women to address pressing issues, share narratives, and cultivate a sense of community, these safe spaces empower women and promote solidarity among them. However, the prevalence of online suppression and dismissal of women's voices underscores the importance of leveraging machine learning to enhance the detection and prevention of harmful content, support user engagement and moderation, and deliver personalized and empowering experiences for women. This talk will share and evaluate the roles of technology firms and governments in fostering the establishment and sustainability of secure digital environments. Recommendations will be proposed to enhance the efficacy of these spaces and address potential challenges, emphasizing the significance of collaborative efforts among online communities, technology developers, and advocacy groups. By shedding light on the evolving dynamics of gendered interactions in the digital sphere, this speech will provide valuable insights into how digital safe spacescan catalyze positive transformations. It offers guidance on leveraging technology to create safe and inclusive online environments for women in today's digital landscape.

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**2nd IMCEET-2024/Keynote-003**

# SMART ELECTRICAL MACHINE, OPERATING IN ALL MODES.

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**ABSTRACT:** Switched Reluctance Machine (SRM) has emerged as an outstanding alternative to the existing industrial motors like induction motors and synchronous generators. The applications of SRM have been extended to domestic and industrial applications, including offshore wind farms, agriculture, and high-speed aircraft, railways, cranes, electrical vehicles. The smartness of this motor is visible from its variety of operations, multiple phases, and choice of a suitable converter topology. SRM is believed to be the best contender in the family of electrical machines.

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**2nd IMCEET-2024/Keynote-004**

# EMERGING AND DISRUPTIVE TRENDS IN AUTOMOTIVE TECHNOLOGY

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**ABSTRACT**: The global automotive industry is undergoing a paradigm shift driven by emerging and disruptive technologies, reshaping traditional notions of transportation and mobility. These disruptions are broadly due to the emergence of Urbanization, Digitalization and Sustainability. This keynote speech explores the dynamic landscape of automotive technology, focusing on the latest trends poised to revolutionize the sector. Due to environmental concerns and technological breakthroughs in battery efficiency, rapid advancement of electric vehicles (EVs) spurred. EVs are gaining traction globally, supported by government incentives and the growing infrastructure for charging stations. Additionally, the integration of renewable energy sources into vehicle charging networks enhances sustainability and reduces dependency on fossil fuels. Fuel cell vehicles are also a class of EV gaining popularity among OEMs, which runs on hydrogen. Another disruptive trend is the development of autonomous vehicles (AVs), powered by artificial intelligence (AI) and advanced sensor technologies. AVs promise enhanced safety, increased efficiency, and improved accessibility, potentially transforming urban transportation systems. However, challenges such as regulatory frameworks, cyber security risks, and societal acceptance must be addressed to realize the full potential of autonomous driving technology. Furthermore, connectivity and digitalization are reshaping the automotive ecosystem, enabling vehicle-to-everything (V2X) communication and facilitating the emergence of smart mobility solutions. With the advent of 5G networks and edge computing, vehicles can interact with each other and with infrastructure in real time, optimizing traffic flow and enhancing user experience.
Innovations in materials science are also driving automotive technology forward, with lightweight materials such as carbon fiber and advanced composites improving fuel efficiency and vehicle performance. Additive manufacturing techniques enable the production of complex geometries and customizable components, reducing lead times and enhancing design flexibility. Moreover, the rise of shared mobility services and the concept of Mobility-as-a-Service (MaaS) are challenging traditional ownership models, leading to collaborative partnerships between automotive manufacturers, tech companies, and transportation service providers. In conclusion, automotive technology is experiencing a period of unprecedented transformation, characterized by the convergence of electrification, fuel efficiency, improvement in aerodynamics, advancements in combustion technologies, connectivity, and digitalization. Embracing these emerging and disruptive trends is essential

for industry stakeholders to remain competitive and address the evolving needs of consumers in the rapidly changing mobility landscape.

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2nd IMCEET-2024/Keynote-005

# STATISTICAL MEASURES BASED UNDERSTANDING OF BRAIN NETWORKS

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**ABSTRACT:** The Human brain is the most complex network with millions of neurons interconnected via axons and dendrites. This complex structure needs to be understood via various methods among which source localization and connectivity analysis are popular. The connectivity analysis can be structural, functional or effective analysis depending upon application and imaging modality. In this talk, we shall try to understand the brain structure first and then will shift our discussion to brain networks. Furthermore, we shall discuss about the graph theory and finally provide a detailed account on statistical measures for understanding the brain dynamics. The talk also include some of the research work results taken through CONN software package. Keywords: Brain connectivity, Neurosciences, Brain networks, Graph theory, Eigenvalues, Covariance, Coherence.

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**2nd IMCEET-2024/Keynote-006**

# MULTI SCALE MODELLING OF WATER-ENERGY AND FOOD NEXUS

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**ABSTRACT:** Given the increased climate change certainty, the security of supply of the life sustaining crucial resources (i.e. water, energy and food) is highly uncertain globally let alone for Pakistan. This presentation aims to capture key interactions and implications for water, energy and food and demonstrates the development and application of tools and approaches to simulate water-energy-food nexus at a range of micro to macro level spatial and temporal scales. The tools application is demonstrated using case studies from Europe and Asia. References are also made to capture the alarming situation in Pakistan.

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2nd IMCEET-2024/Keynote-007

# WATER RESOURCES AVAILABILITY AND SHORT FALL IN PAKISTAN AND ITS POSSIBLE SOLUTIONS

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**ABSTRACT:** Pakistan is consecrated with ample water resources but still confronting a severe water scarcity due to a dearth of storage amenities, miserable water management, and the antagonistic effects of climate change. Rapid population growth, which may cross 250 million by 2025, is making an extra load on water resources. In Pakistan, the water availability in 1951 was around 5000$m^3$/capita/year which is being abruptly exhausting, and is projected to reduce up to 800$m^3$/capita/year by 2025. It is projected that, the available resources of Pakistan are around 240 to 258 $km^3$ on the basis of area, but the demand is increasing at the rate of 10% per year, which will be 338 $km^3$ by 2025. The fresh water resources of Pakistan include glaciers, rainfalls, surface water and groundwater. Almost 74% of accessible surface water and 83% of the groundwater is being utilized for cultivation and other uses. Climate change is also badly affecting Pakistan, as a result severe drought and floods are being faced frequently every year. The Water related challenges in Pakistan comprise of insufficient water storage facilities, water loss in during farming and cultivation and domestic purposes, insignificant reprocessing and using wastewater, and impurity of potable water are the main causes for spread of various diseases. It is established that surface as well as groundwater resources in Pakistan is diminishing quickly, which requires serious attention and timely action otherwise may become one of the serious national security issue in near future.

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**2nd IMCEET-2024/Keynote-008**

# SPACE WEATHER EFFECTS ON SATELLITE-BASED NAVIGATION SYSTEMS

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**ABSTRACT:** The rising trend of mass customization and personalization, coupled with high-mix, low volume applications, necessitates that existing manufacturing sectors—whether in Medical, AgriFood, or Packaging—acquire greater agility, resilience, and human centeredness to stay competitive and profitable. To achieve this, Industry 5.0 provides guidelines and modern technologies for flexibly and human-centrically automating production lines through advanced robotics and AI tools, primarily to achieve task and domain agnosticism. In this regard, the burgeoning large language models (LLMs), such as Chat GPT, Google's Gemini, or Facebook's LLAMA series, have not only captivated global attention but also possess the capability to enhance existing off-the-shelf automation setups with greater world understanding and awareness, thereby achieving the required agility, human-centrism, and resilience. This talk will discuss the limitations of existing robotic automation and the integration of LLM-based architectures into this framework. To fully comprehend the ongoing developments, I will delve into the working of LLMs and their deployment strategies. We will examine applications of these models in agile manufacturing scenarios, including packaging, product repair, and intra logistics. Finally, I will offer closing remarks about upcoming technological advancements and the urgent need for Pakistan to remain vigilant in this rapidly evolving era of digital world.

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2nd IMCEET-2024/Keynote-009

# DESIGNING OF CONCEPTUAL FRAMEWORK TO SUPPORT AMT SYSTEM IN MANUFACTURING INDUSTRIES OF SINDH, PAKISTAN

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**ABSTRACT:** This research paper outlines the progress of Advanced Manufacturing Technology (AMT) systems, which has low application due to economic and technical constraints during implementation. Although these systems are partially implemented in small to large scale manufacturing enterprises in the province of Sindh in particular and manufacturing industries of Pakistan in general. The major concern appears to be implementation of AMT based technologies with major constraints. In this regard, the conceptual framework has been designed to address the aspects, which are Top Management support, Economic Aspects, and Technical aspects. This research has further extended the previous research and developed the new approach by incorporating the different tools that are considered as the pillars of AMT, in order to investigate the effects of these tools on the implementation of AMT systems in SMEs and LSIs. The conceptual framework was developed using four parameters of AMT. The aim was to determine the correlation between various parameters of the four pillars of AMT in order to investigate the economic and technical constraints. The data were collected from 60 industries of Sindh province in Pakistan. Data of each parameter was analyzed based on likert scale and also correlation model was carried out on the combined parameters of each pillar of AMT. The results show that these systems are partially implemented in the manufacturing companies with less support and technical expertise.

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**2nd IMCEET-2024/Keynote-010**

# DESIGN AND DEVELOPMENT OF ORGANIC-INORGANIC BASED ELECTROLYTE BY USING THE UV METHOD FOR ENERGY STORAGE DEVICES (LITHIUM-ION BATTERIES)

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**ABSTRACT:** Lithium-Ion batteries (LIBs) are promising energy storage devices due to the high capacity and lower negative electrochemical potential. Nevertheless, their concrete applications remain disturbed by unbalanced electrolyte-electrode interfaces, limited electrochemical window, and high-risk. Herein, a novel strategy to obtain ceramic-based electrolytes that possess great potential in energy storage due to their higher level of energy densities in LMBs. UV Irradiation allows to obtain of a highly cross-linked solid-state electrolyte membrane that was designed for the use of energy storage devices. The membrane was successfully fabricated by polymer and nano fillers of ceramics with the help of UV photo-polymerization. The cross-linked solid-state membrane can accommodate a liquid inside the membrane via strong interaction with lithium- ion and solvents. Solid-state membrane that shows much higher mechanical properties than pure PEO based electrolyte. The fundamental function of ceramic nanoparticles is to support in building a stable electrolyte interphase (SEI) and suppress the growth of dendrites. The prepared ceramic-based electrolyte effectively renders to inhibit lithium dendrite growth in asymmetrical cell Li/SSE/Li test during charge/discharge at a current density of 2 mAcm-2. In addition, the battery assembled of LiFePO4/SSE/Li exhibits superior charge/discharge cycling. This provides a fundamental strategy that to improve the applications of energy storage devices performance.

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**2nd IMCEET-2024/Keynote-011**

# GIS & REMOTE SENSING APPLICATIONS IN CIVIL ENGINEERING

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**ABSTRACT**: GIS and remote sensing are cutting-edge technologies and instruments widely used in several fields of civil engineering. These technologies are crucial for developing systems and solutions that can facilitate streamlined decision-making in civil engineering projects. Examples of these projects are: (i) Project 1: A Geographic Information System (GIS) road asset management system for the China-Pakistan Economic Corridor (CPEC); (ii) Project 2: A GIS decision-making system for government departments in Punjab and KPK; and (iii) Project 3: A multi-hazard vulnerability risk assessment system for Punjab. Project 1 involved developing a GIS-based road asset management system for the CPEC Hazara motorway. A GPS-based app was used to collect road asset data, which was then utilized to generate maps in Web GIS. GIS centres were established in selected districts of Punjab and KPK to create GIS-based decision support systems for government departments under Project 2. A multi-hazard vulnerability risk assessment system was created for Punjab in Project 3. It involved simulating floods, droughts, earthquakes, socioeconomic indicators, and institutional capability. The results of these initiatives were used for decision-making by the pertinent government departments in Pakistan

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**2nd IMCEET-2024/Keynote-012**

# HIGH ACTIVE SPINEL COFE2O4- ER0.4BI1.6O3 COMPOSITE BASED CATHODE OXYGEN ELECTRODE FOR REVERSIBLE SOLID OXIDE CELLS

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**ABSTRACT**: Solid oxide cells (SOCs) allow the eco-friendly and direct conversion between chemical energy (e.g., hydrogen) and electric power, effectively mitigating the environmental issues associated with excessive fossil fuel consumption. Herein, we report the development of a highly active bifunctional oxygen electrode by combining the cubic fluorite structured Er0.4Bi1.6O3d and the spinel-type CoFe2O4 (CFO– ESB) for applications in reversible SOCs at reduced temperatures. X-ray diffraction analysis showed that CFO had a good chemical compatibility with the ESB phase. X-ray photoelectron spectroscopy and O2-temperature-programmed desorption results revealed that the incorporation of ESB into CFO increased the number of chemisorbed oxygen species, thereby promoting their catalytic activity in the oxygen reduction reaction (ORR) and the oxygen evolution reaction (OER). These results were consistently confirmed by electrochemical impedance spectroscopy, wherein the low polarization resistance of the CFO–ESB electrode in the YSZ electrolyte was observed (e.g., 0.29 Ω-cm2 at 700 C). Consequently, the reversible SOC prepared using the CFO–ESB oxygen electrodes showed excellent performances in both the fuel cell (1.0 W cm2 peak power density) and electrolysis cell (1.5 A cm-2 at 1.3 V) modes at 700 oC. These results are one of the best values among the spinel-based oxygen electrode adopted cells reported to date, demonstrating highly efficient ORR and OER bifunctionality of the CFO–ESB. Thus, our findings suggest that CFO–ESB has high potential for use in oxygen electrodes for reversible SOC applications.

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2nd IMCEET-2024/Keynote-013

# TRANSFORMATIVE POTENTIAL OF DIGITAL SAFE SPACES FOR WOMEN'S EMPOWERMENT

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**ABSTRACT**: Digital safe spaces represent virtual sanctuaries aimed at fostering supportive and respectful environments for women encountering various forms of abuse, discrimination, or harassment in the online realm. These spaces serve not only as platforms for empowerment but also underscore the pivotal role of digital technologies in democratization efforts. By providing forums for women to address pressing issues, share narratives, and cultivate a sense of community, these safe spaces empower women and promote solidarity among them. However, the prevalence of online suppression and dismissal of women's voices underscores the importance of leveraging machine learning to enhance the detection and prevention of harmful content, support user engagement and moderation, and deliver personalized and empowering experiences for women. This talk will share and evaluate the roles of technology firms and governments in fostering the establishment and sustainability of secure digital environments. Recommendations will be proposed to enhance the efficacy of these spaces and address potential challenges, emphasizing the significance of collaborative efforts among online communities, technology developers, and advocacy groups. By shedding light on the evolving dynamics of gendered interactions in the digital sphere, this speech will provide valuable insights into how digital safe spaces can catalyze positive transformations. It offers guidance on leveraging technology to create safe and inclusive online environments for women in today's digital landscape.

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**2nd IMCEET-2024/Keynote-014**

# THE RISING TREND OF MASS CUSTOMIZATION AND PERSONALIZATION

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**ABSTRACT:** The rising trend of mass customization and personalization, coupled with high-mix, low volume applications, necessitates that existing manufacturing sectors—whether in Medical, AgriFood, or Packaging—acquire greater agility, resilience, and human centeredness to stay competitive and profitable. To achieve this, Industry 5.0 provides guidelines and modern technologies for flexibly and human-centrically automating production lines through advanced robotics and AI tools, primarily to achieve task and domain agnosticism. In this regard, the burgeoning large language models (LLMs), such as Chat GPT, Google's Gemini, or Facebook's LLAMA series, have not only captivated global attention but also possess the capability to enhance existing off-the-shelf automation setups with greater world understanding and awareness, thereby achieving the required agility, human-centrism, and resilience. This talk will discuss the limitations of existing robotic automation and the integration of LLM-based architectures into this framework. To fully comprehend the ongoing developments, I will delve into the working of LLMs and their deployment strategies. We will examine applications of these models in agile manufacturing scenarios, including packaging, product repair, and intra logistics. Finally, I will offer closing remarks about upcoming technological advancements and the urgent need for Pakistan to remain vigilant in this rapidly evolving era of digital world.

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2nd IMCEET-2024/Keynote-015

# ROLE OF NOVEL MATERIALS IN THE DESIGN OF WEARABLE FLEXIBLE SENSORS

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**ABSTRACT:** Flexible sensors with high sensitivity, wide sensing range, and excellent long-term stability are highly anticipated due to their promising potential in user-friendly electronic skins, interactive wearable systems, and robotics. Fortunately, there have been more flexible sensing materials developed during the past few decades, and some important milestones have been reached. Among the various sensing approaches, liquid-type (fluidic type) sensing has attracted great attention due to its appealing qualities, including its high flexibility, broad electrochemical window, variety in design, minimal saturated vapor pressure, and outstanding solubility. In this talk, I will provide the comprehensive and systematic development of various strain/pressure/humidity flexible sensors, especially our work in the past 5 years, with a focus on various types of liquids used, fabrication methods, channel structures, and their wide-range applications in wearable devices and robotics. Furthermore, it is believed that this talk will be of great help to young researchers looking for ideas in the field.

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2nd IMCEET-2024/Keynote-016

# INNOVATIVE INTERLAYER DESIGNS FOR IMPROVED POLYSULFIDE MANAGEMENT AND SELF-DISCHARGE PREVENTION IN LI-S BATTERIES

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**Abstract:** Lithium sulfur (Li-S) batteries possess the potential to become next-generation electrochemical storage/conversion devices due to their combination of high energy density and low cost. However, their cyclic stability and lifespan are significantly compromised by issues such as polysulfide shuttling and self-discharge. Introducing an interlayer between the cathode and separator provides a promising solution for containing polysulfide species and modifying the cathode. These interlayers serve as both an upper current collector and a barrier to hinder polysulfides, utilizing their strong physical and chemical adsorption properties. We have developed interlayers employing three different strategies (separator-coated, cathode-coated, and freestanding) using facile slide and spray coating methods, based on 2D materials such as $MoS_2$, $WS_2$, and TiN. These materials effectively capture polysulfides through chemical bonding and dipolar adsorption, enhancing the reutilization of polysulfides within the conductive matrices. Additionally, the substrate's micro-mesoporous structure acts as a molecular sieve, mechanically trapping polysulfides within tortuous nanochannels. Consequently, the shuttle effect and self-discharge in Li-S batteries are significantly mitigated. Li-S batteries equipped with these developed interlayers exhibit a discharge capacity of over 1000 mAh $g^{-1}$ at 1 C, with less than 0.05% capacity decay per cycle over 1000 cycles, even with a sulfur loading of 2.5 mg $cm^{-2}$. Remarkable cyclic performances are also demonstrated at higher sulfur loadings of 3.5 mg $cm^{-2}$ and 4.5 mg $cm^{-2}$. Furthermore, the issue of self-discharge is addressed, with only a 10.3% capacity loss observed after resting for 30 days.

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2nd IMCEET-2024-Keynote/017

# PROPERTIES OF BRICKWORK UNDER AGRESSIVE ENVIRONMENT

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**ABSTRACT:** The influence of aggressive environmental exposures on the mechanical properties of masonry systems has been investigated. The investigation involved the measurement of deformation and strength of single leaf masonry walls which were built from fired-clay and calcium silicate bricks in conjunction with designation (iii) mortar with proportions of 1: 1: 6 (OPC: lime: sand). After being constructed, the masonry walls were cured under polythene sheet for 14 days in a controlled environment room with temperature of 20±5ºC and 80±5% relative humidity. They were then exposed to sodium sulphate, sodium chloride and sodium sulphate-sodium chloride solutions at concentrations of 5%. The deformation and strength of the brick walls was determined at the ages of 28, 56, and 180 days. In addition, the properties of companion control walls, brick units and mortar were also assessed so that the effects of the aggressive exposure conditions could be quantified. XRF analysis was also carried out to determine the actual elements in the masonry materials before being exposed to soluble salts. SEM analysis also were conducted after 180 days to observe the compounds developed after the exposure the soluble salts. As a result, after the period of exposure to the soluble salt conditions, reduction in strength of masonry wall were observed in particular for the case of sulphate exposures. These are mainly associated with the formation of ettringite crystals in the mortar, inducing expansion, cracking and disintegration of the mortar which led to the disintegration of the masonry walls. The formation of thenardite was observed in the fired-clay and calcium silicate brick due the exposure to sulphate, whereas halite formation was observed for the case of calcium silicate brick and mortar, due the exposure to chloride, but they did not cause any significant effect on the masonry walls. Both the fired-clay and calcium silicate masonry walls exhibited better performance in chloride environment than in sulphate exposure and sulphate – chloride exposure due to the formation of expansive ettringite crystals.

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**2nd IMCEET-2024/Keynote-018**

# FABRICATION OF AN IMPEDIMETRIC BIOSENSOR BASED ON CO-POLYMER FOR THE DETECTION OF *E. COLI K12* IN WATER

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**ABSTRACT**: Development of a simple and rapid clinical testing system for pathogens is important for addressing serious public health issues. Here is a newly constructed co-polymer based Impedimetric biosensor for the specific detection of *E. coli K12* in water. The antibody was covalently immobilized onto an electrode surface-modified copolymer film on the surface of the electrode. Then the electrochemical performance of a disposable screen-printed electrode was identified using the impedance technique. The Nyquist plots identified the charge transfer resistance Rct and determined that it was modeled with a modified Randles circuit as the relevant parameter after the immobilization of antibody, the blocking with BSA, and the binding of specific *E. coli K12*. The use of a typical copolymer film and immobilization techniques confirms the linear detection response of electrochemical impedance spectroscopy (EIS) in the range of $10^1$ - $10^7$ CFU/mL, and a short response time of 15 min. Furthermore, the covalently immobilized antibody selectivity was proved against various non-targeting bacterial strains in the presence of targeted *E.coli K12* with 94% specificity and 98% sensitivity. Therefore, the newly developed phage biosensor can be used as a disposable label-free impedimetric biosensor for rapid and real-time water quality monitoring.

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**2nd IMCEET-2024/Author-001**

# DESIGN AND ASSESSMENT OF PHOTOVOLTAIC POWER GENERATION POTENTIAL IN PAKISTAN'S SOUTH PUNJAB

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**ABSTRACT:** Electricity demand is rising steadily in today's contemporary world. No one in today's world can imagine a world without energy. Electricity is a vital part of our modern way of life. Currently, the bulk of the world's electricity is produced by conventional thermal or hydropower sources. Among all renewable energy sources, photovoltaic cells are the most affordable and are widely installable in densely populated regions. Pakistan is at a prime position on the solar horizon to capture solar energy. Research is now being done to calculate performance ratio and construct a grid-connected 204 kWp DC/ 175 kWp AC solar system utilizing PVSyst software. Assessment of solar Irradiation through direct and diffuse on collector plane of photovoltaic cell and total losses of system are calculated. Performance ratios are recorded at a minimum of 78.8% in May and a maximum of 89.3% in January, overall average performance is reported at 82.5% yearly.

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**2nd IMCEET-2024/Author-002**

# RECOGNITION OF VITILIGO SKIN LESION THROUGH NEURAL NETWORK AND KNN

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**ABSTRACT:** Vitiligo affects up to 2% of the world's population, impacting children and adults' quality of life. It has features with other skin disorders, such as poor contrast and uneven skin lesions, but the lesion's size makes dermoscopy photos difficult to acquire under regulated lighting conditions. This article aims to provide a method for segmenting skin lesions using a clustering algorithm and then provide automatic recognition using KNN and NN on the collected dataset. A total of 18 participants with diagnosed non-segmental type of vitiligo participated. A total dataset of 285 images was obtained which later increased to 500 images through image augmentation. The achieved accuracy for KNN is 81.9% (k=1), 78.7% (k=2), and 74.7% for NN. The technology might help doctors and researchers diagnose and track vitiligo. It can simplify the analysis of vast amounts of skin lesion photos and improve diagnosis and therapy by automating segmentation and identification.

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2nd IMCEET-2024/Author-005

# EFFECT OF NOISE POLLUTION AND ITS INFLUENCE ON ROADSIDE OF PEOPLES AND BUSNIESS COMMUNITY IN NORTHERN PART OF NAWABSHAH

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**ABSTRACT:** The research looked at the amount of noise pollution and the issues associated with noise pollution in light of its negative outcomes on people's quality of life in the Northern area of Nawabshah. Noise pollution levels checkout by keeping view of different recommendations from United States of America under the Department of Housing and Urban Development (HUD) for noise level in living domain, the noise level was obviously objectionable. Highest noise level of (68.8 dBA) recorded in between 1:10-1:40 pm, at 4:10 to 4:40pm noise level was recorded (61.51 dBA), the lowest value (57.04 dBA) at 9:00 to 9:30 pm. During morning hours March saw the maximum noise level of 73.57 dBA, while the November evening hours had the bottom noise level of 57.11 dBA.
At Qazi Ahmed Mor and Doctors' Colony, which is close to hospital road, the noise level was measured within the allowed limit for a safe environment. Noise level during the month of May, June, July, August, October & November as well as in the evening time throughout year was acceptable normally & it was totally unacceptable in January, February, March, April, September and December. Health issues that are concerned with noise pollution includes decrease in hearing capacity, listening barriers, irritation, sleeping disturbances, melancholy as well as mental collapse. Problems were found quite more in quantity during the age limit of 20-40 years and the most frequent reported problems like, annoyance and listening capacity problem. A growing percentage of respondents under older age group domain reported experiencing despair, insomnia, and the deafening impact. The effects of deafness on those older than 60 years of age were substantially more common.

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2nd IMCEET-2024/Author-006

# ASSESSMENT OF CHEMICAL PROPERTIES OF GROUNDWATER QUALITY OF LARKANA CITY

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**ABSTRACT:** A total of 40 samples were collected randomly from various locations in Larkana city. The chemical parameters like pH, Calcium, Magnesium, Total hardness (TH), Arsenic, Chloride, Sodium, Iron, Nitrites, and Nitrates were determined in the laboratory and were compared with WHO permissible limits. The results revealed that 26% of samples had chloride beyond the permissible limit, and 32% of samples had a concentration of Total Hardness (TH) above the desirable limits. Moreover, 6%, 23%, 29%, 92%, and 80%, of samples had a concentration of Nitrates, Nitrites, Sulfate, calcium, and magnesium respectively beyond the permissible limit. However, the concentration of pH, Iron, Sodium, and Arsenic in groundwater was found within the permissible limit.

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2nd IMCEET-2024/Author-010

# INVESTIGATION ON PERFORMANCE OF GEOTHERMAL COOLING SYSTEM IN BUILDINGS

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**ABSTRACT:** The objective of this research was to highlight the benefits of adopting geothermal cooling systems in buildings. The stability of soil temperature at a specific depth throughout the year, regardless of external temperature fluctuations, presents a unique opportunity to explore various methods of harnessing ground energy for cooling purposes. This involves a network of pipes with carefully selected materials and design buried in the ground. Among the various heat transfer mediums available, air is commonly used to extract energy from the ground during the summer season. The research involves evaluating the soil temperature at a specific depth, selecting appropriate piping materials and configurations, and experimentally determining the coefficient of performance (COP) of the installed system. The developed working model has achieved an average temperature gradient of 33°C.

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2nd IMCEET-2024/Author-011

# DETERMINATION OF NOISE POLLUTION AND ITS POSSIBLE EFFECTS UPON ROADSIDE RESIDENTS AND TRADERS IN SOUTHERN PART OF NAWABSHAH CITY.

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**ABSTRACT***:* The research looked at the amount of noise pollution and the issues associated with noise pollution in light of its negative outcomes on people's quality of life in the southern area of Nawabshah. Noise pollution levels checkout by keeping view of different recommendations from United States of America under the Department of Housing and Urban Development (HUD) for noise level in living domain. Purani Sabzi Mandi and the noise level was obviously objectionable. It was found terrible at Regal Chowk and Nia Naka. Highest noise pollution (68.8 dBA) recorded in between 1:10-1:40 pm, at 4:10 to 4:40pm noise pollution was recorded (61.51 dBA), the lowest value (57.04 dBA) at 9:00 to 9:30 pm. During morning hours March saw the maximum noise level of 73.57 dBA, while the November evening hours had the botton noise level of 57.11 dBA. Noise level during the month of May, June, July, August, October & November as well as in the evening time throughout the year was acceptable normally & it was totally unacceptable in January, February, March, April, September and December. Health issues that are concerned with noise pollution includes decrease in hearing capacity, listening barriers, irritation, sleeping disturbances, melancholy as well as mental collapse. Problems were found quite more in quantity during the age limit of 20-40 years and the most frequent reported problems like, annoyance and listening capacity problem. A growing percentage of respondents under older age group domain reported experiencing despair, insomnia, and the deafening impact. The effects of deafness on those older than 60 years of age were substantially more common.

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2nd IMCEET-2024/Author-013

# MACHINE LEARNING-BASED CLASSIFICATION OF ALZHEIMER'S DISEASE USING EEG SIGNAL DATASET: A COMPARATIVE STUDY OF FEATURE EXTRACTION AND CLASSIFICATION TECHNIQUES.

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**ABSTRACT***:* Alzheimer disorder (AD) is a brain disorder that is regarded as one of the most dangerous diseases. It is a debilitating illness in which a part of the brain that has been affected cannot be restored to its former condition. AD has been diagnosed using a variety of methods, including physiological and neurological examinations, laboratory tests, assessments of mental condition and neurophysiology, and brain scans. Brain scans is considered one of the most accurate and frequently used methods among the earlier ones, but it has several drawbacks. The currently used methods are inefficient, expensive, and time- consuming. This study suggests a unique method for diagnosing Alzheimer's disorder using an intelligent healthcare system that uses six antennas put on the head of the individual to record EEG data in order to overcome these challenges. The suggested approach employs an intelligent strategy to efficiently diagnose AD. Automated machine learning and deep learning models are used to determine whether an individual has Alzheimer's disease or not. We use other popular machine learning methods to evaluate how well the suggested prediction model performs in comparison. The proposed classifiers achieved 96.8% accuracy with less computation time which is better than previous approaches.

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2nd IMCEET-2024/Author-018

# EFFECTS OF GLASS WASTE AS FINE AGGREGATE REPLACEMENT IN THE CONCRETE CONTAINING SAWDUST ASH AS CEMENTITIOUS MATERIAL

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**ABSTRACT:** The aim of this study is to evaluate the effects of Glass Waste (GW) as fine aggregate Replacement in the concrete containing Sawdust Ash (SDA) as Cementitious Material. In this study performance of normal cement mortar was compared with the modified cement mortar containing 10% SDA by weight of cement and different percentages of GW like 10%, 20% and 30% by weight of fine aggregates. Initially the fresh property of mortar was checked then 36 cubes were prepared and kept for 3, 7 and 28 days curing. It was found that the flowability of mortars was measured as 125 mm with 0% replacement, 122mm with 10%SDA+10%GW, 118mm with 10%SDA+20%GW and 115mm with 10%SDA+30%GW. Next, the compressive strength was evaluated on harden mortar mortars cubes and found that the compressive strength was decreased by -6.94% while added 10%SDA+10% GW, -16.75% while added 10% SDA+20% GW, -18.95% while added 10% SDA +30% GW. This study declared 10% SDA+10% GW is the optimum dosage.

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2nd IMCEET-2024/Author-019

# DESIGN OF ASPHALT MIX USING POSTCONSUMER RECYCLED PLASTIC AS A PARTIAL REPLACEMENT OF FILLER

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**ABSTRACT:** The use of post-consumer recycled plastic (PCR) in asphalt mixtures has gained noteworthy attention in recent years as a means of reducing plastic waste and improving the mechanical properties of asphalt. This research paper evaluates the performance of asphalt mixes containing PCR specifically Polyethylene Terephthalate (PET) as a partial replacement for aggregate passing through the No. 4 sieve and retained on the 200-micron sieve. The study examines the impact of different percentages of PET (0%, 5%, 10%, 15%, 20% and 25%) on the mechanical properties of the asphalt mixes, including Marshall stability, flow, air voids, bulk density, and indirect tensile strength. The results show that the addition of PET significantly enhanced the mechanical properties of the asphalt mixes, with the optimum replacement percentage determined to be 13.67%. Furthermore, the mixes containing PET showed enhanced resistance to moisture damage, indicating improved durability.

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**2nd IMCEET-2024/Author-020**

# PRE-QUALIFICATION CRITERIA FOR CONTRACTOR SELECTION IN CONSTRUCTION INDUSTRY IN SINDH

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**ABSTRACT**: A project's success depends on choosing the right contractor because it impacts the project success parameters. To ensure that the right contractor is picked, project owners must evaluate a variety of variables. The goal of research is to provide a standardized approach while also shedding light on Sindh's current contractor selection practices. A thorough literature review and questionnaires are used for data collection. For data analysis, a variety of methods were utilized, including the Relative Importance Index, and the Analytical Hierarchy Process. The study demonstrated that the technical, legal, and financial factors are the most crucial of all the factors consequently. The findings show that opinions about the contractor selection process among all stakeholders do not significantly differ from one another. A systematic mechanism is achieved by applying the analytical hierarchy process, which weighs each component in accordance with its relative importance.

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2nd IMCEET-2024/Author-021

# TOWARDS SIGNAL FLOW GRAPH ANALYSIS OF SIGNAL STREAM ARRIVAL AT RAKE RECEIVERS

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**ABSTRACT**: Scientific work on RAKE receivers architecture, design and performance analysis have been done by investigators but the frequency domain analysis of RAKE receivers have not been focused more by the researchers and engineers working in the field of Telecommunications Systems and Internet of Things by considering the parameter of reduction in computational complexity. In this research paper I want to propose an algorithm for reduction in computational complexity of algorithms processed by RAKE receiver and put light on the frequency domain analysis of RAKE receivers input signal stream through Fast Fourier Transforms analysis. The Fast Fourier Transforms are computationally lesser complex having the complexity of product of n and log n as compared to the Discrete Fourier Transforms and are more effective and applicable computationally. The simulated results will be used to validate the proposed algorithm.

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2nd IMCEET-2024/Author-022

# AN INVESTIGATION OF SYSTEM CHARACTERISTICS OF RAKE RECEIVERS

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**ABSTRACT**: When we discuss the Code Division Multiple Access spread spectrum based systems, the discussion is incomplete without the discussion of RAKE receivers. The RAKE receivers are deployed in Internet of things and clouds most commonly because of the low bit error rate of time shifted multi path signals and lesser fading effects during transmission of multi path signals. In this research paper I will elaborate the system characteristics of RAKE receivers through quantitative analysis of linearity, time invariant, memory less property and causality. This quantitative analysis will be fruitful for adaptation of RAKE receivers in heterogeneous wireless communication networks.

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2nd IMCEET-2024/Author-023

# TATANIUM DIOXIDE [$TiO_2$] and MXene BASED PHOTO CATALYST: A REVIEW ON STATE-OF-THE-ART SYNTHESIS CHARACTERISTICS AND PHENOL PHOTO CATALYTIC DEGRADATION

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**ABSTRACT**: Photocatalytic degradation of phenol is an efficient strategy by employing heterogeneous photocatalysis and has attracted increasing attention. Single-phase photocatalyst participation is hampered by obstacles and limits such as quick charge recombination, poor spectrum absorption, and a small surface area, which restrict its applications to effective photocatalytic performance. Therefore, the coupling of photocatalysts is a more efficient approach than the pristine phase because they influence the interfaces while offering channelized pathways for charge carrier separation, minimizing the impacts of energy losses including recombination and poor spectrum performance. herein, we highlighted the photocatalytic degradation application of composite phase utilization for phenol wastewater treatment based on MXene and titanium dioxide (TiO2) material. The review starts with the fundamentals and mechanism of photocatalytic degradation of phenol by composite material. In the mainstream, fundamental characteristic, manufacturing methods, optical and electrical properties have been deliberated for pristine phases of TiO2 and MXene independently. Moreover, the photocatalytic degradation application of MXene/TiO2 composite for phenol decomposition have been highlighted. Different fabrication approaches are adopted for fabricating the desired TiO2 and MXene that have intense influence on characteristic properties (such as the electrical, optical, luminescence, structure, morphology etc) and photocatalytic performance. Considerable emphasis is given to MXene/TiO2 composite for selective photocatalytic degradation application from the perspective of surface area, adsorption, porosity, light-harvesting effectiveness, charge carrier formation, separation, migration, and chemical composition. In conclusion, the pristine and composite materials along with their benefitted aspects have been summarized that affect the photocatalytic performance. Moreover, potential prospects for improving areas that may best contribute to improving photocatalytic degradation performance are suggested.

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2nd IMCEET-2024/Author-024

# EFFECT OF DIFFRENT CURING METHODS ON THE PROPERTIES OF CONCRETE

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**ABSTRACT**: Concrete is a mixture of cement, aggregates, water and sometimes admixtures. The strength properties of concrete are mainly due to its curing. The strength in concrete is usually achieved because cement hydrates. The hydration can begin only with impart of water. With the help of curing, plastic shrinkage is prevented, permeability loss can be minimized and resistance to abrasion is improved. Due to water unavailability or unsuitable water the chances of improper curing occur. In this research, the effect of ponding curing, sodium chloride solution, membrane curing on properties of concrete have been investigated. Mixing of concrete have been done by machine mixer. The design mix of M30 according to ACI code was used. The compressive strength conducted in compression machine conducted in Universal Testing Machine. Curing periods selected are 7 and 28 days. The conclusion of the study is that compressive strength of concrete were shown to increase for specimens mixed and cured in water, sodium chloride and membrane curing respectively

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2nd IMCEET-2024/Author-028

# COMPARATIVE STRUCTURAL ANALYSIS OF BUILDING FRAME AND DUAL FRAME SYTEM BY INCORPORATING SHEAR WALL

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**ABSTRACT**: Abstract-With the time the trend in the buildings changed and people started to move towards the high rise buildings and hence the implementation of performance based engineering philosophies concerning the lateral forces specially, seismic design of civil engineering structures became necessary to be analyzed to make the structure safe and stable. These provision, has led the structural engineers to develop and implement such structural member in the structure which could withstand the lateral or seismic loads. Such as shear wall. Also due to the increasing demand of the earthquake resisting buildings led the engineers to analyze this shear wall in different positions or circumstances. The objective the study is to perform 3D modeling of the building frame and dual frame system and to check the effect of reducing dimensions of building and also to compare the story drift and displacement of models with different positions of shear wall using UBC-97. The finite element method is used for simulating the model of G+7 building along with a modeling software ETABS which is used to design and analyze the structure throughout the world. After analyzing it was founded that the shear wall at the core gives the best results.

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2nd IMCEET-2024/Author-029

# SMART UNDERGROUND LINE FAULT LOCATOR ON MAPS USING ARDUINO GSM & GPS

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**ABSTRACT**: Underground lines have been an integral part of power transmission and distribution systems. These lines are subject to various faults that reduce their practicality and largely affect the reliability of power transmission. This research proposes an advanced model to detect and locate faults in underground lines. The output is received through a well-integrated circuitry consisting of Arduino, GSM, and GPS. The system sends a data set including fault type, distance from substation, and fault location coordinates to user's smartphone in real time. The model functions on the principles of Ohm's Law and implements IOT for accessibility. Hence, whenever a fault situation occurs, the essential data set is available at hand to start the repair process immediately. With this model, reliable power transmission can be ensured through underground lines at minimal repair and maintenance costs. Unlike existing fault tracking methods used for underground cables, this model tends to provide pin-point fault location through an effortless mechanism. Therewith unnecessary excavations or the use of extra manpower to locate faults will be unneeded. The entire process is digital and single-handedly executable. During initial experimentation the model was tested with a simulated version that brought intended results. Later, the research was concluded with hardware demonstration which corroborated the applicability of this model. A set of resistors represented underground cables and the faults were introduced as in practical scenario. The system responded to fault and sent over the data set promptly. It was found that the model is feasible to be employed for practical use. The objective to increase the reliability of power transmission through underground lines was well achieved.

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2nd IMCEET-2024/Author-032

# INVESTIGATION OF AUDIO FEATURES FOR HEART MURMUR DETECTION AND CLASSIFICATION

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**ABSTRACT**: Abnormal heart sounds called heart murmurs, frequently linked to underlying cardiac problems, are a primary global health concern. To be effectively diagnosed and treated, cardiac murmurs must be promptly detected and accurately classified. This study aims to improve heart murmur detection using handcrafted features like Mel-frequency cepstral coefficients (MFCC), Linear prediction coefficients (LPCC), and Gammatone cepstral coefficients (GTCC). The paper is focused on the impact of feature ordering and window size on the overall heart murmur detection performance. The performance of these features is validated by training and testing various Support Vector Machine (SVM) classifier models on the dataset. Experimental results show that features do not show any specific trend on different window sizes, and in the case of feature vectors, MFCC and GTCC performed well at 14, while LPCC showed better results at 20. Further, performance is also evaluated by combining two different features, where MFCC and GTCC showed better results among other combinations.

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2nd IMCEET-2024/Author-034

# AN EVALUATION OF THE EFFECTIVENESS OF NANO-SILICON DERIVED FROM RICE HUSKS AS A FERTILIZER FOR WHEAT PRODUCTION AND PHOSPHOROUS USE EFFICIENCY

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**ABSTRACT**: Soil scientists are highly interested in the use of nanotechnology in agriculture. Hence, plant growth and nutritional interactions need to be investigated. Specifically, this study explored wheat growth and phosphorus uptake in response to nano-silicon (Si) derived from rice husk. Nano-Si was applied at 200 mg kg-1 and P was applied at 100 mg kg-1 to wheat plants. The highest dry weight was obtained with the application of nano Si+P treatment; while no significant effect was observed over the applied 100 mg P kg-1. Phosphorus fertilization significantly reduced Si concentrations in wheat plants. However, the decrease in Si concentration was partly satisfied by nano-Si treatment. When P was applied together with nano-Si, its uptake and phosphorus use efficiency (PUE) significantly increased in wheat plants as compared to other treatments. Nano-Si is derived from rice husk a sustainable waste biomass and is an important alternative Si fertilizer source, which can be a valid strategy for the effective use of P fertilizers. The depletion of available Si in soil can be recovered by applying nano-Si as a fertilizer. The overall results obtained from the current research were encouraging.

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2nd IMCEET-2024/Author-035

# EFFECT OF LOCAL METAKAOLIN ON THE PROPERTIES OF NO FINE CONCRETE

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**ABSTRACT**: No fine concrete is the type of light weight concrete in which there is zero percentage fine aggregate. The civil engineering structures all over the world are mainly made up of concrete. In concrete the main ingredient is Portland cement. Due to the manufacturing of cement CO2 and other harmful gases are emitted. The objective of this study to investigate the effect of local metakaolin on the properties of no fine concrete. The local metakaolin produced from local natural material Soorh which is available in millions of tons in district Thatta Sindh calcined at 8000C for 2 hours in furnace. The cement was replaced by local metakaolin as 5 to 20% by the weight of cement. The properties of no fine concrete like density, compressive and tensile strength of concrete were investigated. The outcome reveals that the is improvement in investigated properties of no fine concrete at 15% replacement of cement with local metakaolin was observed.

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2nd IMCEET-2024/Author-037

# INVESTIGATING THE USE OF METAKAOLIN AND FLY ASH ON SELECTED PROPERTIES OF CONCRETE

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**ABSTRACT**: Among all concrete ingredients, cement is the most important of all. Cement production produces large quantity of raw materials which are burnt to produce clinker and results in the emission of CO2 which is hazardous to the environment. Therefore, utilization of waste and eco-friendly supplementary cementitious materials is gaining momentum. The aim of this paper is to investigate the effects of Metakaolin (MK) and Fly Ash (FA) on the workability and compressive strength of Concrete. MK and FA were used separately and in combination as a partial replacement of Ordinary Portland Cement in different concrete mixes. Twenty mixes were made by different replacement levels. The replacement levels of OPC by MK and FA separately were 0%, 5%, 10%, 15%, 20% and 0%, 10%, 20%, 30% respectively, whereas binary replacement (MK+FA) was done at 5% ,10%, 15% and 20% MK constant with increasing dosage of FA from 10 to 30%. A nominal mix proportion of 1:2:4 at w/b ratio of 0.50 was used for all mixes and specimen were tested at age of 28 days. 60 cubes (100mm x 100mm x 100mm) were casted for compressive strength. The results showed that the workability decreased with the increase in dosage of MK and FA. However, the compressive strength increased up to some extent i. e 10% replacement of MK and 10% replacement of FA after which it decreased.

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**2nd IMCEET-2024/Author-038**

# SUITABILITY OF SOORH NATURAL MATERIAL AS A SOIL STABILIZER FOR LOAMY SOIL

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**ABSTRACT**: Natural loamy soils are mostly stabilized by mixing with certain materials, such as cement, lime, or similar products, so that the natural soil may acquire the necessary properties for civil works. Some industrial waste can also be used for this purpose. Soorh is a natural material and available in large quantities in Sindh province Pakistan. This study was conducted to use Soorh which is natural material available in large quantity in Dadu district of as a stabilizer in natural loamy soil. The soil samples were collected from the premises of QUEST Campus Larkana. The natural material soorh of district Dadu was added in terms of the percentage of the total weight of the soil being 10%, 10%, 20%, 30%, and 40%. The effectiveness of the Soorh in soil as stabilizer was examined in terms of various properties of soil by conducting the different tests such as, particle size distribution, consistency limits (liquid limit and plastic limit). The results revealed that the natural material soorh has no potential as stabilizer of loamy soil.

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**2nd IMCEET-2024/Author-040**

# INFORMATION TECHNOLOGY'S EFFECT ON WORKFORCE PRODUCTIVITY AT WORK

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**ABSTRACT**: This research based on the identifying the effect of Information technology at work by human resource and their productivity. Modern information and communication technology (ICT) has become widely used in a relatively short amount of time, and its use is still expanding quickly.One account states that the entire amount spent on IT worldwide is rising at a rate of 5% annually, which means it doubles every 15 years.

It takes up a sizable and increasing share of the budgets of many consumers as well as those of businesses, governments, and educational institutions. ICT is widely used, but its effects on productivity are not well understood, and opinions on how it affects societal development and human welfare are divided. It is quite difficult to quantify ICT as an input in any economy. Numerous studies quantify this input by concentrating on the amount of ICT capital, which is represented by the total amount invested in commodities related to the Internet. It is challenging to measure this precisely. Data technology Investments in IT have grown in significance. Large companies' equipment spending over the past three decades has moved from heavy machinery to information-processing technology, especially computers. Hence, this research project will employ quantitative research to extract relevant information from the respondents of Universities of Khairpur, Sindh, Pakistan.

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2nd IMCEET-2024/Author-042

# DESIGN AND ANALYSIS OF THE BUILDING GROUND PLUS TWO STOREY BUILDING USING ETABS

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**ABSTRACT:** Traditionally, the buildings have been designed manually, which was a lengthy process, and the chances of human error were large. With the time, the trend in the buildings changed and people started to move towards high rise buildings. Which made it very difficult to design such high-rise structures by manual methods. Hence, different software was introduced in the market to fill the Gap. ETABS is one of those software, which is used to design any kind of building throughout the world has been taken for analysis and design by using ETABS. In this project, the modeling, analyses and design of the department of Civil Engineering, MUET, SZAB Campus Khairpur Mir's has been done using ETABS (version 9.5). UBC-97 is used, and along with the vertical loads, earthquake loads are also considered in this design for the static analysis. The finite element method is used in this project to simulate the model of building. The building is a G+2 story having classrooms, laboratories (filled with equipment) and offices. It is RC framed structure located in Khairpur Mir's, a district in the Sindh province of Pakistan. In terms of earthquake zones, it is located in Zone 2A(moderate) according to the Building Code of Pakistan (BCP Provisions 2007). The objectives of the study were to perform 3D modeling, structural analysis, check structure against the story drift and design the structure by seismic analyses. The structure was analyzed, and it was found safe against all the load combinations. The structure was checked against story drift and it was found well within the limits. The structure was checked against seismic loadings and it was found safe. Hence, the building was found to be safe against different factors mentioned above.

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2nd IMCEET-2024/Author-043

# EFFECTS OF PARTIAL REPLACEMENT OF COARSE AGGREGATES WITH MARBLE WASTE AND TILE WASTE ON PROPERTIES OF CONCRETE

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**ABSTRACT:** Natural resources are being extracted and consumed at faster pace because of the rapid growth in the construction activities. Particularly the use of natural resources likes coarse aggregates in the concrete at the higher rate because typical concrete contains 70% coarse aggregate materials. The aim of this study was to evaluate the effect of the partial replacement of coarse aggregates with the Marble Waste (MW) and Tile Waste (TW). However, In this study compressive strength of normal cement concrete cubes were compared with the modified concrete cubes containing different percentages of MW and TW i.e. 5%, 10%, 15%, 20%, 25% and 30% respectively by weight of coarse aggregates individually. Next, the MW and TW were combined and coarse aggregate was partially replaced at the rate of 10%, 20%, 30%, 40%, 50% and 60%. Initially the slump value of fresh concrete with the water cement ratio of 0.50 was measured as 55mm. It was observed from the experimental findings that the inclusion of MW increases the workability of concrete but the presence of TW decreases the workability of concrete. The compressive strength of normal concrete with 1:2:4 ratios give the 17 MPa and 19MPa at 7 and 28days respectively. However, the inclusion of MW and TW increases the compressive strength. The inclusion of MW upto 20% replacement of coarse aggregate gives the better strength results. The inclusion of MW upto 10% gives the better strength results. While in the combined use of both waste materials upto 20% give the best results. Thus, this study recommended using MW and TW as partial replacement of coarse aggregates.

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# EFFECT OF MONO-SILICIC COATED UREA WITH DIFFERENT FERTILIZING APPROACHES ON MAIZE PRODUCTION AND NITROGEN CONTENT

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**ABSTRACT**: Nitrogen (N) is the most necessary nutrient for the growth and yield of crops. Urea is its primary source of solid fertilizers. Conversely, excessive urea application is vulnerable to losses through leaching and volatilization which may cause environmental problems. Applying N at a decreasing rate may also be unable to control some greenhouse gas emissions and water pollution. Controlled released urea (CRU) can tackle such problems because it releases N steadily. Keeping the N losses scenario in mind, a field experiment was carried out at Soil Fertility Research Institute (SFRI) Tandojam in randomized complete block design (RCBD). The experiment consisted of six treatments each with four replications. The treatments applied were commercial urea as 160 kg N $ha^{-1}$ with broadcasting, with placement, coated with palm stearin, coated with vegetable oil, coated with palm stearin+mono-silicic acid, and coated with vegetable oil+mono-silicic acid. The results revealed that the maximum stem girth (17.2 mm), number of cobs $plant^{-1}$ (1.86), grain yield (5636 kg $ha^{-1}$), 1000-grain weight (193.17g), N content in soil (0.08%) and N content in the plant (2.58%) were recorded where coated urea with palm sterain+mono-silicic acid was applied. The result of this experiment shows that coated urea had a positive response to maize yield. It is further suggested to test the coated urea on other seasonal crops to evaluate its effect.

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# FRESH AND HRDENED PROPERTIES OF BLENDED GGBFS AND MICRO SILICUMA MADE SELF COMPACTING CONCRETE

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**ABSTRACT:** Self-Compacting concrete (SCC) is highly viscous type of concrete having high workability. It has to property to compact itself under its own weight without any vibration. It is highly recommended for the design having congested reinforcement. Ground Granulated Blast Furnace Slag (GGBFS) is industrial waste obtained during the manufacturing of Steel. Another material named Micro Silica which is also known as silica fume is used in this study which help to enhance the mechanical properties of SSC. Admixture used in this study was Carbo-Plast G-2002. The intention of this research work is to observe the fresh and hardened properties of blended GGBFS and Micro silica made Self-Compacting Concrete. Where Ground Granulated Blast Furnace Slag (GGBFS) and micro Silica is blended in the ratio of (1:4)) and then replaced with the cement at the rate of 0%, 10%, 20%, 30% and 20% by adding 1.5% of the of super-plasticizer (Carbo-Plast G-2002) by the weight of cement. Fresh properties of the mix is observed with the procedure of V-Funnel Test and J-Ring Test. Total 36 cubes of standard size were cast and cured for 7day, 28days and 56days to investigate the compressive strength of concrete and 24 cylinders of standard size were casted and cured for 7days and 28days to check the Split tensile strength of the specimen. It was observed that with the increase in the percentage replacement the workability of the concrete decreased in the both tests (V-funnel and J-Ring Test). Whereas the compressive Strength increased at the replacement rate of 10% were found maximum with the increase by 7.6% after curing the specimen for 56days. While the tensile strength observed higher at the age of 28th day of mix in which GGBFS and Micro Silica was 15% replaced with the cement. The increase in the tensile strength was 3.7%.

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**2nd IMCEET-2024/Author-048**

# EFFECTS OF A NORMAL FAULT RUPTURE ON A MULTI-STORY BUILDING RESTING ON DEEP FOUNDATION

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**ABSTRACT:** Seismic occurrences have demonstrated that surface and subsurface structures may sustain significant damage from both seismic forces and the contact between fault rupture and structure. The necessity to account for fault-generated loads in the design of buildings in fault-active regions has been uncovered via field surveys.

In this work, a three-dimensional numerical model generated in ABAQUS finite element software is employed to analyze how a normal fault rupture interacts with a multi-story building frame lying on a raft foundation. Finite element analysis in three dimensions was employed in this study. A 20-story building built on a 4-by-4 stacked raft foundation on sand, a standard break with a 600-degree dip angle and a 60-centimeter length was enacted. A 15-by 15-meter square raft was used as the foundation for the building, and it was supported by a grid of 4-by-4 piles that were 3.75-meters apart.

The computed findings showed that the building's induced settlement happened linearly. It was anticipated that there would be very little differential settlement in the initial stage (fault slip-O cm). On the other hand, differential settlement rises with increasing fault slide. At the 60-centimeter fault slip, the highest movement was 400 mm. The biggest sideways movement occurred at the building's pinnacle, on the 20th floor's roof. It was also predicted that the greatest negative bending moment kN-m) would occur at the top of pile Pl.

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# WATER SAVINGS ON NAI GAJ DAM AND BENEFITS OF SURFACE IRRIGATION OPTIMIZATION

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**ABSTRACT:** This research work is focused on the project of NaiGaj Reservoir to estimate the yield-projections for various crops in the project area. The designed questionnaires were used for interviews from farmers falling in the project-command in order to collect the relevant data with possible accuracy. The required secondary data was obtained from NESPAK and other concerned data collecting divisions. The data obtained had been analyzed to simulate the NaiGaj reservoir operation for optimization of irrigation water allowances for various copping patterns. Crop productions in the arid & irrigation regions, highest crop production index & available water discharge Q from the department of irrigation & agriculture-extension of the project region were kept as basis of yield forecasting. From the viewpoint of the estimations of irrigation supplies for area of project, irrigation performance and irrigation efficiencies comprised of:

i. Application efficiencies
ii. Storage and Requirement efficiencies
iii. Field distribution Uniformity

Irrigation events were simulated & optimized by SRFR Model to achieve improved performance of the surface irrigation which is being practiced in the project region. The cropping patterns were designed keeping in view climatic-conditions, Crop-Evapotranspiration, cropping-intensity of the region and in the surrounding project area.

The results indicated that for each year total accessible water was 131,600 Acre- feet but the crop needs were as 131 460 Acre- feet as estimated by using Model-CROPWAT, which included water losses during irrigation. This makes it quite clear that available irrigation-supply is sufficient for all crop-patterns. The SEFR Optimizations indicated that further 25% of valuable water conservation is achievable which can be used to bring more land under cultivation and for other purposes of domestic use and hydro-electric power generation.

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2nd IMCEET-2024/Author-054

# TRENDS IN OVERALL EQUIPMENT EFFECTIVENESS (OEE) WITHIN MANUFACTURING ORGANIZATIONS

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**ABSTRACT:** This paper explores the trends of Overall Equipment Effectiveness in manufacturing organizations. The study explores how OEE is changing and examines how it is used and how it affects productivity in the manufacturing industry. The paper aims to provide insights into how organizations are using OEE to optimize their production processes by looking at current practices, issues, and emerging patterns. The study also looks at possible future paths for OEE adoption, taking industry changes, technology breakthroughs, and the goal of continuous improvement in manufacturing operations into account. The present analysis enhances our comprehension of the intricate relationship between OEE and the productivity and efficiency of contemporary manufacturing enterprises.

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**2nd IMCEET-2024/Author-055**

# EFFECT OF MARBLE DUST ON STABILITY OF SOIL

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**ABSTRACT:** Every Civil Engineering structure is built on natural soil therefore bearing capacity and other factors are very important. Many natural and waste materials are used by the researchers for strengthening soil. Marble dust is the waste from Cushing and polishing of marble stone and is obtained from local factory of Khairpur. The objective of this research is to investigate the suitability of marble dust in soil. Disturbed soil was taken from the new land of the Benazir Bhutto Shaheed University of Technology and Skill Development Khairpur Mirs, and the marble dust was added in the soil as 10, 20 and 30% by the weight of soil. Soil classification, maximum dry density MDD, optimum moisture content OMC and California bearing ratio CBR was determined. The results revealed that there is a significant improvement observed in the soil.

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2nd IMCEET-2024/Author-056

# ENHANCING HOME SECURITY: A COMPREHENSIVE APPROACH THROUGH MACHINE LEARNING IN SMART HOMES

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**ABSTRACT:** In an era marked by technological advancements, smart homes have revolutionized traditional living spaces by integrating intelligent devices into interconnected ecosystems. As these smart technologies redefine daily life, the need to secure these environments becomes paramount. This research explores the application of machine learning (ML) algorithms to automate and optimize security measures in smart homes. Traditional home security models, although effective to a certain extent, fall short in addressing the dynamic and evolving nature of modern threats, especially with the proliferation of Internet of Things (IoT) devices. The increasing attack surface requires innovative solutions to safeguard occupants' privacy and well-being. Machine learning, with its analytical prowess and adaptability, emerges as a promising tool to enhance the efficacy of home security systems. This research aims to investigate the potential of ML in automating facets like intrusion detection, anomaly recognition, and predictive analysis. By leveraging artificial intelligence capabilities, the goal is to develop proactive security mechanisms that learn and adapt to emerging risks over time, surpassing responses to known threats. A comprehensive review of ML algorithms suitable for home security is presented, assessing their strengths, weaknesses, and potential applications. This exploration aspires to contribute to the discourse on the intersection of technology and security, providing insights into how ML can fortify the defenses of smart homes. A proposed smart home system with machine learning-driven automation emphasizes user comfort, energy conservation, and security, introducing innovative curtain control using machine learning. The contribution of a study to addressing security challenges in smart home automation, particularly through intrusion detection with deep learning, offers a practical and cost-effective approach to improving living quality.

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2nd IMCEET-2024/Author-057

# EXPLORING MODERN THREATS AND TRENDS IN HEALTHCARE CYBERSECURITY: A SYSTEMATIC REVIEW

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**ABSTRACT**: Amidst the dynamic landscape of healthcare technology, the integration of digital systems presents both opportunities and challenges. While these advancements offer the potential to enhance patient care and operational efficiency, they also expose healthcare organizations to an array of cybersecurity threats. This systematic review addresses the pressing issue of cybersecurity within the healthcare sector, with a specific focus on contemporary trends and vulnerabilities, notably the pervasive threat of ransomware attacks. Conducting a thorough examination of academic literature retrieved from leading databases such as CINAHL, PubMed (MEDLINE), and ProQuest, this research identifies and analyzes 31 relevant articles. The findings reveal a concerning reality: the healthcare industry lags behind other sectors in implementing robust cybersecurity measures, leaving critical patient data vulnerable to exploitation. Based on the synthesized insights, this review emphasizes the urgent imperative for healthcare organizations to bolster their cybersecurity defenses. Key recommendations include clearly defining cybersecurity responsibilities, establishing rigorous protocols for software updates and data breach response, adopting advanced security technologies like VLANs and cloud-based computing, and providing comprehensive user training. These strategies are essential to mitigate risks and safeguard sensitive healthcare information effectively.

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# DEVELOPMENT OF A COST-EFFECTIVE DYNAMOMETER USING PLC

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**ABSTRACT:** Induction motors are widely utilized due to their simple and robust design cost-effectiveness, and high reliability. With a wide power range and efficient operation, they offer self-starting capability and compatibility with the standard power grid, making them the preferred choice for various applications. These motors must be tested before any application for performance parameters such as speed (rpm), torque, and power. The development of a dynamometer proves very fruitful for testing purposes, but this testing comes at a greater expense, and hence not quite affordable. This research describes how a "Cost Effective Dynamometer" effectively tests such parameters under a reasonable tag. The dynamometer works with PLC, analog modules, communication buses, and HMI. The components being used are cheaper but effective. The encoder and load cell measure the speed, and torque of the motor under test, respectively. The results of these parameters are displayed on an HMI. This project also follows the rule of SDGs which is decent work and economic growth and industry, innovation, and infrastructure which are goals number 8 and 9 respectively.

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2nd IMCEET-2024/Author-059

# AN IN-DEPTH ANALYSIS OF CROSS-SITE SCRIPTING (XSS): THREATS, MECHANISMS, AND MITIGATION STRATEGIES

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**ABSTRACT**: Cross-site Scripting (XSS) presents a significant security threat in the realm of web applications, posing risks to both data integrity and user privacy. This paper delves into the intricacies of XSS attacks, elucidating their methodologies and far-reaching implications within the cybersecurity domain. Through a meticulous literature review and case analysis, the paper sheds light on the multifaceted impact of XSS, emphasizing the urgent need for robust defense mechanisms against these exploits. The primary objective of this research is to offer a comprehensive examination of XSS, covering its diverse types, attack vectors, and preventive measures. The document is structured as follows: an extensive review of existing literature to contextualize XSS within the cybersecurity landscape, a detailed exploration of XSS types and associated attack vectors, and a conclusive section that synthesizes crucial findings and provides actionable recommendations for mitigating XSS vulnerabilities in web applications.

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2nd IMCEET-2024/Author-060

# A COMPARATIVE SURVEY OF SYMMETRIC AND ASYMMETRIC KEY CRYPTOGRAPHY ALGORITHMS

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**ABSTRACT**: In today's digitally interconnected world, ensuring the secure transmission and storage of sensitive information is imperative. Cryptography, the science of encoding and decoding data, serves as a cornerstone in safeguarding against unauthorized access and manipulation. This field encompasses two primary categories of cryptographic algorithms: symmetric and asymmetric. Symmetric algorithms utilize a single key for both encryption and decryption, while asymmetric algorithms rely on a pair of keys – public and private. The selection of cryptographic techniques hinges on various factors, including security requirements, computational efficiency, and complexities in key management. This research paper undertakes a comparative analysis of modern cryptographic techniques, specifically examining symmetric (DES, 3DES, AES) and asymmetric (RSA, ElGamal, ECC) algorithms. Through a comprehensive literature review, we explore the performance characteristics of these algorithms, emphasizing the delicate balance between security and efficiency. Methodologically, we delve into fundamental cryptography principles, encompassing both symmetric and asymmetric key cryptography. Our empirical evaluations incorporate encryption/decryption time and key generation time to evaluate algorithmic efficiency. In our discussion, we dissect the current state of cryptographic techniques, highlighting the superior performance of AES over DES in symmetric cryptography. Additionally, we observe RSA's notable efficiency in encryption/decryption tasks within asymmetric cryptography, despite its longer key generation times compared to ElGamal.

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**2nd IMCEET-2024/Author-061**

# SOCIAL MEDIA CRISIS COMMUNICATION: EXPLORING ITS INFLUENCE ON ORGANIZATIONAL REPUTATION BEYOND BREACHES

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**ABSTRACT**: Social media platforms play a crucial role in modern communication but also pose risks like data breaches and privacy concerns. This research examines crisis communication strategies in the wake of such breaches, emphasizing their impact on organizational reputation and user privacy. Exploring transparent incident explanations and admission of responsibility as effective crisis responses, the study highlights communication's pivotal role in mitigating fallout. Consumer concerns drive demand for research on ethical business practices and responsible platform design. The influence of social media on consumer behavior and the aftermath of brand apologies are examined, shedding light on reputation management complexities. Coping responses to post-breach stress and notable incidents on platforms like LinkedIn are also discussed. Through social media analytics, the research evaluates breaches' repercussions on Information Security Reputation, offering insights for post-breach interventions. This research provides a nuanced understanding of social media breach challenges, stressing proactive crisis communication and ethical considerations for preserving reputation and user trust in the digital era.

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2nd IMCEET-2024/Author-062

# MACHINE LEARNING FOR HEART ATTACK PREDICTION: A COMPARATIVE ANALYSIS

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**ABSTRACT**: In this comprehensive analysis using machine learning algorithms on dataset that includes a range of contributing factors, for the prediction of heart attack. Utilizing the force of relationship grids and scikit-learn system, this study distinguishes the chest torment type as the most compelling variable, explaining its principal job in foreseeing coronary episodes. The assessment gives out to six grouping models, going from decision tree to logistic techniques. Surprisingly, logistic regression comes out on top in terms of accuracy, recall, precision, and F1-score metrics. This analysis not only stresses the meaning of powerful component determination in refining perceptive models but additionally highlights the ground breaking capability of machine learning in lifting symptomatic exactness for heart illnesses. The recognizable proof of chest pain as a key indicator gives significant experiences to medical care experts as well as reaffirms the clinical importance of this side effect in early determination. By and large, this study lays out the convincing capability of machine learning for upgrading the symptomatic scene of heart illnesses, working with convenient treatment mediations, and working on tolerant results.

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2nd IMCEET-2024/Author-064

# POTENTIAL OF BIOCHAR DERIVED FROM FRUITS AND VEGETABLE PEELS FOR THE TREATMENT OF BLACK SULPHUR DYE FROM THE TEXTILE WASTEWATER

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**ABSTRACT**: In this investigation, we delved into the adsorption capabilities of biochar derived from fruit and vegetable peels, aiming to ascertain its efficacy as a cost-effective adsorbent for eliminating black Sulphur dye from textile wastewater. Biochar samples were meticulously prepared through pyrolysis at temperatures of 300°C and 400°C, with subsequent characterization employing proximate analysis, thermogravimetric analysis (TGA), scanning electron microscopy (SEM), Fourier-transform infrared spectroscopy (FT-IR), and zeta potential measurements. A series of batch adsorption experiments were conducted, exploring the impact of varying biochar dosages (0.5g, 1.0g, and 1.5g) on the adsorption of black Sulphur dye. Comprehensive analysis of the experimental data was undertaken using adsorption isotherm and kinetic models. The outcomes of this study unequivocally demonstrate that the utilization of biochar derived from fruit and vegetable peels, produced through cost-effective pyrolysis, presents a viable and promising strategy for effectively removing black Sulphur dye from textile wastewater. This research contributes valuable insights into the potential application of biochar as an environmentally friendly solution in wastewater treatment processes.

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2nd IMCEET-2024/Author-065

# DESIGN AND DEVELOPMENT OF DCS FOR PRODUCTION UNIT

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**ABSTRACT**: In this research article, the production plants or industries were operated manually. There is no real-time data and controls of machine on other systems. Design and development of a Distributed Control System (DCS) for a production unit by leveraging the RS-485 Modbus communication protocol and Fatek Programmable Logic Controllers (PLCs). The main objective of that research is to enhance the automation and control capabilities of the production unit, leading to improved operational efficiency and productivity. The Fatek PLCs are utilized as the primary control devices, responsible for executing control logic and interacting with various sensors and actuators in the production unit. The design process involves identifying the control requirements, mapping them into functional specifications, and configuring the Fatek PLCs accordingly. The RS-485 Modbus protocol is implemented to establish communication channels between the central control station and the distributed PLCs. The system employs a master-slave configuration, where the central control station acts as the master and the Fatek PLCs operate as slave devices. To ensure seamless communication and synchronization, appropriate data structures and protocols are defined for data exchange between the central control station and the distributed PLCs.

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2nd IMCEET-2024/Author-066

# ADAPTIVE POLP: TAILORING LEAST PRIVILEGE ACCESS CONTROLS FOR DYNAMIC IOT ENVIRONMENTS

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**ABSTRACT**: This paper delves into the intricate realm of securing dynamic Internet of Things (IoT) environments through the implementation of the Adaptive Principle of Least Privilege (PoLP). Utilizing a comprehensive methodology, which incorporates simulations and case studies, our objective is to meticulously evaluate the adaptability and security implications inherent in the deployment of dynamic access controls within IoT ecosystems.
The literature review serves as a compass, guiding us through existing knowledge while shedding light on critical gaps. It underscores the pressing necessity for bespoke security measures tailored to meet the challenges posed by the ever-evolving IoT landscape. Our study takes flight with the introduction of Adaptive PoLP, setting the stage by framing a pivotal research question and elucidating its profound significance within the intricate tapestry of the IoT context. As we navigate through this exploration, the research aims not only to contribute to the existing body of knowledge but also to provide actionable insights that can shape the future of securing IoT environments. This abstract encapsulates the overarching mission of our research, promising a deep dive into the nuances of Adaptive PoLP, and its potential to fortify the security posture of dynamic IoT ecosystems.

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2nd IMCEET-2024/Author-067

# COMPARATIVE ANALYSIS OF PROPOSED MODEL OF GRAVITY SUIT AT PHARMACEUTICAL COMPANY

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**ABSTRACT:** The Success of every Manufacturing organization mainly depends upon the process improvement and cost minimization. Pharmaceutical companies are world-leading consumer healthcare companies with a clear purpose to deliver better everyday health with humanity. This research compares and determine the cost and benefit analysis with the existing process of Solid manufacturing of Vitamin CaC 1000 and the proposed model of GRAVITY SUIT. Dry granulation is a vital process in pharmaceutical manufacturing and playing a crucial role in transforming powders into granules for tablet production. This method offers distinct advantages in terms of cost-effectiveness, reduced material waste, and enhanced product quality. However, the company faced issues related to lead time due to slow process of granulation resulting in delay in the delivery of products. The proposed model of GRAVITY SUIT on the other hand, is expected to be more efficient in reducing the lead time and more cost efficient.

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2nd IMCEET-2024/Author-068

# SMART EYE BLINK APPLIANCE CONTROL VIA RASPBERRY PI

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**ABSTRACT**: This system introduces an innovative assistive technology system designed to empower individuals with disabilities by granting them control over home appliances and ensuring prompt emergency notifications. Leveraging the capabilities of a Raspberry Pi 3B, computer vision technologies such as OpenCV and Dlib, and an array of IoT components including relays, a GSM module (SIM800L), an I2C-enabled LCD display, and a dedicated push button, this system offers a comprehensive solution to enhance the quality of life for disabled individuals. The core functionality relies on the detection of eye blinks, and based on blink frequency, the system activates or deactivates appliances through relays. In emergency situations, the GSM module sends notifications to pre-defined contacts, guaranteeing timely assistance. Moreover, the inclusion of a push button enables a concerned person to stop the buzzer when they arrive, providing a manual override to ensure user comfort and control. This abstract provides a succinct overview of the project's hardware and software components, its functionality, and the potential impact it holds in promoting independence and safety for individuals with disabilities. The comprehensive thesis delves into the details of the project's development and implementation, presenting a thorough exploration of its technical and practical aspect.

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2nd IMCEET-2024/Author-070

# DESIGNING AN ARDUINO UNO BASED CONTROLLED ROBOTIC SYSTEM A FIRE FIGHTING ROBO CAR FOR FIRE RESCUE

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**ABSTRACT**: The world trend is moving towards Industry 4.0, Artificial Intelligence, IoT and Applications of robotics in human survival products. This research based on controlled Robotics System, IoT. Detecting fire and extinguishing is a hazardous job for a fire extinguisher, it often risks the life of that person. So, we designed a smart firefighting robo car as a prototype for industrial safety purposes, which detects fire and extinguishes it. A fire-fighting robot car is a specialized robot designed to assist firefighters in extinguishing fires in hazardous and inaccessible environments of industry. The robot is equipped with various sensors and tools to detect and combat fires, as well as to perform search and rescue operations. The robot's main components include a fire detection system, Various sensors to detect the location and intensity of the fire. The water spray system can be used to extinguish the fire, and the locomotion system enables the robot to move around and access hard-to-reach areas for fire man. The robot can be operated remotely by a firefighter or can be programmed to navigate autonomously through the fire scene. The robot's autonomous capabilities allow it to enter dangerous areas without risking the lives of firefighters, making it a valuable tool in fire-fighting operations. In conclusion, fire-fighting robots have the potential to revolutionize the way we approach firefighting, making it safer and more efficient.

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2nd IMCEET-2024/Author-071

# ENHANCING CYBERSECURITY THROUGH HONEYPOT-BASED INTRUSION DETECTION AND PREVENTION SYSTEMS

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**ABSTRACT**: With the escalating threat landscape in the digital sphere, safeguarding sensitive information stands paramount for individuals and enterprises alike. Traditional security measures like encryption, firewalls, and authorization protocols have been pivotal, yet evolving cyber threats necessitate more proactive approaches. This paper advocates the adoption of honeypot-based Intrusion Detection and Prevention Systems (IDPS) as a robust defense mechanism. By leveraging the amalgamation of diverse honeypot types, this proposed system offers real-time analysis capabilities, bolstering its efficacy and cost-effectiveness. Furthermore, the utilization of virtualization technology streamlines setup and management processes, enhancing operational efficiency. In an era where network-connected devices proliferate, the risk of cyberattacks looms larger. Honeypots, acting as decoy traps, emerge as indispensable assets in fortifying cybersecurity postures. This study delves into the intersection of cybersecurity, encompassing facets such as machine learning, cyber threats, and the pivotal role of honeypots. Empirical evidence underscores the pivotal role of honeypots in thwarting unauthorized access attempts, providing invaluable insights into attack origins and methodologies. Thus, advocating for the integration of honeypot-based IDPS emerges as a proactive strategy in the relentless pursuit of fortifying digital defenses against evolving cyber threats.

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**2nd IMCEET-2024/Author-074**

# STONE COLUMNS: A PARADIGM SHIFT IN GROUND STABILIZATION TECHNIQUES

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**ABSTRACT**: Various methodologies exist within the realm of geotechnical engineering to improve ground conditions. One extensively employed technique is the stone column method, designed to augment soil bearing capacity and mitigate both total and differential settlement in structures erected on soft soil. By incorporating stone columns into the soft soil, their inherent high permeability is harnessed to amplify load-bearing capabilities and diminish soil settlement. Furthermore, these columns serve a dual purpose as vertical drains, expediting the consolidation process. The focal point of this paper is to furnish a comprehensive review of ground improvement strategies, with a specific focus on the utilization of stone columns and an assessment of their efficacy as a ground improvement technique.

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**2nd IMCEET-2024/Author-081**

# OPTIMIZATION OF INVENTORY CONTROL IN SUPPLY CHAIN MANAGEMENT BY RFID WITH ZIGBEE NETWORK

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**ABSTRACT:** Radio frequency identification (RFID) is the system of automatic identification of tangible entities like human, animal and items. This technology is used for real time locating system (RTLS) without human intervention by radio frequency waves. It doesn't use line of sight like barcode system. RFID system has been rapidly growing significantly over the last decade. The efficiency of inventory management in the supply chain management (SCM) can be effectively controlled by integrating RFID network with ZigBee low cost, low power mesh network. The use of RFID system aim is to avoid the product loss or shrinkage in SCM. This research explains the technique of radio frequency identification. The RFID chip embedded with entities of Internet of Things (IoT). The RFID reader is an enabling device used to locate, identify and track record of IoT in the supply chain management cycle. The benefit of the application of RFID system with zigbee network of internet of things in SCM increases the traceability of movements of items in real time locating and bring up to date information exchange. It also increases the productivity and quality of service. RFID system minimize the human error and labour cost.

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2nd IMCEET-2024/Author-082

# AI-ENHANCED DEVSECOPS: SECURING CLOUD ENVIRONMENTS

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**ABSTRACT:** Electricity This research explores the integration of artificial intelligence (AI) into DevSecOps to fortify cloud security. DevSecOps addresses the challenges of dynamic cloud environments by seamlessly integrating security measures. AI plays a pivotal role in threat detection, vulnerability assessment, and automated incident response, becoming intrinsic to Continuous Integration/Continuous Deployment pipelines. Real-world examples highlight successful AI implementations in DevSecOps, resulting in tangible improvements in security posture and incident response times. The paper navigates benefits, considerations, and future trends, emphasizing the significance of AI-powered techniques for robust cloud security. Additionally, it delves into contemporary tools for threat detection and response, emphasizing the collaboration between cloud security and AI operations. The integration of IoT systems with AI and Robotics is explored, focusing on challenges in confidentiality and data safeguarding. The paper investigates security threats and privacy concerns, offering insights into innovative security mechanisms. Another section discusses the application of AI-driven threat intelligence in cloud networks to enhance proactive threat detection. In response to evolving AI capabilities, the paper advocates for GIF-based CAPTCHAs to safeguard online platforms. A case study illustrates the effectiveness of this approach, emphasizing technical considerations and developmental challenges. The comprehensive exploration contributes to enhancing digital security in the AI era, emphasizing the role of AI in DevSecOps and proposing innovative solutions.

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2nd IMCEET-2024/Author-083

# ANALYSIS OF DRINKING WATER QUALITY OF LARKANA CITY (URBAN AREAS)

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**ABSTRACT:** Water is the most important source of life. However, due to various anthropogenic activities, water is no longer pure and drinkable. Pakistan is a country that is facing an acute shortage of safe water, and safe water drinking resources in Sindh, which is the second largest province of Pakistan, are depleting day by day. Therefore, a research study was carried out to determine the Physico-Biological properties of groundwater of Larkana city of Sindh province of Pakistan, where groundwater is the only source of drinking. For this purpose, a total of 40 samples were collected randomly from various locations in Larkana city, and the Physico-Biological parameters like Color, Odor, Taste, Turbidity, Total Solids (TS), Electrical Conductivity (EC), and Fecal Coliform and E-Coli were determined in the laboratory and were compared with WHO permissible limits. The results revealed that all of the samples were colorless with no turbidity, but 20% of the samples had having odor of sewage water. Moreover, 20% of samples had having slightly bitter taste, particularly the samples collected from Ahsan Colony, Sachal Colony, and QUEST hostel. Moreover, 92% of samples had values of Total Solids and EC beyond permissible limits. Further, most of the samples were found to have no presence of E. coli, but 8% of samples were found to have fecal Coliform present.

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2nd IMCEET-2024/Author-084

# EVALUATION OF EFFECT OF CLAY-WATER ON THE PHYSICO-CHEMICAL PROPERTIES OF Drinking water

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**ABSTRACT:** The issue of degradation of drinking water quality has become a problem of great concern in Pakistan, and especially availability of water treatment facilities in the Sindh province of Pakistan is almost negligible, particularly in rural areas. And, the public has been using traditional methods to reduce the concentration of physic-chemical parameters in drinking water. Therefore, this study was carried out to analyze the impact of a Clay-water cooler on physic-chemical parameters of drinking water. Analysis revealed that samples remained colorless, with the passage of time odor of water changed to a clayey odor; Turbidity increased with the passage of time and temperature decreased; the pH value of water increased initially and crossed the allowable limit but with time it was observed that pH of water decreased came under the limit; the concentration of EC, Cl, Ca, Total Hardness and TDS decreased for first 12 hours, but increased with increase in storage time. The value of Magnesium increased as storage time increased. Overall, it was disclosed that a Clay-water cooler has a positive impact on the quality of drinking water particularly if water is stored in a clay-water cooler for a time not longer than 8 hours.

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2nd IMCEET-2024/Author-085

# A STUDY ON THE PHYSICOCHEMICAL PARAMETERS OF DRINKING WATER OF TALUKA LAKHI OF SINDH PROVINCE USING WQI MODEL

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**ABSTRACT:** Pakistan is one of the victims of global warming that's the reason that global warming has egregiously impacted Pakistan and has afflicted it with severe floods, drought, and scorching heat. Shortage of water and bad quality of drinking water have grown concerns for executives and civil society. Therefore, attempts are being made to analyze the availability of safe drinking water quality throughout Pakistan. Keeping this in mind this research was carried out to assess drinking water quality parameters of groundwater of Taluka Lakhi of Sindh, Pakistan. For this purpose, total of 25 samples were randomly collected from various locations covering all union Councils of Lakhi Taluka. The samples were analyzed in the Laboratory following standard methods and physical and biological water quality parameters like odor, taste, Turbidity, Total solids, Electrical Conductivity, Fecal Coliform, and E. coli were determined, and results were compared with WHO-prescribed values. Further, for evaluating the overall quality of groundwater for domestic use the Water Quality Index (WQI) model was used for accurate prediction of groundwater quality. Analysis revealed that all samples were colorless tasteless, odorless, and had Turbidity within the permissible limits. However, about 15% and 12.5% of samples were found to have EC and TDS beyond the permissible limits, 13.3% of samples had chlorides beyond permissible limits, and about 6.67%, 16.67%, 6.67%, 20.1%, 10%, 13.3% of samples were having Nitrate, Nitrite, Calcium, Magnesium, Sulfate, and Total Hardness higher than desired limits respectively. Moreover, the WQI model revealed that 22.5% of samples were within the slightly contaminated water category; 61.5% of water samples fell within the moderately contaminated water category, and 16% of samples were found unsuitable for drinking based on the Physicochemical analysis.

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2nd IMCEET-2024/Author-091

# EFFECT OF FLY ASH AND POLYPROPYLENE FIBERS ON STRENGTH DEVELOPMENT OF GREEN CONCRETE

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**ABSTRACT:** Today global warming and energy crises are the major issues all around the world. The manufacturing of one ton of cement emits approximately 0.8 tons of CO2 into the atmosphere, which accounts for about 5-8% of CO2 emissions worldwide. This research aimed to study the influence of fly ash and polypropylene on the mechanical properties of concrete. In this research work cement was replaced with fly ash at 3%, 6%, 9%, 12%, 15%, 18%, and 21% along with the addition of 0.1% PP fiber by the total volume of mix. Mechanical performance in terms of compressive and split tensile strength at the end of 7 and 28 days of water curing. Based on the test result, at 7 days compressive and split tensile strength was found to be 24.44 & 2.8 MPa respectively at 15% replacement level of fly ash with cement, however at 28 days of curing maximum compressive and split tensile strength was found to be 33.23 and 3.11 MPa respectively. Test results show that the addition of both fly ash and fiber enhances the early-age strength of concrete because of the quick hydration process that produces C-S-H gel, which is the main contributor of early strength.

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2nd IMCEET-2024/Author-092

# SELF-HEALING CAPABILITY EVALUATION OF FIBER REINFORCED MORTAR INCORPORATING SELF-HEALING AGENTS FOR RECOVERY AGAINST MECHANICAL PROPERTIES

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**ABSTRACT:** This paper investigates the characterization of mechanical performance of self-healing in fiber-reinforced mortar at early-age. The employed mortar consists of cement, sand, special self-healing materials 3-6% by weight of cement by and poly vinyl alcohol (PVA) based synthetic fiber (0.5%) by total mass of mix. Effect of self-healing mechanism on future mechanical performance have been evaluated with the help of 3-point bending test, conducted up to controlled damaged state and after final failure before and after healing duration respectively. Only water immersion exposure condition at 20 °C was considered for healing observation at 28 and 56 days. Moreover, microscopic observations were also followed to obtain cracks characteristic before and after healing process. Finally, test results are presented in terms of mechanical properties. The results show the significant increase in mechanical performance has been observed and almost complete recovery of healing has been achieved at the end of 28 and 56 days of healing duration.

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**2nd IMCEET-2024/Author-95**

# SECURITY THREATS ON CLOUD COMPUTING VULNERABILITIES

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**ABSTRACT**: Cloud computing has rapidly reshaped the IT industry, providing unmatched scalability and cost-efficiency. However, this transformation comes with a pressing challenge: safeguarding the security and privacy of sensitive data in the cloud. This paper delves deeply into the complex security issues surrounding cloud computing, focusing on data confidentiality, integrity, and control. It explores the vulnerabilities inherent in storing sensitive information in a shared, internet-based environment. To address these risks, we introduce a new approach to cloud security called secured cloud computing, which emphasizes independent encryption and decryption services to bolster data privacy. Additionally, the paper underscores the importance of understanding the evolving threat landscape of data breaches in the cloud. It offers a comprehensive analysis of recent high-profile breach incidents, highlighting the diverse attack methods and their severe impacts. To counter these threats, we investigate cutting-edge prevention and detection techniques, including advancements in encryption, intrusion detection systems, and vulnerability management. Furthermore, we recognize the socio-technical aspects of cloud-based breaches, examining their broad effects on individuals and organizations. By shedding light on the intersection of technical vulnerabilities and social consequences, this paper aims to advance a more holistic approach to cloud security that prioritizes data privacy and user protection.

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2nd IMCEET-2024/Author-096

# ENHANCING NETWORK SECURITY IN THE INTERCONNECTED WORLD: A COMPREHENSIVE STUDY ON WIRELESS SENSOR NETWORKS, IOT, AND DATA LEAK PREVENTION

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**ABSTRACT:** In today's digital world, organizations often overlook network security, increasing their vulnerability to attacks. This paper highlights the vital need for robust security, offering practical guidance via best practices and breach detection methods (including a new scalable solution: MR-DLD). It delves into vulnerabilities of wireless sensor networks and the complex security challenges of the Internet of Things (IoT), emphasizing the need for efficient measures like data protection and anonymity. Ultimately, the paper recommends designing and deploying solutions that guarantee security in diverse IoT environments.

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2nd IMCEET-2024/Author-097

# CHALLENGES FACED BY CONSTRUCTION INDUSTRY OF PAKISTAN

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**ABSTRACT:** Electricity Construction is one of the biggest industries after agricultural sector in Pakistan. It contributes around 10% to the country's GDP and it employees around 6 to 7% of the workforce to this domain. The field of construction is full complexity with various types of problems that can be countered during the execution and construction phase. Construction domain plays an important role in the developing of the country. All the developed countries like United States, United Kingdom, Australia and other first-world countries are recognized due to their extra-ordinary construction and infrastructure. These complexities can be classified into pre-construction problems and post-construction problems. The pre-construction problems are associated in terms of lack of work force for the subjected project, lack of tools which is needed for construction activities to be completed, delay in material transportation due to strict foreign policies and economic problems due to which lack of stability in the prices of the material can cause poor estimation. Whereas, for post-construction problems like delay in material supply to the site due to payment issues, delay in construction and approval drawings for the assigned project, lack of coordination due to poor management skills, poor selection of core member committee for the allocated project and poor execution of the project due to lack of experience towards the complicated projects. These challenges are faced everywhere in the world like in India, UAE, Iran and other countries but they made their rigid policies against these problems and successfully terminated all the negative outcomes. Pakistan must look deeply towards their neighboring countries so that they can control the situation and get the positive outcomes.

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2nd IMCEET-2024/Author-098

# DESIGN AND DEVELOPMENT OF SYNCHRONOUS RELUCTANCE MACHINE FOR INDUSTRIAL APPLICATION

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**ABSTRACT:** This paper presents 3kW synchronous reluctance motor for industrial application. The stator of the machine has 2-poles, 24 slots which are similar to an induction motor. The paper is focused on a new winding configuration with rotor flux barrier and flux career design. The finite element method has been used for the machine analysis. It is aimed to improve the efficiency of the machine. The machine rotor is robust with optimized performance. The particle swarm optimization method has been used to optimize the motor. The simulation is done with different machine parameters. Additionally, the two different winding guage size arrangements is practically tested and finally chosen the best wire size with improved speed performance. There is a huge potential in the designed machine with simulation and experimental results for industrial applications. The main advantage is a stable speed without variation and good thermal performance

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2nd IMCEET-2024/Author-099

# REVOLUTIONIZING AIR QUALITY FORECASTING: RELEASING THE POWER OF FUNCTIONAL DATA ANALYSIS AND MACHINE LEARNING ON EXTENSIVE ENVIRONMENTAL DATASETS

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**ABSTRACT:** The impacts of air pollution are not limited to respiratory and heart diseases; they also affect neurological health and well-being. This necessitates AI to predict air quality, providing accurate real-time pollution data. This study deviates from statistical approaches, employing functional data analysis to examine a large dataset that includes hourly updates from several sensors across various chemicals over an entire year. Complex pollution patterns such as carbon monoxide, nitrogen oxides, and benzene can be identified using this method. To transform the time series into an analytical form that allows for a more in-depth analysis of climate trends, the method requires meticulous data preparation. By utilizing a combination of non-parametric methods and functional linear models, this study enhances its estimates' accuracy and scope. Ultimately, the findings also validate these models, indicating how functional data analysis can guide overall health strategies and environmental surveillance. This research is a significant milestone in environmental data analysis as it contributes to large-scale sustainable environment management.

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**2nd IMCEET-2024/Author-100**

# AI-ENHANCED SECURE MULTI-PARTY COMPUTATION VIA SECRET SHARING: ADVANCEMENTS AND APPLICATION

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**ABSTRACT**: Secure Multi-Party Computation (SMPC) enables multiple parties to collaboratively determine a function's outputs while preserving its privacy. Recent AI developments have dramatically increased SMPC protocols' efficiency, scalability, and security. The interaction between SMPC and Artificial Intelligence (AI) techniques is the focus of this paper. Our proposed scheme uses machine learning algorithms for shared distribution, performs minimal communication overhead and enhances computation. AI additionally chooses standards and adjusts their configuration, ensuring privacy and application requirements. Our experiments based on real-world applications demonstrate that AI-enhanced SMPC is capable of supporting advanced data analysis and machine learning operations. The complexities of scalability to a large number of participants and adversarial threats are demonstrated with the help of real-world examples. The purpose of this research is to investigate the revolutionary possibilities of privacy-preserving technology in highly confidential group situations. Finally, our paper shows SMPC and artificial intelligence are able to support each other by the integration of their respective technologies.

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# ENHANCING HYDROFOIL ENERGY HARVESTING PERFORMANCE THROUGH SLOT INTEGRATION: AN EXPERIMENTAL STUDY

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**ABSTRACT**: An experimental study was proposed and designed for micro energy harvesting from the wake of streamline body (NACA 0012) with addition of introducing three different configurations of slots. The hydrofoils were placed at three different angles of attack α= 0°, 4°, and 8° in the closed-circuit water tunnel in a uniform flow with piezoelectric eel placed in the wake. The response (power output) of the piezoelectric eel and instantaneous data was collected through LabView and flapping footage of the eel was captured through high-speed camera for a time span of 120 sec each. The flapping traces and dominant frequency are post processed by MATLAB. The Amplitude to Length (A/L) ratios, frequencies, and power output for all configurations were determined. It has been found that hydrofoils are also suitable for energy harvesting through piezoelectric eel from their wake's contrary to bluff bodies

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2nd IMCEET-2024/Author-102

# MITIGATING PHISHING AND SOCIAL ENGINEERING RANSOMWARE THREATS IN BIOINFORMATICS: STRATEGIES FOR EDUCATION AND AWARENESS

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**ABSTRACT**: Emerging as an unexpected challenge in the rapidly evolving domain of bioinformatics, phishing, social engineering, and ransomware threats have begun to risk sensitive data and disrupt research workflows. Even bioinformatics experts are not immune to these cyber traps, as the bioinformatics landscape continues to evolve, addressing cybersecurity vulnerabilities becomes a paramount concern. Phishing and social engineering attacks target the human element, requiring a proactive response that combines technical solutions with education and awareness programs. By development a watchful and educated community, bioinformatics professionals can navigate the digital landscape with resilience, safeguarding critical data and maintaining the integrity of scientific endeavour. We found 1251 studies; a careful analysis was conducted on 20 relevant studies. This literature review specifically explored the safeguards that bioinformatics employs to shield against the ever-evolving strategies of ransomware attackers. It scrutinized a range of aspects, from the intricate intricacies of ransomware-as-a-service (RaaS) models to the escalating sophistication exhibited by encryption algorithms. This paper highlights an innovative approach centered on education and awareness programs to counteract these ransomware threats. By cultivating a culture of cybersecurity mindfulness, bioinformatics professionals can navigate the digital landscape with resilience, ensuring the security of critical data and the continuity of groundbreaking research Social Engineering, Phishing, Encryption

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**2nd IMCEET-2024/Author-105**

# PHOTOCATALYTIC DEGRADATION OF PESTICIDE FROM WASTEWATER BY TI3ALC2-MAX/TIO2 COMPOSITE

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**ABSTRACT**: Pesticide incorporation for high-yield production is the most hazardous substance that deteriorates the natural environment. Photocatalytic degradation has attracted considerable attention on account of its more feasible and higher rate of decomposition of pesticides and other organic pollutants in wastewater. Several photocatalysts such as ZnO, WO3, g-C3N4, TiO2, CdS, etc are employed for the photocatalytic degradation of pesticides. Among these, the Titanium dioxide (TiO2) photocatalyst is commonly employed because of its great stability, low cost, and harmless properties. However, its performance is still low because of poor spectrum absorption and fast charge recombination, therefore the efficiency may be enhanced by coupling with a highly conducting material such as the MAX phase. We looked at the combined impact of Ti3AlC2-MAX/TiO2 on the photocatalytic removal of pesticide (LAMBDA-CYHALOTHRIN) in this work. The MAX phase is added to the TiO2 and the composite was obtained with solvothermal treatment method. The maximum photocatalytic performance was demonstrated about three times higher when TiO2 was coupled with Ti3AlC2 as compared to pure TiO2. Thus, we proposed that this eco-friendly technique offers a long-term and affordable plan for reducing pesticide pollution in agricultural wastewater, helping protect ecosystems and public health.

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**2nd IMCEET-2024/Author-107**

# DESIGN AND DEVELOPMENT OF A GESTURE-CONTROLLED ROBOTIC ARM FOR ASSISTIVE HUMAN-ROBOT INTERACTION IN DIVERSE ENVIRONMENT

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**ABSTRACT**: With recent technological advancements, robotics is likely to play an increasingly important role in various domains and segments of society, contributing to the improvement of our ability to perform a wide range of tasks efficiently and effectively. The assistive robots particularly robotic arms are designed to support/aid individuals in task execution, especially in situations where a person may have difficulty in carrying out tasks on his own. Despite the growing need for robotic arms that are versatile, intelligent and cost-effective, there remains a gap in the availability of such solutions. Traditional robotics systems often come with high prices and complex and unintuitive interface, making them unaffordable and infeasible for small applications, educational purposes, medical, and budget-constrained environments. To address above mentioned issues, this paper aims to design and develop a low-cost, light-weight and efficient working prototype of Robotic Arm with user-friendly interface for Human-Robot-Interaction (HRI). The proposed robotic arm consists of combination of cylinder-shaped wooden fingers, Polyvinyl Chloride (PVC) pipe for the arm structure, and servo motors for actuation. It can detect, track the hand/finger movements and recognize the gestures using image processing techniques and then perform the specific action based on detected gesture. Experimental verification of the robotic arm's functionality and results demonstrate its effectiveness and potential for a wide range of applications. The design of this Robotic arm aligns with the growing demand for assistive robots and contributes to greater independence and task performance for individuals facing physical disabilities on, Gesture Control, Image processing.

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# EXPERIMENTAL INVESTIGATION OF FATIGUE STRENGTH OF ALLOYS OF ALUMINIUM, BRASS AND MILD STEEL USING ROTATING FATIGUE TESTING MACHINE

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**ABSTRACT**: In this paper we intend to investigate the fatigue strength of Aluminium alloy, Mild steel and brass alloy. Fatigue strength of these alloys specimens with thin neck is done on the rotating fatigue machine SM 1090 is investigated. Using this apparatus, the fatigue strength and behavior of these alloys is observed under constant vertical load which acts axially on a rotating cantilever machine having a point load near to its end. The fatigue testing of specimens is carried out at room temperature by applying totally reversed repeated load with the frequency of 63Hz and having a mean stress ratio of R=-1 (minimum stress/maximum stress). This stress ratio R=-1 was kept constant throughout the series of experiments. From the results significant variation in the number of cycles to fatigue failure for these alloys is observed. The failure is always occurred at the thinnest part (neck) observed from broken section all specimens due to high stress concentration in that region. Fatigue strength of mild steel is high than other two alloys due its greater toughness and yield strength. Results are shown on the graphs with comparison at maximum, intermediate and minimum loading versus number of cycles and SN curve of these alloys.

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# STUDY OF PHYSICOCHEMICAL CHARACTERISTICS OF DRINKING WATER OF KHAIRPUR MIRS

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**ABSTRACT**: Water is essential for life; no living thing survives without water. Human, animals and plants need specific amount of water for various purposes. The contaminations in drinking water can be of physical, chemical and biological nature. Water is contaminated naturally or by men's activities. Contaminated water can affect the human health and cause the abdominal pain, diabetes, diarrhea and cancer (Kidney, liver and lungs). The ground water of Khairpur city was studied to check the physico-chemical suitability for drinking purpose. Total of 58 samples were collected according to ward vise, two samples from each ward. The pH values were in the WHO range and the TDS values of 19 samples were exceeding the prescribed limits. The Temperature values were in safe limit. The turbidity values were in boundary except Faizabad, Kachi abadi, Gareebabad, Rajper muhalla, Bhurgiri and Dahot Muhallah. The Arsenic values were found in range except Babu shah colony, Mumtaz colloge, Lashari Muhallah, Bhurgiri, Hussaini Chowk, Memon Muhallah, Lambo Athar Chowk, Hindor Pir, Jillani Muhallah and Munshi Muhallah. It is therefore suggested to avoid groundwater of above mentioned locations for drinking purpose. Overall quality of groundwater of study area is within WHO limits.

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# DESIGN AND DEVELOPMENT OF A PESTICIDE SPRAYING DRONE FOR AGRICULTURE SYSTEM

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**ABSTRACT**: There are too many technologies involved in agriculture sectors. Out of these technologies have spraying pesticide by drone because farmers in agriculture fields face health problems due to disease caused by pesticides and insecticides. Thousands of cases result in adverse health effects when spraying pesticides manually onto crop fields. Many dangerous effects on the human's skin, allergies and problem during breathing. Spraying pesticide by drone used in plant protection and development the yield product. Therefore, this article is an attempt to explore the latest technological advances and application in hardware, Flight controller (FC) & and electronic speed controller (ESC), smart agriculture sensors and spraying system. To make a mention some key advancements in drone system which they are. The crops can be monitored by the use of the multispectral camera mounted on a drone. The drone spraying system makes use of GPS coordinates to auto navigate to spray the pesticides on the infected areas in real-time as soon as the camera takes a picture of the spraying areas. Different types of nozzles are mounted to lead specific sprinkling speeds and auto control of the quantity of pesticide as per the required. And no more pesticide waste in useless place

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# ENHANCING POWER GENERATION AND FUEL EFFICIENCY WITH SOLAR AIDED FEED WATER HEATING AT ENGRO POWERGEN THAR LIMITED (EPTL): A COMPREHENSIVE RESEARCH STUDY

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**ABSTRACT**: Assimilation of solar energy into conventional coal-fired power plants presents a sustainable approach to enhance power generation efficiency while reducing environmental impacts. This paper deals with the integration of solar concentrator in place of conventional feed water heating mechanism on existing 330 MW Engro Powered power plant located in Tharparker district of Sindh Province, as this location is known for its high Direct Normal Irradiance (DNI). By Utilizing the Engineering Equation Solver (EES) software, a model based on solar thermal collectors has been developed to enhance the efficiency of existing power generation system. Moreover, this modification aims to harness the abundant solar energy resources in the region to augment the efficiency of the existing plant. This proposed model demonstrates a significant reduction in coal consumption, which leads to reduce greenhouse gas emissions and a decrease in the cost per unit kWh.

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