# Editorial

In an era where the pursuit of knowledge transcends disciplinary boundaries, it is imperative to recognize the significance of research endeavours spanning a multitude of domains. From the intricate realms of acoustics to the complexities of cyber security, and from the challenges of e-learning during a pandemic to the nuances of human-computer interaction for older adults, the array of 18 research papers presented in this compilation underscores the breadth and depth of contemporary scholarship.

The first paper delves into the nuanced phenomenon of acoustic monochromatic radiation, shedding light on the resonant energy transfer from boundaries into sound waves with traveling distributions of phases. Through meticulous analysis, the authors unravel the intricate interplay between spatial frequencies, wave dimensions, and curvature of radiating boundaries, offering insights into resonant radiation phenomena [1].

Transitioning to the realm of cybersecurity, the second paper navigates the intricate landscape of public policy issues, cyber vulnerabilities, and automated defence capabilities. In an age marked by ubiquitous connectivity and digital dependence, understanding and mitigating cyber threats assume paramount importance. The paper furnishes a comprehensive overview, equipping decision-makers with the requisite knowledge to navigate the evolving cyber threat landscape [2].

Amidst the backdrop of the COVID-19 pandemic, the third paper elucidates innovative approaches to distance learning, leveraging internet technologies and online platforms to facilitate effective education delivery. By harnessing existing digital infrastructure and engineering tools, the paper exemplifies the resilience and adaptability of educational systems in times of crisis [3].

Venturing into the realm of structural engineering, the fourth paper presents a novel polynomial displacement function to evaluate the stability of rectangular thick plates. Grounded in the principles of 3-D elasticity theory, the paper offers an exact solution for stability analysis, addressing the limitations of conventional approaches and enhancing our understanding of plate behaviour [4].

In the domain of materials science and civil engineering, the fifth paper investigates the influence of aggregate nature on the fire performance of concrete exposed to high temperatures. Through meticulous experimentation and analysis, the authors discern the differential responses of concrete compositions, thereby informing the development of fire-resistant building materials [5].

Moving to the realm of agricultural science, the sixth paper introduces a hybrid evolutionary/fuzzy machine learning approach to predict plant growth and yield. By integrating genetic algorithms and fuzzy logic, the paper pioneers a robust forecasting model, facilitating informed decision-making in agricultural management [6].

Transitioning to the socio-political sphere, the seventh paper delves into the factors shaping political ideas and values, with a particular focus on the role of media, education, family, and youth participation. Through empirical analysis, the paper elucidates the dynamics of political socialization, offering insights into pathways for fostering positive political attitudes [7].

This paper comprehensively studies the detailed design procedure and analysis of flat belt conveyor components for light-duty applications. It includes calculations, finite element analysis (FEA), and stress analysis of pulleys, shafts, and conveyor belts, ensuring the safety and efficiency of conveyor systems [8].

The paper conducts a structural analysis, utilizing finite element simulation, of single-row deep groove ball bearings made from three different materials: Silicon Nitride, 440C Stainless Steel, and AISI 4140 Alloy Steel. It evaluates contact stress and total deformation to determine the materials' suitability for bearing applications [9].

This paper proposes an adaptive filtering technique using the Least Mean Square (LMS) Algorithm to identify the coefficients of Finite Impulse Response (FIR) filters. The methodology employs microcontrollers and adaptive filters to find the estimated weights of the transfer function, facilitating the design of complex resistive circuits [10].

The paper outlines a methodology for direct teacher-student interaction and evaluation in remote classrooms, particularly during the COVID-19 pandemic. It emphasizes active-participatory classes, collaborative activities, and feedback mechanisms using Moodle-based platforms for effective teaching and assessment [11].

This paper presents an algorithm for fire alarm systems designed to detect fire-colored areas in captured images. It describes the comparison process of captured pictures, fire detection, and system reset functionalities, offering a systematic approach to fire detection and monitoring using image processing techniques [12].

The paper explores the use of anaerobic digestion systems for managing rural and urban waste, focusing on the generation of biogas from various feedstocks. It discusses process kinetics, substrate degradation, biogas properties, and factors influencing biogas production, providing insights for efficient waste management practices [13].

This study conducts a literature review to identify critical factors in human-computer interaction for technology-enhanced health care systems catering to older adults. It emphasizes factors such as personal integrity, trust, technology acceptance, and accessibility, recommending user-centered design and adequate support for successful adoption [14].

The paper proposes procedures for selecting parameters of sine-wave filters to address increased voltage frequency output from frequency converters in power supply systems. It describes the structure of power supply systems and simulators, focusing on improving voltage quality and modulation index contributions [15].

This study investigates the adsorption of heavy metals, particularly Cadmium (Cd), from water samples using activated carbon derived from Date Tree Leaves (DTL). It evaluates the effectiveness of impregnating the activated carbon with Zinc Oxide catalyst for heavy metal removal, providing insights into sustainable water treatment solutions [16].

The paper analyzes multi-carrier pulse width modulation (MC-PWM) techniques for cascaded H-bridge multilevel inverters (CHB-MLI). It reviews various MC-PWM methods, conducts mathematical analysis, and performs simulation studies to evaluate harmonic reduction and input source balancing capabilities of different modulation techniques [17].

This study evaluates machine learning algorithms, specifically the Extreme Learning Machine (ELM) algorithm, for non-invasive estimation of blood pressure and waveform from Photoplethysmography (PPG) signals. It demonstrates high correlation and accuracy in estimating blood pressure values and waveform characteristics, paving the way for non-invasive blood pressure monitoring technologies [18].

In conclusion, the compilation of research papers presented in this editorial exemplifies the multifaceted nature of contemporary scholarship. By traversing disciplinary boundaries and embracing interdisciplinary collaboration, researchers continue to illuminate the complexities of our world and pave the way for transformative innovation and societal progress. As we

navigate the frontiers of knowledge, let us embrace the spirit of inquiry and collective endeavour, forging new pathways towards a brighter and more sustainable future.

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**Editor-in-chief**

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