Editorial

In this issue, we proudly present a collection of 19 cutting-edge accepted research papers spanning diverse domains. These contributions showcase the latest advancements in fields such as artificial intelligence, transportation, renewable energy, computer vision, geophysics, cybersecurity, and more. Each paper presents novel insights and solutions, contributing to the ever-expanding landscape of scientific knowledge. Let's delve into the details of each paper, with reference numbers included for your convenience.

The first paper delves into the realm of artificial intelligence and medical imaging, specifically focusing on the detection of lung cancer tumors through improved CT images [1]. The study employs advanced image processing techniques and a one-stage detector, achieving impressive results in sensitivity, precision, and F1-score rates.

Expanding on previous research presented at ICECCME2021, this paper discusses the development of a solitary wave track circuit with added functionality, such as insulation deterioration diagnosis [2]. The enhancements contribute to improved reliability, availability, maintainability, and safety in railway operations.

Addressing economic challenges faced by traditional low-income retail stores, this paper introduces a low-cost smart basket designed using ARM system on chip architecture [3]. The innovative basket supports local micro-businesses and promotes social distancing during the COVID-19 pandemic.

Traffic management takes a leap forward with a market-based control approach for real-time intelligent speed adaptation in road networks [4]. The paper presents a solution to optimize traffic flow using dynamic market-based control, addressing the challenges posed by communication delays in connected autonomous vehicles.

The study investigates the application of infrared radiation, microwave antennas, and metamaterials-based sensors for detecting red palm weevils in date palm trees [5]. The experimental results demonstrate the effectiveness of these sensing modalities in predicting the presence of pests.

Contributing to hydrocarbon exploration in the Doba Basin, Chad, this paper integrates seismic and well log data to characterize and analyze petroleum reservoirs [6]. The 3D static reservoir model provides valuable insights into reservoir properties, facilitating predictions of performance and production behaviour.

Addressing the challenges of modern autonomous driving, this paper presents a computer vision radar system with a road line lane detection approach based on the histogram of grayscale images [7]. The method is compared with other computer vision techniques, showcasing its real-time effectiveness.

Introducing a modified simulation tool using Minecraft and ARAIG, this paper provides researchers with an optimized search space and egress path [8]. The integration of the ARAIG haptic suit enhances the user's experience, demonstrating the adaptability of virtual environments in research projects.

Focusing on distribution grid applications, this article presents a comprehensive roadmap for micro-Phasor Measurement Unit (µPMU) hardware and software design [9]. The proposed device ensures high performance, robustness, and accurate measurements in distribution grids.

Recognizing the challenges of interpretability in machine learning models, this paper introduces model selection methods that strike a balance between accuracy and interpretability [10]. The results showcase significant improvements in interpretability with minimal trade-offs in accuracy.

This paper addresses the critical issue of energy demand prediction, presenting a one-year-ahead estimation for Turkey using metaheuristic algorithms [11]. The proposed approaches, especially the M4 model, demonstrate superior estimation capabilities compared to existing models.

Focusing on filter design, this paper introduces compact bandpass filters using innovative structures [12]. The triple bandpass filter, designed with stepped impedance microstrip lines and T-shaped stubs, shows promise for applications in GPS, WLAN, WiMAX, and radar systems.

In the realm of solar photovoltaic modules, this paper introduces a performance adjustment factor to address output power variations caused by factors such as solar irradiation and sun position [13]. The proposed factor ensures optimal performance during different seasons, enhancing the efficiency of solar PV systems.

Examining cyber security reports for Central European countries, this article critically evaluates the state of cyber security, threats, and common attack types [14]. The study emphasizes the impact of COVID-19 on cyber security and proposes measures to enhance defense against phishing attacks.

Addressing the challenges of the false nearest neighbors method, this study proposes a robust method to estimate the minimum embedding dimension without relying on an arbitrary threshold [15]. The results demonstrate the accuracy and reliability of the proposed approach.

Exploring the properties of the Radon transform on convex shapes, this work extends previous findings on its discontinuity [16]. The study reveals that the regularity in the Radon space is determined by the regularity of the shape's points, providing insights into the continuity conditions for line detection methods.

In the realm of wireless networks, this paper introduces a deep learning algorithm for joint source-channel coding, aiming to improve Bit Error Rate (BER) performance [17]. The results demonstrate the superiority of the deep learning autoencoder model over conventional coding systems.

Examining the scalability of optical switches, this paper presents a nested Mach-Zehnder interferometer (MZI) configuration with phase generating couplers [18]. The multi-stage switch exhibits low crosstalk over a broad wavelength range, showcasing its potential for high-speed optical switching.

In addressing the societal issue of alcohol consumption, this paper explores the use of accelerometer data for detecting over-consumption [19]. The comparative analysis of five supervised machine learning methods reveals that "Decision Tree Learning" is the most suitable for accurate sobriety classification using mobile devices.

In conclusion, this special issue offers a diverse array of innovative research papers, spanning fields from medical imaging and transportation to renewable energy and cybersecurity. The

contributions showcase advancements in artificial intelligence, geophysics, computer vision, and more, reflecting the ongoing evolution of scientific inquiry. From the improved detection of lung cancer tumors to the development of low-cost smart baskets and the exploration of deep learning algorithms for enhanced wireless communication, each paper adds a valuable piece to the puzzle of contemporary scientific knowledge. The integration of advanced technologies, such as market-based control for traffic management and the utilization of metamaterials in insect detection, demonstrates the interdisciplinary nature of modern research. As we navigate through these insightful papers, it becomes evident that the pursuit of knowledge continues to drive breakthroughs, fostering a dynamic landscape of innovation across various domains.

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