Editorial

In this edition of our journal, we are pleased to present a collection of 31 accepted research papers, each contributing valuable insights to their respective fields. The diverse range of topics covered in these papers reflects the breadth and depth of contemporary research endeavors. From educational strategies to economic modeling, from healthcare applications to technological innovations, these papers showcase the remarkable progress made by scholars and researchers in addressing complex challenges.

The initial paper introduces a computer-based tutoring strategy aimed at addressing school dropout issues in Morocco. Focusing on collaboration between educational administration and teachers at the national level, the proposed strategy utilizes a computerized system based on student learning and evaluation portfolios. This approach aims to provide personalized assistance, considering individual student shortcomings and didactic needs [1].

Employing Markov Regime Switching Analysis, the second paper investigates the dynamic linkages between COVID-19 outbreak situations and the German stock market. The study evaluates the impact of pandemic situations on the market, utilizing log growth rates and GARCH models. Practical econometric methods are presented, demonstrating their applicability in assessing the impact of various epidemics and negative factors on economic activities [2].

The study in the third paper addresses the challenge of limited interactive communication modes in online learning environments. The authors construct and test models to infer student needs based on facial expressions. Utilizing Random Forest models and the Facial Action Coding System, the study suggests methods to enhance real-time understanding of student responses in online learning systems [3].

A measurement system is presented to evaluate radar algorithms for vital signs sensing applications. The system generates reproducible vital sign micro-movement and dynamic clutter scenarios using loudspeakers. The study demonstrates the system's capability to assess the impact of a beamforming algorithm on dynamic clutter, showcasing its potential for medical applications [4].

Addressing the complexity of indoor positioning, the fifth paper provides an agile taxonomy for selecting suitable solutions. The study analyzes a real-world scenario, offering practical recommendations for indoor positioning applications. The research contributes to understanding the diverse requirements and implications of indoor positioning techniques [5].

It introduces a navigation aid device for visually impaired individuals. The device utilizes a depth camera to collect visual information of surrounding objects, representing it through stereophonic sound. The portable and comfortable device demonstrated high accuracy in obstacle detection and navigation, offering a promising solution for visually impaired users [6].

Extending Quantum Machine Learning to weather forecasting, the seventh paper applies classifiers like Quantum Support Vector Machine and Quantum Neural Networks. The study discusses the potential of quantum algorithms in predicting weather conditions and highlights the importance of testing their performance on real-world datasets [7].

Exploring short-term pulse rate variability as a substitute for heart rate variability in evaluating emotional changes during the Trier Social Stress Test, the eighth paper reveals that physiological changes in pulse rate variability may represent psychological changes. The study emphasizes the need for cautious interpretation of physiological alterations as indicators of mental threats [8].

Adopting a human-centered design approach, the ninth paper addresses the lack of situational awareness in power system outages. The study develops interfaces for a microgrid project, emphasizing the need for accessible and timely information for microgrid operators [9].

Introduces HistoChain, a scalable storage scheme for consortium blockchain networks. The system efficiently manages on-chain big data by utilizing both current and historical blockchains, demonstrating its potential for applications requiring secure and immutable data storage [10].

A landmarking technique is proposed to optimize YOLO version 4 for fish recognition in diverse background conditions. The study introduces a method to improve detection accuracy, making it applicable for both underwater and terrestrial fish recognition scenarios [11].

A wireless sensor-based volume estimation technique for sealed boxes, utilizing machine learning algorithms. The proposed system achieves high accuracy in volume estimation without the need for unpacking, offering an efficient solution for monitoring product transportation [12].

It introducing social financial technologies aiming to optimize wages, revenue growth, and contributions to the development fund for enterprise and economic development, the thirteenth paper presents a comprehensive model for improving the efficiency of economic development processes [13].

A phase shifter design with electrically adjustable parameters is introduced, utilizing a single voltage differencing gain amplifier (VDGA) and a floating capacitor. The resistorless design offers practical advantages with a low component count [14].

It conducts a technical, economic, and environmental study of hybrid power systems for grid-connected and standalone applications. The study compares two configurations and emphasizes the suitability and cost-effectiveness of a grid-connected hybrid system for meeting specific power consumption needs [15].

A review of photoluminescence properties of Eu(III) complexes with two different phosphine oxide structures is presented. The study highlights the potential applications of these complexes in micro-LEDs, security, and sensing devices, emphasizing their significance as red phosphors in micro-LED displays [16].

Medical adherence is a global concern, particularly for patients managing multiple medications. Addressing this issue, a proposed automated medicinal-pill dispenser integrates Wi-Fi and cellular IoT, offering a cost-effective solution for home and long-term care settings. The device's web interface allows users to control dosage, potentially improving patient adherence and overall health outcomes [17].

The COVID-19 pandemic has underscored the need for innovative healthcare solutions. In response, a microcontroller-based smart healthcare kit has been developed for measuring vital signs at home. Utilizing multiple sensors, this low-cost system presents a convenient alternative to traditional checkups, especially in regions facing healthcare infrastructure challenges [18].

Renewable energy sources, specifically land-based solar power generation, are gaining significance. A numerical study employing the Strength Reduction Method assesses the safety factor of solar facilities on varying terrains. The research investigates the impact of slope angle and water level changes, providing insights into safety considerations for solar power installations [19].

Bitcoin's exponential growth prompts a study forecasting prices using an LSTM deep-learning approach with On-Chain Data. This research fills a gap by leveraging transaction data from the blockchain network. The application of LSTM provides a novel perspective on predicting Bitcoin prices, considering macroeconomic variables and investor sentiment [20].

In the realm of medical robotics, soft swimming milli-robots designed for magnetic navigation in biomedical environments are explored. The study investigates the influence of magnetic moments, particularly orientation and strength, on swimming behavior and performance. The findings contribute to the design of soft robots for medical applications [21].

Power systems see innovation with the introduction of a three-phase Continuously Variable Series Reactor (CVSR). Modeled using a Gyrator-Capacitor approach, the research delves into the performance and operational characteristics of CVSR, considering ferromagnetic core nonlinearities. This deepens our understanding of this device's utilization in power grids [22].

To ensure the quality of electric power systems, another study addresses bad voltage drop buses through minimum static VAR compensation. The research presents a compensating model to increase voltage to the minimum safety limit, showcasing results on the IEEE 9 bus system. The findings contribute to maintaining optimal bus voltages and system stability [23].

Amidst the challenges posed by the COVID-19 pandemic, a design-based research approach supports the development of enriching rural STEM camps. The study outlines barriers, decisions, and best practices in transitioning to virtual STEM enrichment programming. The insights gained from this rapid adaptation can guide other STEM providers facing similar challenges [24].

Decentralized public platforms are explored in the context of the Waterfall platform. This article details the fundamental principles of the economic policy integrated into Waterfall, a DAG-based system architecture. The economic leverages discussed aim to create a favourable environment, ensuring equilibrium and affordable transaction fees across decentralized platforms [25].

In robotics, a simulation of obstacle detection based on optical flow images is presented for mobile robot avoidance control. The study divides optical flow vectors to detect hazardous areas, allowing the robot to avoid obstacles and navigate safely. The proposed simulation enhances the robot's ability to recognize obstacles and ensure effective avoidance [26].

China's internet financial industry evolution is examined, emphasizing fintech's critical role. The study provides an overview of fintech's historical trajectory, recent developments, and potential risks. Using a VAR model, the research identifies key factors influencing China's electronic payment landscape, offering insights into future developments [27].

Addressing the need for robust license plate recognition, a research paper introduces an intelligent model trained on multiple fonts and diverse conditions in Morocco. Leveraging Yolov5 and Detectron2 frameworks, the proposed model achieves high precision in recognizing plates under challenging conditions, contributing to improved public safety [28].

Concluding the compilation, a study focuses on the design, optimization, and experimental study of hub and axial flux BLDC motors for light electric vehicles. The research compares the efficiency of both motors, offering insights into their performance under various parameters. The study's optimization using a genetic algorithm contributes to enhanced motor efficiency. This compilation offers a glimpse into a wide spectrum of technological advancements, providing unique insights in each domain. The research presented here contributes to the ongoing progress and innovation, inspiring further exploration and discussion within the scientific community [29].

References:

[1] S. Nai, A. Rifai, A. Sadiq, M. Bakrim, “Detailed Study of a Proposal for a Computer Based Tutoring Strategy,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 1–10, 2023, doi:10.25046/aj080301.

[2] K. Tan, S. Tokinaga, “Markov Regime Switching Analysis for COVID-19 Outbreak Situations and their Dynamic Linkages of German Market,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 11–18, 2023, doi:10.25046/aj080302.

[3] Y. Yan, E.W. Cooper, R. Lee, “Inferring Student Needs Based on Facial Expression in Video Images,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 19–28, 2023, doi:10.25046/aj080303.

[4] C. Domnik, D. Erni, C. Degen, “Measurement System for Evaluation of Radar Algorithms using Replication of Vital Sign Micro Movement and Dynamic Clutter,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 29–39, 2023, doi:10.25046/aj080304.

[5] J.P. Balbela, A.P. Bianzino, “Indoor Positioning: Comparing Different Techniques and Dealing with a user Authentication use Case,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 40–47, 2023, doi:10.25046/aj080305.

[6] H. Kusuma, M. Attamimi, J. Sintara, “Navigation Aid Device for Visually Impaired using Depth Camera,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 48–53, 2023, doi:10.25046/aj080306.

[7] C. Khemapatapan, T. Thepsena, “Forecasting the Weather behind Pa Sak Jolasid Dam using Quantum Machine Learning,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 54–62, 2023, doi:10.25046/aj080307.

[8] A. Sahroni, I. Miladiyah, N. Widiasmara, H. Setiawan, “Analysis of Linear and Non-Linear Short-Term Pulse Rate Variability to Evaluate Emotional Changes during the Trier Social Stress Test,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 69–79, 2023, doi:10.25046/aj080309.

[9] M.M. Hossain, T. Ortmeyer, E. Hall, “Human-Centered Design, Development, and Evaluation of an Interface for a Microgrid Controller,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 80–88, 2023, doi:10.25046/aj080310.

[10] M. Felipe, H. Xu, “HistoChain: Improving Consortium Blockchain Scalability using Historical Blockchains,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 89–99, 2023, doi:10.25046/aj080311.

[11] S. Satthamsakul, A. Kuswantori, W. Sriratana, W. Tangsrirat, T. Suesut, “Landmarking Technique for Improving YOLOv4 Fish Recognition in Various Background Conditions,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 100–107, 2023, doi:10.25046/aj080312.

[12] K. Wasayangkool, K. Srisomboon, C. Mahatthanajatuphat, W. Lee, “Accuracy Improvement-Based Wireless Sensor Estimation Technique with Machine Learning Algorithms for Volume Estimation on the Sealed Box,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 108–117, 2023, doi:10.25046/aj080313.

[13] E. Kostyrin, E. Sokolov, “Social Financial Technologies for the Development of Enterprises and the Russian Economy,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 118–135, 2023, doi:10.25046/aj080314.

[14] O. Channumsin, J. Pimpol, T. Pukkalanun, W. Tangsrirat, “Tunable Resistorless Phase Shifter Realization with a Single VDGA,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 136–143, 2023, doi:10.25046/aj080315.

[15] S. Mohamed, H. Cherif, O. Hasnaoui, J. Belhadj, “Design and Comparative Analysis of Hybrid Energy Systems for Grid-Connected and Standalone Applications in Tunisia: Case Study of Audiovisual Chain,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 144–153, 2023, doi:10.25046/aj080316.

[16] H. Iwanaga, “Photoluminescence Properties of Eu(III) Complexes with Two Different Phosphine Oxide Structures and Their Potential uses in Micro-LEDs, Security, and Sensing Devices: A Review,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 154–160, 2023, doi:10.25046/aj080317.

[17] C. Bandara, Y. Kodithuwakku, A. Sandanayake, R.A.R. Wijesinghe, V. Logeeshan, “Design and Implementation of an Automated Medicinal-Pill Dispenser with Wireless and Cellular Connectivity,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 161–169, 2023, doi:10.25046/aj080318.

[18] Y. Kodithuwakku, C. Bandara, A. Sandanayake, R.A.R. Wijesinghe, V. Logeeshan, “Smart Healthcare Kit for Domestic Purposes,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 170–177, 2023, doi:10.25046/aj080319.

[19] S. Lee, M. Park, “A Numerical Study on The Change in Safety Factor (FOS) According to Slope Angle Change for The Establishment of Photovoltaic Facilities Using SRM (Strength Reduction Method),” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 178–185, 2023, doi:10.25046/aj080320.

[20] Y.-J. An, H.-Y. Oh, H.-J. Kim, “Forecasting Bitcoin Prices: An LSTM Deep-Learning Approach Using On-Chain Data,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 186–192, 2023, doi:10.25046/aj080321.

[21] X. Tang, L. Manamanchaiyaporn, “Investigation of Swimming Behavior and Performance of the Soft Milli-Robots Embedded with Different Aspects of Magnetic Moments,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 193–201, 2023, doi:10.25046/aj080322.

[22] M. Hayerikhiyavi, A. Dimitrovski, “Three-phase Continuously Variable Series Reactor – Realistic Modeling and Analysis,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 202–211, 2023, doi:10.25046/aj080323.

[23] H. Zein, A.D. Mulyadi, A. Mudawari, “Minimum Static VAR Compensation Capacity for Bad Voltage Drop Buses in Power Systems,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 212–217, 2023, doi:10.25046/aj080324.

[24] R.Z. Lowe, A. Smith, C. Prout, G. Maresch, C. Bacot, L. Murfee, “How a Design-Based Research Approach Supported the Development and Rapid Adaptation Needed to Provide Enriching Rural STEM Camps During COVID and Beyond,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 218–230, 2023, doi:10.25046/aj080325.

[25] S. Grybniak, Y. Leonchyk, I. Mazurok, O. Nashyvan, A. Vorokhta, “Waterfall: Salto Collazo. High-Level Design of Tokenomics,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 231–243, 2023, doi:10.25046/aj080326.

[26] M.N. Anh, “Simulation of Obstacle Detection Based on Optical Flow Images for Avoidance Control of Mobile Robots,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 244–249, 2023, doi:10.25046/aj080327.

[27] The Influence Analysis of Internet Finance on China’s Banking Industry Development, Advances in Science, Technology and Engineering Systems Journal, **8**(3), 250–261, 2023, doi:10.25046/aj080328.

[28] E.M. Ben Laoula, M. Midaoui, M. Youssfi, O. Bouattane, “Improving License Plate Identification in Morocco: Intelligent Region Segmentation Approach, Multi-Font and Multi-Condition Training,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 262–271, 2023, doi:10.25046/aj080329.

[29] O. Tosun, K. Toker, O. Tosun, N.F.O. Serteller, V. Topuz, “The Design, Optimization, and Experimental Study of Hub and Axial Flux BLDC Motor Under Operating Conditions For Light Electric Vehicles,” Advances in Science, Technology and Engineering Systems Journal, **8**(3), 272–282, 2023, doi:10.25046/aj080330.

Editor-in-chief

Prof. Passerini Kazmersk