

## Editorial

We are pleased to present this issue showcasing 20 accepted research articles across a diverse array of topics in science and engineering.

The issue opens with El Kadiri et al.'s study on performance measurement practices in the automotive industry [1]. Through a survey of Moroccan firms, they identified barriers to effective overall performance management and recommended key indicators for sustainability. Their findings can guide improved decision-making.

Sentiment analysis is the focus of Laaz and Mazroui's paper proposing an Arabic text classification framework [2]. Combining lexicon-based approaches with machine learning achieved promising accuracy. Advancing natural language processing for under-resourced languages provides broad societal benefits.

Shifting focus to systems design, Wohlrab et al. put forth a model-based, variant-oriented methodology for developing systems of systems [3]. Identifying commonalities early on facilitates standardized interfaces and loose coupling. This work provides an efficient engineering approach for complex aggregations.

In the artificial intelligence domain, Ouahmane et al. empirically investigate embedding chaos in neural network models [4]. For both substance classification and breast cancer detection tasks, chaotic bidirectional associative memories yielded perfect accuracy, demonstrating the power of brain-inspired computing.

Gamification of instructional media is examined by Pratama et al. who designed science lessons incorporating the Genially platform [5]. Evaluations showed improved critical thinking and creativity in primary students. This highlights the potential of engaging tools to strengthen foundational skills.

Predictive modeling is spotlighted in Wulandari and Amin's comparison of algorithms for credit card default risk [6]. On real-world data, generalized linear models achieved high interpretability and accuracy. Practical insights are provided for financial risk assessment.

Multi-agent reinforcement learning is explored by Laaziz who proposes knowledge sharing to accelerate decentralized learning [7]. Simulations verified faster convergence through communicating learned state values. Such techniques may enable more nimble autonomous systems.

In the machine learning systems domain, Garg et al. tailored a CNN architecture called High Performance SqueezeNext for efficient deployment on embedded hardware [8]. Optimizations yielded high accuracy given memory constraints. This facilitates expanding AI to the edge.

Semiconductor physics is the focus of Almutairi and Wang's work modeling hole-confined optical phonon interactions in quantum well structures [9]. Their analysis revealed key insights into scattering mechanisms. Advancing physics-based simulations guides device optimization.

Integrated circuit design is spotlighted in Huang et al.'s paper on a CMOS process-voltage-temperature-leakage monitoring system [10]. A novel circuit topology achieved highly accurate real-time detection capabilities. Such self-awareness allows mitigating variability and enhancing robustness.

Secure wireless sensor networks for the Internet of Things are examined by Razaque et al. [11]. They propose an ant colony optimization routing protocol combined with trust management. Simulations demonstrated improved resilience to malicious nodes and energy efficiency. Hardening IoT systems against evolving threats remains crucial.

Supply chain provenance through blockchain technology is explored by Tran et al. who put forth aggregated verification schemes [12]. A multi-layer architecture minimized blockchain storage costs for tracking agricultural production. Integrity improvements have far-reaching potential.

Alternative energy sources are evaluated by Olajire et al. who characterized coal-biomass briquette blends [13]. Mixing agricultural wastes with coal boosted energy density while lowering emissions. This provides a more sustainable fuel option.

Wireless power transfer is the focus of Collot's paper on maximizing efficiency for near-field charging systems [14]. Optimizing coil parameters and alignment can reach up to 80% efficiency. Enabling robust contactless power has many applications from consumer electronics to EVs.

Indoor positioning is targeted by Kawasaki et al. through deep learning on BLE beacon fingerprints [15]. Temporal interpolation of RSSI sequences combined with a DNN model achieved 0.33m accuracy. Precise location services augment many contexts from navigation to asset tracking.

Automation for analytical chemistry is demonstrated by Stelzle et al. who developed a robotic platform for heavy metal quantification in dust samples [16]. The automated workflow provided faster, reliable measurements. Intelligent systems have potential to accelerate and expand environmental monitoring.

Information security is revisited by Flowerday and Blundell who apply facial expression analysis to evaluate reactions to policies [17]. Deep learning based sentiment classification provided promising results. Novel affective computing techniques can complement surveys.

Optoelectronic devices are explored by Abd-Allah et al. who fabricated a perovskite-TiO<sub>2</sub> heterojunction for broad-spectrum photodetection [18]. Incorporating NiO quantum dots yielded high responsivity and detectivity. Further advances in hybrid materials can lead to next-generation solar technologies and imaging systems.

Remote sensing for cartography is the theme of Abdelhafiz's work on segmenting buildings in aerial images by leveraging shadow information [19]. The proposed technique demonstrated over 97% precision on complex scenes. Reliable feature extraction facilitates geospatial applications.

Robotics control is targeted by Lu and Liu who developed a two-layer scheme for redundant manipulators [20]. Simulations verified improved performance in navigating constraints. Intelligent algorithms continue enabling more nimble automation across domains.

In summary, the diverse excellence of the research compiled in this special issue exemplifies leading-edge innovations pushing the boundaries of science and technology. We hope these contributions will stimulate researchers across disciplines to consider synergistic approaches leading to impactful discoveries. We thank the authors and reviewers for their diligent efforts in creating this issue.

## References:

- [1] A. Lamjahdi, H. Bouloiz, M. Gallab, "Heuristic Analysis of Overall Performance Measurement Perception and Management in Automotive Industry," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 1–11, 2022, doi:10.25046/aj070301.
- [2] B. Marieme, Z. El Houssaine, "Analysis Methods and Classification Algorithms with a Novel Sentiment Classification for Arabic Text using the Lexicon-Based Approach," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 12–18, 2022, doi:10.25046/aj070302.
- [3] S. Melzer, S. Thiemann, H. Peukert, R. Möller, "Towards a Model-based and Variant-oriented Development of a System of Systems," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 19–31, 2022, doi:10.25046/aj070303.
- [4] H. Naoum, S.M. Benslimane, M. Boukadoum, "Encompassing Chaos in Brain-inspired Neural Network Models for Substance Identification and Breast Cancer Detection," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 32–43, 2022, doi:10.25046/aj070304.
- [5] N. Hermita, R. Vebrianto, Z.H. Putra, J.A. Alim, T.T. Wijaya, U. Sulistiyo, "Effectiveness of Gamified Instructional Media to Improve Critical and Creative Thinking Skills in Science Class," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 44–50, 2022, doi:10.25046/aj070305.
- [6] L. Xiong, S. Duncan-Williams, "Generalized Linear Model for Predicting the Credit Card Default Payment Risk," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 51–61, 2022, doi:10.25046/aj070306.
- [7] N.E.A. Amrani, E.F. Ezzahra, M. Youssfi, S.M. Snineh, O. Bouattane, "A New Technique to Accelerate the Learning Process in Agents based on Reinforcement Learning," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 62–69, 2022, doi:10.25046/aj070307.
- [8] J.K. Duggal, M. El-Sharkawy, "High Performance SqueezeNext: Real time deployment on Bluebox 2.0 by NXP," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 70–81, 2022, doi:10.25046/aj070308.
- [9] M. Boumaza, Y. Boumaza, "Hole-Confined Polar Optical Phonon Interaction in Al<sub>0.35</sub>Ga<sub>0.65</sub>As/GaAs/Al<sub>0.25</sub>Ga<sub>0.75</sub>As Quantum Wells," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 82–86, 2022, doi:10.25046/aj070309.
- [10] P.-Y. Lou, Y.-X. Chen, C.-C. Wang, W.-C. Chang, "A CMOS On-Chip High-Precision PVTL Detector," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 87–94, 2022, doi:10.25046/aj070310.
- [11] A. Sharmin, F. Anwar, S.M.A. Motakabber, A.H.A. Hashim, "A Secure Trust Aware ACO-Based WSN Routing Protocol for IoT," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 95–105, 2022, doi:10.25046/aj070311.
- [12] M.F. Sie, J. Wu, S.A. Harding, C.-L. Lin, S.-T. Wang, S. Liao, "Secured Multi-Layer Blockchain Framework for IoT Aggregate Verification," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 106–115, 2022, doi:10.25046/aj070312.
- [13] C.N. Anyanwu, C.J. Animoke, B.U. Agu, I.F. Okafor, N.J. Ogbuagu, S. Bentson, O. Ojike, "Physical and Emission Properties of Blended Bio-Coal Briquettes Derived from Agro-Wastes in Nigeria," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 116–122, 2022, doi:10.25046/aj070313.
- [14] J. Quignon, A. Tornambe, T. Deleruyelle, P. Pannier, "Antenna System Design To Increase Power Transfer Efficiency with NFC Wireless Charging Technology," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 123–128, 2022, doi:10.25046/aj070314.
- [15] K. Echizenya, K. Kondo, "Indoor Position and Movement Direction Estimation System Using DNN on BLE Beacon RSSI Fingerprints," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 129–138, 2022, doi:10.25046/aj070315.

- [16] H. Fleischer, S. Statkevych, J. Widmer, R. Stoll, T. Roddelkopf, K. Thurow, "Automated Robotic System for Sample Preparation and Measurement of Heavy Metals in Indoor Dust Using Inductively Coupled Plasma Mass Spectrometry (ICP-MS)," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 139–151, 2022, doi:10.25046/aj070316.
- [17] T. du Toit, H. Kruger, L. Drevin, N. Maree, "Deep Learning Affective Computing to Elicit Sentiment Towards Information Security Policies," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 152–160, 2022, doi:10.25046/aj070317.
- [18] Y.A. Alwadei, M.S. Alshatwi, N.M. Alwadai, M.A. AlWehaibi, M.F. Alotaibi, M.M. Lashin, M.H. Alotaibi, "NiO Quantum dots Doped Triple Cation Perovskite CsMAFAPbI<sub>2</sub>Br<sub>2</sub> Heterojunction Photodetector with High Responsivity," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 161–166, 2022, doi:10.25046/aj070318.
- [19] A. Benchabana, M.-K. Kholadi, R. Bensaci, B. Khaldi, "A Supervised Building Detection Based on Shadow using Segmentation and Texture in High-Resolution Images," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 167–174, 2022, doi:10.25046/aj070319.
- [20] D.M. Hung, D.X. Ba, "A Constrained Intelligent Nonlinear Control Method for Redundant Robotic Manipulators," *Advances in Science, Technology and Engineering Systems Journal*, **7**(3), 175–182, 2022, doi:10.25046/aj070320.

**Editor-in-chief**

**Prof. Passerini Kazmersk**