

Editorial

The *Journal of Engineering Research and Sciences (JERS)* is pleased to present a diverse collection of studies that address important challenges in healthcare technology, mathematics education, and intelligent environmental monitoring. The contributions featured in this issue demonstrate how advances in data analytics, machine learning, educational theory, and sensor-based systems can be leveraged to improve quality of life, strengthen learning processes, and enhance safety in complex real-world environments. Together, these studies highlight the value of interdisciplinary research in generating innovative solutions with both theoretical significance and practical relevance.

Falls remain one of the leading causes of injury and loss of independence among older adults, creating an urgent need for effective monitoring and prevention strategies. One contribution explores the use of wearable sensor technology and time-series classification methods to assess walking balance through acceleration data collected from sensors positioned around the waist. By comparing the performance of the MiniROCKET and InceptionTime classification frameworks, the study evaluates different approaches for identifying deviations from normal gait patterns that may indicate balance impairments. The findings demonstrate the feasibility of accurately detecting gait anomalies while also investigating optimal sensor placement and sensor quantity for practical implementation. This research establishes an important foundation for future fall-risk assessment systems and long-term monitoring solutions aimed at supporting healthy aging. [1]

The development of mathematical understanding requires carefully structured progression across different stages of education. A curriculum-focused study examines how the concept of the triangle evolves from elementary school through secondary education when viewed through the framework of Van Hiele's geometric thinking levels. The analysis reveals that the recurring appearance of triangle-related concepts throughout the curriculum reflects a gradual transformation in students' reasoning processes rather than simple repetition of content. From visual recognition and relational understanding to formal deductive reasoning and trigonometric abstraction, the triangle serves as a powerful example of conceptual continuity in mathematics education. The findings provide valuable theoretical support for curriculum design and offer insights into instructional approaches that can facilitate deeper geometric understanding across educational levels. [2]

Maritime safety continues to depend on timely and reliable detection of hazardous weather conditions, particularly in environments where communication infrastructure may be limited or disrupted. Addressing this challenge, a study presents a sensor-based framework for the early detection of non-tropical maritime storms using onboard measurements of key meteorological variables. The proposed approach employs a temporal autoencoder trained exclusively on normal atmospheric conditions to identify anomalies associated with storm development. By eliminating reliance on large labeled datasets and predefined storm signatures, the framework offers a flexible and adaptive solution capable of detecting previously unseen weather patterns. Validation through synthetic and real-world case studies demonstrates strong detection performance and meaningful advance warning times, highlighting the potential of intelligent anomaly detection systems to significantly improve maritime safety and operational decision-making. [3]

The research contributions presented in this issue reflect the expanding role of intelligent technologies and analytical frameworks in addressing challenges across healthcare, education, and environmental monitoring. By combining methodological innovation with practical application, these studies advance scientific understanding while offering solutions with tangible societal benefits. It is hoped that the findings reported herein will encourage further

interdisciplinary collaboration and inspire future research that continues to bridge the gap between theoretical knowledge and real-world impact.

References:

- [1] J. Chen, "Identification of Walking Balance using Acceleration Sensors," *Journal of Engineering Research and Sciences*, vol. 5, no. 5, pp. 1–11, 2026, doi:10.55708/js0505001.
- [2] H. Kang, E. Jekal, "A Study on the Hierarchical Expansion of the Triangle Concept in Mathematics Education," *Journal of Engineering Research and Sciences*, vol. 5, no. 5, pp. 12–18, 2026, doi:10.55708/js0505002.
- [3] S. Srivastava, H. Xu, D. Yan, R. Balasubramanian, "Early Warning for Maritime Storm Formation Using Temporal Autoencoder-Based Anomaly Detection," *Journal of Engineering Research and Sciences*, vol. 5, no. 5, pp. 19–39, 2026, doi:10.55708/js0505003.

Editor-in-chief

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