

Editorial

The evolving intersections of artificial intelligence, human-centered systems, industrial optimization, and security underscore the critical importance of interdisciplinary research in addressing pressing global challenges. This issue brings together innovative work spanning machine learning applications in manufacturing, vision-based health monitoring for elder care, educational tools for lean management, and robustness in deep learning security—each offering impactful insights into how intelligent systems are transforming industries and lives.

Manufacturing continues to benefit from the integration of advanced machine learning, particularly in custom industrial production environments. A regression-based approach using gradient-boosting techniques—specifically LightGBM and XGBoost—demonstrates notable performance improvements in predicting work man-hours for metal sheet stamping projects. These models are enhanced through strategic feature engineering, selection, and synthetic data generation. Results highlight not only the high accuracy of the optimized models but also the importance of interpretability through explainable AI tools, which empower domain experts to critique and trust machine-generated predictions [1].

The application of AI in healthcare is exemplified through a deep learning-based fall detection system designed to support elderly individuals, a demographic increasingly in need of non-invasive monitoring solutions. By leveraging Human Silhouette and Dense Optical Flow techniques, the system creates a robust visual representation of motion, further refined by convolutional and recurrent neural networks. This multi-modal approach significantly improves detection accuracy, achieving a remarkable 99% on a benchmark dataset. The solution provides a scalable, vision-based tool for fall detection that accounts for complex human movements and varied camera perspectives, offering substantial promise for enhancing elderly care [2].

A more educational and conceptual contribution focuses on improving understanding of “value” in lean management through a novel gamified approach. Value Karuta (VK), inspired by the traditional Japanese card game, acts as an engaging educational medium for communicating foundational lean principles. Survey-based evaluations in both Japan and the UK confirm the tool’s efficacy in teaching the abstract concept of customer value. Combining qualitative observation with quantitative feedback, the study validates VK’s role in strengthening conceptual understanding among students, professionals, and academics, contributing meaningfully to the pedagogy of lean thinking [3].

Security and reliability in artificial intelligence are critical, particularly as deep learning models become more embedded in real-world systems. A focused investigation into quantized neural networks explores their resilience to adversarial attacks, a significant vulnerability in conventional deep models. Quantization is shown to provide inherent robustness, reducing the efficacy of perturbation-based attacks even in scenarios where adversarial examples typically succeed. To support ongoing work in this domain, the authors release the Adversarial Neural Network Toolkit (ANNT), encouraging reproducibility and further exploration of security techniques in neural network compression [4].

Together, these papers illuminate how modern computational techniques can be leveraged for practical solutions across diverse domains. From optimizing industrial workflows to safeguarding AI against manipulation, and from enhancing elder care to reimagining business education, these studies reflect a shared commitment to purposeful and resilient technological development.

References:

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