Editorial

We are pleased to introduce the third issue of ***Digital Signal Processing and Artificial Intelligence*** *for Automatic Learning*, featuring the research contributions outlined below.

The opening paper, ***"Comprehensive Signal Processing and Anomaly Detection of Multivariate Sensor Signals Using Time-Frequency and Entropy-Based Methods,"*** presents an integrated multidomain signal processing and unsupervised anomaly detection framework designed for the robust characterization of static multivariate MEMS accelerometer data. The proposed approach combines time domain statistics, Fast Fourier Transform (FFT), and Welch power spectral density (PSD) analysis. The results reveal that no single analytical domain sufficiently captures the behavior of static MEMS sensors, underscoring the necessity of a multidomain strategy to differentiate persistent nominal structures, transient anomalies, and sustained statistical regime shifts. This framework offers a structured, reproducible, and label-free methodology well suited for sensor monitoring and anomaly detection in resource-constrained and IoT-enabled environments.

The second paper, ***"Noise, Masking, and Translation Robustness of Multilayer Perceptrons for Handwritten Digit Recognition,"*** examines the robustness of a multilayer perceptron (MLP) trained on the MNIST dataset under four distinct perturbation types. The authors find that MLP robustness varies significantly across perturbations and is inherently limited by the absence of spatial inductive biases, such as weight sharing and local connectivity. Their work provides practical insights for deploying lightweight classifiers and emphasizes the importance of preprocessing strategies or translation-invariant architectural designs in real-world handwriting recognition tasks.

The final paper, ***"Predictive Modelling of Overall Performance in IoT-Enabled Multicultural English Learning Environments: An Ensemble Learning and Interpretability Analysis,"*** presents a comprehensive predictive analysis of *Overall_Performance* using the English Learning Interaction Dataset, which includes 15,000 session records and 54 features collected from IoT-enhanced smart classrooms in Chinese universities. The findings indicate that the current set of tabular features is inadequate for achieving practically accurate predictions or for effectively distinguishing among pedagogical strategies. Through a detailed tabular gradient boosting analysis, the study advocates for the adoption of longitudinal modeling frameworks and alternative outcome metrics to fully harness the potential of AI-driven personalized English education.

We trust that these contributions reflect both technical rigor and originality.

Editors