Editorial

In the ever-evolving landscape of technological advancements, various sectors have leveraged innovations to address pertinent challenges and improve operational efficiency. This editorial summarizes eight research papers, each contributing significantly to their respective fields through novel methodologies and insightful findings.

The rise of internet economies has revolutionized business operations, notably in financial institutions leveraging credit card usage. However, this surge has also escalated cybercrime, leading to significant financial losses. This paper explores the development of robust credit card fraud detection algorithms, focusing on machine learning techniques like ensemble classifiers. Challenges such as data non-stationarity and class imbalance are addressed, proposing adaptive systems that enhance fraud detection accuracy amidst evolving data distributions [1].

The growth of solar photovoltaic (PV) power as a clean energy source is hindered by its variability due to weather conditions. This research investigates the use of light sensor networks and deep learning models (LSTM and GRU) to forecast solar PV output in Kotzebue, Alaska. Evaluating models on statistical and event-based error metrics, findings indicate the potential of GRU-based models, suggesting improvements with additional data, contributing to grid stability and reduced fuel costs [2].

Extending previous research on time-series clustering of vegetation indices for paddy rice, this study introduces UAVs for visualizing growth changes post-fertilization and optimizing fertilization amounts. Results show optimal yields with minimal fertilization, reducing environmental impacts. Random Forest-based analysis also optimizes monitoring periods, significantly cutting down workload and costs, promoting sustainable agricultural practices through advanced UAV technology [3].

Addressing the intermittent nature of solar energy, this study evaluates deep learning models (LSTM, GRU, and hybrid LSTM-GRU) for forecasting PV power output at the Zagtouli plant in Burkina Faso. Metrics like RMSE, MAE, and R^2 demonstrate the superior performance of the hybrid model. Recommendations are made for transitioning to this advanced forecasting method to enhance the reliability and efficiency of solar energy management [4].

The bandwidth challenges of 360-degree video transmission over the internet are mitigated by Viewport Adaptive Streaming (VAS). This research introduces HEVEL, a deep learning-based method for predicting user viewing behaviour in VAS systems. Combining head and eye movement data, the model outperforms existing methods in precision and error metrics, offering significant advancements in efficient video streaming technologies [5].

Exploring the effects of PFAS on kidney function, this study employs machine learning to analyze chemical features and kidney parameters. Models like XGBoost and Random Forest achieve high accuracy in classifying kidney types and predicting PFAS accumulation, revealing significant correlations between PFAS exposure and kidney health. These findings contribute to understanding PFAS impacts and highlight machine learning's role in health studies [6].

Addressing biases and trust issues in machine learning predictions, this paper proposes a novel deployment methodology using public blockchain and smart contracts. Efficient algorithms ensure secure, immutable storage of model parameters, facilitating peer validation and feedback. A case study on vehicle price prediction models demonstrates the approach's effectiveness in enhancing model transparency and reliability [7].

Focusing on encryption and decryption times, this study evaluates three hybrid encryption schemes (AES-RSA, AES-ECC, AES-ElGamal) in terms of throughput. Results highlight Hybrid AES-RSA as the fastest and most efficient scheme, suitable for performance-critical applications. The research underscores the importance of balancing performance and security needs, recommending Hybrid AES-RSA for systems requiring optimal performance [8].

The research papers summarized herein underscore the diverse applications and potential of advanced technologies such as machine learning, deep learning, blockchain, and UAVs across various sectors. From enhancing cybersecurity and financial fraud detection to optimizing agricultural practices and improving renewable energy forecasting, these studies collectively highlight the transformative impact of innovative methodologies. As these technologies continue to evolve, their integration into practical solutions will likely drive further advancements and efficiencies, addressing contemporary challenges and paving the way for future developments.

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