

Credit Card Fraud Detection Using State-of-the-Art Machine Learning and Deep Learning

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Abstract: Credit card fraud continues to be a critical concern for financial institutions and consumers alike. Traditional rule-based detection systems are often ineffective against evolving fraud strategies. This paper proposes a hybrid fraud detection system that integrates advanced machine learning and deep learning models to enhance fraud detection accuracy and reduce false positives. The proposed architecture consists of multiple layers—presentation, application, data, analytics, integration, and security—that work cohesively to support real-time monitoring and adaptive learning. Experimental results on the European credit card dataset validate the system's efficiency and effectiveness in identifying fraudulent activities.

Keywords: Credit Card Fraud Detection, Machine Learning, Deep Learning, Neural Networks, LSTM, Autoencoder, Real-Time Analytics, System Architecture, AI Security

