

AI-Powered Models for Real-Time Fraud Detection in Financial Transactions to Improve Financial Security

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Abstract : Financial fraud continues to be a major threat to financial institutions across the world, causing colossal money losses and undermining public trust. Fraud prevention techniques, based on hard rules, have become ineffective due to evolving patterns of fraud in recent times. Against such a background, the present study probes into distinct methodologies that exploit emergent AI-driven techniques to further strengthen fraud detection. We would like to compare the performance of generative adversarial networks and graph neural networks with other popular techniques, like gradient boosting, random forests, and neural networks. To this end, we would recommend integrating all these state-of-the-art models into one robust, flexible, and smart system for real-time anomaly and fraud detection. To overcome the challenge, we designed synthetic data and then conducted pattern recognition and unsupervised and supervised learning analyses on the transaction data to identify which activities were fishy. With the use of actual financial statistics, we compare the performance of our model in accuracy, speed, and adaptability versus conventional models. The results of this study illustrate a strong signal and need to integrate state-of-the-art, AI-driven fraud detection solutions into frameworks that are highly relevant to the financial domain. It alerts one to the great urgency that banks and related financial institutions must rapidly implement these most advanced technologies to continue to have a high level of security.

Keywords : AI-driven fraud detection, financial security, machine learning, anomaly detection, real-time fraud detection

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