

Leveraging Machine Learning for Real-Time Fraud Detection and Risk Assessment in Modern Fintech Platforms

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Abstract: *The rapid growth of financial technology platforms has created both opportunities and challenges for the global financial ecosystem. Digital payment processors, neobanks, peer-to-peer lending services, and cryptocurrency exchanges now handle billions of dollars in daily transaction volume, often with settlement speeds measured in seconds rather than days. This acceleration has outpaced the capacity of traditional rule-based systems to detect fraudulent transactions, assess credit risk accurately, and comply with evolving regulatory requirements. In this paper, we examine how machine learning techniques are being applied to three critical problems in modern fintech:*

(1) real-time transaction fraud detection using ensemble methods and deep learning on streaming payment data, (2) dynamic credit risk assessment that incorporates alternative data sources and adapts to shifting economic conditions, and (3) automated regulatory compliance monitoring through natural language processing and anomaly detection. We describe practical system architectures, discuss model selection and training challenges specific to financial data, and address the explainability and fairness requirements that regulators increasingly demand. Our analysis draws on recent developments across AI-driven infrastructure optimization [15], the broader role of generative AI in finance [14], and intelligent systems integration in the energy sector [13] to place fintech-specific applications within the wider context of AI transformation across regulated industries.

Keywords: Machine Learning, Fraud Detection, Credit Risk, Fintech, Regulatory Compliance, Deep Learning, Financial Technology, Real-Time Systems

