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UPI Fraud Detection Using Machine Learning

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Abstract: *The rapid adoption of digital payments in India has made the Unified Payments Interface (UPI) a dominant platform for fast and seamless transactions. However, this growth has also led to a significant rise in fraudulent activities, including phishing, social engineering, and unauthorized account access. To address these challenges, this paper proposes a machine learning–based UPI fraud detection system capable of identifying fraudulent transactions in real time. The system employs supervised learning algorithms trained on transactional data to detect suspicious patterns, anomalies, and abnormal user behavior. In addition, behavioral analysis and anomaly detection techniques are incorporated to capture evolving fraud strategies. The proposed architecture integrates Flask for backend services and React.js for frontend visualization, enabling real-time monitoring and intuitive dashboards. The model analyzes key features such as transaction frequency, geolocation inconsistencies, device usage, and merchant risk profiles to proactively flag fraudulent activities. Designed for scalability, the system can be deployed on cloud infrastructure to handle high transaction volumes with low latency. Overall, the proposed solution enhances digital payment security, improves transparency, and supports proactive fraud prevention, contributing to a secure and trustworthy UPI ecosystem.*

Keywords: UPI fraud detection, digital payments, machine learning, online transaction security, financial fraud prevention, real-time monitoring

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