

FRAUD DETECTION IN CREDIT / DEBIT CARD TRANSACTIONS USING ML AND NLP

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ABSTRACT

The rapid evolution of digital payment systems has led to an increase in fraudulent activities involving credit and debit card transactions. This paper explores the implementation of Machine Learning (ML) and Natural Language Processing (NLP) techniques to enhance fraud detection mechanisms. By leveraging large datasets containing transaction histories, we employ various ML algorithms, including decision trees, support vector machines, and ensemble methods, to identify anomalous patterns indicative of fraudulent behavior. Additionally, NLP is utilized to analyze textual data associated with transactions, such as customer communications and transaction descriptions, providing valuable insights into potential fraud indicators.

Our approach involves preprocessing transaction data, feature extraction, and model training to achieve a robust detection system capable of real-time monitoring. We evaluate the performance of the developed models using precision, recall, and F1-score metrics to ensure high accuracy in identifying fraudulent activities while minimizing false positives.

The results demonstrate significant improvements in detecting fraudulent transactions compared to traditional rule-based systems. Furthermore, the integration of NLP techniques highlights the importance of contextual understanding in fraud detection, enabling a more comprehensive analysis of transaction-related information. This research contributes to the field by proposing an innovative framework for fraud detection that not only addresses current challenges in financial transactions but also lays the groundwork for future advancements in the application of AI technologies within the finance sector.

KEYWORDS: *Fraud Detection, Credit Card Transactions, Debit Card Transactions, Machine Learning, Natural Language Processing, Anomaly Detection, Data Preprocessing, Feature Extraction, Predictive Modeling, Financial Technology, Real-Time Monitoring, Artificial Intelligence*

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