


Chapter 9


Directly Relevant to Finance and E-Commerce for Fraud Detection, Credit Scoring, and Transaction Analysis

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ABSTRACT

This paper presents a novel DL design for online shopping and financial fraud detection highlighting meticulous transaction analysis and risk assessment. The approach applies a comprehensive preprocessing pipeline consisting of min-max normalization, correlation-based filter and median imputation to obtain high quality data. Latent behavioural features are derived by an autoencoder, and anomaly sensitivity is enhanced by the Local Outlier Factor (LOF). For classification, a Bi LSTM and Transformer network hybrid model learns the sequential and global

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interdependence among transactions. This hybrid model is beneficial in identifying sophisticated schemes of fraud and assists in intelligent credit scoring. The final classification step correctly distinguishes legitimate and fraudulent transactions. Designed to be adaptive to new patterns of fraud the classical can be directly functional to real-world financial systems, internet shopping systems and internet payment gateways. Experimental results outperform traditional fraud detection techniques.

1. INTRODUCTION

The growing volume of online transactions in e-commerce and finance has led to a concomitant rise in fraudulent activity, necessitating more intelligent and responsive fraud detection systems (Karthikeyan et al., 2024). The earlier machine learning techniques usually fail on imbalanced datasets, dynamic patterns of fraud, and inadequate temporal modelling (De Zarzà et al., 2023). Although the latest deep learning algorithms have enhanced detection rates, they are still lacking behind in extracting longer-range dependencies and addressing noise in transactional data (Liang et al., 2022). To overcome these shortcomings, this paper introduces a new framework that integrates strong preprocessing, autoencoder-based feature extraction of latent features, Local Outlier Factor for outlier detection, and a hybrid Bi-LSTM-Transformer model for sequence classification (Park et al., 2023). Such a combined framework improves fraud detection precision, facilitates real-time decision-making, and can be directly applied to financial platforms, e-commerce systems, and credit scoring applications (Prabha & Priscilla, 2024).

1.1 Background and Importance

The high development pace of digital finance and e-market has exponentially grown the number of online transactions, which in turn has made such platforms a target for fraudulent behaviour (Sani et al., 2024). With increased real-time payment and cross-border accessibility, spotting fraudulent activity quickly and effectively is a concern of utmost importance to financial institutions and merchants alike (Mienye & Swart, 2024). Here, fraud detection, credit scoring, and transaction analysis are critical in the protection of users and building platform trustworthiness (Chy & Buadi, 2024). Conventional approaches routinely fail in detecting advanced or dynamic fraud patterns, which calls for the implementation of intelligent, data-centric solutions (Zioviris et al., 2024). The integration of deep learning and behavioural modelling provides a promising avenue (Suhaimi et al., 2022). Efficient detection systems should not only detect historic fraudulent behaviour but also forecast upcoming risks (Nguyen et al., 2022). Ensuring strong accuracy and few false alarms

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