

Cloud Based Credit Card Fraud Detection Using Random Forest Algorithm

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Abstract: *The advent of electronic payment systems has transformed financial transactions between businesses and consumers alike, providing levels of convenience and efficiency hitherto unknown. But with the change has also come an increased incidence of credit card fraud that threatens the existence of financial institutions and consumers equally. The banking industry is left with the twofold responsibility of protecting information while maintaining smooth transaction processes. The goal of this project is to build a scalable cloud-based system to detect credit card fraud based on the powerful Random Forest machine learning algorithm due to its effectiveness in providing very accurate results along with resistance from overfitting. The planned system starts from a thorough assessment of the available status of fraud with credit cards, including their frequent methods as utilized by cheaters and why older detection procedures failed to adequately stop them. Traditional rule-based systems tend to falter when faced with the ever-changing dynamics of fraud, resulting in more false negatives and negatives. The Random Forest algorithm, however, adopts an ensemble method, building several decision trees to examine transactional data and discern patterns revealing fraudulent activity. This approach makes the model better at generalizing across varied datasets and thus well-suited for practical applications. By hosting the fraud detection system in a cloud computing platform, we are able to leverage the scalability and flexibility required to handle large volumes of transaction data in real-time. The cloud infrastructure enables fast deployment and maintenance, allowing the system to respond to new patterns of fraud and sustain high performance under changing loads. In addition, the inclusion of One-Time Password (OTP) authentication provides a critical level of security, prompting users to verify their identity on high-risk transactions. This multi-factor authentication mechanism greatly minimizes the risk of unauthorized access and maximizes overall transaction security. The performance of the proposed system is tested using large-scale testing on benchmark datasets, quantifying critical performance metrics such as detection accuracy, false positive rates, and processing speed. Early findings suggest that the Random Forest-based approach performs better than conventional methods, with increased detection rates and minimal interference with legitimate transactions. This study highlights the need to embrace sophisticated machine learning methods and cloud computing in the war against credit card fraud, offering a scalable and effective solution that not only safeguards consumers but also builds confidence in electronic payment systems.*

Keywords: Credit card fraud detection, Random Forest, Cloud computing, OTP verification

