A Survey on: Credit card fraud detection system using machine learning.

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Abstract

Now a day the usage of credit cards has dramatically increased. As credit card becomes the most popular mode of payment for both online as well as regular purchase, cases of fraud associated with it are also rising. In this paper, we model the sequence of operations in credit card transaction processing using a Hidden Markov Model (HMM) and show how it can be used for the detection of frauds. An HMM is initially trained with the normal behavior of a cardholder. If an incoming credit card transaction is not accepted by the trained HMM with sufficiently high probability, it is considered to be fraudulent. At the same time, we try to ensure that genuine transactions are not rejected. We present detailed experimental results to show the effectiveness of our approach and compare it with other techniques available in the literature.

Keywords— Credit card fraud, Applications of machine learning, Hidden Markov Model(HMM), Waterfall model,Automated fraud detection.

I.   INTRODUCTION

'Fraud' in credit card transactions is unauthorized and unwanted usage of an account by someone other than the owner of that account. Necessary prevention measures can be taken to stop this abuse and the behaviour of such fraudulent practices can be studied to minimize it and protect against similar occurrences in the future.In other words, Credit Card Fraud can be defined as a case where a person uses someone else's credit card for personal reasons while the owner and the card issuing authorities are unaware of the fact that the card is being used. Fraud detection involves monitoring the activities of populations of users in order to estimate, perceive or avoid objectionable behaviour, which consist of fraud, intrusion, and defaulting. This is a very relevant problem that demands the attention of communities such as machine learning and data science where the solution to this problem can be automated. This problem is particularly challenging from the perspective of learning, as it is characterized by various factors such as class imbalance. The number of valid transactions far outnumber fraudulent ones. Also, the transaction patterns often change their statistical properties over the course of time.

These are not the only challenges in the implementation of a real-world fraud detection system, however. In real world examples, the massive stream of payment requests is quickly scanned by automatic tools that determine which transactions to authorize. Machine learning algorithms are employed to analyse all the authorized transactions and report the suspicious ones. These reports are investigated by professionals who contact the cardholders to confirm if the transaction was genuine or fraudulent. The investigators provide a feedback to the automated system which is used to train and update the algorithm to eventually improve the fraud-detection performance over time.

II.   LITERATURE SURVEY

1.Ghosh and Reilly have proposed credit card fraud detection with a neural network.

2.Recently, Syed et al. Have used parallel granular neural networks (PGNNs) for improving the speed of data mining and knowledge discovery process in credit card fraud detection.

3.Stolon et al. suggest a credit card fraud detection system (FDS) using metal earning techniques to learn models of fraudulent credit card transactions.

4.Prodromidis and Stolfo use an agent-based approach with distributed learning for detecting frauds in credit card transactions.

5.Vatsa et al. have recently proposed a game-theoretic approach to credit card fraud detection.

- **Problems with existing system:**

In case of the existing system the fraud is detected after the fraud is done that is, the fraud is detected after the complaint of the card holder. And so the card holder faced a lot of trouble before the investigation finish. And also as all the transaction is maintained in a log, we need to maintain a huge data. And also now a days lot of online purchase are made so we don't know the person how is using the card online, we just capture the IP address for verification purpose. So there need a help from the cyber crime to investigate the fraud. To avoid the entire above disadvantage we propose the system to detect the fraud in a best and easy way.

III.   METHODS AND TECHNIQUE

1)   Our project follows the **waterfall model.**

The steps of waterfall model are:

- Requirement Definition
- System and Software Design
- Implementation
- Integration and System Testing
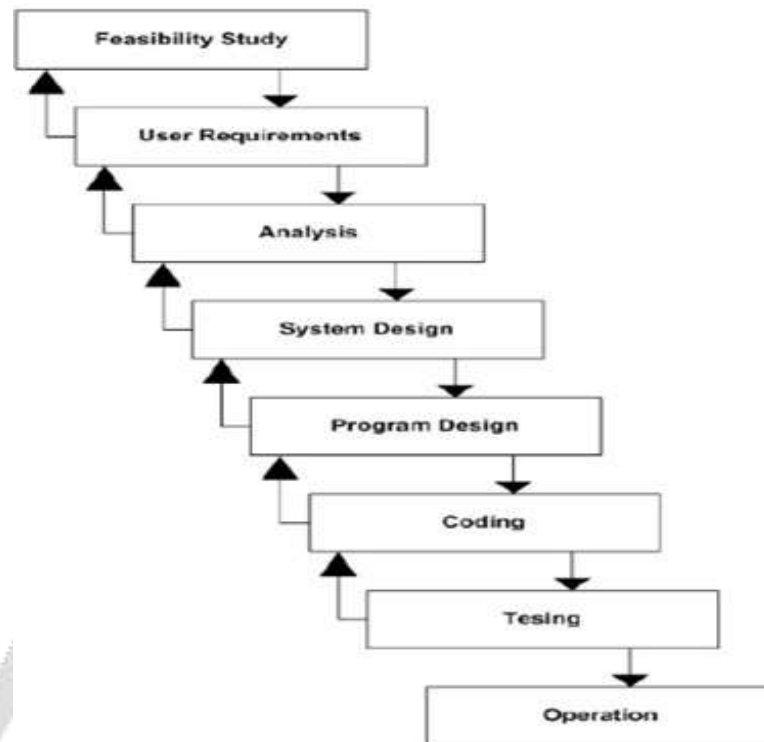- Operation and Maintenance

FIG: WATERFALL MODEL

2)In proposed system, we present a Hidden Markov Model (HMM).Which does not require fraud signatures and yet is able to detect frauds by considering a cardholder's spending habit. Card transaction processing sequence by the stochastic process of an HMM. The details of items purchased in Individual transactions are usually not known to any Fraud Detection System(FDS) running at the bank that issues credit cards to the cardholders. Hence, we feel that HMM is an ideal choice for addressing this problem.

● **PROPOSED SYSTEM**

Our proposed system applies supervised machine learning algorithms to detect credit card fraudulent transactions using a real-world dataset. Furthermore, we employ these algorithms to implement a classifier using machine learning methods. We identify the most important variables that may lead to higher accuracy in credit card fraudulent transaction detection.In proposed system, we present a Hidden Markov Model (HMM).Which does not require fraud signatures and yet is able to detect frauds by considering a cardholder's spending habit. Card transaction processing sequence by the stochastic process of an HMM. The details of items purchased in Individual transactions are usually not known to any Fraud Detection System(FDS) running at the bank that issues credit cards to the cardholders. Hence, we feel that HMM is an ideal choice for addressing this problem. Another important advantage of the HMM-based approach is a drastic reduction in the number of False Positives transactions identified as malicious by an FDS although they are actually genuine. An FDS runs at a credit card issuing bank. Each incoming transaction is submitted to the FDS for verification. FDS receives the card details and the value of purchase to verify, whether the transaction is genuine or not. The types of goods that are bought in that transaction are not known to the FDS. It tries to find any anomaly in the transaction based on the spending profile of the cardholder, shipping address, and billing address etc. If the FDS confirms the transaction to be of fraud, it raises an alarm, and the issuing bank declines the transaction.
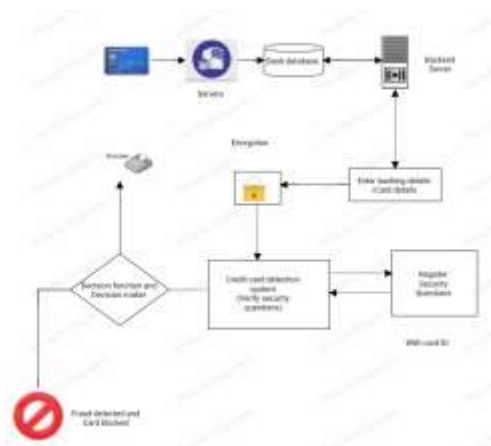
Fig. Credit card fraud detection

- **ADVANTAGES OF PROPOSED SYSTEM**
    1.   More accurate result.
    2.   Able to detect different fraudulent behavior.
    3.   Cost and Time efficient.

IV.   CONCLUSION AND FUTURE WORK

We have proposed an application of HMM in credit card fraud detection. The different steps in credit card transaction processing are represented as the underlying stochastic process of an HMM. We have used the ranges of transaction amount as the observation symbols, whereas the types of item
 have been considered to be states of the HMM. We have suggested a method for finding the spending profile of cardholders, as well as application of this knowledge in deciding. the value of observation symbols and initial estimate of the model parameters. It has also been explained how the HMM can detect whether an incoming transaction is fraudulent or not. Comparative studies reveal that the Accuracy of the system is close to 80 percent over a wide variation in the input data. The system is also scalable for handling large volumes of transactions

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