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Credit card Fraud Detection Using Machine Learning

Vaishnavi Sunil Patil
PG student, Padm. Dr. V. B. Kolte College of Engineering, Malkapur , Maharashtra,India

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ABSTRACT

In today's world, the mosteasiest mode of payment is credit card forboth online and offline. It helps in providing cashless shopping across theglobe. Fraud event occurs only during online payment as credit card number is sufficient to make transaction which will beon the credit card to make online paymentbut for offline payment password will beasked so during offline transaction fraudscannot occur. In the existing system of detecting fraud transaction, the fraud is detected after the transaction is done.Companies have a detailed analysis of transactional and fraud data. Frauds tendsto appear in patterns. In billions of creditcard transactions, it is quite difficult to analyse each in isolation. Having predictive algorithms can help to detect fraudulent transactions. this is how data mining comes into play. Data consists of combination ofcontinuous data and nominal data. We can use variety statistical tests to prevent fraud events. Detecting credit card fraud is stillnot a perfect science. While fraud is still amajor financial issue to banks, the distributionof fraud to non-fraudulent transactions is severely skewed towards non-fraudulent transactions. To analyse and predict fraud events we have used local outlier factor and isolation forestalgorithms and thus calculated number offraud transactions. We have calculated theaccuracy and number of errors of both thealgorithms.

Keywords: Credit card, Isolated forest ,Local outlier factor, Fraud detection, Data mining.

1. INTRODUCTION

In daily routine we use credit cards to buy goods and services using online transaction or physical card for offline transaction. In credit card based purchase, the card holder issues his card to merchant to do payment the person has to steal the card to make the transaction fraudulent. If the user is not aware of loss of card it leads to financial loss to the user as well as credit card company. When the payment mode is online, attackers require only little information for doing false transaction. Example card number. The only way to detect this kind of fraud is to analyse the spending patterns on every card and irregularities are figured with respect to normal pattern. Fraud which is detected using existing purchase data of card holder is way to reduce the rate of frauds. Every card holder is characterised by patterns

containing information about distinctive purchase category the time since the last buying, money spent and other things. Falsehood from such patterns is sensed as fraud. Fraud in finance is an ever growing issue, resulting in far reaching consequences. Fraud can be defined as criminal cheating with an aim of financial gain. With an emergence of internet, it has lead to increase in credit card transactions .As credit card is most prevailing method, as it attracts more discounts and offers in both stores and e-commerce, it is more vulnerable to fraud events. Credit card fraud detection is the science and the art of detecting unusual activity in credit transactions. Fraud occurs when the credit card information of the individual is stolen and used to make unauthorized purchases and or withdrawals from the original holders account .A major challenge to credit fraud detection research is availability of the real world data due to privacy and legal concerns. Online Shopping is one of the largest and fast-growing trend and mode of payment will be by using credit card, debit card and net banking. Online payment does not require physical card. If credit card details is known to others that will become a major risk. Currently, card holder will come to know only after the fraud transaction is carried out.

2. LITERATURE SURVEY

In [2] the authors begin by explaining the method used for transactions through credit cards. They have proposed a system in which they integrate their algorithm with the payment gateway to detect fraudulence in real time. The authors used seven techniques to develop the algorithm, which are Neural Networks, Rule Induction, Case-based reasoning, Genetic Algorithms, Inductive Logic Programming, Expert Systems, Regression. The authors determined; the ANN method would best serve this problem statement. The output of the neural network will be in the form of probability which

1. tells the degree of a transaction being fraudulent.
2. Neural network is trained on information based on the various categories about the card holder such as profession of the card holder, earnings, about the large amount of purchased are placed. The system will use back propagation learning algorithm in this phase to train the network. Depending on the numeric value of probability between 0 and 1, a transaction will be classified into one of the following categories: Non-Fraudulent, Doubtful , Suspicious and Fraudulent.

3. SYSTEM DESIGN

The fraud detection module will work in thefollowing steps:
1)The Incoming set of transactions andamount are treated as credit card transactions.
2)The credit card transactions are given to machine learning algorithms as an input.
3)The output will result in either fraud or validtransaction by analyzing the data and observing a pattern and using machine learning algorithms such as logistic regression
4)The fraud transactions are given to alarm which alerts the user that fraud transaction hasoccurred and the user can block the card toprevent further financial loss to him as well as the credit card company.
5) The valid transactions are treated a

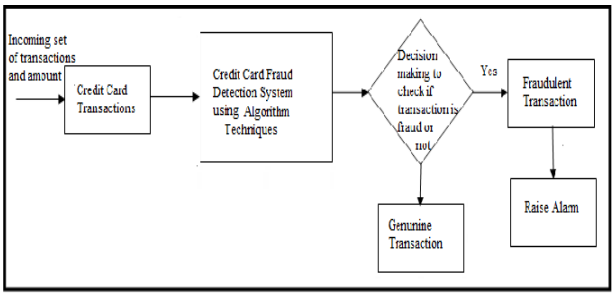

Fig 3: Block Diagram of Credit Card Fraud Detection System

4. SOFTWARE IMPLEMENTATION

A. Logistic Regression -In logistic regression- stastical model that in its basic form uses to model a binary dependent variable and then classification categorizing given dataset into classes.that is effective for fraud detection,emergency detection. In logistic regression used for categorical data (yes/no,true/false,pass/fail)
sigmoid function-trying to convert prediction into probabilities
(0<Y>1)
Y=1/1+e^-x where
X=independent variable Y=outpute=eulers constant(2.718)

5. RESULT

- The code prints out the number of false positive it detected and compare it with the actual values
- This is used to calculate the accuracyscore and precision of the algorithm.
- The fraction of data we used for faster testing is 60% of the entire dataset.
- These result along with the detailed report of the algorithm is given in the output,where class 0 means thetransaction was determined to be valid and 0 means it was determined to be valid and 1 means it was determined as a fraud transaction.
- This result matched against the class values to check for false positive.

6. CONCLUSION

The machine learning algorithm model thatcaptured the fraud pattern have the highestaccuracy rates as the developed machine learning model present an average level of accuracy, we have to focus on improving the prediction level to acquire a better prediction.

7. REFERENCES

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