Credit Card Fraud Detection Using Machine Learning

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Abstract :- *Now a days, digitalization gaining popularity because of seamless, easy and convenience use of ecommerce. People choose online payment and e-shopping; due to time convenience, transport convenience, etc. Because of that the credit card frauds are increasing day by day. It is very important to detect such frauds and to find the solution to avoid these frauds. The proposed 'Credit Card Fraud Detection System using Machine Learning' is based on the various machine learning algorithms.*

Key Words: **PCA, SVM, Incremental Model, Heatmap.**

1. INTRODUCTION

Machine Learning is the study of computer systems that learns from the data and experience. Machine Learning is the application of artificial intelligence that provides machines the ability to learn and develop from past data. With the help of machine learning, we can observe the past data and make decisions. There are many types of machine learning methods like supervised learning, unsupervised learning, reinforcement machine learning. Credit card is the essential need for the online transactions, for online shopping and many more things. But on other hand there is a risk that fraud can happen with card at any-time, anywhere. There are no constant patterns for frauds, because of that reason the good credit card fraud detection system should be developed to avoid the frauds. So here we are using machine learning for identification and detection of fraud..

Now a days, credit card has become a popular payment method in online shopping for goods and services. Since, the fraudsters have tried to falsely adopt normal behaviour of users to make their own payment. Due to this problems most research on credit card fraud detection has focused. The huge annual financial losses incurred by card issuers due to fraudulent use of the credit card products.

2. LITERATURE SURVEY

[1]. Credit card fraud detection using ada boost and majority voting

A number of standard models which include NB, SVM, DL have been used in empirical evaluation The online transaction learning models are not found A perfect MCC score of 1 is has been achieved using this method.

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[2].Credit Card Fraud Detection Using Machine Learning Models and Collating Machine Learning Models.

This investigates and checks the performance of Decision tree, Random Forest, SVM and logistic regression on highly skewed credit card fraud data. The Random forest algorithm will perform better with a larger number of training data, but speed during testing and application will suffer, imbalanced dataset problem and requires more pre-processing. The results indicate about the optimal accuracy for logistic regression, decision tree, Random Forest and SVM classifier.

[3] Credit Card Fraud Detection - Machine Learning methods

The algorithms used in the experiment were Logistic Regression, Random Forest, Naive Bayes and Multilayer Perceptron. It should focus on different machine learning algorithms such as genetic algorithms, and different types of stacked classifiers, alongside with extensive feature selection to get better results. Results show that each algorithm can be used for credit card fraud detection with high accuracy. Proposed model can be used for detection of other irregularities.

[4] Bank Fraud Detection Using Support Vector Machine

The various forms of fraud to which are exposed banks d data mining tools allowing its early detection data already accumulated in a bank. We use supervised learning methods Support Vector Machines with Spark to build models representing normal and abnormal customer behaviour and then use it to evaluate validity of new transactions he slight improvement on credit scoring databases was because of the difficulty of obtaining real databases. The system was tested on the benchmarks General Ledger, Payables Data. The precision obtained for the single class SVM method, was of about 80%, which represents a significant improvement in comparison to similar works reference

3. SYSTEM ARCHITECTURE

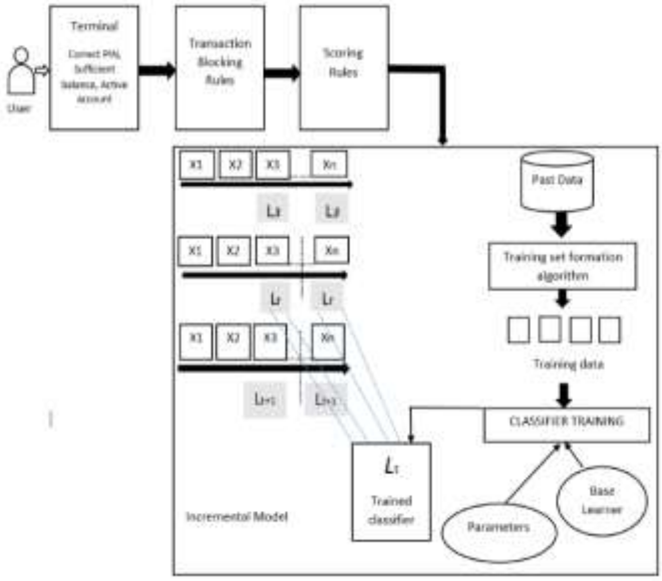

Fig -1: System Architecture

4. PROPOSED SYSTEM

In above architecture there are mainly five layers of control are present in fraud detection system. First layer that is terminal layer checks the security for all the transactions. This layer is used when any transaction is initialized. Security checks like correct PIN code, number of attempts, valid user name available balance, validity of credit card are performed by this layer. After checking all valid checks the transaction will proceed further otherwise it will denied. Then transaction blocking rules are the rules which are defined for secure transaction. These rules use the few information available when the payment is requested, without analysing historical records or cardholder profile. If there is internet transactions initialized Credit Card Fraud Detection using Machine Learning on a website which is unsecured then deny the transaction request. Transactions blocking rules are designed so that it should guarantee real-time operations and avoid blocking many genuine transactions. Scoring rules are also expert-driven models that are expressed as if-then statements. An example of scoring rule can be IF previous transaction in a different continent AND less than one hour from the previous transaction THEN fraud score =0.95.Scoring rules can be subjective as they can be designed differently. It is expected that fraudulent patterns should be detected from this layer. Only a limited number of alerted transactions are reported to the investigators, which represent the final layer of control. Investigators are the professionals experienced in analyzing credit card transactions and are responsible of expert-driven layers of fraud detection system. Any card that is found victim of a fraud is immediately blocked, to prevent further fraudulent activities and this task is performed by investigators. Using this system architecture, transaction is detected as fraud or normal.

Also, PCA for dimensionality reduction and SVM for classification is used to train the data. And successfully applied on the dataset which contains details about past transaction.

5. VISUALIZATION OF DATA

The visualization of the data of past transaction is done using heatmap. Heatmap is two-dimensional representation of data where the individual values contained in a matrix are represented as colors. A heat map is data analysis software that uses color the way a bar graph uses height and width: as a data visualization tool. A heat map is a graphical representation of data that uses a system of color-coding to represent different values. Heat maps are used in various forms of analytics but are most commonly used to show user behavior on specific webpages or webpage templates.

Heat map as a data-driven "paint by numbers" canvas overlaid on top of an image. In short, an image is divided into a grid and within each square, the heat map shows the relative intensity of values captured by your eye tracker by assigning each value a color representation

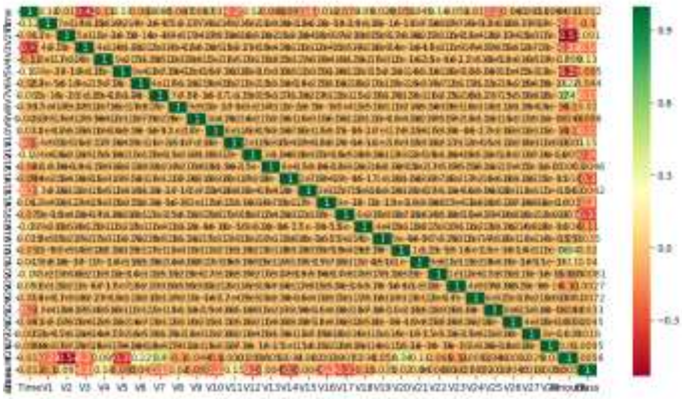

Fig-2: Heatmap

6. ADVANTAGES

1) Allows cross platform compatibility.

2) Easy Implementation.

3. Distributed Architecture.

4. Increases performance rate.

5. Achieve optimized results..

7. CONCLUSION

This method proves accurate in detecting fraudulent transaction. Also, algorithms like PCA, SVM, etc are applied so that training and testing of data becomes more easy.

8. FUTURE SCOPE

There can be more accurate classification algorithms, data training and testing algorithms can be used to get better result.

9. REFERENCES

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