ERROR DETECTION CREDIT CARD USING MACHINE LEARNING

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ABSTRACT

In our project, we mainly focussed on credit card error detection in real world. The motive is to find all the error transactions that have taken place .In order to find whether a transaction is error or not the model is trained from past credit card transactions that turned out to be error . The models that we have used are logistic regression

This abstract introduces the concept of credit card error detection, a critical component of the modern financial landscape. It explores the mechanisms and technologies employed to identify and rectify discrepancies in credit card transactions. Credit card error detection leverages advanced techniques such as machine learning and artificial intelligence to proactively detect and mitigate errors in real-time.

This paper delves into the challenges posed by errors in credit card transactions, the benefits of implementing error detection systems, and the evolving landscape of this essential field. It underscores the significance of error detection in ensuring the accuracy, security, and trustworthiness of credit card transactions for both consumers and financial institutions. As digital commerce continues to expand, the need for effective credit card error detection mechanisms becomes increasingly vital in safeguarding the integrity of financial transactions in our digital world.

The widespread adoption of credit cards in today's digital economy has revolutionized the way we conduct financial transactions. However, with the convenience and speed of electronic payments comes the ever-present risk of errors in credit card transactions. These errors can range from minor billing discrepancies.

More severe technical glitches within payment processing systems left unaddressed, these errors can
Lead to financial inconvenience for cardholders and operational challenges for financial institutions

1 INTRODUCTION

Nowadays 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 Error associated with it are also rising. In this paper, we model the sequence of operations in credit card transaction processing using a Random Forest to show how it can be used for the detection of Errors. In both algorithms is initially trained with the normal behavior of a cardholder. If an incoming credit card transaction is not accepted by the trained with sufficiently high probability, it is considered to be Error lent. At the same time, we try to ensure that genuine transactions. We present detailed experimental results to show the effectiveness of our approach and compare it with other techniques.

Credit card error detection is a vital component of the modern financial landscape, aimed identifying and mitigating discrepancies, inaccuracies, and irregularities in credit card transactions. These errors can manifest in various forms, from accidental overcharges and duplicate payments to technical glitches within payment systems. Left unchecked, these errors can lead to financial inconveniences for consumers and operational disruptions for businesses.

In an era dominated by digital commerce and cashless transactions, credit cards have become an indispensable part of our daily lives. These plastic cards offer convenience, flexibility, and efficiency in making payments, whether it's for online shopping, dining out, or travel bookings. However, with the widespread use of credit cards, the occurrence of errors in credit card transactions has also surged, presenting a significant challenge for both cardholders and financial institutions..

2.LITERATURESURVEYANDRELATEDWORK

2.1Error Detection in Credit Card System Using SVM & Decision Tree

With growing advancement in the electronic commerce field, error is spreading all over the world, causing major financial losses. In the current scenario, Major cause of financial losses is credit card error; it not only affects tradesperson but also individual clients. Decision tree, Genetic algorithm, Metal earning strategy, neural network, HMM is the presented methods used to detect credit card errors. In contemplating system for error detection, artificial intelligence concept of Support Vector Machine (SVM) & decision tree is being used to solve the problem. Thus by the implementation of this hybrid approach, financial losses can be reduced to greater extent.

2.2Machine Learning Based Approach to Financial Error Detection Process in Mobile Payment System

Mobile payment error is the unauthorized use of mobile transaction through identity theft or credit card stealing to error obtains money. Mobile payment error is a fast-growing issue through the emergence of smart phone and online transition services. In the real world, a highly accurate process in mobile payment error detection is needed since financial error causes financial loss. Therefore, our approach proposed the overall process of detecting mobile payment error based on machine learning, supervised and unsupervised method to detect error and process large amounts of financial data. Moreover, our approach performed sampling process and feature selection process for fast processing with large volumes of transaction data and to achieve high accuracy in mobile payment detection. F-measure and ROC curve are used to validate our proposed model.

2.3The Use of Predictive Analytics Technology to Detect Credit Card Error in Canada

This research paper focuses on the creation of a scorecard from relevant evaluation criteria, features, and capabilities of predictive analytics vendor solutions currently being used to detect credit card error. The scorecard provides a side-by side comparison of five credit card predictive analytics vendor solutions adopted in Canada. From the ensuing research findings, a list of credit card error PAT vendor solution challenges, risks, and limitations were outlined.

2.4 BLAST-SSAHA Hybridization for Credit Card Error Detection

This paper propose to use two-stage sequence alignment in which a profile Analyzer (PA) first determines the similarity of an incoming sequence of transactions on a given credit card with the genuine cardholder's past spending sequences. The unusual transactions traced by the profile analyzer are next passed on to a deviation analyzer (DA) for possible alignment with past error behavior. The final decision about the nature of a transaction is taken on the basis of the observations by these two analyzers. In order to achieve online response time for both PA and DA, we suggest a new approach for combining two sequence alignment algorithms BLAST and SSAHA

3 EXISTING SYSTEM

It is vital that credit card companies are able to identify error credit card transactions so that customers are not charged for items that they did not purchase. The credit card error detection problem includes modeling past credit card transactions with the data of the ones that turned out to be error. This model is then used to recognize whether a new transaction is error or not

Every credit card transaction is monitored in real-time or near-real-time as it occurs. This monitoring can be done by financial institutions, credit card companies, or third-party error detection services.

Each transaction is assigned a error score or risk score based on rule-based checks and machine learning predictions. Transactions with high scores trigger alerts for further investigation.

In cases where a transaction is highly suspicious or has a high likelihood of being an error or error, the system may block the transaction or flag it for the cardholder's review. Cardholders may receive notifications asking them to verify the transaction's legitimacy.

Disadvantages of Existing system

Overzealous error detection algorithms can occasionally flag legitimate transactions as errors, causing inconvenience to customers

The accuracy of error detection heavily relies on the quality and accuracy of the training data, which may be affected by data inconsistencies or errors.

Some advanced machine learning algorithms lack transparency, making it challenging to understand the reasoning behind error detection decisions.

In existing System, a research about a case study involving credit card error www.jespublication.com detection, where data normalization is applied before Cluster Analysis and with results obtained from the use of Cluster Analysis and Artificial Neural Networks on error detection has shown that by clustering attributes neuronal inputs can be minimized. This research was based on unsupervised learning. Significance of this paper was to find new methods for error detection and to increase the accuracy of results

The data set for this paper is based on real life transactional data by a large European company and personal details in data is kept confidential. Accuracy of an algorithm is around 50%. Significance of this paper was to find an algorithm and to reduce the cost measure. The result obtained was by 23% and the algorithm they find was Bays minimum risk. The Clustering doesn't produce the less accuracy when compared to Regression methods in scenarios like credit card error detection. Comparatively with other algorithms k-means produce less accurate scores in prediction in this kind of scenario

4 PROPOSED WORK AND ALGORITHM

The Credit card error detection system is initiated for detecting the error transactions from number of transactions made by the card holders. The transactions done by credit card holders are derived in the form of datasets.

Our goal is to implement machine learning model in order to classify, to the highest possible degree of accuracy, credit card error from a dataset gathered from Cagle. After initial data exploration, we knew we would implement a logistic regression model for best accuracy reports.

Logistic regression, as it was a good candidate for binary classification. Python sklearn library was used to implement the project, We used Cagle datasets for Credit card error detection, using pandas to data frame for class ==0 for no error and class==1 for error, mat plot lib for plotting the error and non error data, train_test_split for data extraction (Split arrays or matrices into random train and test subsets) and used Logistic Regression machine learning algorithm for error detection and print predicting score according to the algorithm. Finally Confusion matrix was plotted on true and predicted.

Advantages

The results obtained by the Logistic Regression Algorithm are best compared to any other Algorithms.

Error Prevention: Detecting errors in credit card transactions helps prevent erroneous activities, protecting both customers and businesses from unauthorized transactions.

Cost Savings: Identifying errors promptly reduces the financial impact of charge backs and unauthorized transactions on businesses, leading to cost savings.

Customer Trust: Accurate error detection builds trust among customers, as they are less likely to face wrongful charges and negative experiences.

Machine learning algorithms can adapt and improve over time by learning from new transaction data, enhancing their error detection capabilities.

- The results obtained by the Logistic Regression Algorithm are best compared to any other Algorithms.
- The Accuracy obtained was almost equal to cent percent which proves using of Logistic algorithm gives best results.
- The plots that were plotted according to the proper data that is processed during the implementation
- The 'amount' feature is the transaction amount. Feature 'class' is the target class for the binary classification and it takes value 1 for positive case (error) and 0 for negative case (no error).
- Random forest ranks the importance of variables in a regression or classification problem in a natural way can be done by Random Forest.
- and produce the efficient output as compare to the existing Cagle algorithms

5 METHODOLOGIES

MODULES

DATASET

This paper utilizes the dataset provided by revolution analytics for the detection of the error credit card transaction from Cagle. Dataset has 51149 legal transactions and 3312 error transactions. The dataset is divided as 60%, 20% and, 20% in the Train, Valid and Test set, respectively

DATA PREPROCESSING

For efficient implementation of the classification algorithm, data preprocessing is performed before feature selection. Under-sampling is performed to make the dataset balanced to avoid the biasing of the classification algorithm towards the majority class. Feature Selection is implemented on a balanced dataset.

FEATURE SELECTION

Feature selection methods are used to remove unnecessary, irrelevant, and redundant attributes from a dataset that do not contribute to the accuracy of a predictive model or which might reduce the accuracy of the model. In this paper seven feature selection techniques namely Select-K-best, Feature Importance, Extra tress classifier, Person's correlation, Mutual Information, Step forward selection and Recursive feature elimination are used.

FEATUREIMPORTANCE

Feature importance is a class of techniques for assigning scores to input features to a predictive model that indicates the relative importance of each feature at the time of making a prediction. It reduces the number of input features. In this paper, feature importance is implemented using an extra tree classifier from the decision tree. Extra Trees is similar to Random Forest, it builds multiple trees and splits nodes using random subsets of features, but unlike Random Forest, Extra Tree samples without replacement and nodes are split on random

6 RESULTSANDDISCUSSION

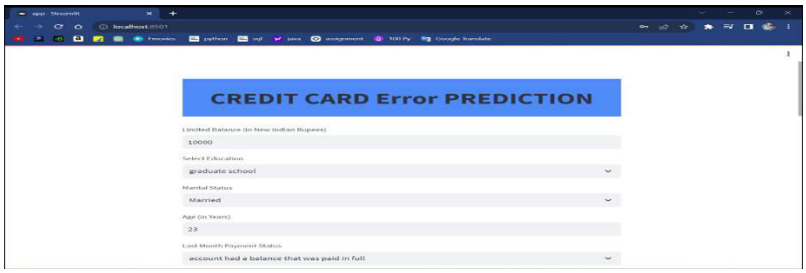

Fig1 :Credit card error prediction.

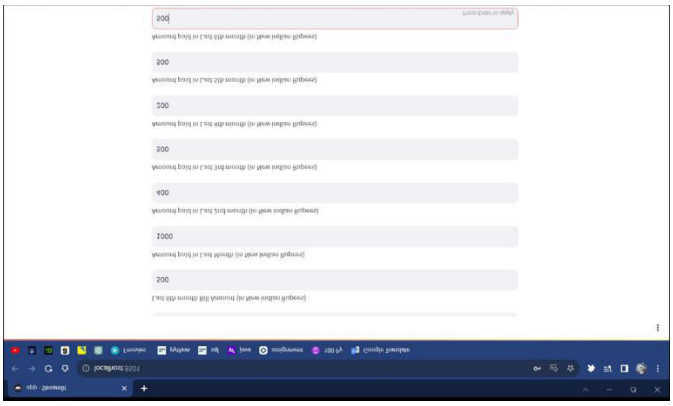

Fig 2: Submittng the form before prediction.

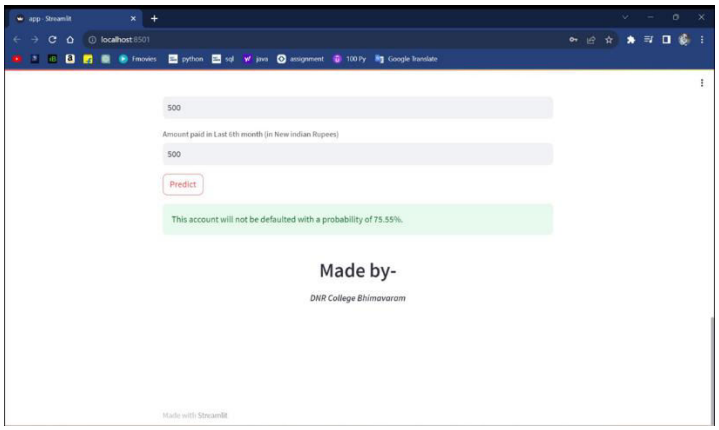

Fig 3: Predicted value

6.CONCLUSION AND FUTURE SCOPE

CONCLUSION

In conclusion, our Credit Card Error Detection System represents a significant advancement in the field of financial security and fraud prevention. This system offers users an efficient solution for identifying and addressing errors and fraudulent transactions.

This machine learning error detection tutorial showed how to tackle the problem of credit card error detection using machine learning. It is fairly easy to come up with a simple model, implement it in Python and get great results for the Credit Card Error Detection task on Cagle. Credit card error detection system using whale optimization algorithm and SMOTE (Synthetic minority optimization technique) aims in indentifying the error transactions occurring during the transactions made by the card holder. The system also aims to improve the convergence speed and solves the data imbalance.

In this research, we have proposed a method to detect the error in credit card transactions that is based on deep learning. We first compare it with machine learning algorithms such as k- Nearest Neighbor, Support vector machine etc. Finally we have

used the neural network, even though tough to train the model which would fit fine to model for detecting an error in credit card Transactions. In our model, by using an artificial neural network (ANN) which gives accuracy approximately equal to 100% is best suited for credit card error detection .It gives accuracy more than that of the unsupervised learning algorithms

FUTURESCOPE

- Continued advancements in machine learning will lead to more accurate and adaptive error detection models
- Biometric authentication methods , such as fingerprint or facial recognition , could enhance the security of credit card transactions and reduce the occurrence of errors
- Our Credit Card Error Detection System is continuously improving to take. The system's future scope has several exciting avenues

From the above analysis, it is clear that many machine learning algorithms are used to detect the error but we can observe that the results are not satisfactory, so we would like to implement deep learning algorithms to detect credit card error accurately.

7 REFERENCES

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