A MINI PROJECT REPORT ON

‘Credit Card Fraud Detection’

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ABSTRACT

Now a day's online transactions have become an important and necessary part of our lives. It is vital that credit card companies are able to identify fraudulent credit card transactions so that customers are not charged for items that they did not purchase. As frequency of transactions is increasing, number of fraudulent transactions are also increasing rapidly. Such problems can be tackled with Machine Learning with its algorithms. This project intends to illustrate the modelling of a data set using machine learning with Credit Card Fraud Detection. The Credit Card Fraud Detection Problem includes modelling past credit card transactions with the data of the ones that turned out to be fraud. This model is then used to recognize whether a new transaction is fraudulent or not. Our objective here is to detect 100% of the fraudulent transactions while minimizing the incorrect fraud classifications. Credit Card Fraud Detection is a typical sample of classification. In this process, we have focused on analyzing and pre processing data sets as well as the deployment of multiple anomaly detection algorithms such as Local Outlier Factor and Isolation Forest algorithm on the PCA transformed Credit Card Transaction data.

CONTENTS

INTRODUCTION

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.

Due to rise and acceleration of E- Commerce, there has been a tremendous use of credit cards for online shopping which led to High amount of frauds related to credit cards. In the era of digitalization, the need to identify credit card frauds is necessary. Fraud detection involves monitoring and analyzing the behavior of various users in order to estimate detect or avoid undesirable behavior. In order to identify credit card fraud detection effectively, we need to understand the various technologies, algorithms and types involved in detecting credit card frauds. Algorithm can differentiate transactions which are fraudulent or not. Find fraud, they need to passed dataset and knowledge of fraudulent transaction.

They analyze the dataset and classify all transactions. Fraud detection involves monitoring the activities of populations of users in order to estimate, perceive or avoid objectionable behavior, which consist of fraud, intrusion, and defaulting. Machine learning algorithms are employed to analyses 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.

LITERATURE SURVEY

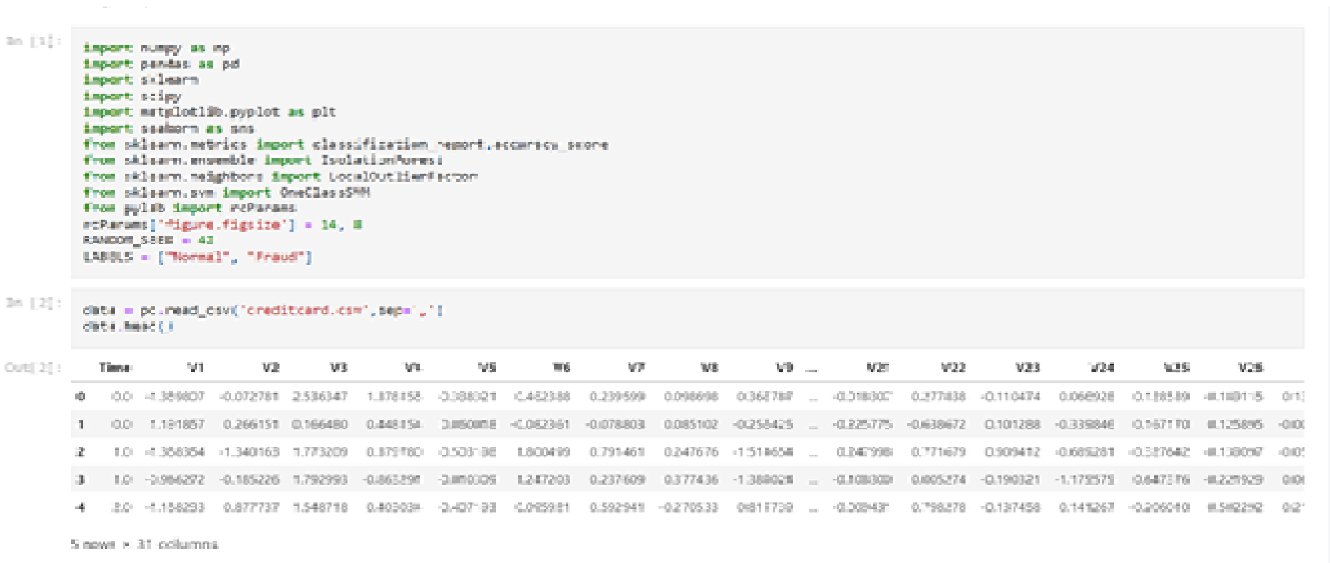
S P Maniraj [1] In this paper, they describe Random forest algorithm applicable on Find fraud detection. Random forest has two types. They describe in detail and their accuracy 91.96% and 96.77% respectively. This paper summaries second type is better than the first type.

Suman Arora [2] In this paper, many supervised machine learning algorithms apply on 70% training and 30% testing dataset. Random forest, stacking classifier, XGB classifier, SVM, Decision tree and KNN algorithms compare each other i.e. 94.59%, 95.27%, 94.59%, 93.24%, 90.87%, 90.54% and 94.25% respectively. Summaries of this paper, SVM has the highest ranking with 0.5360 FPR, and stacking classifier has the lowest ranking with 0.0335.

EXISTING SYSTEM

Since the credit card fraud detection system is a highly researched field, there are many different algorithms and techniques for performing the credit card fraud detection system. One of the earliest system is CCFD system using markov model. Some other various existing algorithms used in the credit cards fraud detection system includes Cost sensitive decision tree (CSDT), support vector machine (SVM), Random forest,etc. credit card fraud detection(CCFD) is also proposed by using neural networks. The existing credit card fraud detection system using neural network follows the whale swarm optimization algorithm to obtain an inceptive value. It the uses BP network to rectify the values which are found error. All of these techniques has some serious disadvantages such as decreasing accuracy levels, lack of efficiency, sometimes classifying the normal transactions as fraud transactions and vise versa. These disadvantages are overcomed in this credit card fraud detection system using whale algorithm and smote technique.

RESULT



In [1]:

```
import numpy as np
import pandas as pd
import sklearn
import scipy
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.metrics import classification_report,accuracy_score
from sklearn.ensemble import IsolationForest
from sklearn.neighbors import LocalOutlierFactor
from sklearn.svm import OneClassSVM
from pylab import rcParams
rcParams['figure.figsize'] = 14, 8
RANDOM_SEED = 42
LABELS = ["Normal", "Fraud"]
```

In [2]:

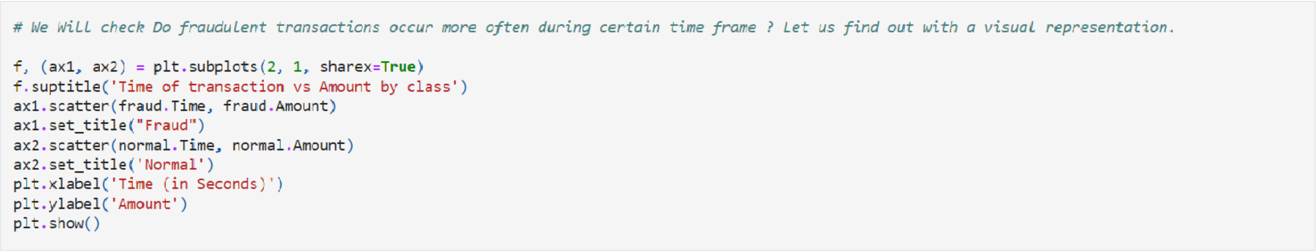
```
data = pd.read_csv('creditcard.csv',sep=',')
data.head()
```

Out[2]:

	Time	V1	V2	V3	V4	V5	V6	V7	V8	V9	...	V21	V22	V23	V24	V25	V26	
0	0.0	-1.359807	-0.072781	2.536347	1.378155	-0.338321	0.462388	0.239599	0.098698	0.363787	...	-0.018307	0.277838	-0.110474	0.066928	0.128539	-0.189115	0.13
1	0.0	1.191857	0.266151	0.166480	0.448154	0.060018	-0.082361	-0.078803	0.085102	-0.255425	...	-0.225775	-0.638672	0.101288	-0.339846	0.167170	0.125895	-0.00
2	1.0	-1.358354	-1.340163	1.773209	0.379780	-0.503198	1.800499	0.791461	0.247676	-1.514654	...	0.247998	0.771679	0.909412	-0.689281	-0.327642	-0.139097	-0.05
3	1.0	-0.966272	-0.185226	1.792993	-0.863291	-0.010309	1.247203	0.237609	0.377436	-1.387024	...	-0.108300	0.005274	-0.190321	-1.175575	0.647376	-0.221929	0.06
4	2.0	-1.158233	0.877737	1.548718	0.403034	-0.407193	0.095921	0.592941	-0.270533	0.817739	...	-0.009431	0.798278	-0.137458	0.141267	-0.206010	0.502292	0.2

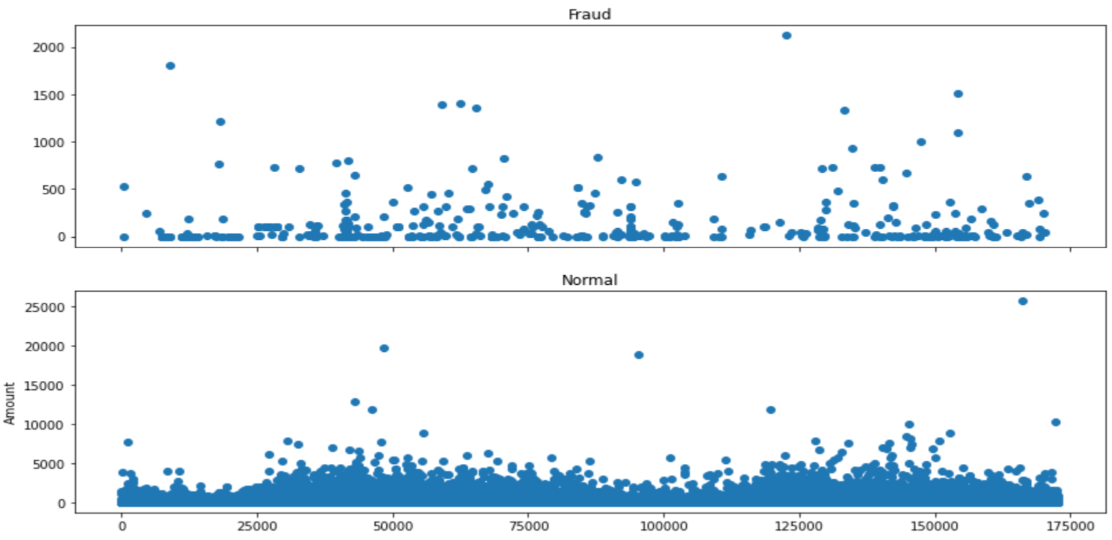
5 rows × 31 columns

Fig: Output of the project



```
# We will check Do fraudulent transactions occur more often during certain time frame ? Let us find out with a visual representation.

f, (ax1, ax2) = plt.subplots(2, 1, sharex=True)
f.suptitle('Time of transaction vs Amount by class')
ax1.scatter(fraud.Time, fraud.Amount)
ax1.set_title("Fraud")
ax2.scatter(normal.Time, normal.Amount)
ax2.set_title('Normal')
plt.xlabel('Time (in Seconds)')
plt.ylabel('Amount')
plt.show()
```



Identify fraudulent credit card transactions. Given the class imbalance ratio, we recommend measuring the accuracy using the Area Under the Precision-Recall Curve (AUPRC). Confusion matrix accuracy is not meaningful for unbalanced classification. The code prints out the number of false positives it detected and compares it with the actual values.

This is used to calculate the accuracy score and precision of the algorithms. The fraction of data we used for faster testing is 10% of the entire dataset. The complete dataset is also used at the end and both the results are printed. These results along with the classification report for each algorithm is given in the output as follows, where class 0 means the transaction was determined to be valid and 1 means it was determined as a fraud transaction

CONCLUSION

Fraud detection is a complex issue that requires a substantial amount of planning before throwing machine learning algorithms at it. Nonetheless, it is also an application of data science and machine learning for the good, which makes sure that the customer’s money is safe and not easily tampered with.

Future work will include a comprehensive tuning of the Random Forest algorithm I talked about earlier. Having a data set with non-anonymized features would make this particularly interesting as outputting the feature importance would enable one to see what specific factors are most important for detecting fraudulent transactions. As always, if you have any questions or found mistakes, please do not hesitate to reach out to me. A link to the notebook with my code is provided at the beginning of this article

REFERENCES

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