Detecting Attempted Credit Card Fraud
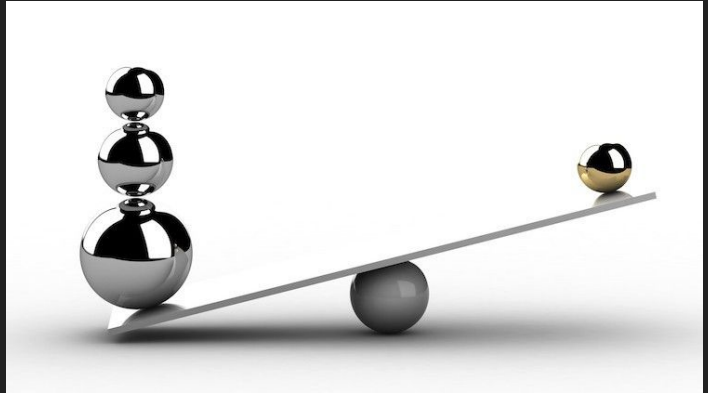
By George Bennett

Image source (https://en.wikipedia.org/wiki/Credit_card)

Problem Statement

- Classification
- Highly Imbalanced
- Flag Fraud
- Don't Flag Too Much

- This is a classification problem the classes represent whether a particular transaction is normal or fraudulent
- The dataset was highly imbalanced. %0.17 Fraud
- My goal is to be able to flag as many incoming transactions as possible
- I must avoid having my models flag too many transactions as that would make the model impractical

Image source
https://towardsdatascience.com/dealing-with-class-imbalanced-datasets-for-classification-2cc6fad99fd9

Business Value

- Prevent As Much Fraud As Possible

- In 2018 over $27 Billion was lost by credit card lenders because of fraud [1]
- My model will be able to give lenders added protection against credit card fraud
- It will also help protect the credit card owners from fraud

Sources:
1) Payment Card Fraud Losses Reach $27.85 Billion
The Nilson Report

https://www.prnewswire.com/news-releases/payment-card-fraud-losses-reach-27-85-billion-300
963232.html#:~:text=The%20United%20States%20accounted%20for,There%20was
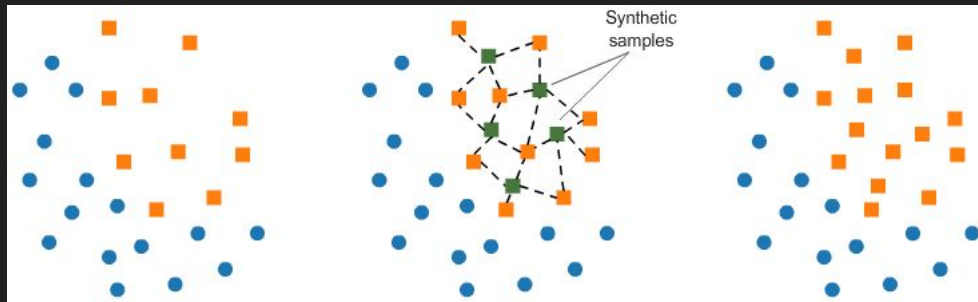%20some %20good%20news.

Image source
https://datafloq.com/read/will-analytics-technology-end-credit-card-fraud/2121

Methodology

- RFE
- PCA
- SMOTE
- Grid Search

Synthetic samples

My methodology included trying out several techniques
- RFE
- PCA
- SMOTE
- Hyperparameter grid search

Findings

- Amount gives no indication
- Repeated transactions
- Model flags %78 of fraudulent transactions
- Less than %0.6 of transactions are falsely flagged

- The amount of a transaction gives no indication of whether or not it is fraud
- The current model is able to flag %77 of fraudulent transactions
- Less than %0.5 of transactions will be falsely flagged

Recommendations

- Decline transactions

- My recommendations for the company would include creating software to process transactions based on this model
- If the model flags the transaction then decline that transaction

Image source https://www.helcim.com/article/understanding-credit-card-declines/
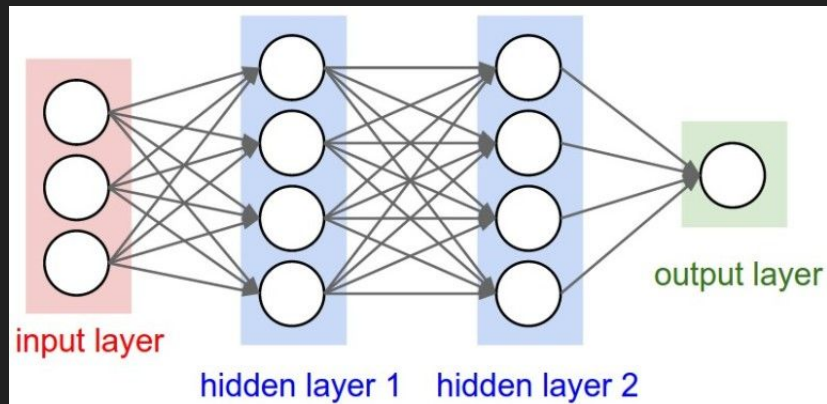
Recommendations

● Make contact with card owner

● Furthermore if a transaction is flagged than call the credit card owner to try and resolve the issue
● And warn them that there is suspicious activity

Image source
http://www.theegreetingsportal.com/things-to-remember-in-choosing-a-conference-call-service-provider/

Future Work

- Additional machine learning algorithms
- Neural Network

- Given more time I could construct more machine learning models
- A neural network may prove to be more effective
- Image source
  https://www.pyimagesearch.com/2016/09/26/a-simple-neural-network-with-python-and-keras/

Thank you