

# Detecting Attempted Credit Card Fraud

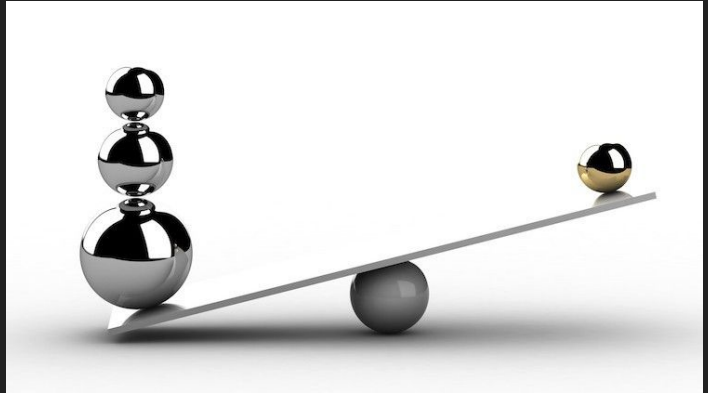
By George Bennett



Image source ([https://en.wikipedia.org/wiki/Credit\\_card](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 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



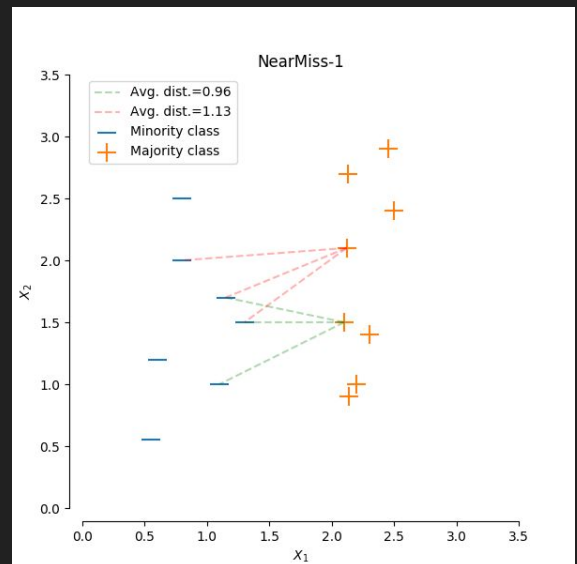
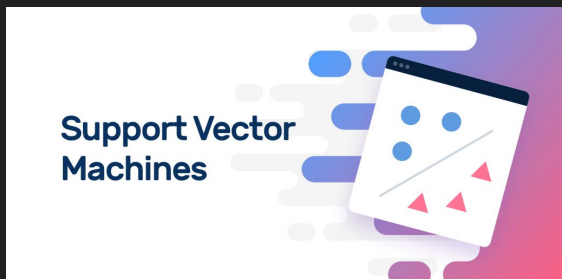
- My model will be able to give lenders added protection against credit card fraud
- It will also help protect the credit card owners from fraud

Image source

<https://dataflog.com/read/will-analytics-technology-end-credit-card-fraud/2121>

# Methodology

- Transform the data different ways
- NearMiss
- Several machine learning models



- My methodology was to transform the data several ways using different techniques
- I used NearMiss to resample the training data to make it balanced
- I used several machine learning algorithms

Image source left

Image source right

[https://imbalanced-learn.readthedocs.io/en/stable/under\\_sampling.html](https://imbalanced-learn.readthedocs.io/en/stable/under_sampling.html)

# Findings

- Time of day
- Repeated transactions
- Model flags %82 of fraudulent transactions
- Less than %1 of transactions are falsely flagged

- The time of day has a relationship with the ratio of fraud to normal transactions
- If identical transactions are repeated they are 10 times more likely to be fraud
- The current model is able to flag %82 of fraudulent transactions
- Less than %1 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



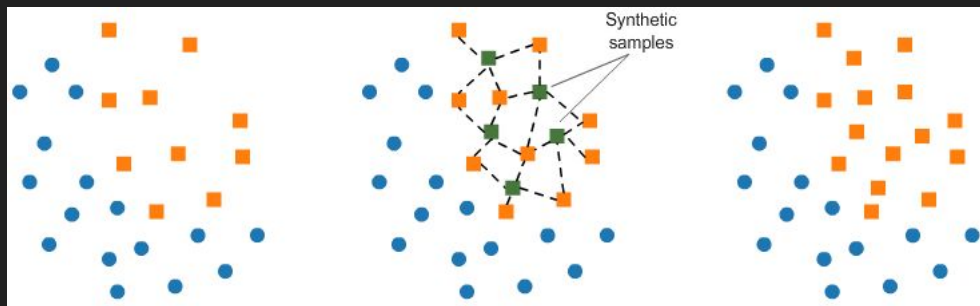
- Furthermore if a transaction is flagged than call the credit card owner to try and resolve the issue
- And warn them that there is suspicious activity

Image source

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

# Future Work

- SMOTE



- Given more time and/or computational power I could use synthetic minority oversampling technique to see if it yields better results

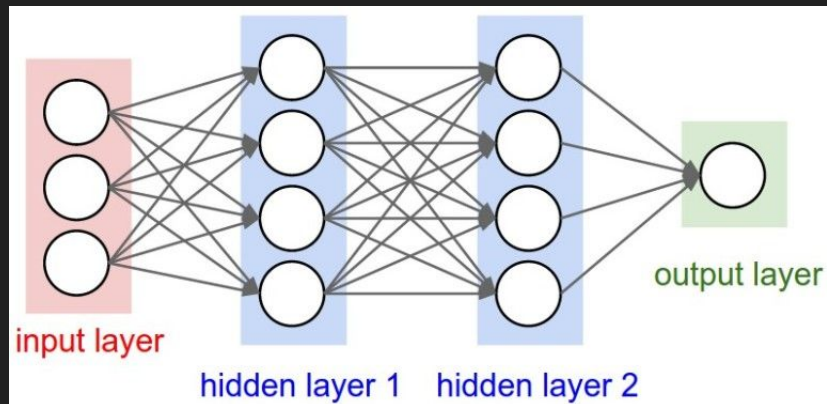
Image source

<https://towardsdatascience.com/the-5-most-useful-techniques-to-handle-imbalanced-datasets-6cdba096d55a>



# Future Work

- Additional machine learning algorithms
- Neural Network



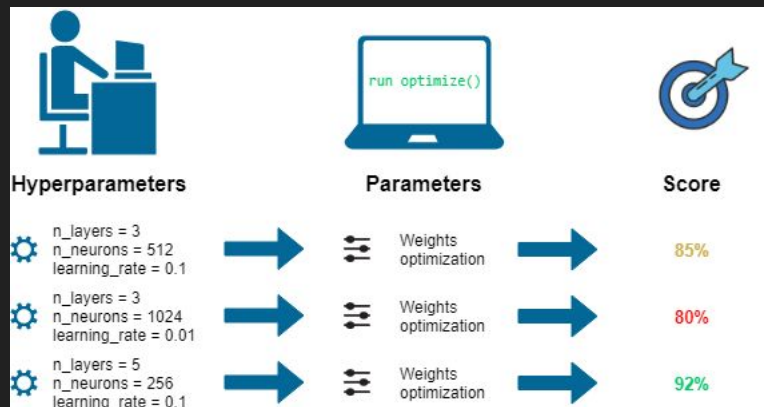
- Given more time I could construct more machine learning models
- A neural network may prove to be more effective if I use SMOTE or have access to more data

Image source

<https://www.pyimagesearch.com/2016/09/26/a-simple-neural-network-with-python-and-keras/>

# Future Work

- More expansive parameter searches



- Along with more machine learning models would be more refined parameter searches

Image source

<https://deepai.org/machine-learning-glossary-and-terms/hyperparameter>

Thank you

