Predicting Fraud

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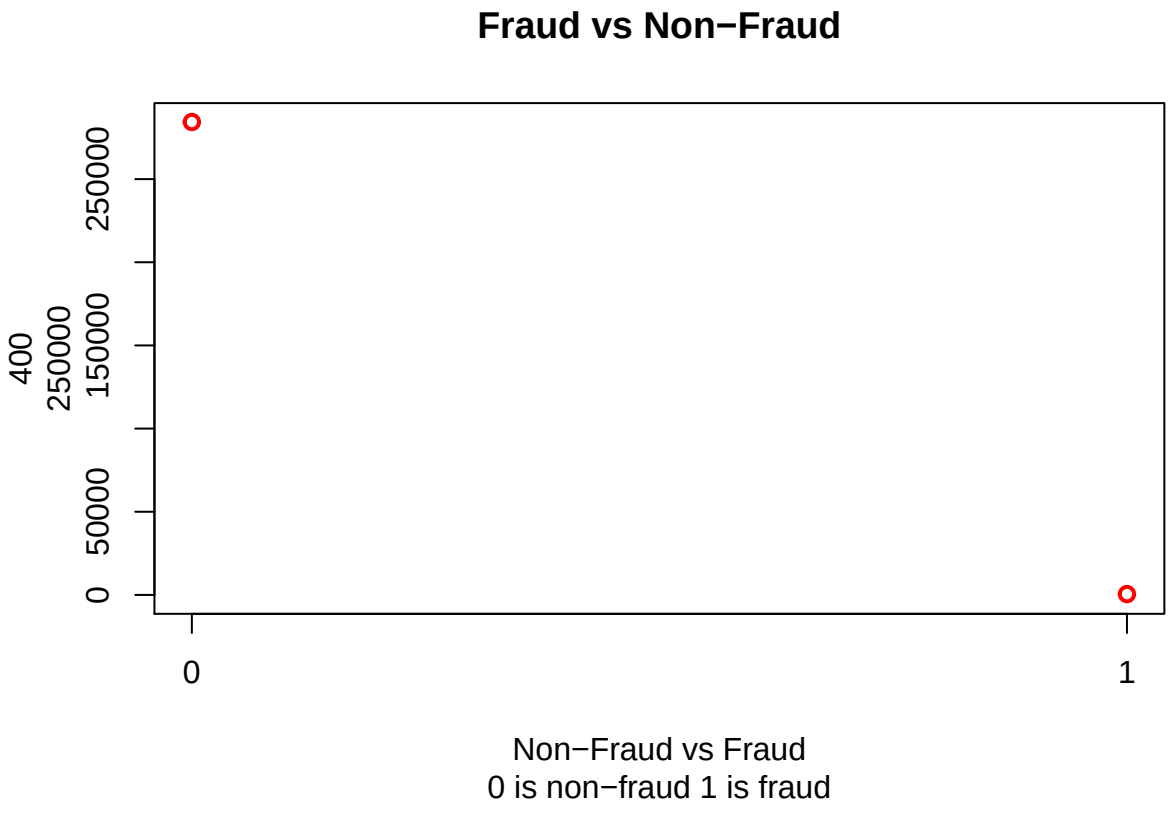
Predicting Fraud in Credit Card Transactions

Using a dataset consisting of ~280,000 european credit card transactions made in two days to explore credit card fraud and to use a decision tree model to predict fraud in a testing dataset.

```
## [1] 284807     31
```

The Data is highly imbalanced as we can see 284,315 credit card transactions that are non-fraudelent and only 492 transaction that were fraud.



This will require sampling methods that will balance the data out. Two baseline sample methods will be used: Up sampling and Down sampling.

Up sampling will increase the amount of fraudelent cases until they are balanced with the non-fraud cases. Down sampling will do the opposite. Up sampling will increase the data size but may lead to overfitting whereas down sampling will reduce the data size which could lead to other numerous problems. We will compare the Accuracy Under the Curve for both sampling methods to determine if one is prefferred to the other.

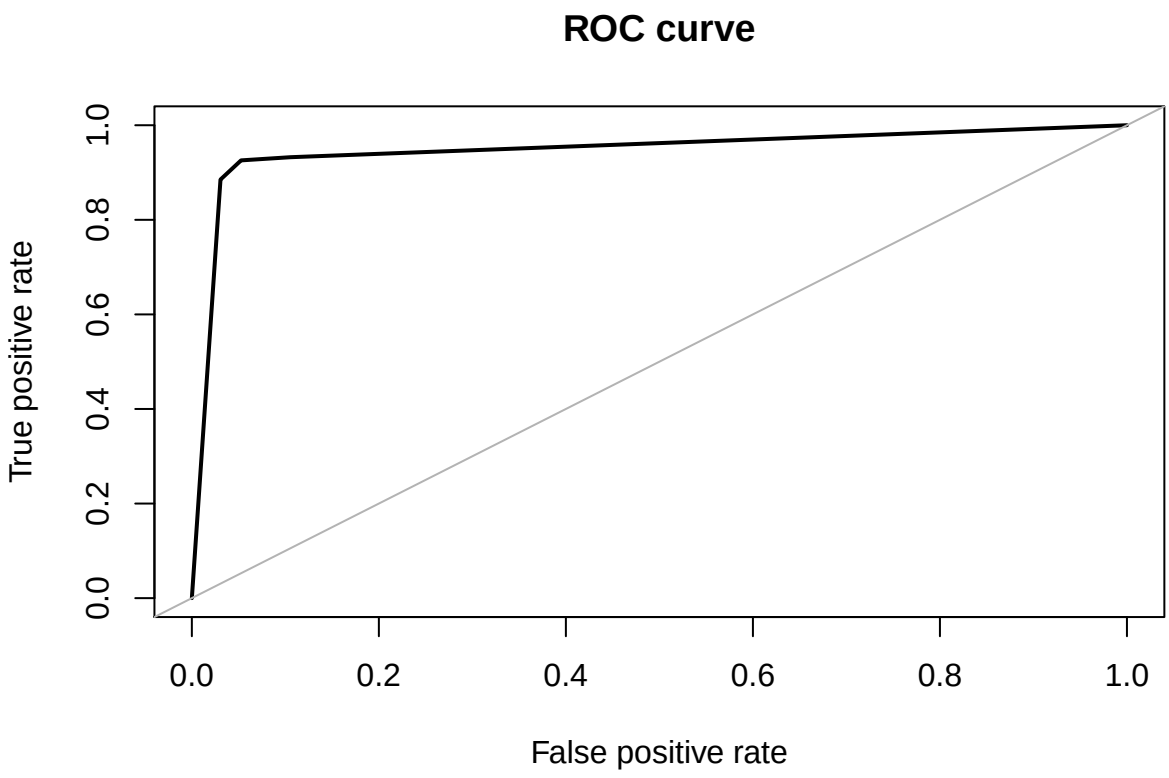
```
## [1] "Using the down sampling method we see a much smaller training data set"
```

```
##
## Not_Fraud     Fraud
##       344       344
```

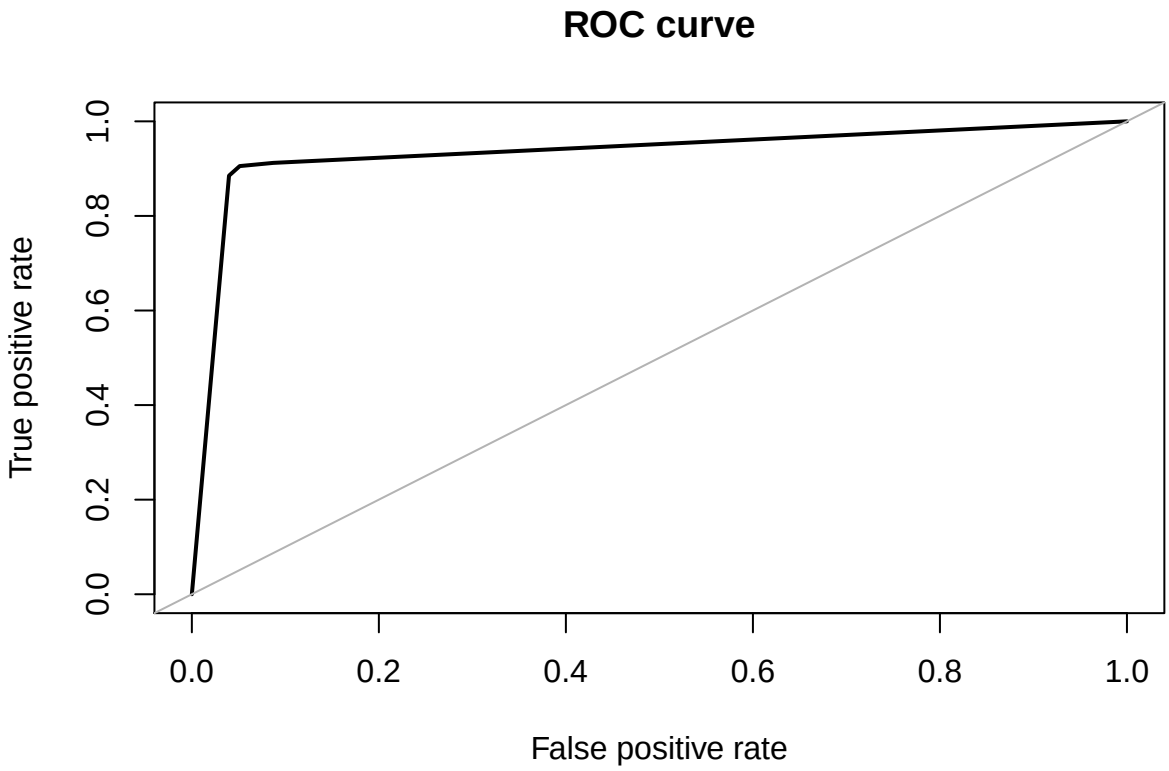
```
## [1] "Using up sampling method we see a much larger training data set"
```

```
##
## Not_Fraud     Fraud
##    199020    199020
```

Lastly we will fit both the up and down sample training sets to a Decision Tree model




```
## Area under the curve (AUC): 0.947
```




```
## Area under the curve (AUC): 0.933
```

The down sample method was 1.4% more accurate than the up sample method when comparing the AUC of both methods being run against the test set.

```
## [1] "94.7%"
```

```
## [1] "93.3%"
```

Based on the increase in accuracy as well as a noticeable decrease in training time in appears that the down sampling method is the prefferred method for sampling for this dataset.

Figure 1: CreditCardFraud