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**Introduction**

In this assignment, we are using tree different Support vector machine kernels (linear, Polynomial and RBF.) to find line or non-linear between the normal transaction and frauds transaction.

**Brief information about Dataset**

This dataset contains transactions made by credit cards. The dataset presents transactions that occurred in two days, where we have 492 frauds out of 284,807 transactions. The data is very unbalanced. If change to percentage 492 fraud are only 0.0172%.

**Data preprocessing**

The data preprocessing is most impotent part of all. I have large data for Class 0 (regular transaction). It has too much data. For training data, we pick only 242 random sample rows from Class 1 and Class 0. The reason why I chose only 242 each from class data is that data unbalanced. I think that would be more accurate because the equal amount of data will help find decision boundaries.

**Experimental observation**

I used different number of the data for the test data. Because we need simulate real life problem. The training data was 50% class 0 and 50% were class 1. In this test data I use 99% class 0, and .0127% class 1.

**SVM Linear**

The result come out, accuracy is 96.35122% and recall 91.891891%.

Because line we fit is linear that training data cannot sperate perfectly.

The confusion matrix plot shows that predicted data match with true data.

**SVM Polynomial**

The accuracy is 95.742097% and recall 92.7927%.

You can see that result are little better than the SVM Linear. The result is better because we use the non-linear like SVM polynomial.

**SVM RBF**

The accuracy is 90.403% and recall 96.3963%

Recall is way better result then the SVM Polynomial and SVM Linear.

**Conclusions**

I believe that we must care about the only fraud transaction. We know that accuracy is important. Recall percentage will help I think only we can have a higher percentage of fraud transaction so that in the future. Base on this SVM we can predict the fraud transaction.