

Executive Summary

Our team worked on comparing different models to predict beforehand whether the credit card users will default on their payment or not given their payment history and other personal characteristics i.e., sex, education, marital status, age etc. This type of study will help banks to find out whether the consumers they are issuing credit cards will default on their payments or not. Hence, giving them a way to hedge the risk of credit exposure.

The data set that we have used so far was obtained in October 2005 from a bank in Taiwan issuing credit cards to its consumers. It consisted of 30,000 observations and 23 explanatory variables giving more information about each consumer.

We compared different models by using various metrics i.e., validation accuracy, lift curve etc. The models are:

1. Logistic regression
2. Random forest classification
3. K-nearest neighbors classification
4. Naïve Bayes
5. Neural networks

With random forest classification, we found that including payment history led to overfitting, whereas using only other features, such as sex, gender, and education level, led to poor classification. With neural networks, we attempted a partial RNN structure but found a simple NN with dense layers worked best. We tested the accuracy of all the above methods and found that, assessing holistically the accuracy and area ratio, the best model is either the neural network or K-nearest neighbors, though we suspect that if given more data, the neural network might outperform. The performance of each model can further be seen in the following table:

Model Type	Validation Accuracy	Area Ratio
Logistic Regression	81.5%	0.454
Random Forest	82.0%	0.416
K-nearest Neighbors	79.4%	0.741
Naïve Bayes	63.6%	0.795
Neural Networks	80.3%	0.639

We hope that our project will help banks and other similar organization to assess beforehand what consumers will default on their credit card payments so as to plan the ways to cope up with the extreme circumstances where many consumers default on their credit, hence devising some strategies timely.