DEVELOPMENT OF A CUSTOMER CREDITWORTHINESS ASSESSMENT TOOL USING PREDICTIVE ANALYTICS

E S S Fernando

A dissertation submitted in partial fulfilment of the requirement for Master of Science degree in Big Data Analytics

Department of Computing

Informatics Institute of Technology, Sri Lanka in collaboration with

Robert Gordon University, Aberdeen, Scotland

2022

Abstract

All the banking and financial institutions recognize their credit borrowers as their biggest asset. Therefore, the decision made in lending credit to a customer should be done with proper care, such that the financial health of the organization would not adversely affect. Statistical models can assist lenders in their lending decision by statically scoring the customers at the onboarding stage, based on historical customer behaviors. A subjective decision made by a loan granter could be highly biased to emotions. As of the current market requirement, regulators expect lenders to utilize an analytics-based rating methodology to assess the associated risk.

Observation of actual default customers in a healthy financial institute is comparatively very low. Therefore, general classification models tend to provide predictions biased to the non-default category. To address the rare event nature of the default class a bias-reduction generalized linear model was fitted to draw predictions on a set of attributes identified based on an Elastic net regression. A segmentation model was developed to further assist the lender's decision, while reducing the customer rejection rate of the lending organization, by considering all the non-default customers in the loan portfolio. The interface of the customer creditworthiness assessment tool was developed using RShiny, for the end users to perform predictions and draw decisions.

Keywords: customer credit rating, creditworthiness assessment, rare event analysis, bias reduction in binomial response in generalized linear model, variable selection, elastic net.