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An efficient credit score prediction model with Deep Neural Network

W. S. V. Lakshan^{1*} and K. D. V. C. Katugampala²

¹Department of Statistics and Computer Science, University of Kelaniya, Sri Lanka

²Research Council, University of Kelaniya, Sri Lanka

wsvla191@kln.ac.lk*

The rapid expansion of the financial industry over the evolution of Computer Science is a breakthrough for both fields. Financial institutes tend to get the maximum benefit from computer science by analysing huge stack of unstructured data which increases daily. One of the most common facilities those institutes provide is loan facilities for both individuals and businesses. Before taking a decision, they need to consider many factors and a wide variety of reference documents to lend on loan. The credit score of a person or a business is an important aspect that needs to be considered when lending money. It depicts the ability of the borrower to pay back the loan on time. This research focused on developing a credit score prediction model based on a deep neural network to predict creditworthiness. Two separate models had been created for personal loans and micro loans. In the initial phase, data had been pre-processed, and correlation tests were carried out for the input feature selection against the prediction of approval. We performed the dimensionality reduction based on principal component analysis to discard components that have low information related to the credit score. This study will support machine learning algorithms to explore, analyse and visualize the data with a more efficient approach. The deep neural network model was trained with the pre-processed data and tuned for the best model by changing weights and activation functions. A REST API was developed as a plugin using the model which is to be integrated into prevailing systems of institutions. Therefore, the overall architecture goals of the system were to provide a high-functioning REST API with a low response time (150 – 200 ms), and to predict the creditworthiness of a client with the details of the relevant inputs which have been achieved with an 80% level of accuracy for the personal loan approval model without tuning the hyperparameters and 72.6% level of accuracy micro loan approval model with the hyperparameter tuning. We achieved better prediction performance of the models by adjusting the hyperparameters such as weight values and biases of the Recurrent Neural Network model selected for model building as the deep learning algorithm. To make the prediction model more accurate and precise, it is required to thoroughly identify the impact points and key features of the relationship between the financial institutes and the borrower.

Keywords: Correlation, Credit score, Deep neural network, Principal component analysis, REST API