ABSTRACT

Fraud is an intentional act carried out by one or more people in management or parties who have management responsibility, employees and third parties that involve the use of deception to obtain an unfair or unlawful advantage. In the banking world, fraud often occurs in various transactions, therefore a classification system is needed that is able to detect fraud accurately. This study uses a dataset from the transaction history of one bank in Indonesia which consists of 28 variables with a total of 13,125 records and the dataset used is an imbalanced dataset. There have been several studies that have discussed the classification/detection of fraud in banking transactions but with the type different deep learning algorithms.

This research was conducted using Convolutional Neural Network (CNN). Based on this, this study will classify fraud data which is divided into 2 classes, namely fraud and non-fraud (normal transactions) using 1 Dimensional CNN architecture and the Synthetic Minority Over sampling Technique (SMOTE) method to overcome the imbalanced class.

The overall stages of the method used are data acquisition, pre-processing, classification with CNN without using SMOTE and using SMOTE by using a combination of several hyperparameters including the optimizer, learning rate, epoch and different batch sizes to get the best model. The results of the testing of the two models will be analyzed with performance parameters loss accuracy, recall, f-1 score and precision. The best model for the classification of fraud in banking transactions is to apply the SMOTE method with a combination of hyperparameters such as the RMSProp optimizer, learning rate with a value of 0.0001, epoch 200 and batch size with a value of 16 and the outputs include training accuracy of 89.78%, loss training is 0.2, testing accuracy is 93.29% and loss testing is 0.2 and the recall, precision and f-1 scores obtained are greater than 84%. The application of the SMOTE method on CNN has a significant impact in overcoming the imbalanced class and is able to produce excellent model performance values.

Keywords : *Fraud, Convolutional Neural Network* and SMOTE