University of Science and Technology of Hanoi

Bachelor's Thesis in Information and Communication Technology

Application of Machine Learning in Credit Card Fraud Detection

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Abstract

Credit card fraud is an [sth] problem in the financial world. The number of fraudulent transactions is expected to increase due to the recent trend of using non-cash payments. However, using machines to detect credit card fraud is not an easy task since the available datasets for this problem are highly imbalance i.e. the number of genuine cases greatly outnumber the fraudulent cases, which makes process of training a classification models harder and create inaccurate models.

In order to tackle this problem, our project suggests different techniques to resample the dataset, such as, undersampling, oversampling and hybrid strategy, which is a combination of both undersampling and oversampling. These techniques are implemented with different predictive models like Logistic Regression, Random Forest and XGBoost. Each combination between a resampling method and model is evaluated based on precision, recall, f1-score, precision-recall (PR) curve and receiver operating characteristics (ROC) curve.

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1 Introduction

1.1 Credit Card Fraud Detection

1.2 Aim of the project

1.3 Overview

This section provides an overall overview of the content entailed in each section. In section 2, we discuss relevant literature in the current field of research, focusing on the methods to build credit card detection model. Section 3 presents the methodology including the data processing steps, tools and libraries used, as well as the training of the model. In Seciton 4, we describe model's evaluation metrics - precision, recall, f1-score, PR curve, ROC curve and provide a detailed discussion on the results of our project. The final section 5 presents a brief conclusion of our project.

2 Literature Review

3 Method

4 Results

4.1 Evaluation Metric

4.2 Performance

4.3 Discussion

Overall, the models we chose achieved our main criteria, real time detection and high accuracy. Both YOLOv4 and YOLOv5 perform similarly, with the average precision on unknown test data achieving 0.75. This result means the system should perform accurately and reliably.

4.3.1 Difficulties

5 Conclusion

6 References