**Fraud Detection in Banking Data by Machine Learning Techniques**

**ABSTRACT**

As technology advanced and e-commerce services expanded, credit cards became one of the most popular payment methods, resulting in an increase in the volume of banking transactions. Furthermore, the significant increase in fraud requires high banking transaction costs. As a result, detecting fraudulent activities has become a fascinating topic. In this study, we consider the use of class weight-tuning hyperparameters to control the weight of fraudulent and legitimate transactions. We use Bayesian optimization in particular to optimize the hyperparameters while preserving practical issues such as unbalanced data. We propose weight-tuning as a pre-process for unbalanced data, as well as CatBoost and XGBoost to improve the performance of the LightGBM method by accounting for the voting mechanism. Finally, in order to improve performance even further, we use deep learning to fine-tune the hyperparameters, particularly our proposed weight-tuning one. We perform some experiments on real-world data to test the proposed methods. To better cover unbalanced datasets, we use recall-precision metrics in addition to the standard ROC-AUC. CatBoost, LightGBM, and XGBoost are evaluated separately using a 5-fold cross-validation method. Furthermore, the majority voting ensemble learning method is used to assess the performance of the combined algorithms. LightGBM and XGBoost achieve the best level

**Keywords :** Banking Data, Fraud Detection, XG Boost, Precision, recall

**HARDWARE REQUIREMENTS**

* Processor- Intel (R) Core (TM) i3-4200U
* CPU - 1.6GHz
* RAM:4 GB
* Hard Disk: 500 GB.

**SOFTWARE REQUIREMENTS**

* Operating System- windows 10
* Server: XAMPP
* Database: MYSQL
* Frontend: HTML, CSS, JS
* Backend: Python
* IDE: Pycharm

SIGNATURE OF GUIDE