

(12) PATENT APPLICATION PUBLICATION

(21) Application No.202441009064 A

(19) INDIA

(22) Date of filing of Application :10/02/2024

(43) Publication Date : 08/03/2024

(54) Title of the invention : PROBABILISTIC XGBOOST THRESHOLD CLASSIFICATION WITH AUTOENCODER FOR CREDIT CARD FRAUD DETECTION

(51) International classification :G06Q0020400000, G06K0009620000, G06N0007000000, G06N0020200000, G06N0003080000

(86) International Application No :NA
Filing Date :NA

(87) International Publication No : NA

(61) Patent of Addition to Application Number :NA
Filing Date :NA

(62) Divisional to Application Number :NA
Filing Date :NA

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(57) Abstract :

PROBABILISTIC XG BOOST THRESHOLD CLASSIFICATION WITH AUTO ENCODER FOR CREDIT CARD FRAUD DETECTION ABSTRACT Due to the imbalanced data of outnumbered legitimate transactions than the fraudulent transaction, the detection of fraud is a challenging task to find an effective solution. In this invention, auto encoder with probabilistic threshold shifting of XG Boost (AE-XGB) for credit card fraud detection is designed. Initially, AE-XGB employs auto encoder the prevalent dimensionality reduction technique to extract data features from latent space representation. Then the reconstructed lower dimensional features utilize extreme Gradient Boost (XG Boost), an ensemble boosting algorithm with probabilistic threshold to classify the data as fraudulent or legitimate. In addition to AE- XGB, other existing ensemble algorithms such as Adaptive Boosting (Ada Boost), Gradient Boosting Machine (GBM), Random Forest, Categorical Boosting (Cat Boost), Light GBM and XG Boost are compared with optimal and default threshold. To validate this we used IEEE-CIS fraud detection dataset for our experiment. Class imbalance and high dimensionality characteristics of dataset reduce the performance of model hence the data is pre-processed and trained. To evaluate the performance of the model, evaluation indicators such as precision, recall, f1-score, g-mean and Mathews Correlation Coefficient (MCC) are accomplished. The findings revealed that the performance of the proposed AE-XGB model is effective in handling imbalanced data and able to detect fraudulent transactions with 90.4% of recall and 90.5% of f1-score from incoming new transactions.

No. of Pages : 14 No. of Claims : 7