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Profit-Based Artificial Neural Network (ANN) Trained by Migrating Birds Optimization: A Case Study in Credit Card Fraud Detection

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Abstract : A typical classification technique ranks the instances in a data set according to the likelihood of belonging to one (positive) class. A credit card (CC) fraud detection model ranks the transactions in terms of probability of being fraud. In fact, this approach is often criticized, because firms do not care about fraud probability but about the profitability or costliness of detecting a fraudulent transaction. The key contribution in this study is to focus on the profit maximization in the model building step. The artificial neural network proposed in this study works based on profit maximization instead of minimizing the error of prediction. Moreover, some studies have shown that the back propagation algorithm, similar to other gradient–based algorithms, usually gets trapped in local optima and swarm-based algorithms are more successful in this respect. In this study, we train our profit maximization ANN using the Migrating Birds optimization (MBO) which is introduced to literature recently.

Keywords : neural network, profit-based neural network, sum of squared errors (SSE), MBO, gradient descent
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