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MACHINE INTELLIGENCE

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SECTION: I

CREDIT CARD FRAUD DETECTION

LITERATURE REVIEW

Abstract

Over the past few years, the payment card sector has experienced remarkable growth. To give their customers better productivity and accessibility, companies and organizations are shifting some or all their operations to online platforms that include e-commerce, information, and communication services. The same purchases that were previously made "over the desk" can be made by customers wherever they are.

fraud Detection is a vital topic that applies to many industries including banking, insurance, law enforcement and government agencies. Fraud instances have seen a rise in the past few years so this topic is as critical as ever. Thus, we need to be able to distinguish between authentic and fraudulent financial transactions. As the world moves towards digitization more transactions become cashless. The use of credit cards and online payment methods have increased. Increase in fraud rates in these kinds of transactions causes huge losses for financial institutions and users. Thus, we will do a comprehensive review of the various methods to detect fraud.

In this study, the neural network be utilized to try to detect fraudulent activity. As we will see, an artificial neural network that has been properly trained can function similarly to a human brain, even though it is not possible for the artificial neural network to fully replicate the functioning of the human brain. Both the artificial neural network and the brain rely on neurons, which are the tiny functional units found in both the brain and the ANN. The network topology, number of hidden layers, and number of nodes that will be employed in the creation of the neural network for our problem of credit card fraud detection are all determined.

Problem statement

The objective of our project is to identify fraudulent transactions from a skewed dataset. We aim to find optimal algorithms to recognize such instances of fraud to better combat this problem. We would be trying different algorithms and find the

optimal hyperparameters such as number of epochs and learning rate. The dataset contains skewed data which we are planning to counter using techniques such as under sampling and oversampling.

Main Body

If the credit card information is stolen, credit card fraud causes financial losses for businesses and has an impact on the individual user. Financial institutions use a variety of fraud prevention techniques, such as rule-based detection, address verification systems and credit card authorization, to deal with this problem. [2]

Merchant Related Frauds, Internet Related Frauds, creating fake credit cards, erasing magnetic strips are some of the problems regarding this credit card system.[2]

ARTIFICIAL NEURAL NETWORKS It is a computing paradigm designed to mimic the human brain and functioning of the nervous system.

A. Neuron: The Basic Building Block
B. The Learning Procedure
C. Back Propagation Method

   The sigmoid function has an asymptotic nature and is easily differentiable.[3]

A common learning strategy is the back propagation learning rule. In the error/weights space, a gradient descent is carried out.

This feed forward network has multiple layers and was trained using supervised learning. Three layers make up a typical back propagation network: an input layer, an output layer, and a hidden layer.

The processing components of the hidden layer are completely coupled to the processing components of the input and output layers. There are no recurrent loops in the network because it is feed forward. A node's output never comes back at the same nodes because cycles are not allowed.[1]

The main issue for credit card fraud identification systems is the lack of real-world dataset availability because financial institutions do not permit the sharing of their customers' history data due to privacy policies.[2]

Conclusion

Because of the great complexity of big networks, there is currently no mechanism for determining the best topology for a specific task. However, the topology of a network has a significant impact on its performance. The outcome of the training process is frequently already determined by the choice of the fundamental parameter (network architecture, learning rate, initial weights).[1]

The number of inputs and outputs is limited by the job, but not the number of hidden layers and neurons inside them. Overtraining can result from having too many free parameters (weights), and the network cannot learn the input-output mapping if there are too few.[3]

We will continue this work in the future to create a fully deployable system with an intuitive GUI for quicker and easier detection of online credit card fraud for usage by various banking and financial organisations to protect both themselves and their clients.

References

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