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OPTIMIZATION BASED FEATURE SELECTION AND CLASSIFICATION FOR CREDIT CARD FRAUD DETECTION

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1.INTRODUCTION

Data mining is the process of discovering patterns for analysis of the data from different perspectives and summarizing it into useful information [1].Considering the profusion of data mining techniques and applications in recent years, however, there have been relatively few reported studies of data mining for credit card fraud detection [2].Data mining used in various activities in the banking sector i.e., customer relationship management, fraud detection, marketing and risk management. Hence, data mining is an important method for each activity of the credit card process. In recent years, the rapid increase in using credit cards for making purchase has caused a substantial amount of data. The credit card issuers have been interested in forecasting the default risk of a credit card holder.

Negative risk arising from customer behaviors can lead to a big loss of money. Therefore, the credit card issuers need to use data mining techniques for predicting and classifying customers more effectively. [3].

Nowadays fraud detection is a hot topic in the context of electronic payments. Fraud detection approaches can be divided into two main groups: misuse detection and anomaly detection [4]. [5] proposed a novel method for secure transportation of railway systems has been proposed in this project. In existing methods, most of the methods are manual resulting in a lot of human errors. This project proposes a system which can be controlled automatically without any outside help. This project has a model concerning two train sections and a gate section. The railway sections are used to show the movement of trains and a gate section is used to show the happenings in the railway crossings. The scope of this project is to monitor the train sections to prevent collisions between two trains or between humans and trains and to avoid accidents in

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the railway crossings. Also an additional approach towards effective power utilization has been discussed. Five topics are discussed in this project : 1) Detection of obstacles in front of the train;2) Detection of cracks and movements in the tracks;3) Detection of human presence inside the train and controlling the electrical devices accordingly 4) Updating the location of train and sharing it with other trains automatically 5) Controlling the gate section during railway crossing. This project can be used to avoid accidents in the railway tracks. In the domain of credit card fraud detection, fraudsters are probing the classification system in order to generate fraudulent transactions that go undetected. For example, fraudsters can purchase thousands of credit card numbers and social security numbers as a means of testing and learning of the current fraud detection systems in use [6].Different algorithms have been proposed so far for credit card fraud detection which is to be tested with real data to assess their performance [7].The various advantages of using credit card includes: (1) Easy to carry (2) Helps to keep track of expenses (3) Instant cash and (4) Flexibility and convenience [8]. The approaches used in detecting credit card fraud can be roughly organized into five categories: neural network, data mining, meta-learning, game theory, Bayesian learning, and support vector machine [9]. [10] discussed about Positioning Of a Vehicle in a Combined Indoor-Outdoor Scenario, The development in technology has given us all sophistications but equal amounts of threats too. This has brought us an urge to bring a complete security system that monitors an object continuously. Consider a situation where a cargo vehicle carrying valuable material is moving in an area using GPS (an outdoor sensor) we can monitor it but the actual problem arises when its movement involves both indoor (within the industry) and outdoor because GPS has its limitations in indoor environment. Hence it is essential to have an additional sensor that would enable us a continuous monitoring /tracking without cutoff of the signal. In this paper we bring out a solution by combining Ultra wide band (UWB) with GPS sensory information which eliminates the limitations of conventional tracking methods in mixed scenario(indoor and outdoor) The same method finds application in mobile robots, monitoring a person on grounds of security, etc.

Credit card fraud detection is a popular but also an extremely difficult problem for (1) there

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comes only a limited amount of data with the transaction being committed (such as transaction amount, date and time, address, Merchant Category Code (MCC) and acquirer number of the merchant), (2) there are millions of possible places and e-commerce sites to use a credit card that makes it extremely difficult to match a pattern, and (3) there may be past transactions made by fraudsters that also fit a pattern of normal (legitimate) behavior [11].There are very few papers on credit card fraud detection methods due to the fact that these methods cannot be tested without a dataset. Hence it's difficult to prove the robustness or even the probability of success ratio of the methods [12].There is multiple algorithms for credit card fraud detection. They are artificial neural-network models which are based upon artificial intelligence and machine learning approach, distributed data mining systems, sequence alignment algorithm which is based upon the spending profile of the cardholder[13].When constructing a credit card fraud detection model, there are several factors that have an important impact during the training phase: Skewness of the data, cost-sensitivity of the application, short-time response of the system, dimensionality of the search space [14].Fraud detection is particularly challenging for two reasons frauds represent a small fraction of all the daily transactions and their distribution evolves over time because of seasonality and new attack strategies[15]. When constructing a credit card fraud detection model, it is very important to use those features that allow accurate classification. Typical models only use raw transactional features, such as time, amount, and place of the transaction [16]. Several technologies have been used to prevent fraud from happening, such as the Address Verification System (AVS), Chip and Pin verification and Card Verification Code (CVV)[17].Therefore, implementation of effective fraud detection system becomes imperative for all card issuing authorities to avert their losses. Various modem techniques or computational intelligence based on artificial neural network (AN), machine learning, fuzzy logic, and genetic programming have evolved in detecting fraudulent transactions [18]. Credit card fraud detection can be improved by associating each transaction with a score and based on these scores the current status of a transaction can be categorized as fraud or legal [19].The particularity of credit card fraud is that wrongly predicting a fraudulent transaction as legitimate carries a significantly different cost than the inverse case [20]. All the literature surveyed in credit card fraud detection utilized different datasets, where some were

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provided by bankers on strict confidentiality agreement. A personalized model refers to model created using an individual's transactions and used to predict fraud cases for the same individual [21].

2. RELATED WORK

EkremDuman*et.al* [22] has developed a method which improves a credit card fraud detection solution currently being used in a bank. With this solution each transaction was scored and based on these scores the transactions were classified as fraudulent or legitimate. In fraud detection solutions the typical objective was to minimize the wrongly classified number of transactions. However, in reality, wrong classification of each transaction have the same effect in that if a card was in the hand of fraudsters its whole available limit was used up. Thus, the misclassification cost should be taken as the available limit of the card. As for the solution method, they have suggested a novel combination of the two well-known meta-heuristic approaches, namely the genetic algorithms and the scatter search. The method was applied to real data and very successful results were obtained compared to other methods.

Nader Mahmoudi*et.al* [23] has proposed a linear discriminant, called Fisher Discriminant Function for the first time 29in credit card fraud detection problem. On the other hand, in these and some other domains, cost of false 30 negatives was very higher than false positives and was different for each transaction. Thus, it was necessary to 31develop classification methods were biased toward the most important instances. To cope for this, a 32 Modified Fisher Discriminant Function was proposed in those studies which make the traditional function 33more sensitive to the important instances. These ways, the profit that can be obtained from a fraud/legiti- 34 mate classifier is maximized. Experimental results confirm that Modified Fisher Discriminant could even- 35tuate more profit.

SanjeevJha *et.al* [24] have proposed employing transaction aggregation strategy to detect credit card fraud employed transaction aggregation strategy to detect credit card fraud. Have aggregated transactions to capture consumer buying behavior prior to each transaction and used these aggregations for model estimation to identify fraudulent transactions. Have use real-life

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data of credit card transactions from an international credit card operation for transaction aggregation and model estimation.

Neda Soltani Halvaie *et.al* [25] has proposed A novel model for credit card fraud detection using Artificial Immune Systems. There was research done on many models and methods for credit card fraud prevention and detection. Artificial Immune Systems was one of them. However, organizations need accuracy along with speed in the fraud detection systems, were not completely gained yet. The address credit card fraud detection using Artificial Immune Systems (AIS), and introduce a new model called AIS-based Fraud Detection Model (AFDM). Have use an Immune System Inspired Algorithm (AIRS) and improve it for fraud detection.

GauravMhatre*et.al*[26] have proposed a model the sequence of operations in credit card transaction processing using a Hidden Markov Model (HMM) and show how it can be used for the detection of frauds. An HMM was trained with normal behavior of Cardholder. If an incoming credit card transaction was not accepted by the HMM with sufficiently high probability, it was considered to be fraudulent. They have present detailed experimental results to show the effectiveness of their approach.

3.PROBLEM STATEMENT

Credit card fraud is a serious and growing problem. While predictive models for credit card fraud detection are in active use in practice, reported studies on the use of data mining approaches for credit card fraud detection are relatively few, possibly due to the lack of available data for research. The credit card fraud-detection domain presents a number of challenging issues for data mining:

1) Mining such massive amounts of data requires highly efficient techniques that scale.
2) Instability and reliability issues.

Most studies used some sort of misclassification measure to evaluate the different solutions,

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and do not take into account the actual financial costs associated with the fraud detection process. Moreover, when constructing a credit card fraud detection model, it is very important how to extract the right features from the transactional data. This is usually done by aggregating the transactions in order to observe the spending behavioral patterns of the customers.

4.PROPOSED STATEMENT

In this paper presents a new methodology based on credit card fraud detection to classify can be used for the detection of frauds. The proposed methodology, first applied to feature selection from a credit card fraud data using Krill Herd (KH) optimization. Feature selection is a preprocessing procedure expecting to select the most informative feature that can separate groups, i.e., credit card fraud subtypes. Then feature reduction by using Euclidean distance to select the significant features from the input patterns of the credit card fraud dataset. Finally the credit card fraud classification is done by neural network classification approach. This improves the classification accuracy and at the same time reduces the complexities, instability and reliability in the classification. The experimental results will show that the algorithm outperforms other existing algorithms.

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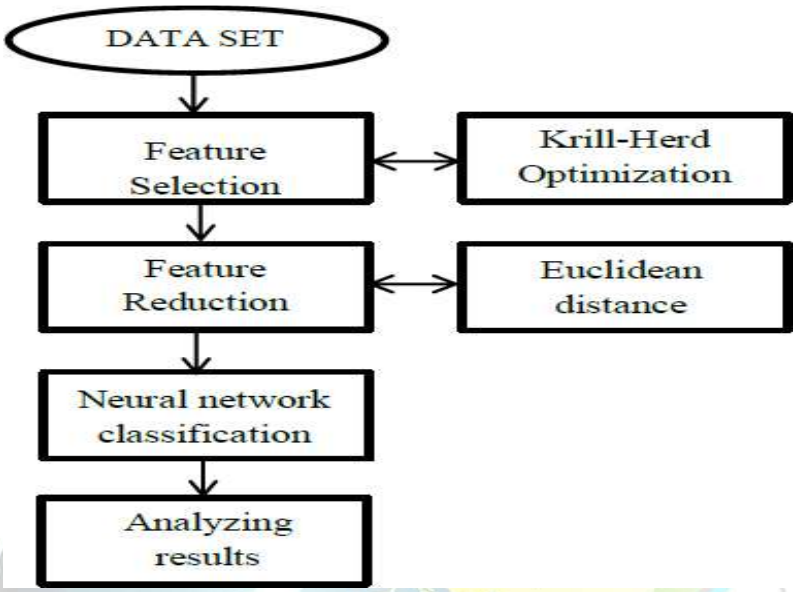
5.BLOCK DIAGRAM:



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