

# Credit Card Fraud Detection Using Clustering Based Approach

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## ABSTRACT

*Now days the use of credit card has dramatically increased. As credit card become the most popular manner for both online as well as orderly purchase cases of fraud joined with it are also increasing. In this paper, k-means clustering is used for credit card fraud detection. Data is developing haphazardly for credit card and the k-means algorithm is used for discovering transaction whether it is fraud transaction or legitimate transaction. Cluster is developed to discover fraud in credit card fraud transaction which is divided into low risky cluster, high risky cluster and medium risky cluster. K-means clustering algorithm is easy and powerful algorithm for credit card fraud detection.*

**Keyword:** *Fraud detection, Electronic commerce, Credit card fraud, Clustering, Outlier detection, data mining.*

## 1. INTRODUCTION

In modern world most of the people are using credit cards. It is the most popular purchase manner-means clustering assists in gathering the transaction dataset into number of clusters that assists in unrelated retrieval of dataset. K- means cluster analysis is a technique for smashing dataset down into narrated constituents in such a way that patterns and order becomes perceivable. Searching outliers is a main duty in k-means clustering. The outlier detection is a bough of data mining technique has lot of consequence applications and worthy of large attention from data mining ownership. In modern years, assembly database querying technique are not enough to pull out important information, and therefore investigation nowadays are tried to implement new techniques to meet the increased needs. It is to be remarked that the addition in dimensionality of transaction dataset gives rise to a number of new computational invitation because of increase in number of dataset and terms also.

Outlier detection is a main investigation problem that aims to search dataset that are considerably alike and inconsistent in the database. Therefore, there is a need to implement a model to discover these frauds in the business. Architecture of credit card fraud detection system is shown in fig 2.4. User first request for transaction. Then it will enter username and password. If it is valid, then it will allow for transaction. Otherwise user requires login again. It also ask security question for cardholder. If it is not valid, then it will detect fraud transaction. If it valid, then it will detect legitimate transaction.

## 2. SYSTEM DESCRIPTION

The following figure shows the system architecture of Credit Card Fraud Detection Using Clustering Based Approach.

1. **Transaction variable declaration:** First, the variables used in this program are declared such as transaction amount, credit card number, city, transaction, transaction date, merchant category id, transaction id and country
2. **Transaction Validation:** It shows the validity of the particulars needed for the transaction such as transaction amount, credit card number, city, transaction, transaction date, merchant category id, and transaction id and transaction country. Think the transaction amount, name of transaction country is entered and if you forget to enter the credit card number then it will not able to process further as well as the dialog box will open with an instruction to enter the credit card number. All the details are filled it will work further [3].
3. **Constructing an entry of the input transaction into database:** The table that is produced before is now entered in the database. It contains transaction country, transaction amount, transaction id, transaction city, credit card number, merchant category id, transaction date [3].
4. **Getting training transaction data set:** The data which is removing from the table is now entered to get transaction data [3].
5. **Transforming list of transaction data object to multi-dimensional array:** Here, the array is used so that the transaction detail will produce row wise. They are transaction amount, credit card number, transaction country and transaction id etc [3].
6. **Assigning cluster name:** The three clusters which are formed are named/labeled as low cluster, high cluster, and middle risky cluster [3].
7. **Commit transaction to database either as fraud transaction or legitimate transaction:** The current transaction details were taken and by using k- means clustering algorithm the fraud is discovered. If it is fraud then the message will display „fraud transaction“ or else it will display „legitimate transaction“.

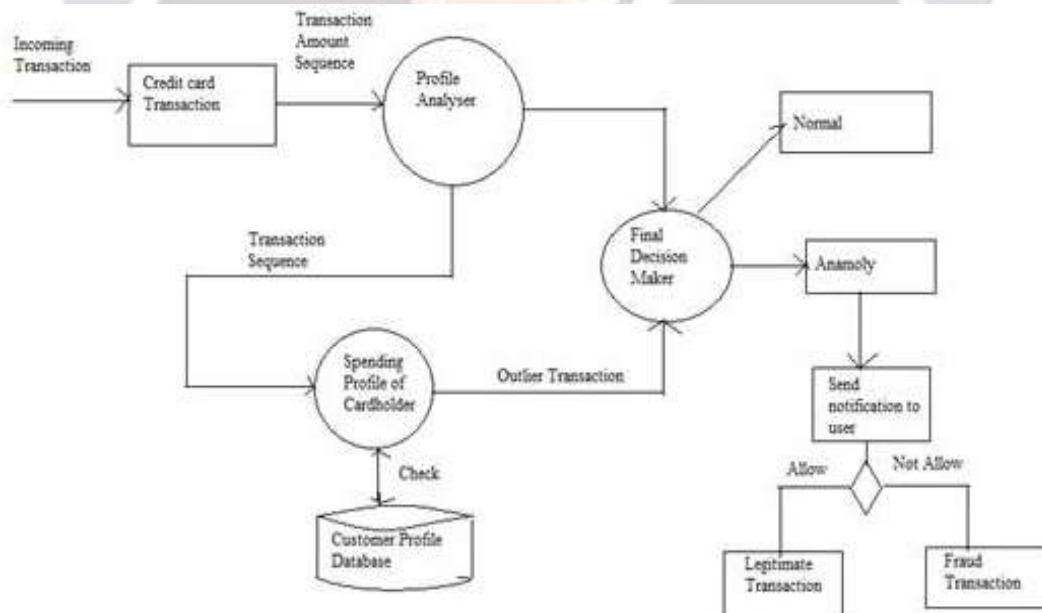


Fig: System Architecture

### 3. MODULES:

There are five modules include in project that are as follows:

1. **Luhn Algorithm:** - The cardholder enters credit card number. The process of validation of the credit card number would be started using the Luhn algorithm. The use of this algorithm is to check weather credit card number is valid or not. Luhn algorithm is a simple checksum formula and can be easily used to validate a range of identification numbers, which can be credit card numbers, IMET numbers etc.

Given Input: Credit Card Number

Expected Output: It detects whether it is valid or not.

**2. K-Means Clustering Algorithm:**-K-Means is one of most popular and easy widely used clustering technique for the purpose of grouping data objects in groups or clusters. Clustering is very useful for reducing the size of bulky datasets. Firstly, centroids for each group are calculated or chosen randomly. And then data with similar characteristics is closer to its respective centroids are grouped together.

Given Input: Transaction Details.

Expected Output: Create a number of clusters.

**3. Getting Training Dataset:** An excel file consisting of credit card transaction stored in a database imported to our project and provides use the input values.

Given Input: Excel file.

**4. Outlier Detection:** - The concept of Hidden Markov Model which essentially works with Markov model, where we have unobserved or hidden states. Hidden Markov Model is being used exhaustively in the field of artificial intelligence and more specifically in speech recognition. In our proposed system HMM is doing the job of detecting outlying objects from the final resultant data. Thus reducing the size of the dataset and eliminating the erroneous data.

Expected Output: It Send notification to cardholder.

**5. Fraud Identification:** The system sends notification to cardholder about outlier transaction. If is allow by cardholder, then it will be legitimate transaction. Otherwise it detects fraud transaction.

Given Input: Transaction allow or not.

Expected Output: Detect legitimate transaction or Fraud transaction.

#### 4. SCREENSHOTS:

Following screenshot shows concept used in project. These will guide cardholder about system. The cardholder will learn concept easily.

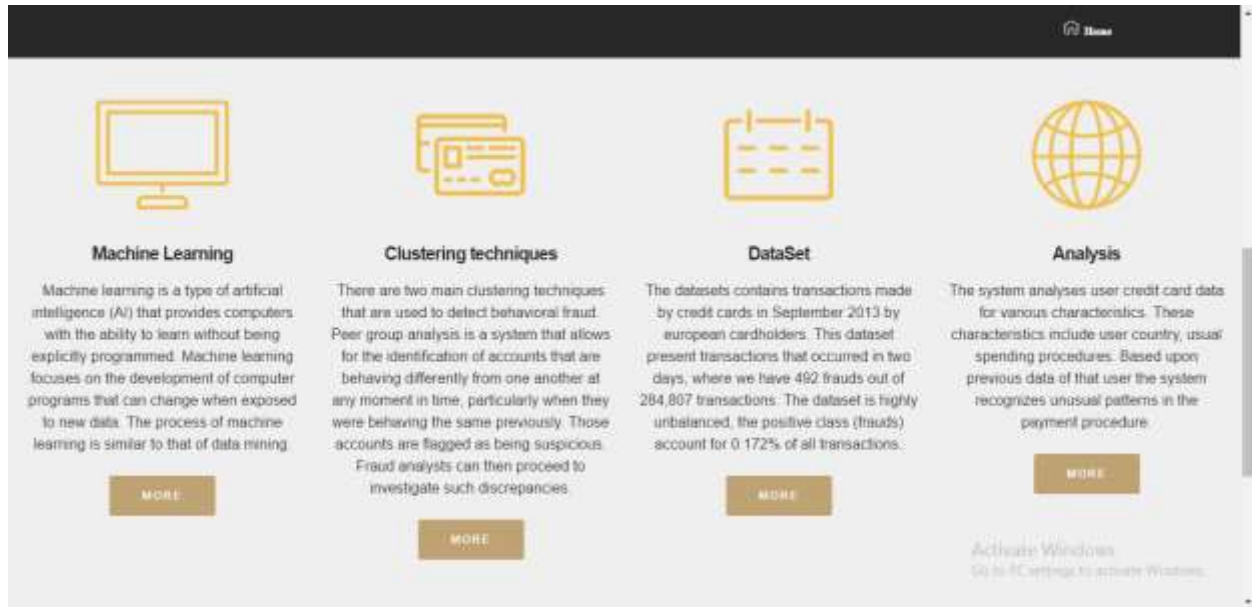
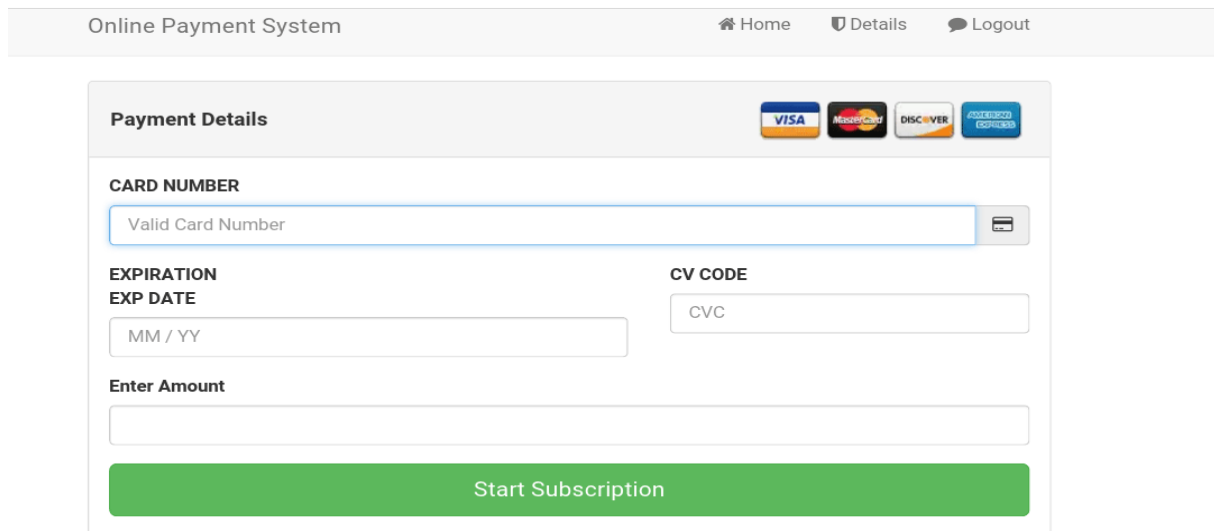


Fig 3.1: Detail Screenshot

Following screenshot shows online payment system. The cardholder enters their transaction details. Then the system will start subscription.



**Features:**

- High Security
- Card Validator
- Fraud Detection using Advanced Security Tools

Fig 3.2: Online Payment System

## 5. CONCLUSIONS

The paper aims to discover outliers which are vulgarly outliers different form or unsuitable with the remaining dataset. The usage of credit card is for both online and regular purchase and fraud join with it also increase. Criminal build it as business. The main thing is that technique for hindering credit card fraud is also improving many folds with passage of time. Minimizing price of computing assist in minimizing introducing composite system, which can analyze outlier transaction in a manner of fraction of second .It is similarly consequence to identify right place of transaction, which should be subject to reconsideration and as every transaction has not same amount of risk join with it .Finally optimally balanced price of fraud associate with it and issuing bank in combating fraud more competently.

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