COMPREHENSIVE ANALYSIS FOR FRAUD DETECTION OF CREDIT CARD THROUGH MACHINE LEARNING

Submitted in partial fulfillment of the
requirements for the award of
Bachelor of Engineering degree in Computer Science and

Engineering by

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SCHOOL OF COMPUTING

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
Accredited with Grade "A" by NAAC

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CHENNAI - 600 119

MARCH – 2022

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **Kasetty Pavan Kumar(38110393) and Mahareddy Yogesh Naidu (38110673)** who carried out the project entitled "**COMPREHENSIVE ANALYSIS FOR FRAUD DETECTION OF CREDIT CARD THROUGH MACHINE LEARNING"** under my supervision from November 2021 to March2022.

Internal Guide

Dr.P.Jeyanthi

Head of the Department

Dr. S. Vigneshwari M.E., Ph.D.,

Dr. L. Lakshmanan M.E., Ph.D.,

Submitted for Viva voce Examination heldon_____

InternalExaminer **ExternalExaminer**

DECLARATION

I **Kasetty Pavan Kumar(38110393) and Mahareddy Yogesh Naidu(38110673)** hereby declare that the Project Report entitled "**Credit Card Fraud Detection Using Machine Learning**" done by us under the guidance of **Dr.P.Jeyanthi** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in 2018-2022.

DATE:08-03-2022

PLACE:Chennai **SIGNATURE OF THECANDIDATE**

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ABSTRACT

The use of credit cards is prevalent in modern day society. But it is obvious that the number of credit card fraud cases is constantly increasing in spite of the chip cards worldwide integration and existing protection systems. This is why the problem of fraud detection is very important now. The credit card fraud detection features uses user behavior and location scanning to check for unusual patterns. These patterns include user characteristics such as user spending patterns as well as usual user geographic locations to verify his identity. If any unusual pattern is detected, the system requires revivification.

In this project, a technique for `Credit Card Fraud Detection' is developed. As fraudsters are increasing day by day. And fallacious transactions are done by the credit card and there are various types of fraud. So to solve this problem combination of technique is used like Genetic Algorithm, Behavior Based Technique and SET (Secure Electronic Transaction), Machinelearning, Data Mining. By this transaction is tested individually and whatever suits the best is further proceeded. And the foremost goal is to detect fraud by filtering the above techniques to get better result. In this project the general description of the developed fraud detection system and comparisons between models based are (pattern reorganization). In the last section of this paper the results of evaluative testing and corresponding conclusions are considered. When a Invalid user(fraud) uses a bank transaction, While transaction first bank authorizercheck weather the user is valid user or a invalid user. If the user is invalid then the bank authorizer block the transaction.

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LIST OF ABBREVIATIONS

ABBREVIATIONS	EXPANSION
ML	Machine Learning
DT	Decision Tree
DFD	Data Flow Diagram
CC	Credit Card
JSP	Java Server Pages

CHAPTER 1

INTRODUCTION

1.1 Introduction

In recent years, the prevailing data mining concerns people with credit card fraud detection model based on data mining. Since our problem is approached as a classification problem, classical data mining algorithms are not directly applicable. So an alternative approach is made by using general purpose meta heuristic approaches like genetic algorithms.

This project is to propose a credit card fraud detection system using genetic algorithm. Genetic algorithms are evolutionary algorithms which aim at obtaining better solutions as time progresses. When a card is copied or stolen or lost and captured by fraudsters it is usually used until its available limit is depleted. Thus, rather than the number of correctly classified transactions, a solution which minimizes the total available limit on cards subject to fraud is more prominent. It aims in minimizing the false alerts using genetic algorithm where a set of interval valued parameters are optimized.

1.2 PROBLEM DEFINITION

To develop a credit card fraud detection system using genetic algorithm. During the credit card transaction, the fraud is detected and the number of false alert is being minimized by using genetic algorithm. Instead of maximizing the numbers of correctly classified transactions we defined an objective function where the misclassification costs are variable and thus, correct classification of some transactions are more important than correctly classifying the others.

The algorithm begins with multi-population of randomly generated chromosomes. These chromosomes undergo the operations of selection, crossover and mutation. Crossover combines the information from two parent chromosomes to produce new individuals, exploiting the best of the current generation, while mutation or randomly changing some of the parameters allows exploration into other regions of the solution space. Natural selection via a problem specific cost function assures that only the best fit chromosomes remain in the population to mate and produce the next generation. Upon iteration, the genetic algorithm converges to a global solution.

1.3OVERVIEW

Fraud detection is a set of activities undertaken to prevent money or property from being obtained through false pretenses. Fraud detection is applied to many industries such as banking or insurance. In banking, fraud may include forging checks or using stolen credit cards.

With an unlimited and rising number of ways someone can commit fraud, detection can be difficult. Activities such as reorganization, downsizing, moving to new information systems or encountering a cyber security breach could weaken an organization's ability to detect fraud. Techniques such as real-time monitoring for fraud are recommended. Organizations should look for fraud in financial transactions, locations, devices used, initiated sessions and authentication systems.

Fraud can be committed in different ways and different settings. For example, fraud can be committed in banking, insurance, government and healthcare sectors. A common type of banking fraud is customer account takeover. This is when someone illegally gains access to a victim's bank account using bots. Other examples of fraud in banking include the use of malicious applications, the use of false identities, money laundering, credit card fraud and mobile fraud.

Government fraud is committing fraud against federal agencies such as the U.S. Department of Health and Human Services, Department of Transportation, Department of Education or Department of Energy. Types of government fraud include billing for unnecessary procedures, overcharging for items that cost less,

providing old equipment when billing for new equipment and reporting hours worked for a worker that does not exist.

1.4 MACHINE LEARNING

Machine learning could be a subfield of computer science (AI). The goal of machine learning typically is to know the structure information of knowledge of information and match that data into models which will be understood and used by folks. Although machine learning could be a field inside technology, it differs from ancient processapproaches.

In ancient computing, algorithms are sets of expressly programmed directions employed by computers to calculate or downside solve. Machine learning algorithms instead give computers to coach on knowledge inputs and use applied math analysis so as to output values that fall inside a particular vary. thanks to this, machine learning facilitates computers in building models from sample knowledge to modify decision-making processes supported knowledge inputs.

1.5 MACHINE LEARNING STRATEGIES

In machine learning, tasks square measure typically classified into broad classes. These classes square measure supported however learning is received or however feedback on the educational is given to the system developed. Two of the foremost wide adopted machine learning strategies square measure supervised learning that trains algorithms supported example input and output information that's tagged by humans, and unattended learning that provides the algorithmic

program with no tagged information so as to permit it to search out structure at intervals its computer file.

1.6 SUPERVISED LEARNING

In supervised learning, the pc is given example inputs that square measure labelled with their desired outputs. The aim of this technique is for the algorithmic program to be ready to “learn” by comparison its actual output with the “taught” outputs to search out errors, and modify the model consequently. Supervised learning thus uses patterns to predict label values on extra unlabeled information. For example, with supervised learning, an algorithm may be fed data with images of sharks labelled as fish and images of oceans labelled as water. By being trained on this data, the supervised learning algorithm should be able to later identify unlabeled shark images as fish and unlabeled ocean images as water.

A common use case of supervised learning is to use historical information to predict statistically probably future events. It's going to use historical stock exchange info to anticipate approaching fluctuations or be used to filter spam emails. In supervised learning, labeled photos of dogs are often used as input file to classify unlabeled photos of dogs.

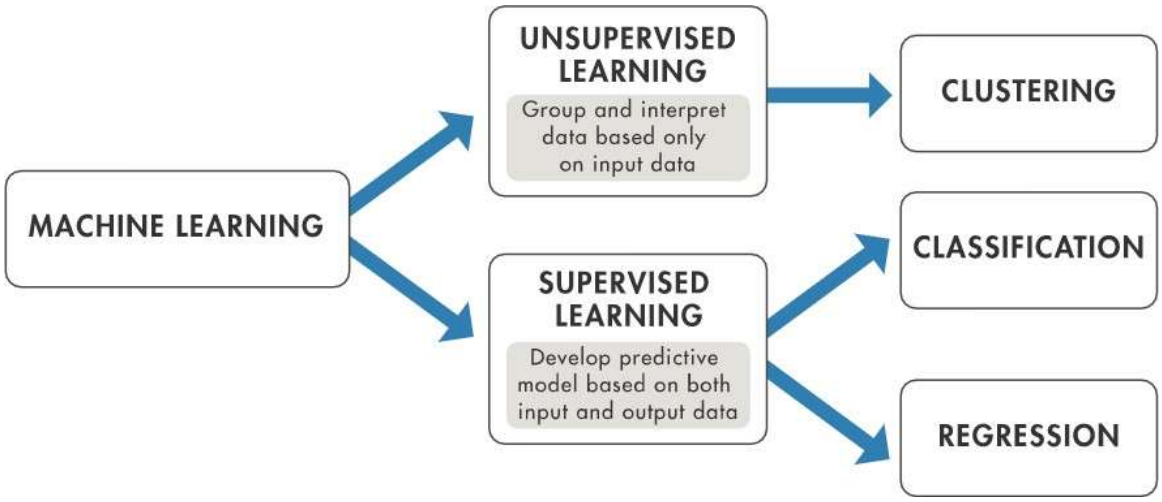
1.7 UNATTENDED LEARNING

In unattended learning, information is unlabeled, that the learning rule is left to seek out commonalities among its input file. The goal of unattended learning is also as easy as discovering hidden patterns at intervals a dataset; however it should even have a goal of feature

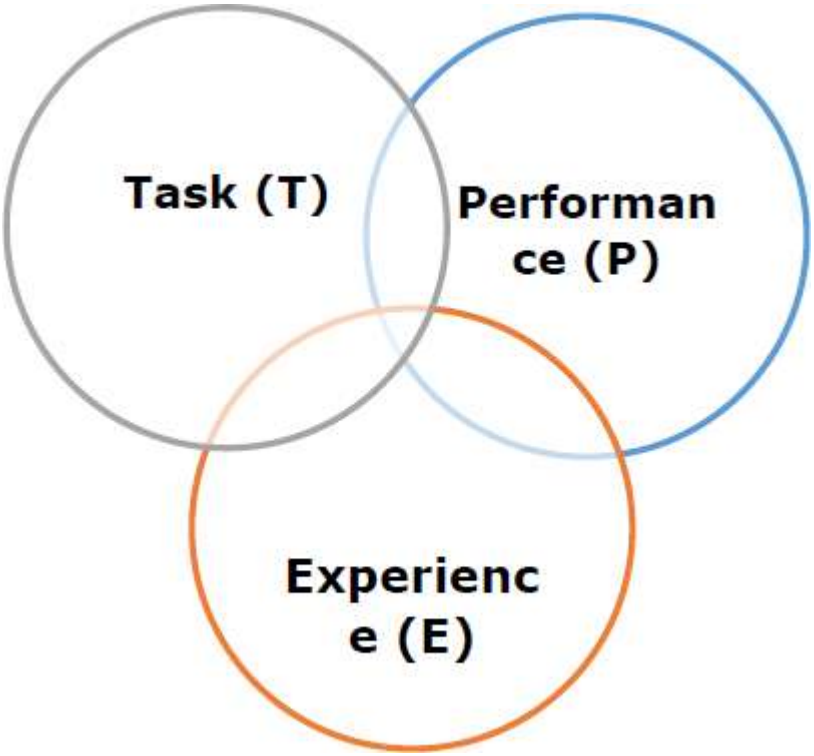
learning, that permits the procedure machine to mechanically discover the representations that square measure required to classify data.

Unsupervised learning is usually used for transactional information. You will have an oversized dataset of consumers and their purchases, however as a person's you'll probably not be able to add up of what similar attributes will be drawn from client profiles and their styles of purchases.

With this information fed into Associate in Nursing unattended learning rule, it should be determined that ladies of a definite age vary UN agency obtain unscented soaps square measure probably to be pregnant, and so a promoting campaignassociated with physiological condition and baby will be merchandised.



MACHINE LEARNINGCLASSIFICATION



MACHINE LEARNINGTASK

CHAPTER 2
LITERATURE SURVEY

2.1 Literature Survey

Fraud detection has been usually seen as a data mining problem where the objective is to correctly classify the transactions as legitimate or fraudulent. For classification problems many performance measures are defined most of which are related with correct number of cases classified correctly.

A more appropriate measure is needed due to the inherent structure of credit card transactions. When a card is copied or stolen or lost and captured by fraudsters it is usually used until its available limit is depleted. Thus, rather than the number of correctly classified transactions, a solution which minimizes the total available limit on cards subject to fraud is more prominent.

Since the fraud detection problem has mostly been defined as a classification problem, in addition to some statistical approaches many data mining algorithms have
been proposed to solve it. Among these, decision trees and artificial neural networks are the most popular ones. The study of Bolton and Hand provides a good summary of
literature on fraud detection problems.

However, when the problem is approached as a classification problem with variable misclassification costs as discussed above, the classical data mining algorithms are not directly applicable; either some modifications should be made on them or new algorithms developed specifically for this purpose are needed. An

alternative approach could be trying to make use of general purpose meta heuristic approaches like genetic algorithms.

Genetic algorithm

Genetic algorithms are evolutionary algorithms which aim at obtaining better solutions as time progresses. Since their first introduction by Holland, they have been successfully applied to many problem domains from astronomy to sports, from optimization to computer science, etc. They have also been used in data mining mainly for variable selection and are mostly coupled with other data mining algorithms. In this study, we try to solve our classification problem by using only a genetic algorithm solution.

Pseudo code of genetic algorithm

Initialize the population

Evaluate initial population

Repeat

Perform competitive selection

Apply genetic operators to generate new solutions

Evaluate solutions in the population

Until some convergence criteria is satisfied.

Selection process

Selection is used for choosing the best individuals, that is, for selecting those chromosomes with higher fitness values. The selection operation takes the current population and produces a ‘mating pool’ which contains the individuals which are going to reproduce. There are several selection methods, like biased selection, random selection, roulette wheel selection, tournament selection. In this work the following selection mechanisms are used.

Tournament Selection

Tournament selection has been used in this as it selects optimal individuals from diverse groups. It selects t individuals from the current population uniformly at random, forms a tournament and the best individual of a group wins the tournament and is put into the mating pool for recombination. This process is repeated the number of times necessary to achieve the desired size of intermediate population. The tournament size controls the selection strength. The larger the tournament size, the stronger is the selection process.

Elitist Selection

In order to make sure that the best individuals of the solution are passed to further generations, and should not be lost in random selection, this selection operator is used. So we used a few best chromosomes from each generation, based on the higher fitness value and are passed to the next generation of population.

Reproduction

To generate a second generation population of solutions from those selected through genetic operators: crossover (also called recombination), and/or mutation.

For each new solution to be produced, a pair of "parent" solutions is selected for breeding from the pool selected previously. By producing a "child" solution using the above methods of crossover and mutation, a new solution is

created which typically shares many of the characteristics of its "parents". New parents are selected for each new child, and the process continues until a new population of solutions of appropriate size is generated. Although reproduction methods that are based on the use of two parents are more "biology inspired", some research suggests more than two "parents" are better to be used to reproduce a good quality chromosome.

These processes ultimately result in the next generation population of chromosomes that is different from the initial generation. Generally the average fitness will have increased by this procedure for the population, since only the best organisms from the first generation are selected for breeding, along with a small proportion of less fit solutions, for reasons already mentioned above.

Although Crossover and Mutation are known as the main genetic operators, it is possible to use other operators such as regrouping, colonization-extinction, or migration in genetic algorithms.

Termination

This generational process is repeated until a termination condition has been reached. Common terminating conditions are:

- A solution is found that satisfies minimum criteria
- Fixed number of generations reached
- Allocated budget (computation time/money) reached
- The highest ranking solution's fitness is reaching or has reached a plateau such that successive iterations no longer produce better results
- Manual inspection
- Combinations of the above

PURPOSE

The purpose of this document is to define the requirements of credit card

fraud detection. In detail, this document will provide a general description of our project, including user requirements, product perspective, and overview of requirements, general constraints. In addition, it will also provide the specific requirements and functionality needed for this project - such as interface, functional requirements and performance requirements.

SCOPE

The scope of this SRSdocument persists for the entire life cycle of the project. This document defines the final state of the software requirements agreed upon by the customers and designers. Finally at the end of the project execution all the functionalities may be traceable from the SRSto the product. The document describes the functionality, performance, constraints, interface and reliability for the entire life cycle of the project.

CHAPTER 3
METHODOLOGY

3.1 EXISTING SYSTEMS

- In case of credit card fraud detection, the existing system is detect the fraud after fraud has been happen. Existing system maintain the large amount of data when customer comes to know about inconsistency in transaction, he/she made complaint and then fraud detection system start it working. It first tries to detect that fraud has actually occur after that it transactions that was used to fraud detection mechanism developed by master and visa cards
- A machine learning paradigm classification, with Credit Card Fraud Detection being the base.
- Intrusion detections to track fraud location and so on. In case of existing system there is no confirmation of recovery of fraud and Customer satisfaction.
- Secure electronic system used to analyze the behavior of legitimate users.
- Data Mining mechanisms to classify and preprocess the user's data.
- Genetic algorithms.

3.2 DISADVANTAGES OF EXISTING SYSTEM

- Each payment system has its limits regarding the maximum amount in the account, the number of transactions per day and the amount of output.

- If Internet connection fails, you can not get to your online account.
- If you follow the security rules the threat is minimal. The worse situation when the system of processing company has been broken, because it leads to the leak of personal data on cards and its owners.
- The information about all the transactions, including the amount, time and recipient are stored in the database of the payment system. And it means the intelligence agency has an access to this information. Sometimes this is the path for fraudulent activities.

3.3 PROPOSED SYSTEM

- The aim of the proposed system is to develop a application. which has capability to restrict and block the transaction performing by attacker from genuine user's credit card details.
- As we seen the existing system detects the fraud after fraud has been occurred. The proposed system tries to detect fraudulent transaction before transaction succeed.
- In proposed system we are using pattern recongnization, which works on transaction behavior of user. By Using pattern recongnization, after certain transactions we find one threshold value by using this threshold value we can compare current transaction with threshold value if transaction is quite different from user behavior then check whether it is genuine or fraud OTP (full form) and security questions are used.
- To get security from hackers we are providing encryption at registration time for password this encryption is done by Secure Hash Algorithm (SHA) algorithm,other encryption algorithms.

3.4 ADVANTAGES OF PROPOSED SYSTEM

- Online alerts are available if suspicious activity is detect on your card. The issuer will notify if any unusual charges come through on the card.

- Credit scores are used in numerous ways and when a person uses a credit card responsibly and makes timely payments without over limits or late payments, their credit score rises.
- By making payments on time and keeping the balance low on the card, a person will save money on the amount of interest charged by the card issuer.
- Eco friendly,no personal presence is required,it treats with growing technology,time saving.

3.5 SOFTWARE AND HARDWARE REQUIREMENTS

3.5.1 HARDWARE REQUIRMENTS

- ✓ System :Pentium IV 2.4GHZ
- ✓ HardDisk :40 Gb
- ✓ Ram :512 Mb

3.5.2 SOFTWARE REQUIRMENTS

- ✓ Operating system :Window 7(32 bit)
- ✓ Coding Language :java
- ✓ Tool :Netbeans

PROGRAMMING LANGUAGES

JAVA

Java is one of the world’s most important and widely used computer languages, and it has held this distinction for many years. Unlike some other computer languages whose influence has weared with passage of time, while Java's has grown.

APPLICATION OF JAVA

Java is widely used in every corner of world and of human life. Java is not only used in software but is also widely used in designing hardware controlling software components. There are more than 930 million JRE downloads each year and 3 billion mobile phones run java.

Following are some other usages of Java:

1. Developing Desktop Applications
2. Web Applications like Linkedin.com, Snapdeal.com etc.
3. Mobile Operating System like Android
4. Embedded Systems
5. Robotics and games etc.

FEATURES OF JAVA

The prime reason behind creation of Java was to bring portability and security feature into a computer language. Beside these two major features, there were many other features that played an important role in moulding out the final form of this outstanding language. Those features are

1) Simple

Java is easy to learn, and its syntax is quite simple, clean and easy to understand. The confusing and ambiguous concepts of C++ are either left out in Java or they have been re-implemented in a cleaner way.

Eg: Pointers and Operator Overloading are not there in java but were an important part of C++.

2) **Object Oriented**

In java everything is Object which has some data and behaviour. Java can be easily extended as it is based on Object Model.

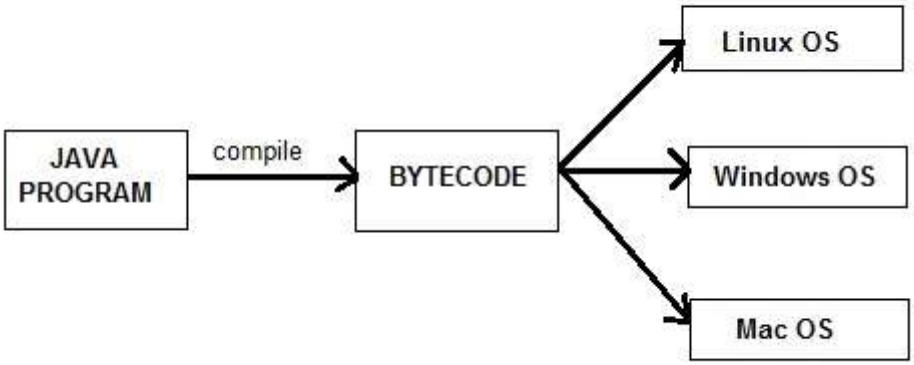
3) Robust

Java tries to eliminate error prone codes by emphasizing mainly on compile time error checking and runtime checking. But the main areas which Java improved were Memory Management and mishandled Exceptions by introducing automatic Garbage Collector and Exception Handling.

4) Platform Independent

Unlike other programming languages such as C, C++ etc. which are compiled into platform specific machines. Java is guaranteed to be write-once, run-anywhere language.

On compilation Java program is compiled into byte code. This byte code is platform independent and can be run on any machine, plus this byte code format also provide security. Any machine with Java Runtime Environment can run Java Programs.



5) Secure

When it comes to security, Java is always the first choice. With java secure features it enable us to develop virus free, temper free system. Java program always runs in Java runtime environment with almost null interaction with system OS, hence it is more secure.

6) Multi-Threading

Java multithreading feature makes it possible to write program that can do many tasks simultaneously. Benefit of multithreading is that it utilizes same memory and other resources to execute multiple threads at the same time, like While typing, grammatical errors are checked along.

7) Architectural Neutral

Compiler generates byte codes, which have nothing to do with a particular computer architecture, hence a Java program is easy to interpret on any machine.

8) Portable

Java Byte code can be carried to any platform. No implementation dependent features. Everything related to storage is predefined, example: size of primitive data types

10) High Performance

Java is an interpreted language, so it will never be as fast as a compiled language like C or C++. But Java enables high performance with the use of just-in-time compiler.

MYSQL

MySQL, officially, but also called "My Sequel" is the world's most widely used open-source relational database management system (RDBMS) that runs as a server providing multi-user access to several databases, though SQLite probably has more total embedded deployments. The SQL phrase stands for Structured Query Language.

The MySQL development project has made its source code available under the terms of the GNU General Public License, as well as under a variety of proprietary agreements. MySQL was owned and sponsored by a single for-profit

firm, the Swedish company MySQL AB, now owned by Oracle Corporation. MySQL is a popular choice of database for use in web applications and is a central component of the widely used LAMP open source web application software stack (and other 'AMP' stacks).

LAMP is an acronym for "Linux, Apache, MySQL, Perl/PHP/Python." Free software-open-source projects that require a full-featured database management system often use MySQL.

For commercial use, several paid editions are available, and offer additional functionality. Applications which use MySQL databases include: TYPO3, MODx, Joomla, WordPress, phpBB, MyBB, Drupal and other software. MySQL is also used in many high-profile, large-scale websites, including Wikipedia, Google (though not for searches), Facebook, Twitter, Flicker and YouTube.

3.6 MODULES

- ❖ User GUI
- ❖ Critical Value Identification
- ❖ Fraud Detection using Genetic Algorithm

MODULES DESCRIPTION

3.6.1 User GUI

In this module, User Interface module is developed using Applet Viewer. This module is developed to user to identify the credit card fraud using genetic algorithm technique. So the user interface must be capable of providing the user to upload the dataset and make manipulations and finally must show the user

whether fraud has been detected or not. Only final output will be in applet screen. All the generation details (crossover and mutation) will b in the console screen of eclipse

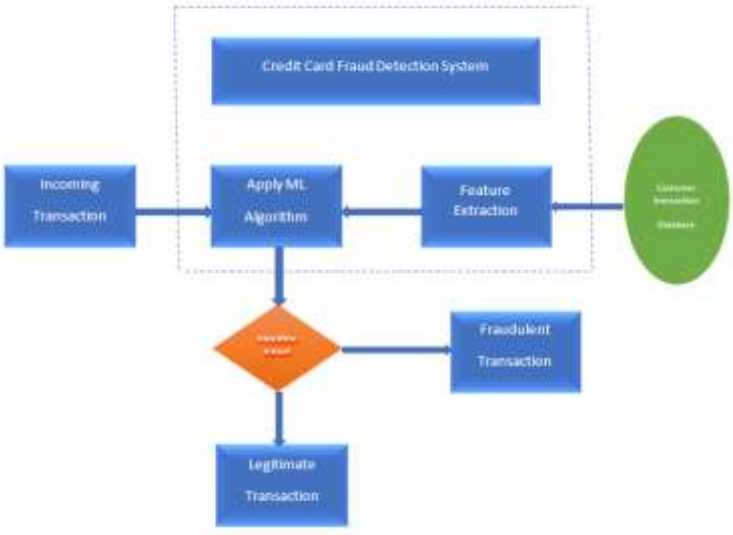


Fig 1:System Architecture

3.6.2 Critical Value Identification

- ► Based on CC usage Frequency
- ► Based on CC usage Location
- ► Based on CC Over Draft
- ► Based on CC Book Balance
- ► Based on CC Average Daily Spending

3.6.3 Fraud Detection using Genetic Algorithm

In this module the system must detect whether any fraud has been occurred in the transaction or not. It must also display the user about the result.

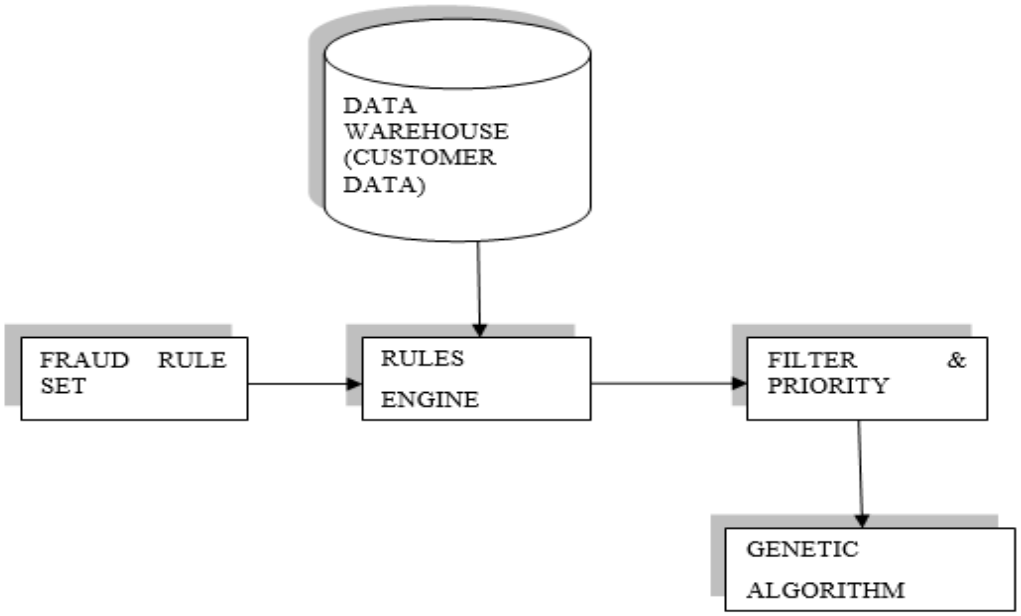


Fig 2:Genetic Algorithm

3.7 DATA FLOW DIAGRAM

Data Flow Diagram (DFD) is a two-dimensional diagram that describes how data is processed and transmitted in a system. The graphical depiction recognizes each source of data and how it interacts with other data sources to reach a mutual output. In order to draft a data flow diagram one must

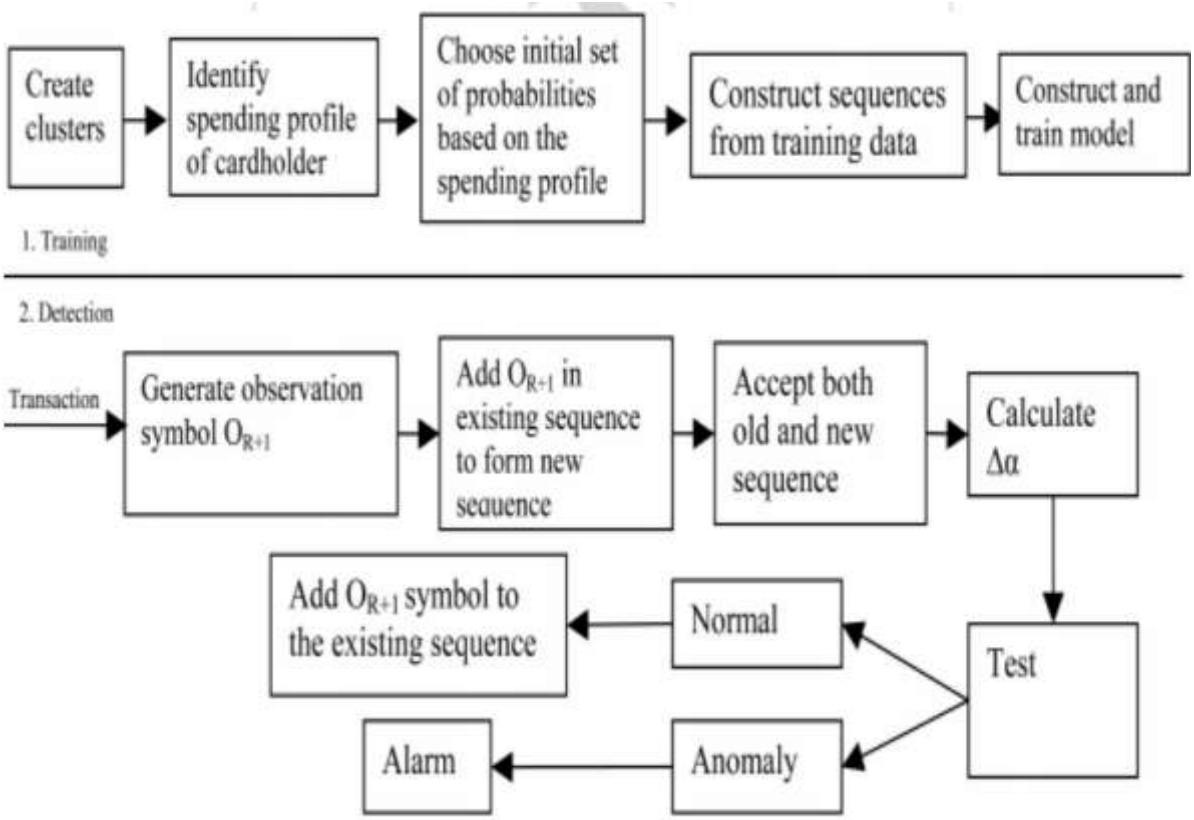
- Identify external inputs and outputs
- Determine how the inputs and outputs relate to each other
- Explain with graphics how these connections relate and what they result in.

Role of DFD:

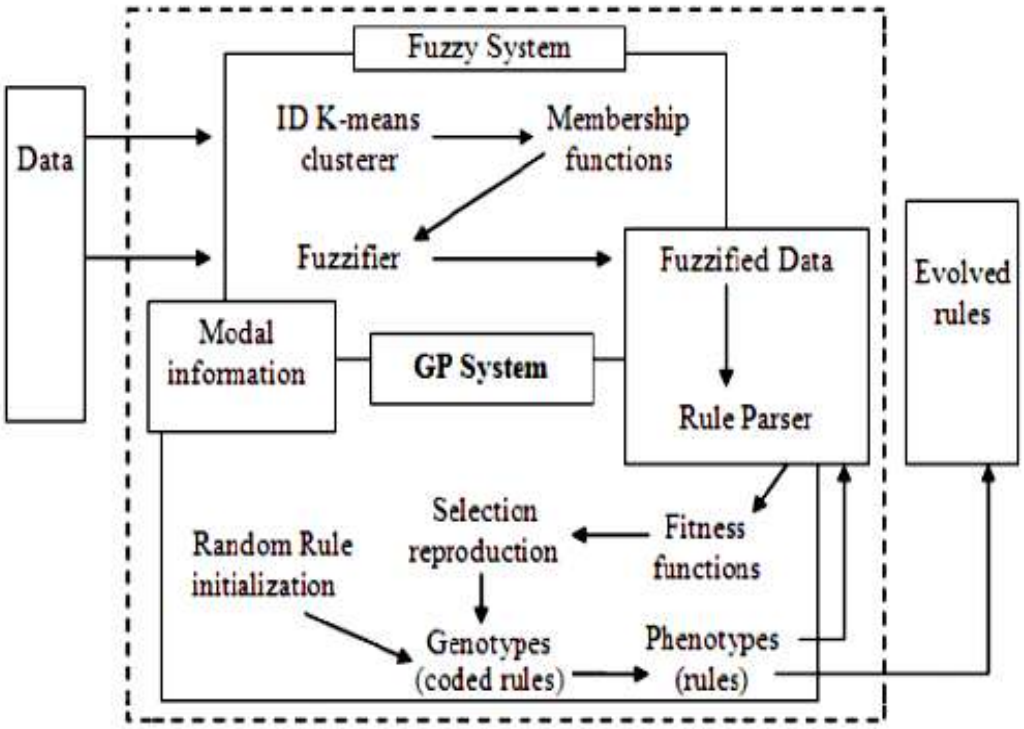
- It is a documentation support which is understood by both programmers and nonprogrammers. As DFD postulates only what processes are accomplished not how they are performed.
- A physical DFD postulates where the data flows and who processes the data.

- It permits analyst to isolate areas of interest in the organization and study them by examining the data that enter the process and viewing how they are altered when they leave.

DFD-1



DFD-2



CHAPTER 4
RESULTS AND DISCUSSION

We have analyzed and evaluated the classification report of all the four algorithms on the data set. We have compared each algorithm's accuracy with each, which can be seen in the given table.

TABLE 1. ACCURACY RESULT OF EACH ALGORITHM

S.No	Classifier	Accuracy
01	Decision tree	94.16
02	Random Forest	99.16
03	Logistic Regression	94.84
04	Naïve Bayes	91.62

The figure 1 shows the System Architecture where the Algorithms are applied and it classifies the transaction whether the transaction is fraudulent or Genuine.

The figure 2 shows the fraud rule set and genenetic Algorithm

CHAPTER 5

CONCLUSION

Machine Learning is a technique used to extract vital information from existing huge amount of data and enable better decision-making for the banking and retail industries. They use data warehousing to combine various data from databases into an acceptable format so that the data can be mined. The data is then analyzed and the information that is captured is used throughout the organization to support decision-making. Data Mining techniques are very useful to the banking sector for better targeting and acquiring new customers, most valuable customer retention, automatic credit approval which is used for fraud prevention, fraud detection in real time, providing segment based products, analysis of the customers, transaction patterns over time for better retention and relationship, risk management and marketing.

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APPENDICES

A) SOURCE CODE

Home Page:

```
<%@page
contentType="text/html"
pageEncoding="UTF-8"%>
<html lang="en">

<head>
<!-- Required meta tags-->
<meta charset="UTF-8">
<meta name="viewport"
content="width=device-width,
initial-scale=1, shrink-to-fit=no">
<meta name="description"
content="au theme template">
<meta name="author"
content="Hau Nguyen">
<meta name="keywords"
content="au theme template">

<!-- Title Page-->
<title>Bank</title>
```

```
<!-- Fontfaces CSS-->
<link href="css/font-face.css" rel="stylesheet" media="all">
<link href="vendor/font-awesome-4.7/css/font-awesome.min.css" rel="stylesheet" media="all">
<link href="vendor/font-awesome-5/css/fontawesome-all.min.css" rel="stylesheet" media="all">
<link href="vendor/mdi-font/css/material-design-iconic-font.min.css" rel="stylesheet" media="all">
<!-- Bootstrap CSS-->
<link href="vendor/bootstrap-4.1/bootstrap.min.css" rel="stylesheet" media="all">
<!-- Vendor CSS-->
<link href="vendor/animsition/animsition.min.css" rel="stylesheet" media="all">
<link href="vendor/bootstrap-progressbar/bootstrap-progressbar-3.3.4.min.css"
```

```
rel="stylesheet" media="all">
<link
href="vendor/wow/animate.css"
rel="stylesheet" media="all">
<link href="vendor/css-
hamburgers/hamburgers.min.css"
rel="stylesheet" media="all">
<link href="vendor/slick/slick.css"
rel="stylesheet" media="all">
<link
href="vendor/select2/select2.min.c
ss" rel="stylesheet" media="all">
<link href="vendor/perfect-
scrollbar/perfect-scrollbar.css"
rel="stylesheet" media="all">

<!-- Main CSS-->
<link href="css/theme.css"
rel="stylesheet" media="all">
</head>

<body class="animsition">
<div class="page-wrapper">
<div class="page-content--bge5">
<div class="container">
```

```
<div class="login-wrap">
<div class="login-content">
<div class="login-logo">


</div>
<div class="login-form">
<form action="login" method="post">
<div class="form-group">
<label>Email Address</label>
<input class="au-input au-input--full" type="text" name="uname" placeholder="Email">
</div>
<div class="form-group">
<label>Password</label>
<input class="au-input au-input--full" type="password" name="pwd" placeholder="Password">
</div>
<button class="au-btn au-btn--block au-btn--green m-b-20" type="submit">sign in</button>
<div class="social-login-content">
</div>
```

```
</form>
<div class="register-link">
<p>
Don't you have account?
<a href="register.jsp">Sign Up
Here</a>
</p>
</div>
</div>
</div>
</div>
</div>
</div>
</div>
<!-- Jquery JS-->
<script src="vendor/jquery-
3.2.1.min.js"></script>
<!-- Bootstrap JS-->
<script src="vendor/bootstrap-
4.1/popper.min.js"></script>
<script src="vendor/bootstrap-
4.1/bootstrap.min.js"></script>
<!-- Vendor JS -->
<script
```

src="vendor/slick/slick.min.js">

</script>

<script

src="vendor/wow/wow.min.js"></s

cript>

<script

src="vendor/animsition/animsition.

min.js"></script>

<script src="vendor/bootstrap-

progressbar/bootstrap-

progressbar.min.js">

</script>

<script src="vendor/counter-

up/jquery.waypoints.min.js"></scri

pt>

<script src="vendor/counter-

up/jquery.counterup.min.js">

</script>

<script src="vendor/circle-

progress/circle-

progress.min.js"></script>

<script src="vendor/perfect-

scrollbar/perfect-

scrollbar.js"></script>

<script

src="vendor/chartjs/Chart.bundle.

```
min.js"></script>

<script

src="vendor/select2/select2.min.js

">

</script>

<!-- Main JS-->

<script src="js/main.js"></script>

</body>

</html>
```

Payment:

```
<%@page

contentType="text/html"

pageEncoding="UTF-8"%>

<!DOCTYPE html>

<html lang="en">

+

<head>

<!-- Required meta tags-->

<meta charset="UTF-8">

<meta name="viewport"

content="width=device-width,

initial-scale=1, shrink-to-fit=no">

<meta name="description"

content="au theme template">
```

```
<meta name="author"
content="Hau Nguyen">
<meta name="keywords"
content="au theme template">

<!-- Title Page-->
<title>Bank</title>

<!-- Fontfaces CSS-->
<link href="css/font-face.css"
rel="stylesheet" media="all">
<link href="vendor/font-awesome-
4.7/css/font-awesome.min.css"
rel="stylesheet" media="all">
<link href="vendor/font-awesome-
5/css/fontawesome-all.min.css"
rel="stylesheet" media="all">
<link href="vendor/mdi-
font/css/material-design-iconic-
font.min.css" rel="stylesheet"
media="all">

<!-- Bootstrap CSS-->
<link href="vendor/bootstrap-
4.1/bootstrap.min.css"
```

```
rel="stylesheet" media="all">


<!-- Vendor CSS-->
<link
href="vendor/animsition/animsition
.min.css"          rel="stylesheet"
media="all">
<link      href="vendor/bootstrap-
progressbar/bootstrap-
progressbar-3.3.4.min.css"
rel="stylesheet" media="all">
<link
href="vendor/wow/animate.css"
rel="stylesheet" media="all">
<link            href="vendor/css-
hamburgers/hamburgers.min.css"
rel="stylesheet" media="all">
<link  href="vendor/slick/slick.css"
rel="stylesheet" media="all">
<link
href="vendor/select2/select2.min.c
ss" rel="stylesheet" media="all">
<link          href="vendor/perfect-
scrollbar/perfect-scrollbar.css"
rel="stylesheet" media="all">
<link           href="vendor/vector-
```

```
map/jqvmap.min.css"
rel="stylesheet" media="all">

<!-- Main CSS-->
<link href="css/theme.css"
rel="stylesheet" media="all">

</head>

<body class="animsition">
<div class="page-wrapper">
<!-- MENU SIDEBAR-->
<aside class="menu-sidebar2">
<div class="logo">
<a href="#">
<img src="images/icon/logo-
mini.png" alt="Cool Admin" />
</a>
</div>
<div class="menu-
sidebar2__content js-scrollbar1">
<div class="account2">
<div class="image img-cir img-
120">
```

```
<img   src="images/icon/male.png"
alt="<%=session.getAttribute("use
rname")%>" />
</div>
<h4
class="name"><%=session.getAttr
ibute("username")%></h4>
<a href="login.jsp">Sign out</a>
</div>
<nav class="navbar-sidebar2">
<ul                class="list-unstyled
navbar__list">

<li>
<a href="balance.jsp">
<i          class="fas          fa-chart-
bar"></i>Balance</a>

</li>
<li>
<a href="payment.jsp">
<i        class="fas        fa-shopping-
basket"></i>Payment</a>
</li>
<li>
```

```
<a href="deposit.jsp">
<i class="fas fa-chart-
bar"></i>Deposit</a>

</li>
<li>
<a href="payment_h.jsp">
<i class="fas fa-shopping-
basket"></i>Payment History</a>
</li>
<li>
<a href="card.jsp">
<i class="fas fa-shopping-
basket"></i>Card Details</a>
</li>

</ul>
</nav>
</div>
</aside>
<!-- END MENU SIDEBAR-->

<!-- PAGE CONTAINER-->
<div class="page-container2">
```

```
<!-- HEADER DESKTOP-->
<header class="header-desktop2">
<div class="section__content section__content--p30">
<div class="container-fluid">
<div class="header-wrap2">
<div class="logo d-block d-lg-none">
<a href="#">
<img src="images/icon/logo-mini.png" alt="CoolAdmin" />
</a>
</div>
<div class="header-button2">
<div class="header-button-item js-item-menu">
<i class="zmdi zmdi-search"></i>
<div class="search-dropdown js-dropdown">

</div>
</div>
```

```
</div>

</div>

</div>

</div>

</header>


<!-- END HEADER DESKTOP-->


<!-- BREADCRUMB-->

<section      class="au-breadcrumb

m-t-75">

<div         class="section__content

section__content--p30">

<div class="container-fluid">

<div class="row">

<div class="col-md-12">

<div          class="au-breadcrumb-

content">



</div>

</div>
```

```
</div>

</div>

</div>

</section>

<!-- END BREADCRUMB-->


<!-- STATISTIC-->

<div class="main-content">

<div class="section__content section__content--p30">

<div class="container-fluid">

<div class="row">




<div class="col-lg-9">

<div class="table-responsive table--no-card m-b-30">

<table class="table table-borderless table-striped table-earning">

<thead>

<tr>
```

```
<th>transaction ID</th>

<th>Date</th>

<th>For</th>

<th                          class="text-

right">Amount</th>


</tr>

</thead>

<tbody>

<tr>

<td>100398</td>

<td>2018-09-29 05:57</td>

<td>iPhone X 64Gb Grey</td>

<td class="text-right">999.00</td>


</tr>


</tbody>

</table>

</div>

</div>
```

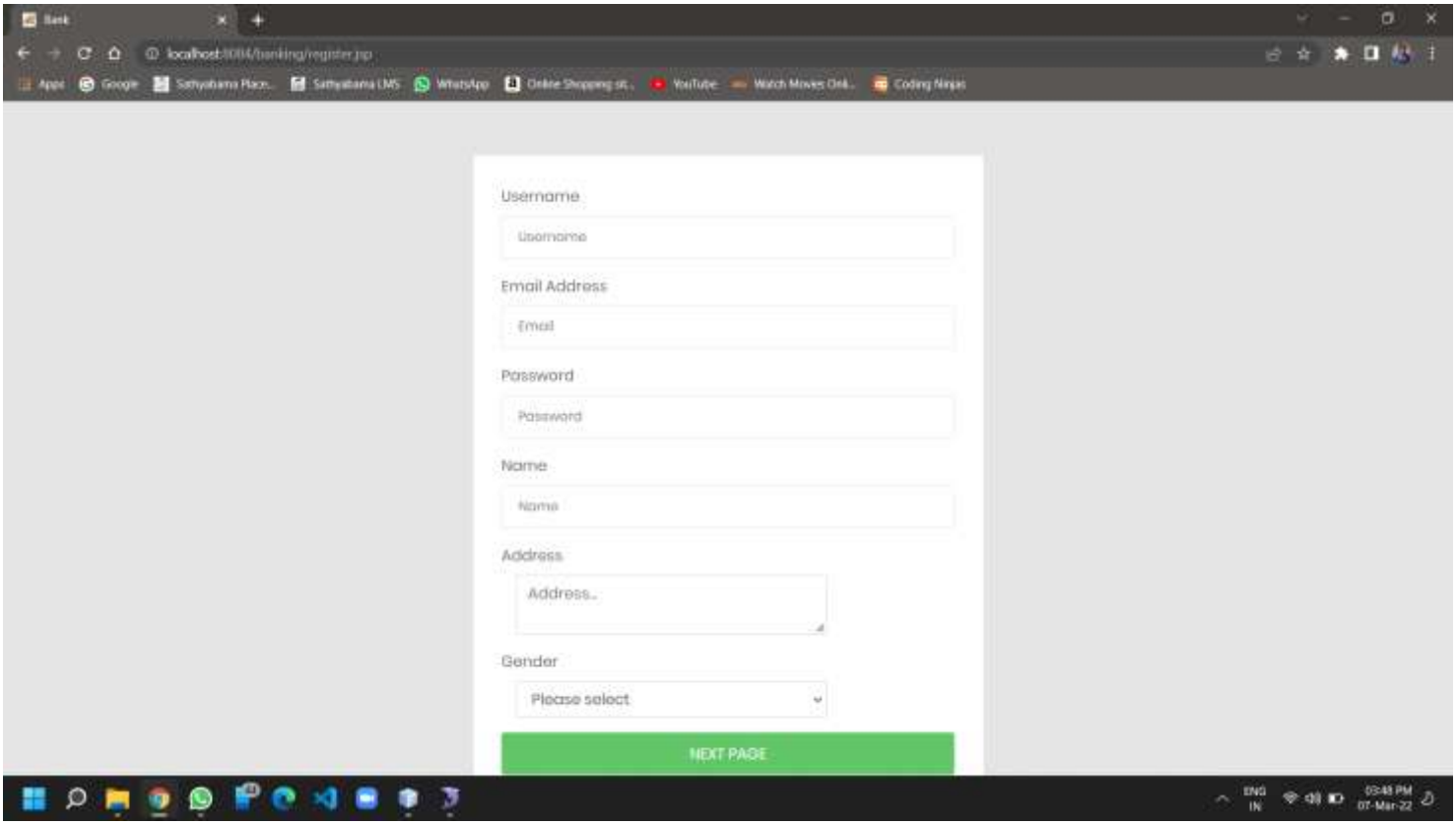
```
</div>

</div>

</div>

</div>

<!-- END STATISTIC-->




<section>

<div class="container-fluid">

<div class="row">

<div class="col-md-12">

<div class="copyright">

<p><a href="#">Bank</a>.</p>

</div>

</div>

</div>

</div>

</section>

<!-- END PAGE CONTAINER-->

</div>


</div>
```

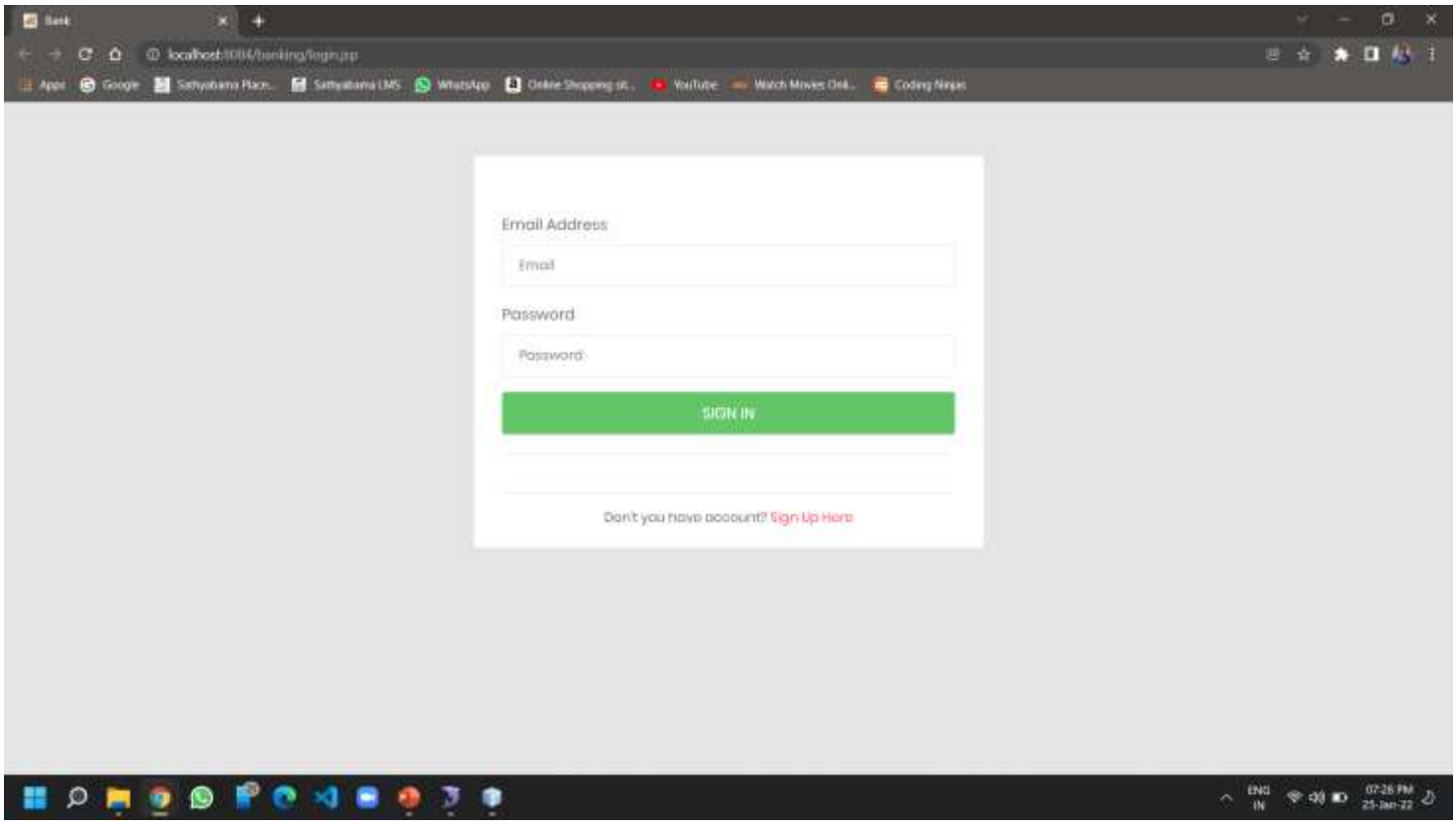
```
<!-- Jquery JS-->
<script src="vendor/jquery-3.2.1.min.js"></script>
<!-- Bootstrap JS-->
<script src="vendor/bootstrap-4.1/popper.min.js"></script>
<script src="vendor/bootstrap-4.1/bootstrap.min.js"></script>
<!-- Vendor JS -->
<script src="vendor/slick/slick.min.js">
</script>
<script src="vendor/wow/wow.min.js"></script>
<script src="vendor/animsition/animsition.min.js"></script>
<script src="vendor/bootstrap-progressbar/bootstrap-progressbar.min.js">
</script>
<script src="vendor/counter-up/jquery.waypoints.min.js"></scri
```

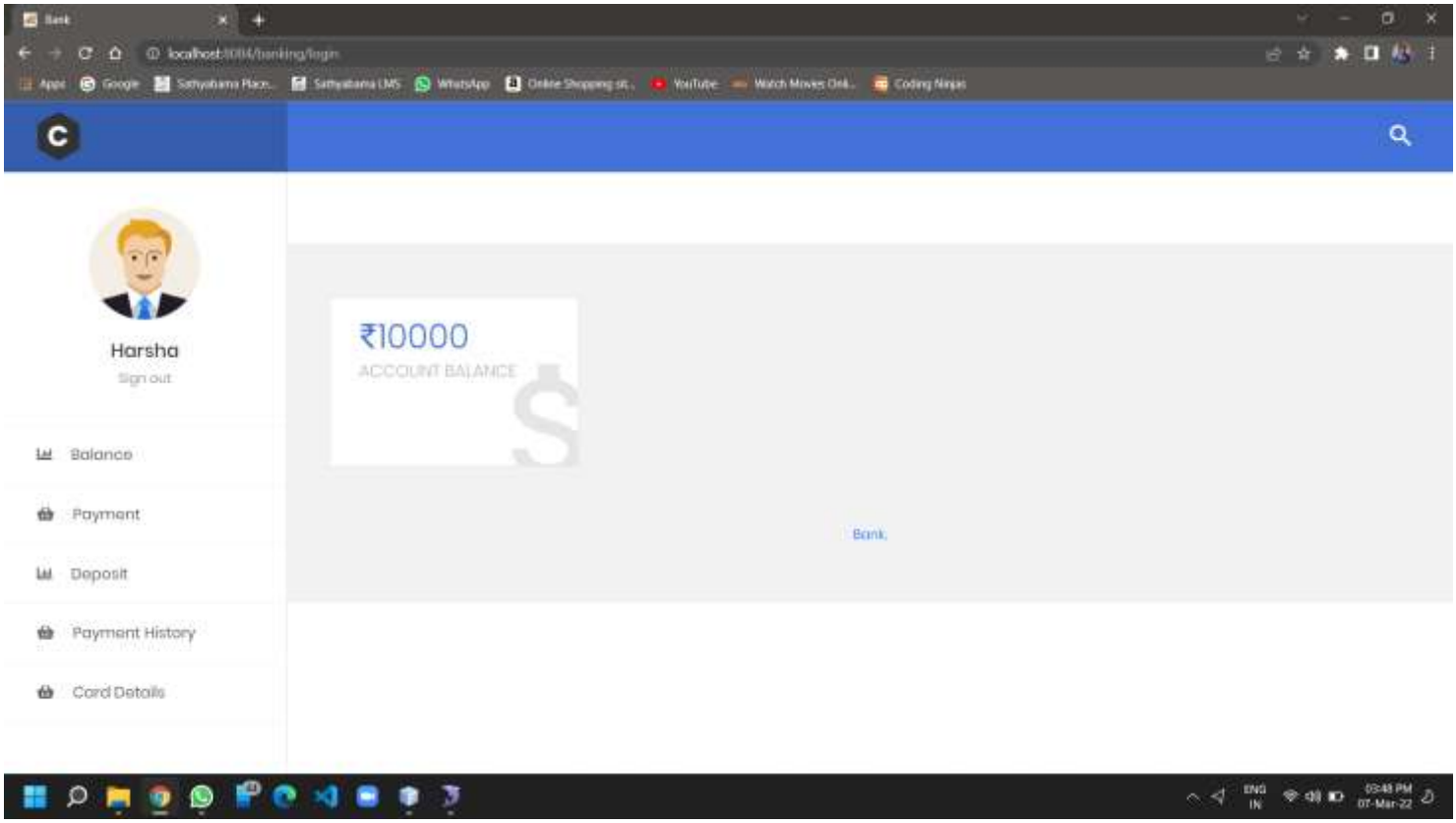
```
pt>
<script src="vendor/counter-
up/jquery.counterup.min.js">
</script>
<script src="vendor/circle-
progress/circle-
progress.min.js"></script>
<script src="vendor/perfect-
scrollbar/perfect-
scrollbar.js"></script>
<script
src="vendor/chartjs/Chart.bundle.
min.js"></script>
<script
src="vendor/select2/select2.min.js
">
</script>
<script src="vendor/vector-
map/jquery.vmap.js"></script>
<script src="vendor/vector-
map/jquery.vmap.min.js"></script
>
<script src="vendor/vector-
map/jquery.vmap.sampledata.js">
</script>
<script src="vendor/vector-
```

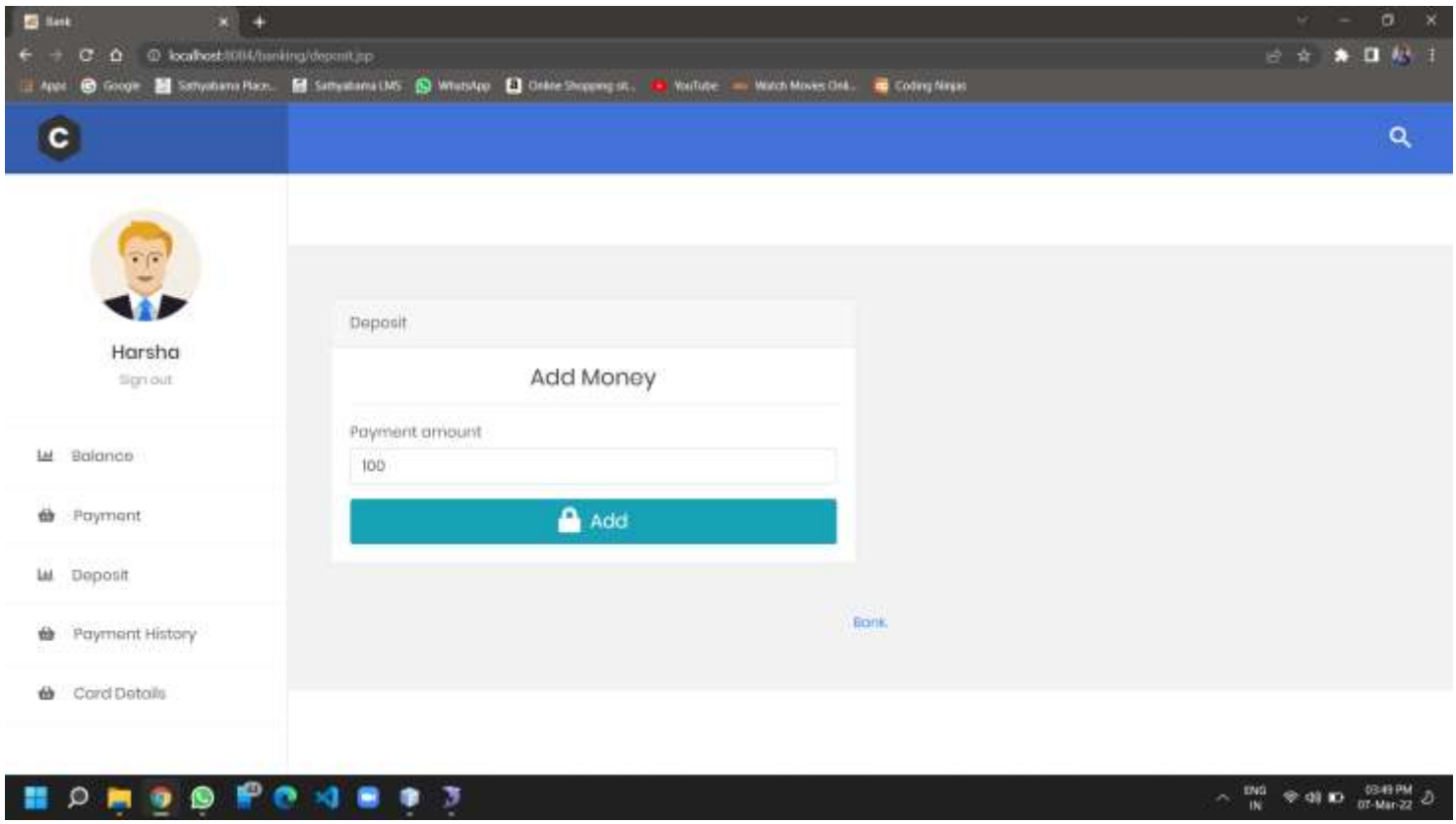
```
map/jquery.vmap.world.js"></scrip
t>


<!-- Main JS-->
<script src="js/main.js"></script>


</body>


</html>
```

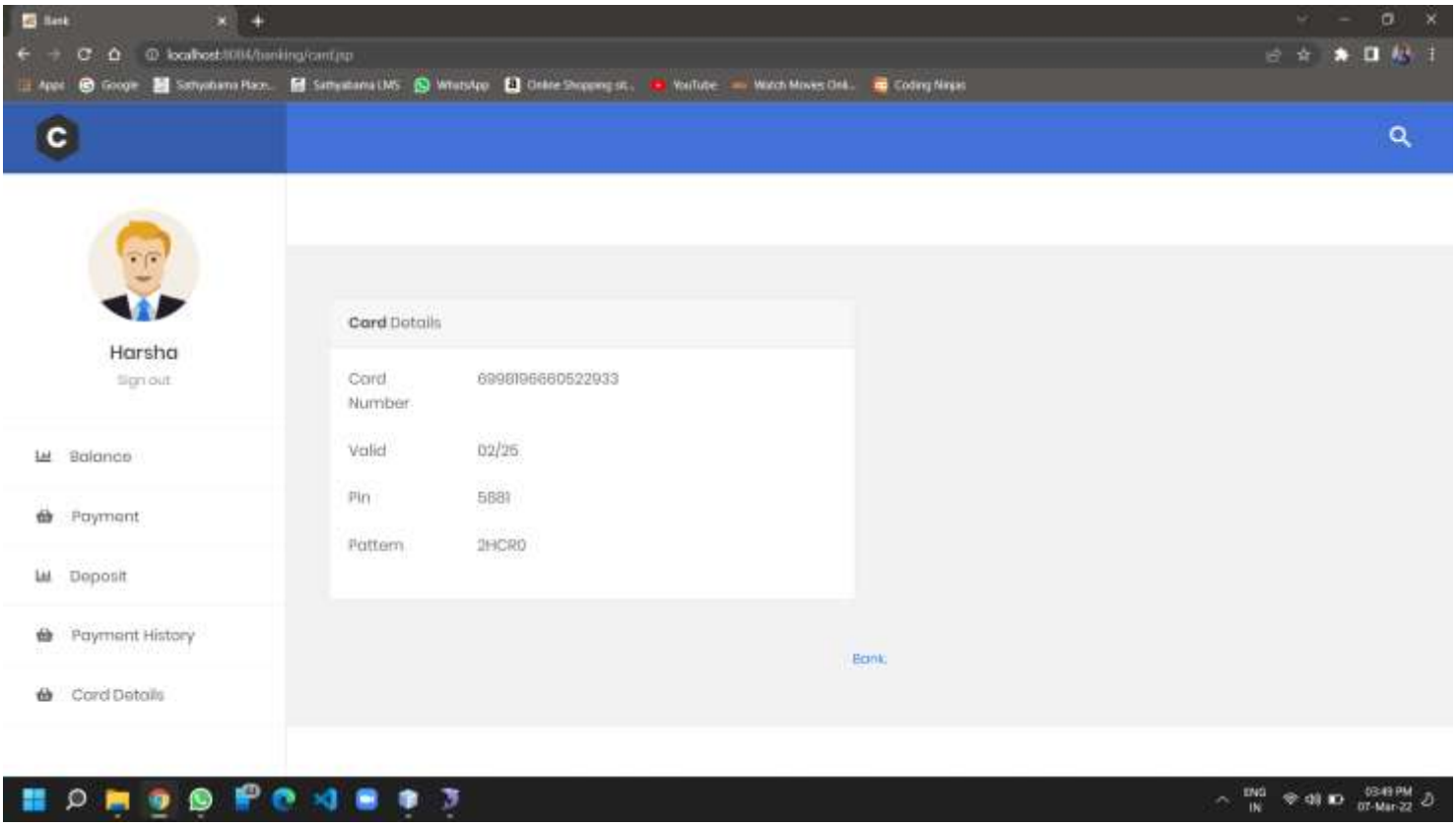
B) SCREENSHOTS

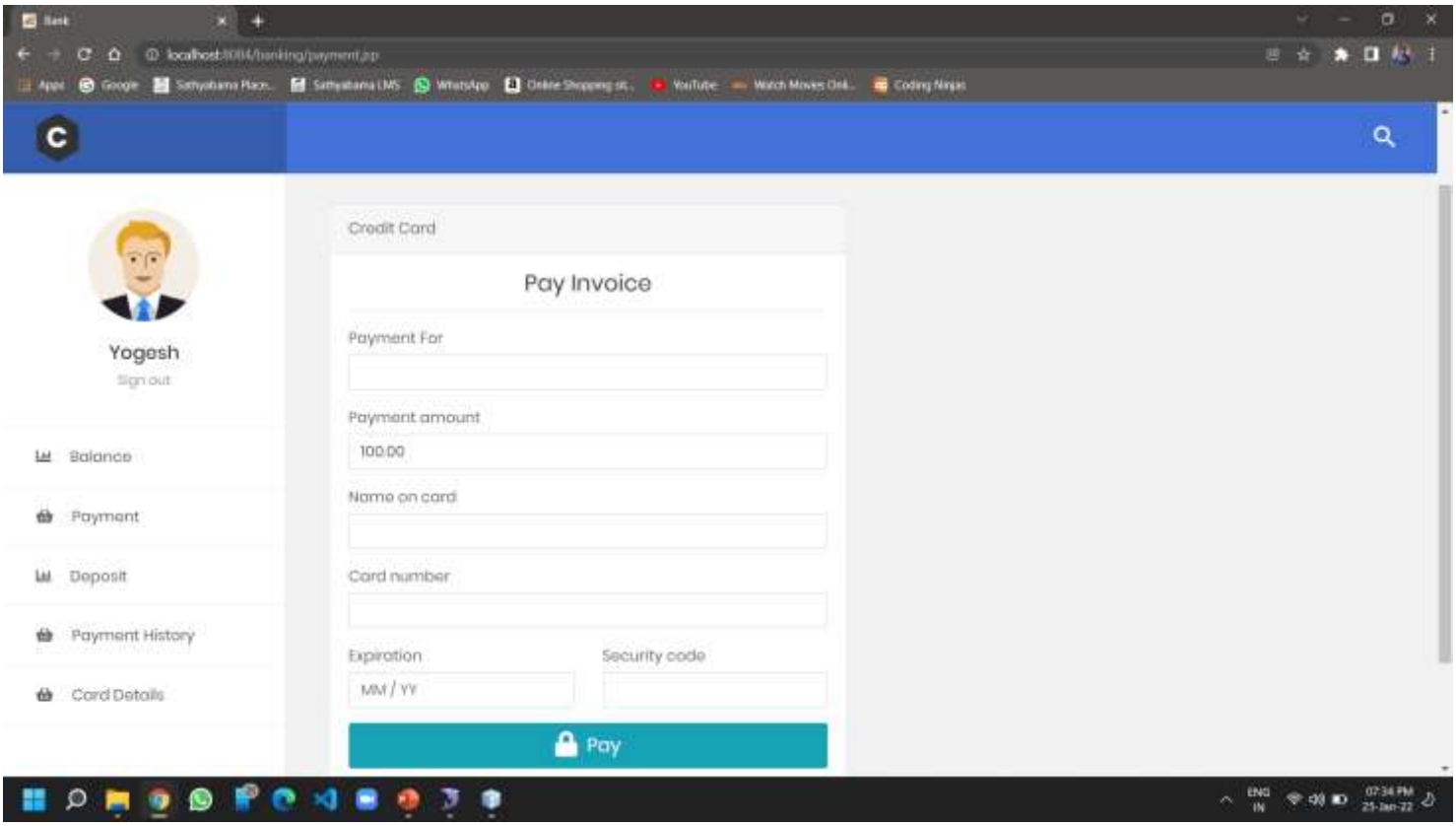


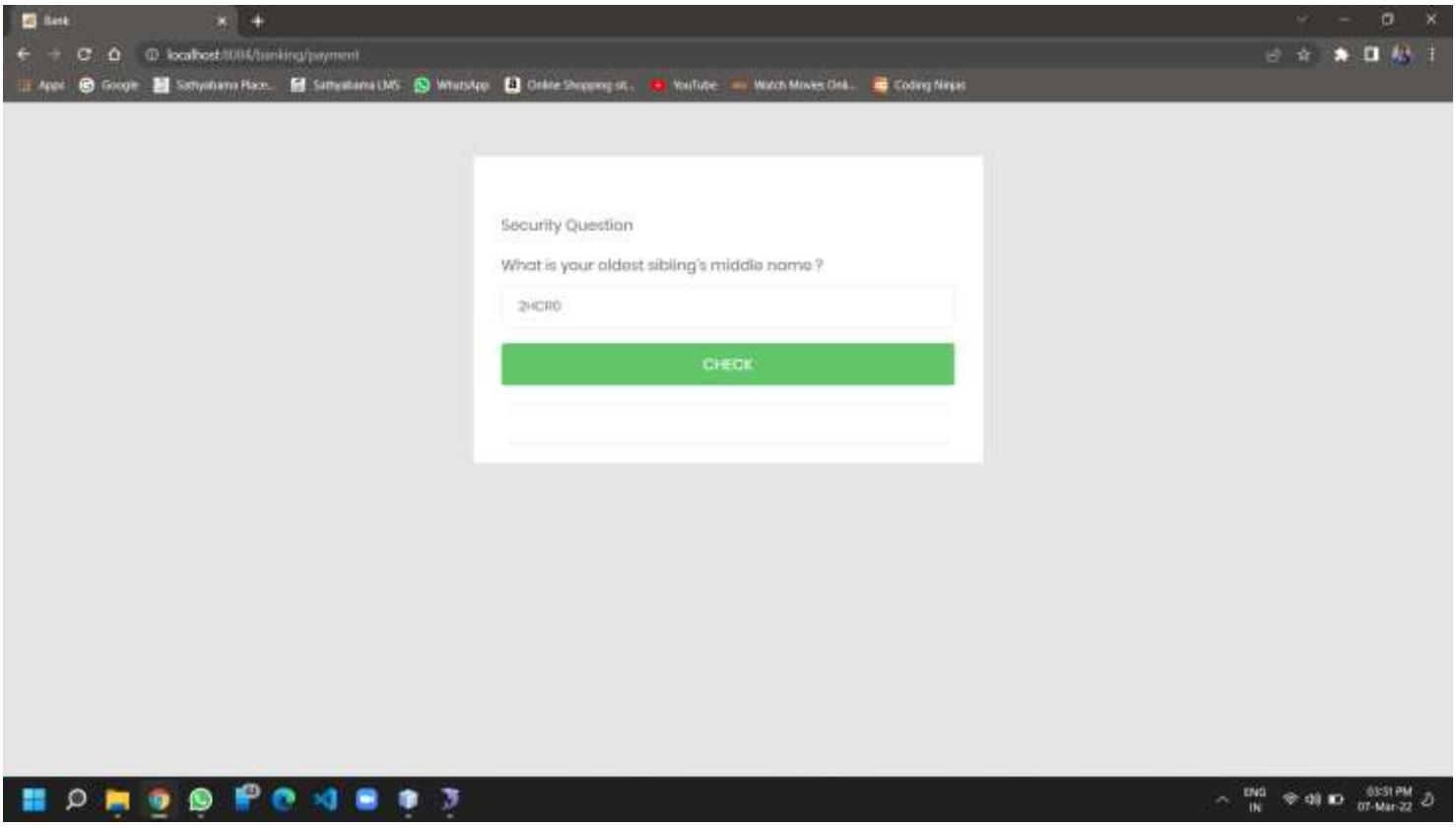

Email Address
Email
Password
Password
SIGN IN
Don't you have account? Sign Up Here

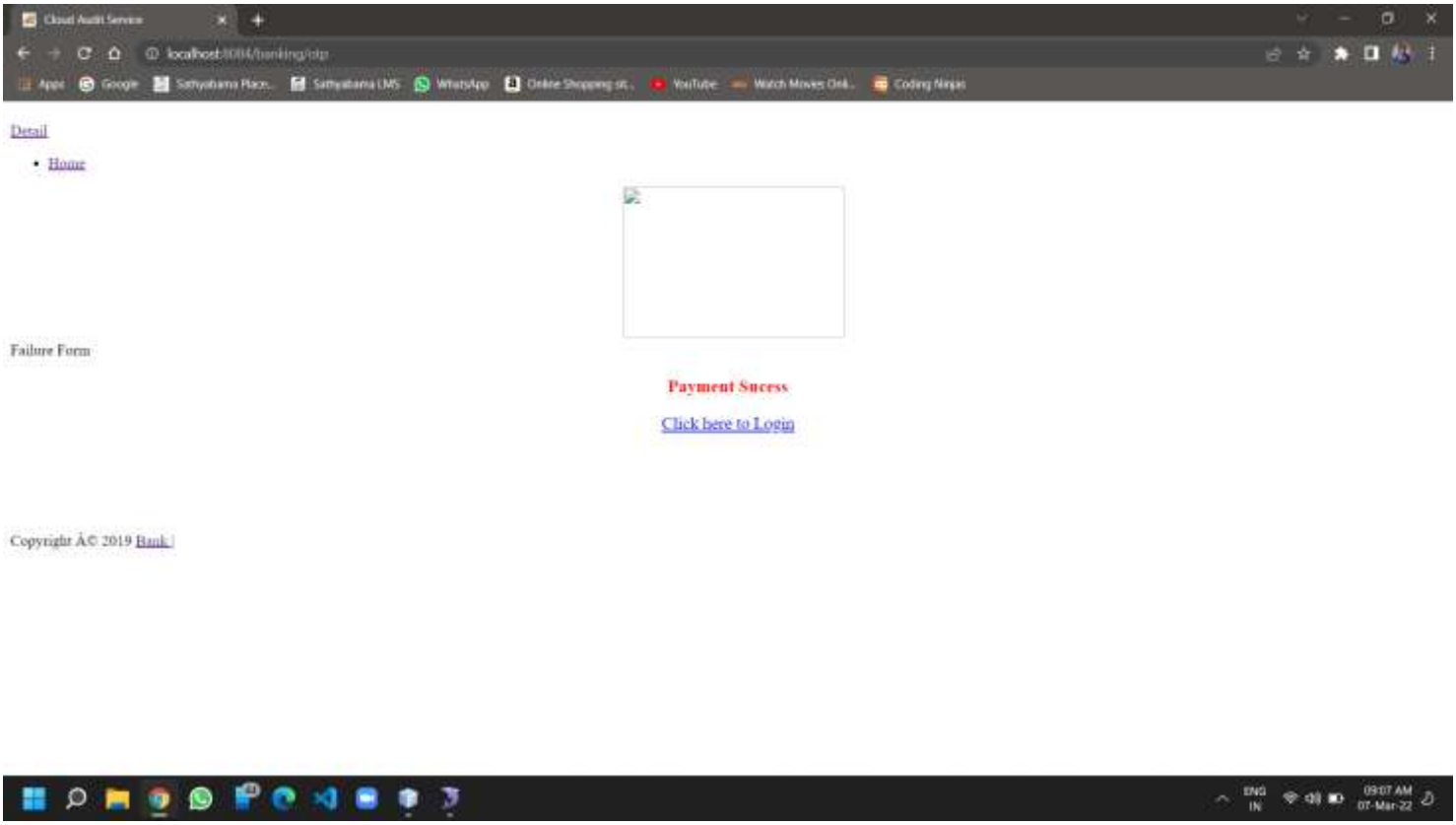

Harsha
Sign out
Balance
Payment
Deposit
Payment History
Card Details
₹10000
ACCOUNT BALANCE
Bank.

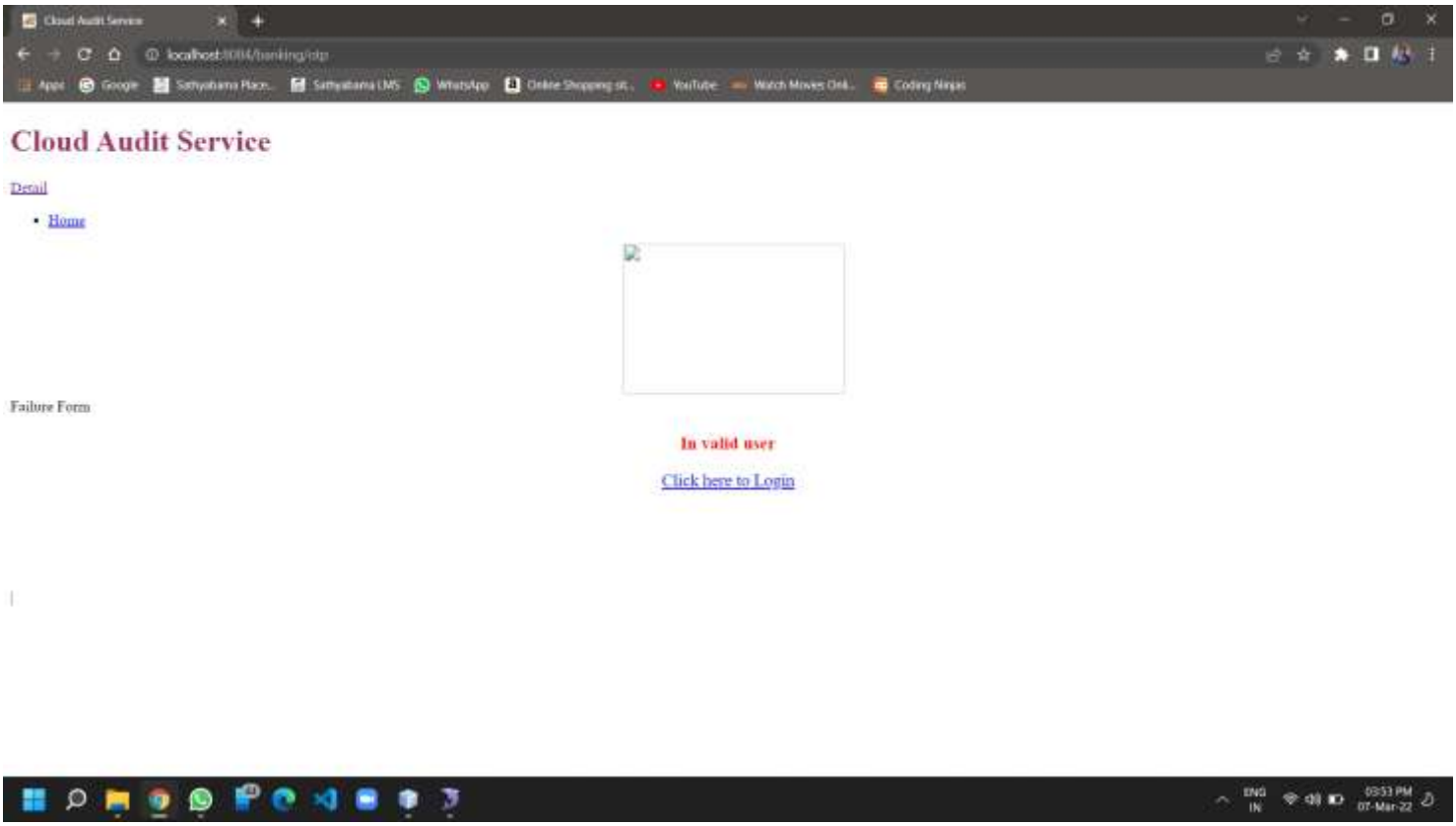

Harsha
Sign out
Balance
Payment
Deposit
Payment History
Card Details
Deposit
Add Money
Payment amount
100
Add
Bank.

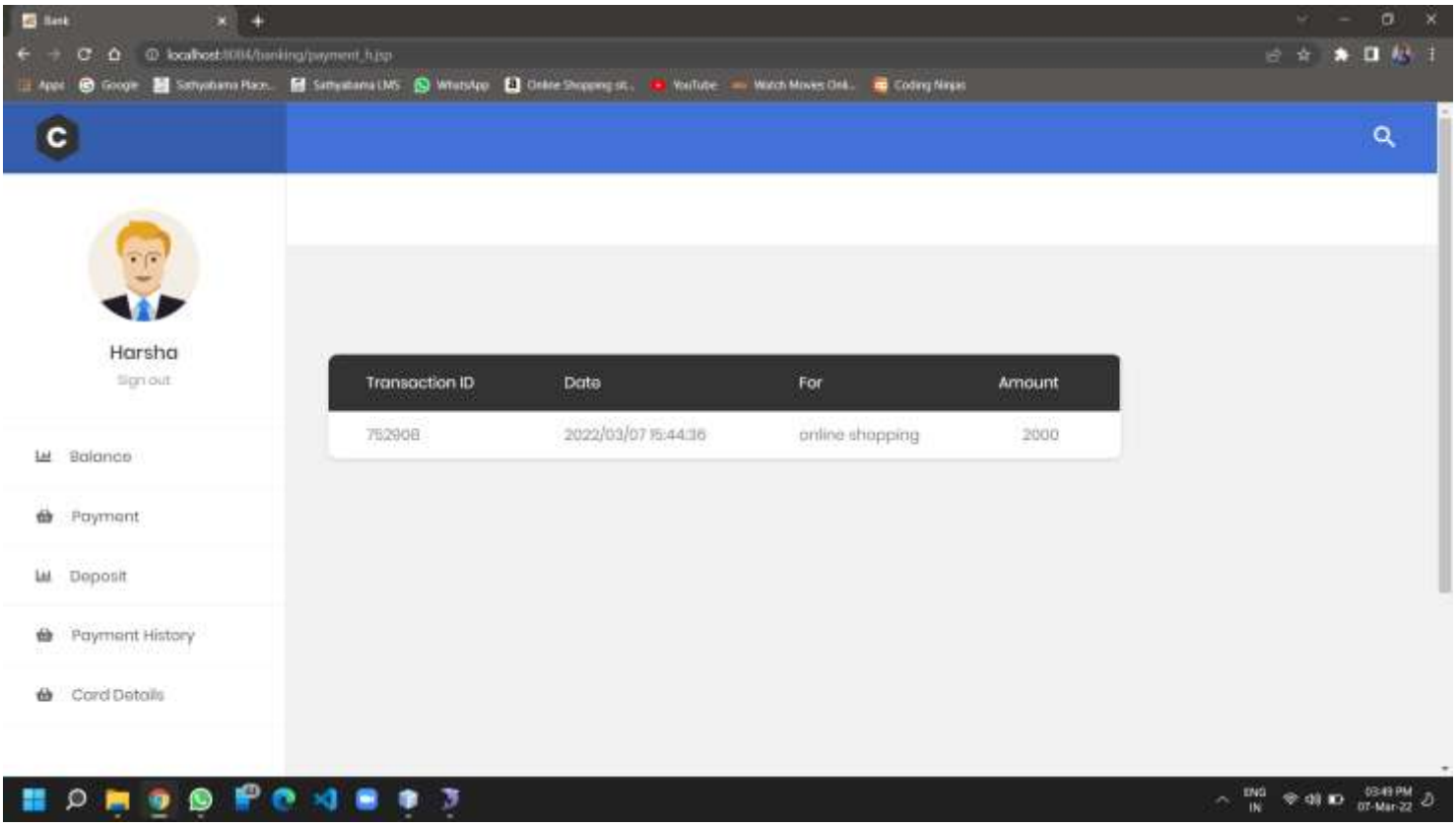

Harsha
Sign out
Balance
Payment
Deposit
Payment History
Card Details
Card Details
Card Number 6998196660522933
Valid 02/25
Pin 5881
Pattern 2HCR0
Bank


Yogesh
Sign out
Balance
Payment
Deposit
Payment History
Card Details
Credit Card
Pay Invoice
Payment For
Payment amount
100.00
Name on card
Card number
Expiration
MM / YY
Security code
Pay

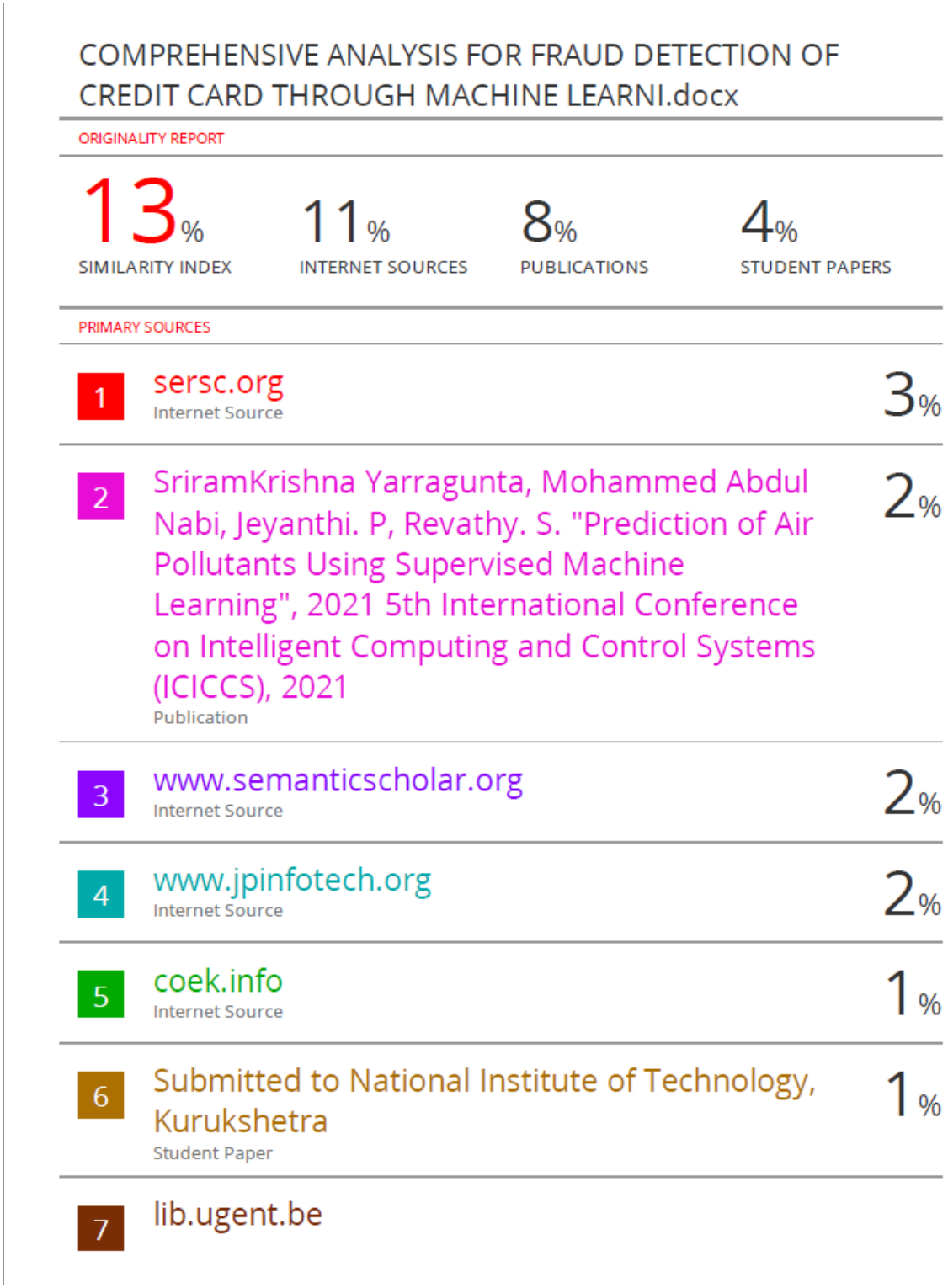

Bank
localhost:8084/banking/payment
Security Question
What is your oldest sibling's middle name ?
CHECK


Cloud Audit Service
localhost:8084/banking/otp
Detail
Home
Failure Form
Payment Sucess
Click here to Login
Copyright Â© 2019 Bank


Cloud Audit Service
localhost:8084/banking/olp
Apps
Google
Sathyabama Place...
Sathyabama LMS
WhatsApp
Online Shopping sit...
YouTube
Watch Movies Onli...
Coding Ninjas
Cloud Audit Service
Detail
Home
Failure Form
In valid user
Click here to Login


Harsha
Sign out
Balance
Payment
Deposit
Payment History
Card Details
Transaction ID
Date
For
Amount
752908
2022/03/07 15:44:36
online shopping
2000

PLAGIARISM REPORT



COMPREHENSIVE ANALYSIS FOR FRAUD DETECTION OF CREDIT CARD THROUGH MACHINE LEARNI.docx

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