CHAPTER 1

INTRODUCTION

1.1Data Mining Overview

There is a huge amount of data available in the Information Industry. This data is of no use until it is converted into useful information. It is necessary to analyze this huge amount of data and extract useful information from it. Extraction of information is not the only process we need to perform; data mining also involves other processes such as Data Cleaning, Data Integration, Data Transformation, Data Mining, Pattern Evaluation and Data Presentation. Once all these processes are over, we would be able to use this information in many applications such as Fraud Detection, Market Analysis, Production Control, Science Exploration, etc

1.1.1 What is Data Mining

Data Mining can defined as extracting valuable information or say extracting knowledge from huge set of data.

1.1.2 Data Mining Applications

Data mining is highly useful in the following domains such as

• Market Analysis and Management

• Corporate Analysis & Risk Management

• Fraud Detection

Apart from these domains, it can also be used in the areas of production control, customer retention, science exploration, sports, astrology, and Internet Web Surf-Aid.

1.1.3 Data Mining Tasks

Data mining deals with the kind of patterns that can be mined. On the basis of the kind of data to be mined, there are two categories of functions involved in it Descriptive Function The descriptive function deals with the general properties of data in the database. Class/Concept Description, Mining of Frequent Patterns, Mining of Associations, Mining of Correlations,

Mining of Clusters are the list of descriptive functions. Data Mining Task Primitives We can specify a data mining task in the form of a data mining query. This query is input to the system. A data mining query is defined in terms of data mining task primitive, set of task relevant data to be mined, kind of knowledge to be mined. Background knowledge to be used in discovery process. Interesting measures and thresholds for pattern evaluation. Representation for visualizing the discovered patterns.

1.1.4 Data Mining System Classification

A data mining system can be classified according to the following criteria Database technology.

- Statistics
- Machine learning
- Information science
- Visualization
- Other disciplines

Apart from these, a data mining system can also be classified based on the kind of (a) databases mined, (b) knowledge mined, (c) techniques utilized, and (d) applications adapted.

1.1.5 WEKA TOOL

Weka is a collection of machine learning algorithms for data mining tasks. The algorithms can either be applied directly to a dataset or called from your own Java code. Weka contains tools for data pre-processing, classification, regression, clustering, association rules, and visualization. It is also well-suited for developing new machine learning schemes.

Found only on the islands of New Zealand, the Weka is a flightless bird with an inquisitive nature. The name is pronounced like this, and the bird sounds like this. Weka is open source software issued under the GNU General Public License. We have put together several free online courses that teach machine learning and data mining using Weka. Check out the website for the courses for details on when and how to enrol.

CHAPTER 2

PROJECT OVERWIEW

2.1. LITERATURE SURVEY

The six factors impacting the customer satisfaction basing on the literature reviews and in-depth interviews with consumers. The questionnaire found that the restaurant property and customer interests and quality of the meal have significant correlation with customer satisfaction [1].

Classification models are developed using decision tree and neural network to determine underlying attributes of customer satisfaction. Generated rules are beneficial for managerial and practical implementation in fast-food industry. Decision tree and neural network yield more than 80% of predictive accuracy [2].

The literature shows that service quality is closely related to customer satisfaction and customer loyalty. Service quality is an important input tocustomer satisfaction and trust as one of the important outcomesof service quality models [3].

Decision trees classifiers are simple and prompt data classifiers as supervised learning means with the potential of generating comprehensible output, usually used in data mining to study the data and generate the tree and its rules that will be used to formulate predictions. One of the major challenges for knowledge discovery and data mining systems stands in developing their data analysis capability to discover out of the ordinary models in data [4].

With the growth of Indian economy, incomes of individuals have also risen. With higher disposable income in their hands, people have adopted new lifestyle trends. One of such trends is visiting restaurants. Given the increase in the number of people visiting restaurants and with the demanding nature of such people, it is imperative for restaurateurs to understand the likes and dislikes of their customers [5].

This research constructs a scale to measure the perceived quality of Haidilao hot pot restaurant, and then evaluates the relationships among perceived quality, customer satisfaction and customer retention by the structural equation model and multiple regression analysis [6].

When people waits for an extending time in a restaurant, the restaurant must take an appropriate action to recovery it to reduce consumers' dissatisfaction and negative oral spreading in order to bring back consumers and reduceloss of customers. The contingent behavior analysis (CBA) is used for establishing the revisit benefit of the restaurant waiting service, which is used for analyzing factors and benefits affecting people's revisit demand under the service recovery and improvement plans "increase service quality" and"improve restaurant facilities and add technical equipment" [7].

The evaluation of service quality is very important for fast food industry. This paper construct the service quality evaluation system of fast food industry based on the customer's point of view, and put forward the questionnaire ofservice quality in Fast Food Restaurant (FFR). Through the investigation and analysis, a valuable target system of service quality in FFR was constructed [8].

In order to reveal the effecting mechanism produced by expectation to service quality and customer satisfaction, we made the studies on the relationships between expectation, perceived service quality and customer satisfaction. Based on the attributes division of Kano's model, this paper built the structure model about the relationships of must-be attributes expectation, one-dimensional attributes expectation, attractive attributes expectation, perceived service quality and customer satisfaction, and made the hypothesis [9].

Recently in the restaurant businesses, it has become more difficult to design contents of dishes because customers' preferences have become diverse. Leftover meals are good indicators to elucidate customers' satisfaction and eating behaviors. This study examines what causes customers to leave food uneaten—particularly addressing their attributes, motivations, and situations—by conducting interviews of customer groups and measuring their leftovers. Results show that leaving leftovers is significantly influenced by customers' purposes, not by their attributes such as sex or age. Based on the results, this paper presents a discussion of flexible menu design [10].

WEKA is a popular machine learning workbench with a development life of nearly two decades. This article provides an overview of the factors that we believe to be important to its success. Rather than focussing on the software's functionality, we review aspects of project management and historical development decisions that likely had an impact on the uptake of the project [11]

2.2. PROBLEM DESCRIPTION

Problem description is the way of addressing the issues and views which lead to the creation of this project. The problem for this project was to find the way to increase the business development for the restaurants by identifying the key parameters of customer's preferences and ultimately predict whether customer will comeback or not. The five w's (who, what, Where, when and why) is the main key to define the problem. For this project we can define them as :-

1. Who :This project problem is specifically addressed to the restaurants and restaurants based organisations.

2. What :This project problem is mainly Focused to increase the business development of the restaurants therefore it can only determine the customer related issues that affects the organisation not the internal issues of organisation till date.

3. When :This problem can occur many times at restaurant when people don't come often therefore this can be used at this times to address the problems and attracts customers.

4. Where :This kind of problem occurs in small scale restaurants organisations which does not have much resources to counter the continuous market growth therefore this project can help them by investing very small amount of resources.

5. Why :This problem will help all the restaurant organisations to increase the productivity also it will help the customers to distinguish their restaurants more easily as it will try to provide all type of support possible to keep customer happy.

In the end we can say this problem solution can lead a large group of successful restaurant organisation and also will provide satisfaction to many customers and people related to the organisations.

2.3. REQUIREMENT GATHERING

Requirement gathering for this software done in five phases. They are defined as :-

1. Inception:In this stage the requirements where totally raw. It was decides that the application will have the POS (point Of Sales) option. Then it was decided that organisation will provide the best offers or solution on basis of the sale made in organisation. Then it was also decided that there will be option for the organisation to provide it own conditions to assess the profit.

2. Elicitation:In this stage the first meeting was conducted with the stakeholders and was decided to change the concept of organisation preference and convert it to customers preference. In the third meeting it was decided that application main working will be to predict the customer's visit while organisation can view other details being secondary working.

3. Elaboration:In this stage during the meetings it was decided that the customer preferences will be measured by the data mining process to find the customers visit to restaurant by taking other restaurants ratings as a benchmark from other popular websites. While it was also decide that other parameters will be data mined to find more accurate result.

4. Negotiation:In this stage the developing team negotiated with the stakeholder to include the POS (point of sales)option but was rejected by the stakeholder.

Quality Functional Deployment :-

1. Normal Requirements:It was decided that collecting feedbacks and storing them will be the normal requirements.

2. Expected Requirements:It was decided that predicting the customer's visit to the restaurants will be the expected requirement.

3. Exciting Requirements:It was decided that owners viewing the other parameters preferences to increase productivity will be exciting requirement.

2.4. REQUIREMENT ANALYSIS

The requirement gathered during the five phases were analysed and was divided in two categories. They are:-

1. Functional Requirement

    - The Functional requirement for this application is to acquire the feedbacks from customer.

    - The Functional requirement for this application is to predict the customer's visit to restaurants.

    - The functional requirement for this application is to generate offers for customer on the basis of their feedbacks.

    - The Functional requirement for this application is to generate the view of most valuable user and their food selections.

    - The Functional requirement for this application is to generate the view of most ordered food items to manage productivity.

    - The Functional requirement for this application is to generate the view of priced related feedbacks.

    - The Functional requirement for this application is to generate the view of parking related feedbacks.

    - The Functional requirement for this application is to generate the offer code for the registered customers.

    - The Functional requirement for this application is to verify the offer code on next visit of customer's.

2. Non-Functional Requirements

I. Performance Requirement

- The application should take minimum response time for any action.
- The application should take minimum response time to load UI for the application.
- The application should be connected to offline server during the restaurants working hours.

II. Safety & Security Requirement

- The application must have a login Id and password for all their registered users.
- The application database can only be modified with the developers or in presence of the developer.
- The application will use a unique Id to keep track of its customer's.

III. Software Quality Attribute

- The application will provide the capability to keep backup for the data if required.
- System shall keep track of all errors as Log file.
- The application will be reliable to continuous feedbacks and logins.

2.5. DATA SOURCE

In this project the data for the restaurants were web scrapped from the internet. The website used to gather the information about restaurants and its various parameters is www.yelp.com. Yelp was founded in 2004 to help people find great local businesses like dentists, hair stylists and mechanics. Yelp had a monthly average of 24 million unique visitors who visited Yelp via the Yelp app and 65 million unique visitors who visited Yelp via mobile web in Q4 2016. Yelpers have written more than 121 million reviews by the end of Q4 2016. In addition to reviews, you can use Yelp to find events, lists and to talk with other Yelpers. Every business owner (or manager) can setup a free account to post photos and message their customers. Yelp makes money by selling ads to local businesses - you'll see these clearly labeled "Yelp Ads" around the site. Paying advertisers can never change or re-order their reviews. Yelp uses automated software to recommend the most helpful and reliable reviews for the Yelp community among the millions we get. The software looks at dozens of different signals, including various measures of quality, reliability, and activity on Yelp. The process has nothing to do with whether a business advertises on Yelp or not. Learn more here. You can access Yelp via iPhone, Android, and more. The Local Yelp brings locals updates on the latest and greatest business openings & other happenings.

2.6. COST ESTIMATION

Before Application Creation During Analysis Phase:-

- Estimated LOC using the use case estimation = 22,400
- Then using COCOMO Model , Effort=80.99
- And taking Rs 2 per LOC we will have Rs 16,198
- And using BOHEM's Model, Effort=83.73
- And taking Rs 2 per LOC we will have Rs 16,746

After Application Creation During Verification & validation Phase

- The lines of code reached out to be 5.2K for the project.
- Work Done Per person per month=3*(5.2)^1.12=19.012/month
- Work Done by 2 person for 4 months= 2*19.012/4=9.506
- Cost Estimation if We will take Rs 2 per LOC then Cost of the Project till now is= 2*9.506=RS.19.01K

2.7. PROJECT SCHEDULE

The project was scheduled to be completed in 4 months period of time. The complete schedule for the work completion is provided below :-

Date	Activity	Time	Responsibility	Remarks
21/11/2016	Review 0	4 Hrs	Determined the project based on existing ieee paper and formed team	Team Formed (2 members), Algorithm Supervised.
10/1/2017	Customer satisfaction based upon parameters for business development	4 Hrs	Abstract Role Description Module Description	Algorithm supervised again.
12/1/2017-2/2/2017	Research	22 Days	Research based on previous projects and algorithm	Selected and compare J-48 and decision table algorithms.
6/2/2017	Discussed with Guide	1 Hr	Confirmation and satisfaction for the research done	Guide satisfied for research
7/2/2017-9/2/2017	Prepared Uml designing and prototypes	3 Days	Designed the basics design and prototypes according to requirements	Designs need some improvements.
10/2/2017	Review 1	1 Hr	1. Abstract 2. Literature Survey 3. Requirement Gathering & Analysis 4. Risk Analysis 5. Cost Estimation 6. User Interface Prototyping 7. Architecture Diagram 8. Data Flow Diagram 9. Class Diagram 10. Sequence Diagram	Collected data from various sources Provided designs and prototypes for requirements

11/2/2017-15/2/2017	Improvement of review 1	3 Days	Improve the architecture diagram	More detailed architecture diagram needed.
16/2/2017-6/3/2017	Coding and Database designing	19 Days	60-80% Coding	60-80% Coding completed & Satisfied
9/3/2017	Review 2	4 Hrs	1. Relational Model 2. ER Diagram 3. Technology Used 4. Unit Testing 5. 60-80% Coding	Use authentic dataset for process.
10/3/2017-12/3/2017	Improvement of review 2	3 Days	Correction for prediction module	Correction done and satisfied
15/3/2017- 22/3/2017	Coding & Testing	8 Days	100% Coding & Testing	Unit testing satisfied
23/3/2017	Ieee Conference	4 Hrs	Provided presentation for the project in conference	Successfully completed conference.
24/3/2017-21/4/2017	Coding & Testing	27 Days	100% Coding & Testing	User & integration testing satisfied
24/4/2017	Review 3	4 Hrs	Integration Testing User Testing Size-LOC Cost Analysis Defect Analysis Mc call's Quality Factors 100% implementation Result Result Analysis	Satisfied and completed successfully

Table 1: Project Schedulefor Customer Satisfaction Model

2.8. RISK ANALYSIS

Risk are the potential problem that might occur or may not and cause problems to the software. Therefore in order to prevent risks and to continuously monitor the software we do risk analysis. Here are some set of questionnaires which helps to determine risks for the software.

- Questionnaires

1- Have top software and customer managers formally committed to support the project?

Yes

2- Are end users enthusiastically committed to the project and the system to be built?

Yes

3- Are requirements fully understood by the software engineering team and its customers?

Yes

4- Have customers been involved fully in the definition of requirements?

No

5- Do end users have realistic expectations?

Yes

6- Is the project scope stable?

Yes

7- Does the software engineering team have the right mix of skills?

Yes

8- Are project requirements stable?

No

9- Does the project team have experience with the technology to be implemented?

No

10- Is the number of people on the project team adequate to the job?

Yes

11- Do all users constituencies agree on the importance of the project and on the requirements for the system to be built?

Yes

- Risk Analysis Report

Risk Information Sheet			
Risk Id: RI001	Date: 8/2/2017	Prob: 80%	Impact: high
Description: The Risk of listener problem for the oracle database may occur much more often during execution which may lead to crashing of the application to fetch data.			
Refinement/context: The listener problem can occur due to the sudden shutting down tof the services that is being provided by operating system which may occur due to some kind of load/stressing problems.			
Mitigation/Monitoring: it is been noticed that this problem might occur after 17 attempts of the database service calling which lead to termination of database link between the application. It is advised that in case of problem restart the oracle services to refresh the link.			
Management/contingency/trigger: This kind of problem can be triggered due to calling of the service many times in a row which causes the load on the database services to handle the request for the application.			
Current Status: The chances of this problem occurring is reduced to 40-30% and may or may not occur in many of the systems.			
Originator: Sourabh Agarwal		Assigned: -	

Table 2: Risk analysis for Customer Satisfaction Model

2.9. SOFTWARE REQUIREMENT SPECIFICATION (SRS)

1. Introduction

The Software Requirements Specification (SRS) provides an overview of the entire SRS with purpose, scope, definitions, acronyms, abbreviations, references and overview of the SRS. This is a SRS document for Restaurant Based Development Software. The objective of Restaurant Based Development Software is to provide complete Customer satisfaction by providing customers reviews to the organization so that they can make their services better.

1.1 Document Purpose

The purpose of this document is to describe the requirements for the Restaurant Based Development Software. The intended audience includes all stakeholders, Employee and Administration in an organization. These include, but are not necessarily limited Developers should consult this document and its revisions as the only source of requirements for the project. They should not consider any requirements statements, written or verbal as valid until they appear in this document or its revision.

1.2 Product Scope

The proposed software product is the Restaurant Based Development Software. The system will be used to get the feedbacks from the Customers and then storing that data for future usage. The current system in use is a paper-based system. The prediction algorithm varies for different application therefore could not most accurate result. The intentions of the system are to predict Customers visit, increase customer satisfaction and increase the number of customer demands that can be treated accurately. Requirements statements in this document are both functional and non-functional.

1.3 Intended Audience and Document Overview

The intended audience includes all stakeholders in the potential system. These include, but are not necessarily limited to, the following: Administrative Staff, Employee and developers. The objective of this document therefore is to formally describe the system's high level requirements including functional requirements, non-functional requirements and business rules and constraints. This model demonstrates the development team's understanding of business domain and serves to maximize the team's ability to build a system that truly does support the business.

1.4 Definitions, Acronyms and Abbreviations

- Feedback – a record to feedback of services from the customers.
- Administrator page– a record to view all kind of resources and demands of the customers.
- Login ID- a user identification number to enter the system
- Password- a word that enables one to gain admission into the system
- Web-based application- an application that runs on the Internet

- SQL– structural query language
- GUI- Graphical User Interface
- SRS - Software Requirements Specification
- DBMS-Database Management System, a database to store all involved information

2. Overall Description

2.1 Product Perspective

This Restaurant based development software is the application designed to take the feedbacks from the customers then it will predict whether the customers will visit again or not. Also this software can also be use to analyze the customers eating behavior and then and maintain productivity of restaurants. Also it can be used manage different resources based on the customers feedback to provide maximum customer satisfaction to the customer.

2.2 Product Functionality

The system functions can be described as follows:

- Feedback**:**

when the customers visit to the restaurants they provide their feedbacks to the organization for their services. This can be done in two ways either the customers log in as the guest customers or as registered customers. The benefit of registered customers is that they get to avail offer provided by the organization for their valuable feedbacks.

- Administrator:

When an customer provide the feedback the system will automatically predict whether there are chances of customer back to organization or not. To do so the system providesthe offer to the customers according to their feedbacks which they can avail on next visit but this only available for the registered user. Simultaneously administrator needs to monitor the services that more in demand and manage them to keep the customers happy.

2.3 Users and Characteristics

The system will be used in the organization. The administrators and Customers will be the main users. Given that not all the users are computer-literate, the system is designed to be user-friendly. It uses a Graphical User Interface (GUI).

Administrators:
They have the authority to access the database, server and are responsible for adding Offers to application.

Customers:The Customer will provide their valuable feedbacks for the organization through feedback forms.

2.4 Operating Environment

The Restaurant Based Development Software requires at least a Windows XP or higher version to run on any laptop. The system works properly on various browsing platforms such as Mozilla Firefox, Google Chrome, or even Internet Explorer. The application is only accessible within the organizational server or Network Connection. It is restricted to use this service within an organization.

2.5 Design and Implementation Constraints

- All of Guest user feedbacks and Registered User feedbacks must be protected for all steps.
- In the future, it is possible that the software design will have to incorporate changes that could take place in other Organization in the same domain. The Feedback record of all organizations in domain should have the same standard of data format and security of data when transferring between the organizations also needed.
- Changes or additions about Entering methods can affect the system directly.
- The system must be user-friendly.

2.7 Assumptions and Dependencies

- It is assumed that minimum number of computers will be available before the system is installed and tested.
- It is assumed that the organization will have enough trained staff to take care of the system
- The system uses licensed third party software products.

3. Specific Requirements

3.1 External Interface Requirements

- User Interfaces -The user interface for software shall be compatible to user which can access to the system. The user interface shall be implemented using any tool or software package like servlet, Html5, jsp, css3, etc.
- Hardware Interfaces: We would need the Intel Celeron system and 1 GB of RAM and a Minimum Space of 1Gb space in Server to work smoothly.
- Network Interfaces- The server and client computer must have NIC card and must get the intranet service active from well-known ISP.
- Software Interfaces- The client machines require Microsoft Windows XP or better. The corporate server requires Red Hat Enterprise Linux AS 5 (RHEL 5) and Oracle Database 10g Enterprise Edition to hold on to all archives. The client requires Net Beans 7 or higher

and virtual server. Also both the client and server computer must have internet browser to work online.

- Communications Interfaces- The System will perform the following functions:
  - Sophisticated and user friendly interface for all passengers.
  - Individual record for each user related to the system.
  - Sophisticated interfaces for all people who related to the system.
  - Implement Administrator and Employee database systems. Implement Account System for managing invoices.
  - Each Customer need only a Customer Id for walking through every step.
  - Keep secret for all of Customer Record. Only admin can view it.
  - Internal server connection to work on with the system.
  - Real time or dynamic service should be given for the system.

3.2 Functional Requirements

Restaurant Based Development Software

- Feedback Form: The Functional requirement for this application is to acquire the feedbacks from customer.

- Prediction Section: The Functional requirement for this application is to predict the customer's visit to restaurants.

- Offer Page: The functional requirement for this application is to generate offers for customer on the basis of their feedbacks.

- Valuable User Page: The Functional requirement for this application is to generate the view of most valuable user and their food selections.

- Valuable Food Page: The Functional requirement for this application is to generate the view of most ordered food items to manage productivity.

- Price Page: The Functional requirement for this application is to generate the view of priced related feedbacks.

- Parking Page: The Functional requirement for this application is to generate the view of parking related feedbacks.

- Offer Page: The Functional requirement for this application is to generate the offer code for the registered customers.

- Verification Offer Page: The Functional requirement for this application is to verify the offer code on next visit of customer's.

4. Other Non-Functional Requirements.

4.1 Performance Requirements

- Response Time:The system shall give responses in 1 second after checking the Customer information.
- Capacity:The System must support 1000 people at a time.
- User-interface: The user-interface screen shall respond within 5 seconds
- Conformity: The systems must conform to the Microsoft Accessibility guidelines.
- Network Connection: The Server must be on all time.

4.2 Safety and Security Requirements

- Customer Identification:The system requires the Customers to identify himself using Customer Id.
- Login ID: Any user who uses the system shall have a Login ID and Password.

- Modification: Any modification (insert, delete, and update) for the Database shall be synchronized and done only by the administrator in the Organization except for prediction data.

- Administrators' Rights: Administrators shall be able to view and modify all information in DBMS except prediction data.

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4.3 Software Quality Attributes

Maintainability:

- Back Up: The system shall provide the capability to back-up the Data
- Errors: The system shall keep a log of all the errors.
- Reliability:The portal will be reliable with the ease of Requesting and security.
- Availability: The system shall be available all the time

5. Software And Hardware Requirements

The Asset Management System deals with the basic problem of managing enormous data. It caters to the organization of data in a well-structured form facilitating its maintenance and expansion.

It makes us of JAVA programming language to process the data and MySQL database management system for storing the data. This system uses a web browser for user interaction and provides the user the facility to add, modify and view asset information.

The JavaServer Pages(JSP) are used for collecting, modifying and displaying information to the user. The system also incorporates user authentication leading to better data security.

Software Requirements

a) Net Beans IDE

Net Beans is an open source Integrated Development Environment (IDE) used extensively for web-application development.
This would be used for processing the information received via JavaServer Pages. It is also used for interacting with the database, in this case MySQL, for storing, modifying and retrieving information.

b) Apache Tomcat

Apache tomcat is an open source web server and servlet container. Tomcat implements the Java Servlet and the Java Server Pages specification from Oracle Corporation, and provides a pure Java HTTP web server environment for a Java code to run. This would be used to host the JavaServer Pages required for user interaction.

c) MySQL

MySQL is an open source database management system. In this asset management system, MySQL is used for organizing the user information. The MySQL Workbench is used for creating and executing SQL queries. It also helps in designing and managing the database more efficiently.
It provides a console to gain better visibility into a database. Any further expansion or manipulation to the existing data structure can be achieved expeditiously using MySQL workbench.

d) Web Browser

A web browser is a software application for retrieving and presenting information on the World Wide Web. This system is hosted using the Apache Tomcat web server and can be

accessed via a web browser by entering the URL of the hosted JavaServer Page. All the user-system interactions are done through the web browser.

Hardware Requirements

a) An Intel (or equivalent) Pentium 300MHZ processor

b) 1GB memory is the minimum amount we should consider for storing the database

c) HDD-500GB minimum

d) Windows OS is preferable (Windows XP being the minimum compatible software)

CHAPTER 3

ARCHITECTURE & DESIGN

3.1.1 SYSTEM ARCHITECTURE

System architecture is the representation of the structure of data and program that are required to run the software. This application has a hybrid architecture system of pipes & filters and Data-Centered architecture. The following diagram is architecture diagram for the software.

Architecture Diagram

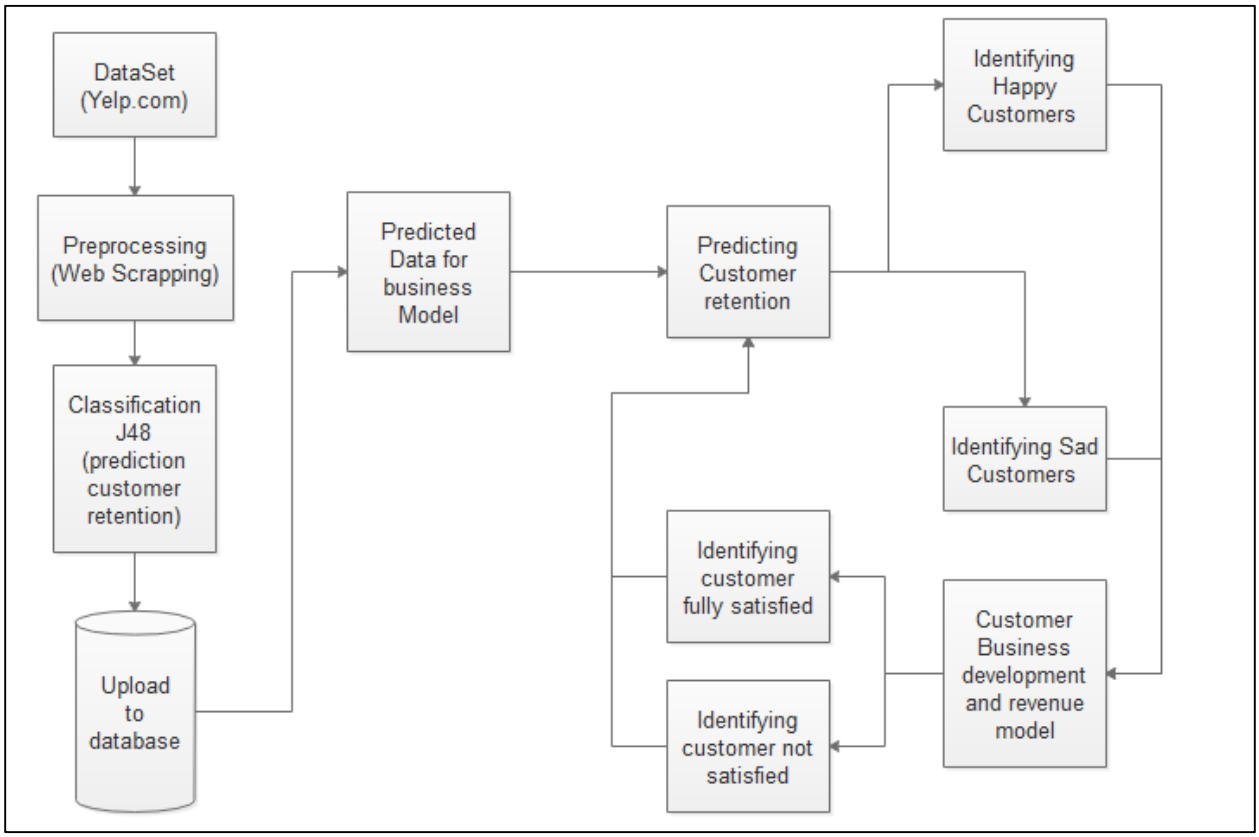


Fig 1: Architecture Diagram for Customer Satisfaction Model

3.1.2. MODULE DESCRIPTION

- Data Collection

For data collection we extracted the data for different restaurants and factors from the yelp.com website. The data collected from the website had many features like fooding, services, clothing, customer nature, location, topology, rating, reviews, etc. The data was extracted using python with beautiful soup as a package. The data was in raw and unordered format which was stored in csv format which can be used in business revenue model.

- Feature Extraction

The data collected from the collection phase was in raw nature and contained the information which was not needed for the prediction model. This features like topololgy, location was not necessary and was needed to be preprocessed which was done by the python using pandas as package and also inbuilt weka tool preprocessor to exactly create the data needed for the prediction model.

- Classification

We used J48 Classifier which is defined in WEKA Tool to predict and test the efficiency of the trained data set. J-48 classifier had more accuracy and efficiency in both training set and cross validation. It builds decision trees from a set of training data by using the concept of information entropy. The training data is a set of already classified samples. Each sample consists of a p-dimensional vector, where it represent attribute values or features of the sample, as well as the class in which it falls.

At each node of the tree, it chooses the attribute of the data that most effectively splits its set of samples into subsets enriched in one class or the other. The splitting criterion is the normalized information gain (difference in entropy). The attribute with the highest normalized information gain is chosen to make the decision. The C4.5 algorithm then recurs on the smaller sub-lists. The J-48 classifier was used because it provided 99% accuracy when compared to other algorithms mentioned in reference.

- Prediction Model

Prediction model of our project predicts whether the customer will come again or not. To do so we created a trained data with the help of historical data gathered from websites the tested the train data to predict customer will come back again or not.

- Business Development Model

In business model we created an offline platform for the organization and combined with the prediction model to predict whether the customer will come again or not. To do so we used web technologies like Jsp, Html and other web technologies. The model can provide offers to customers on the basis of their reviews to help the organization to attract more customers. Also this model can continuously monitor the customers and hence provide the offers provided by the organization

3.2. INTERFACE PROTOTYPING

The Earlier stages Prototyping of software UI are shown below :-

Fig 2: Prototyping of Food type Page

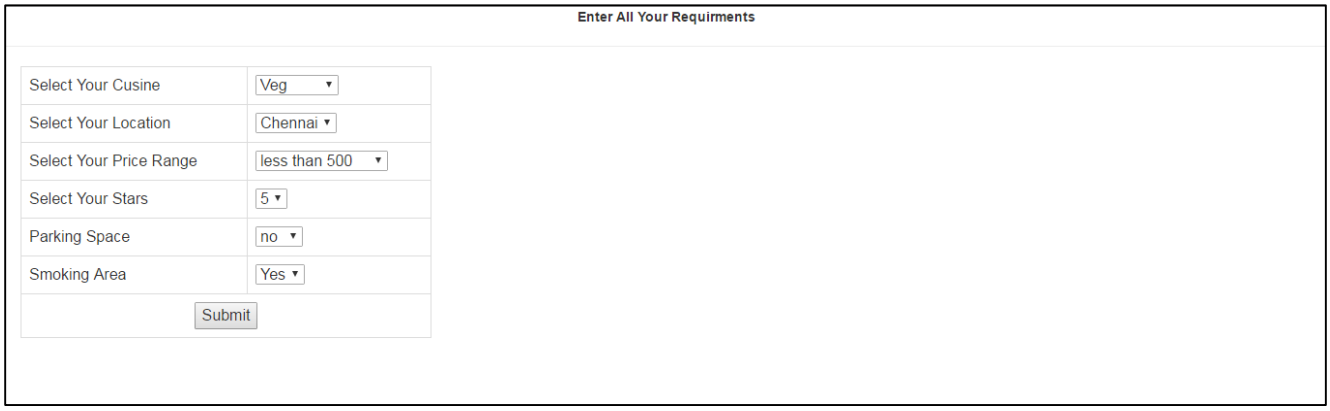


Fig 3: prototyping of Feedback Page

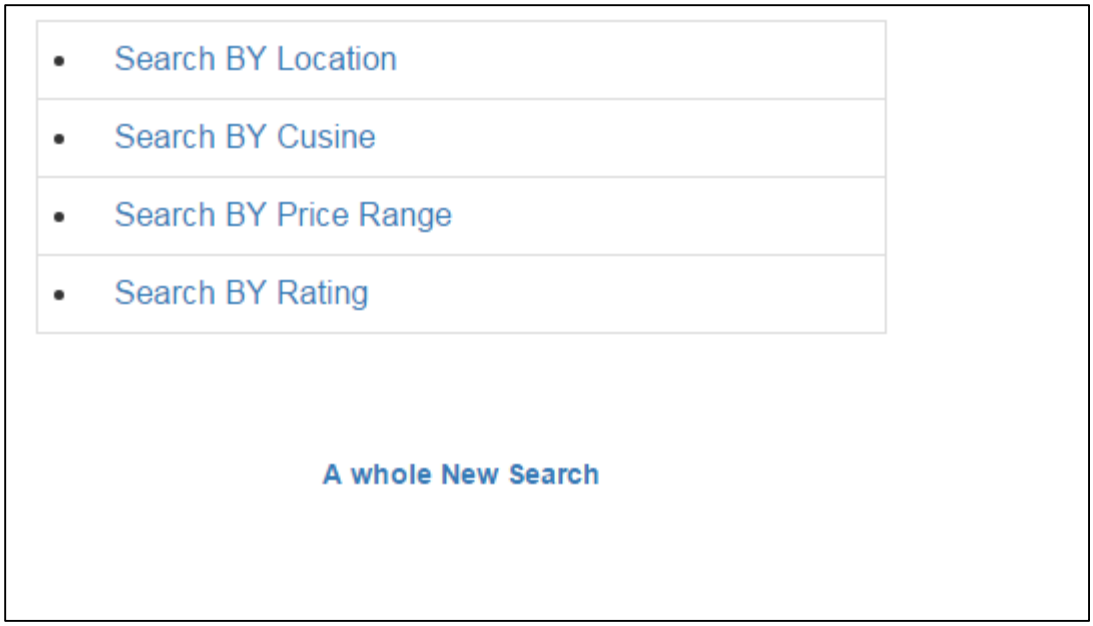


Fig 4: prototyping of Homepage

Fig 5: prototyping of Location Page

Fig 6: prototyping of Price Page

3.3. DATA FLOW DIAGRAM

This diagram help to identify the flow of data across the application and its behavior with the other modules of software. The Data flow diagram for this software is given below.

Data Flow Diagram:-

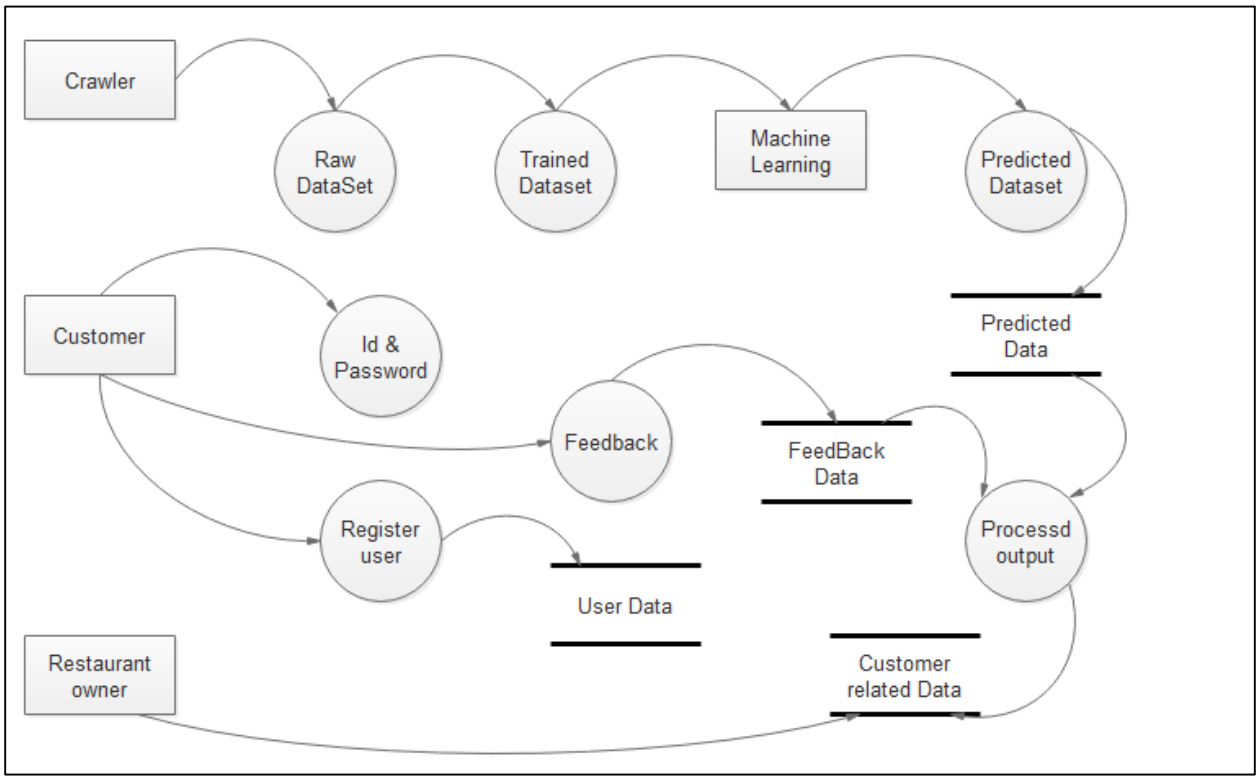


Fig 7: Data Flow Diagramfor Customer Satisfaction Model

3.4. USE CASE DIAGRAM

The use-case diagram is a uml diagram which represents the interaction of actors with software and its functionalities.

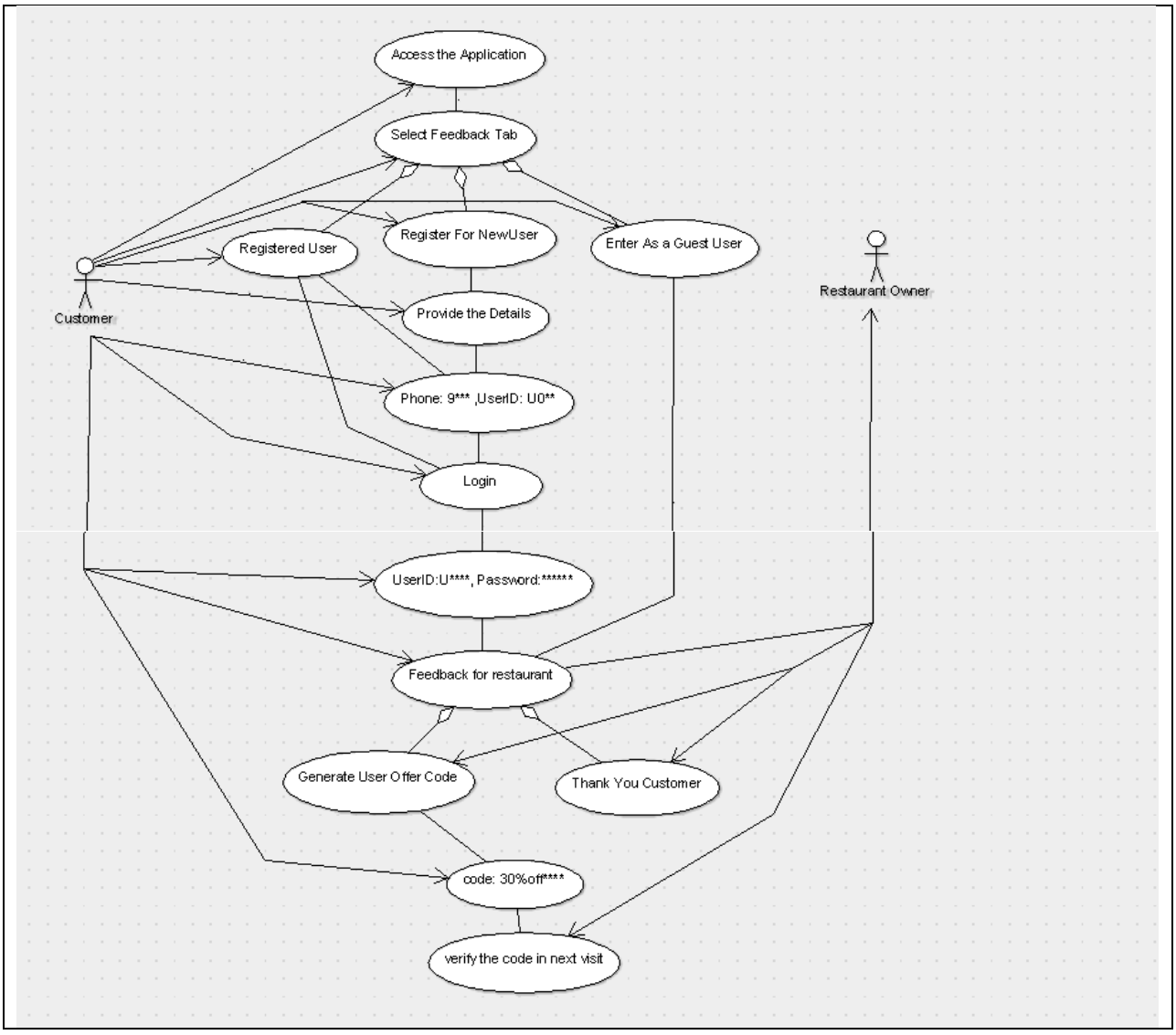


Fig 8: Use Case Diagramfor Customer Satisfaction Model

3.5. SEQUENCE DIAGRAM

Sequence diagram is the uml diagram that represents the interaction of actors with the application with respect to time and accessibility.

Sequence Diagram:-

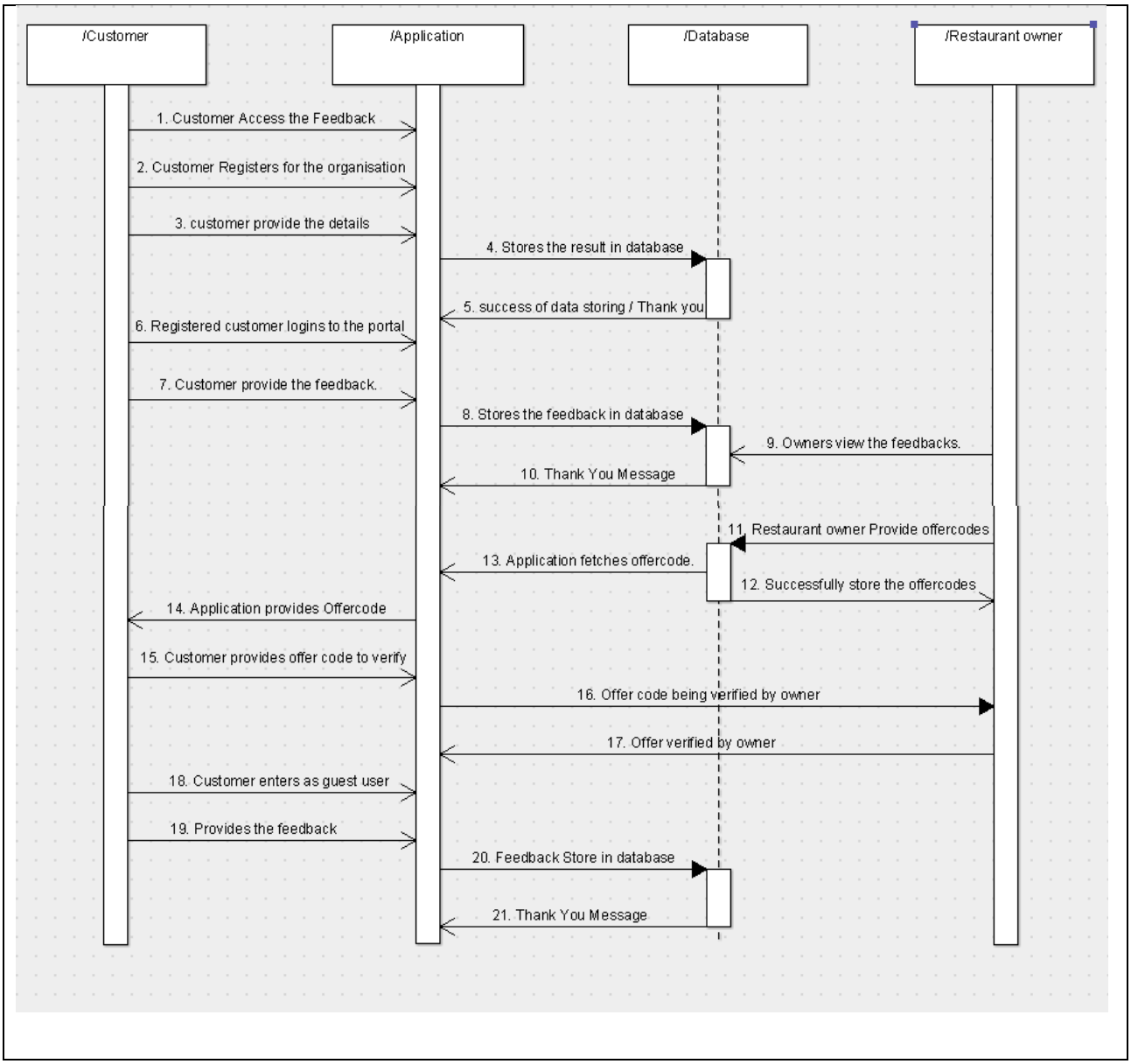


Fig 9: Sequence Diagramfor Customer Satisfaction Model

3.6. CLASS DIAGRAM

Class diagram is the uml diagram is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects.

Class Diagram:-

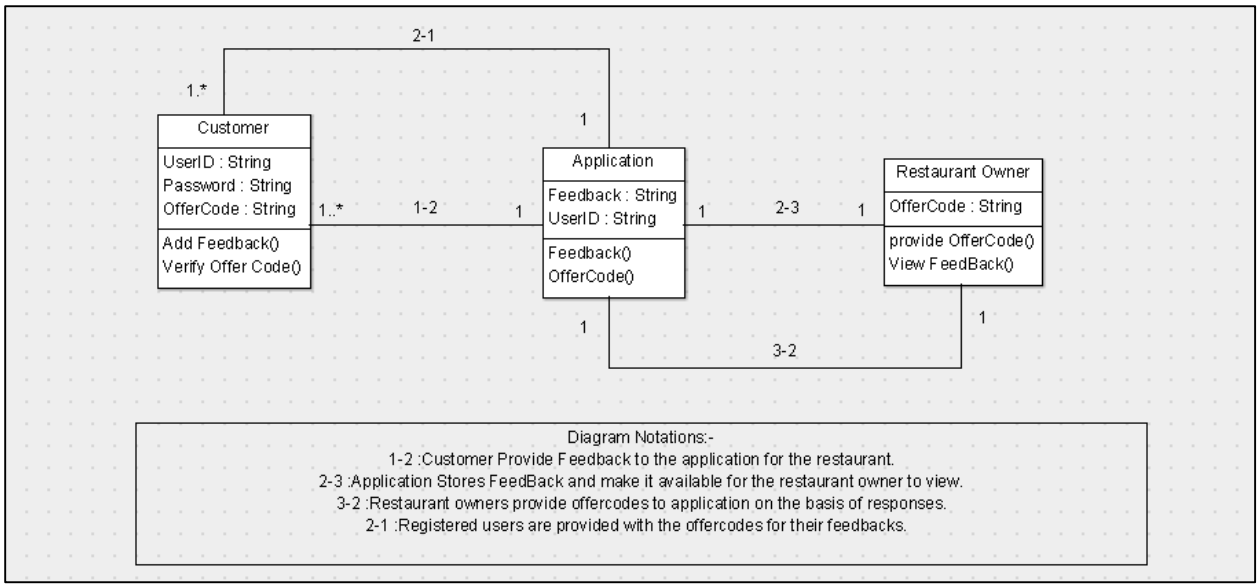


Fig 10: Class diagram representing the relationship between customer and restaurant owner

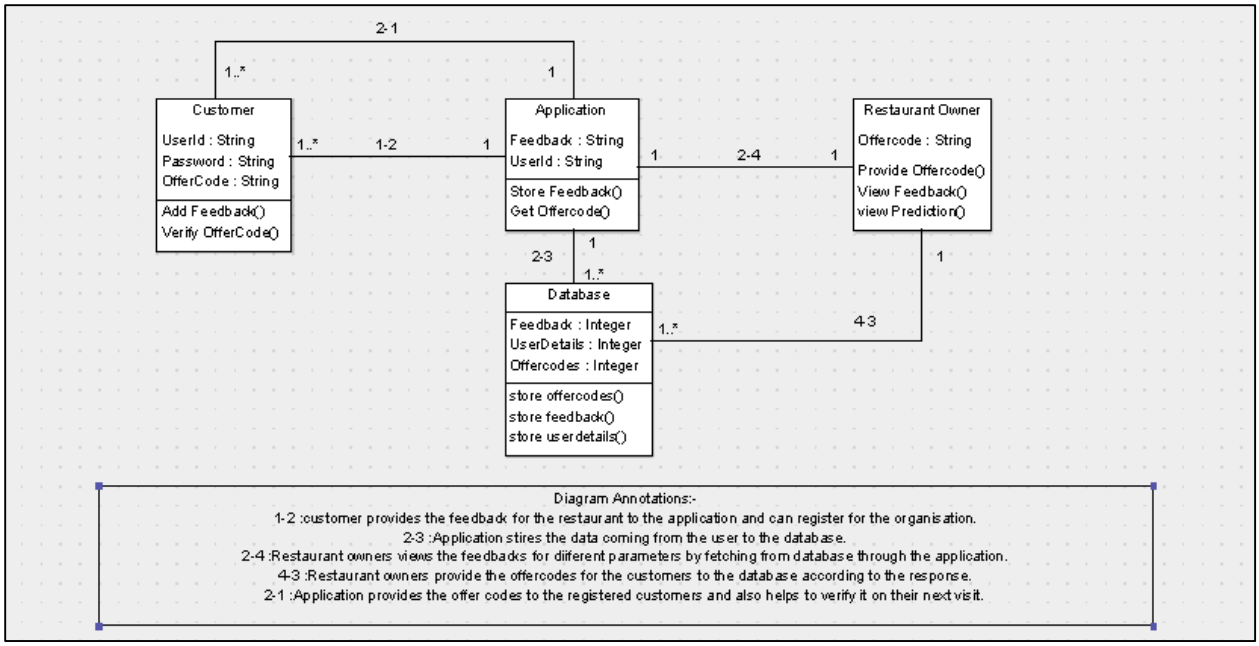


Fig 11: Class diagram for Customer Satisfaction Model

3.7. INTERACTION DIAGRAM

Interaction Diagram is a uml diagram that represents interaction is a part of dynamic behavior of the system.

Interaction Diagram:-

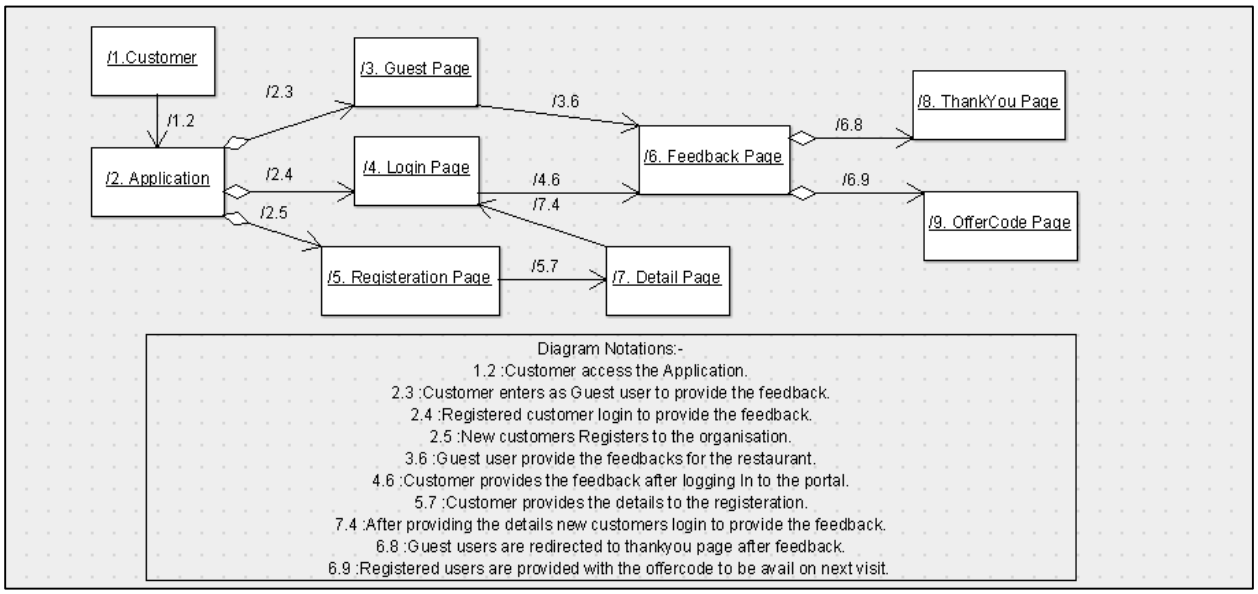


Fig 12: Collaboration Diagram for Customer Interaction

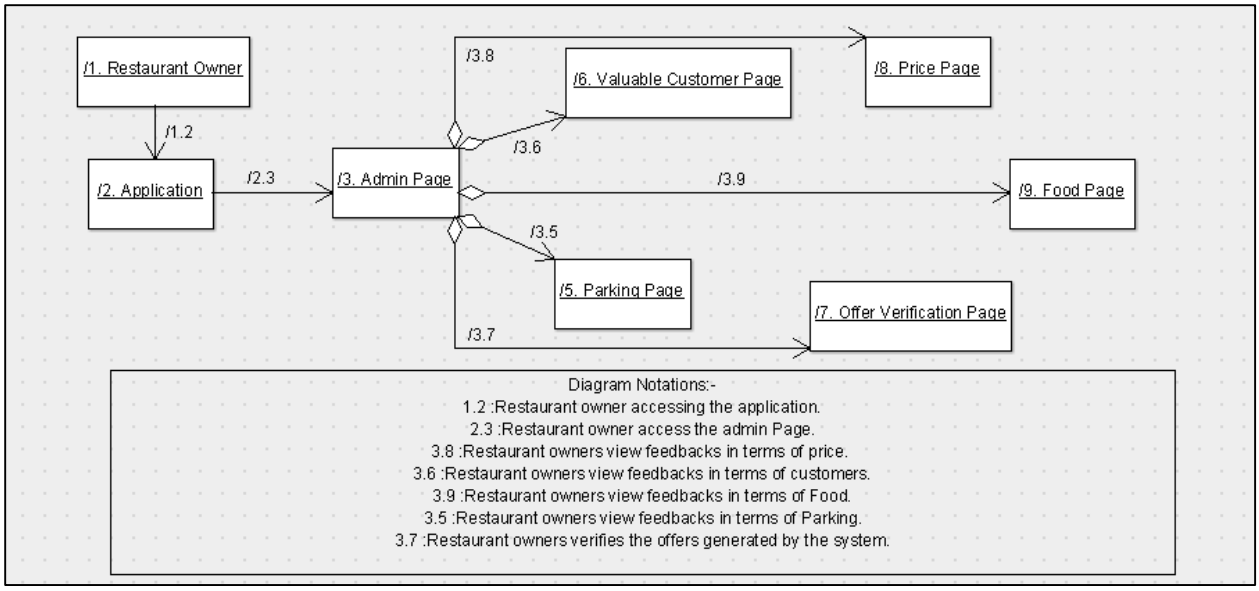


Fig 13: Collaboration Diagram For Restaurant Owner

3.8. STATE / ACTIVITY DIAGRAM

State/Activity diagram is the uml diagram that represents the state of the interaction done between the actor and the application.

State chart Diagram:-

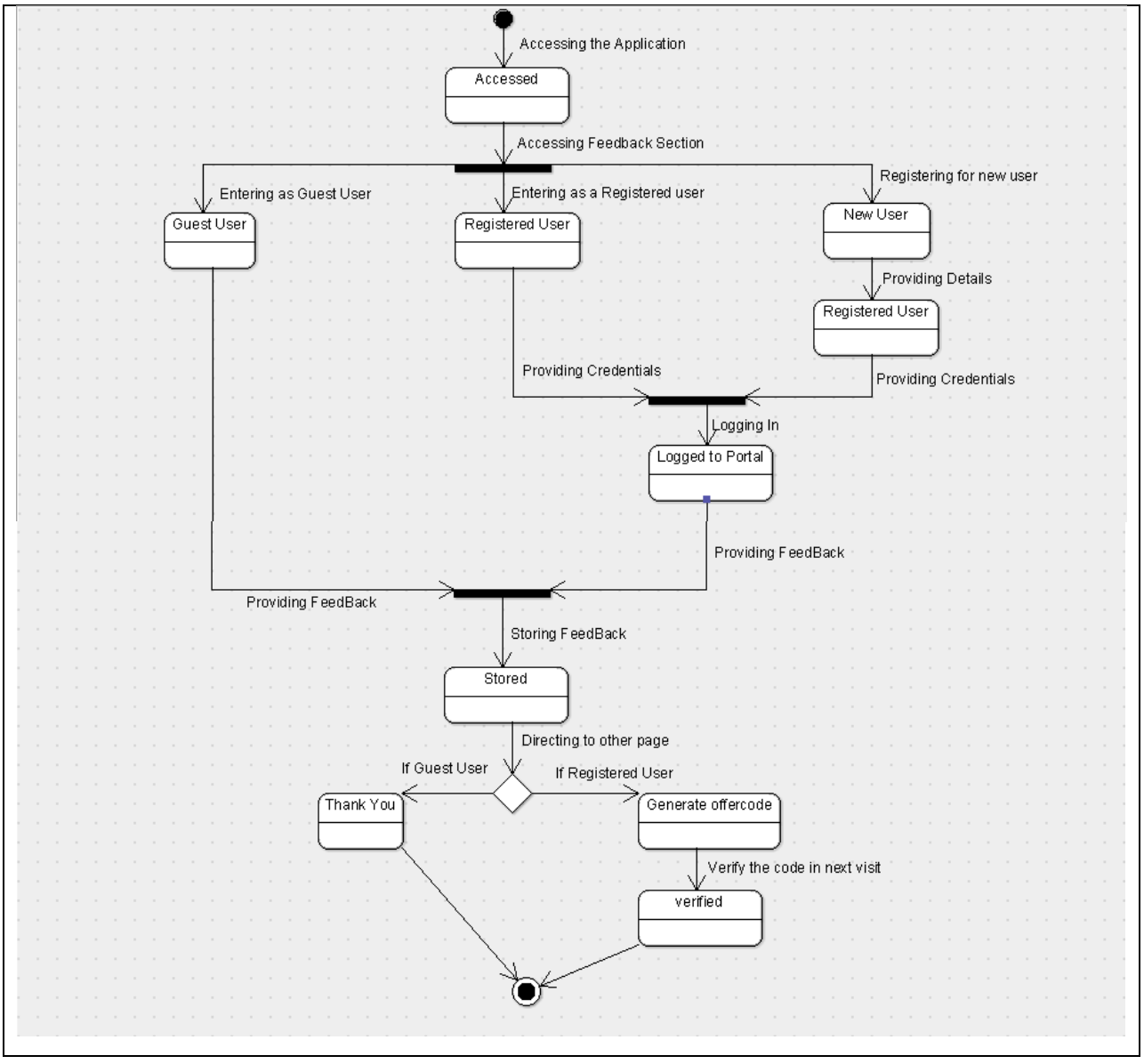


Fig 14: State-chart Diagramfor Customer Satisfaction Model

3.9. COMPONENT & DEPLOYMENT DIAGRAM

Component & Deployment diagram are the uml diagram where component diagram does not describe the functionality of the system but it describes the components used to make those functionalities whereas deployment diagram is a structure diagram which shows architecture of the system as deployment(distribution) of software artifacts to deploymenttargets.

Component Diagram:-

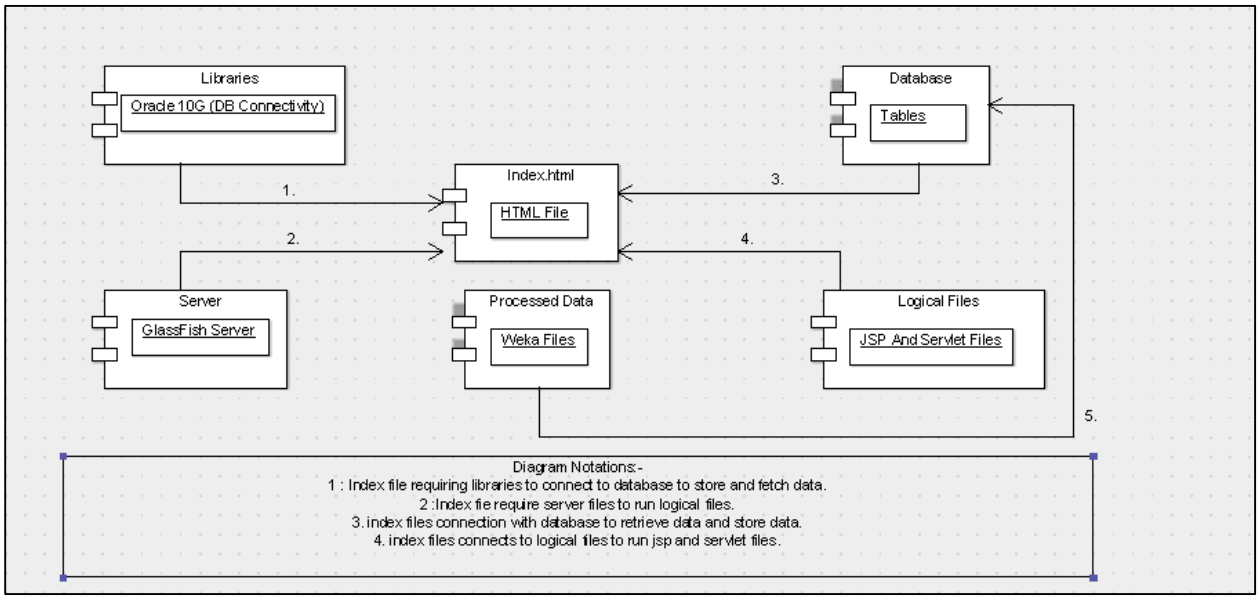


Fig 15: Component Diagram for Customer Satisfaction Model

Deployment Diagram:-

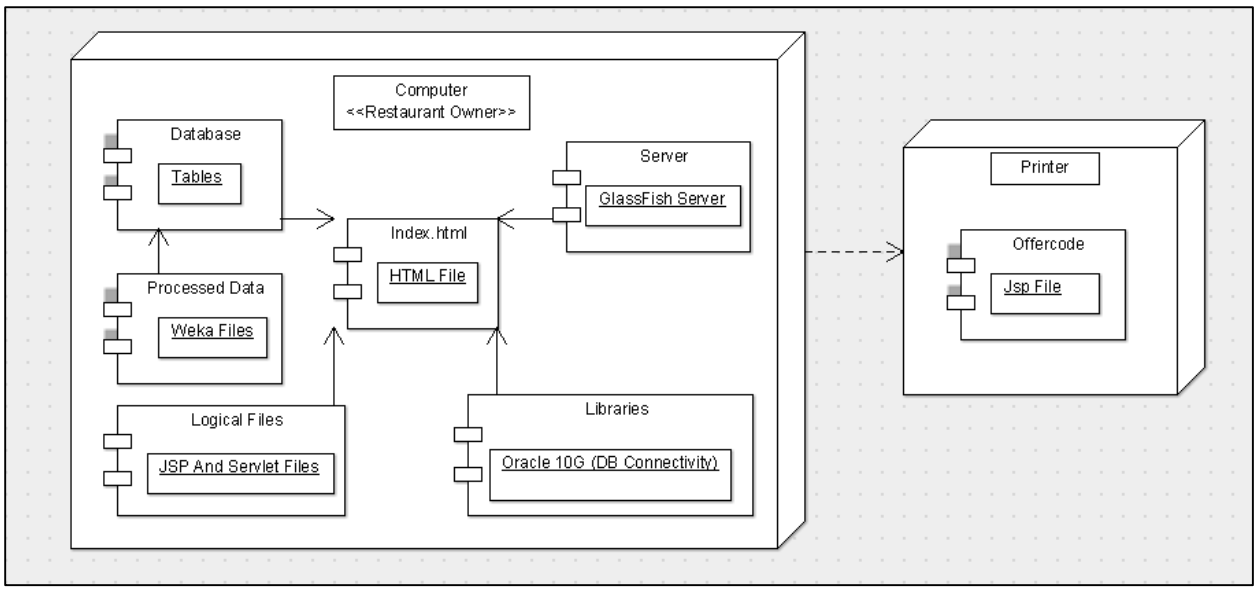


Fig 16: Deployment Diagram for Customer Satisfaction Model

CHAPTER 4

IMPLEMENTATION

4.1. DATABASE DESIGN

1. ER Diagram

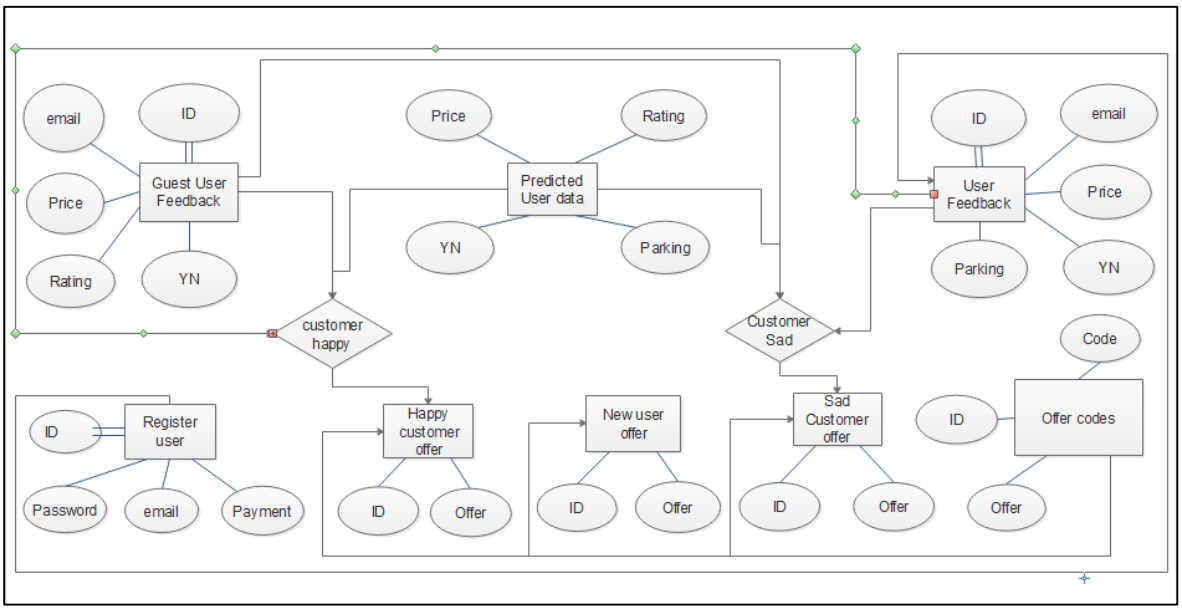


Fig 17: ER Diagram for Customer Satisfaction Model

2. Relational Model

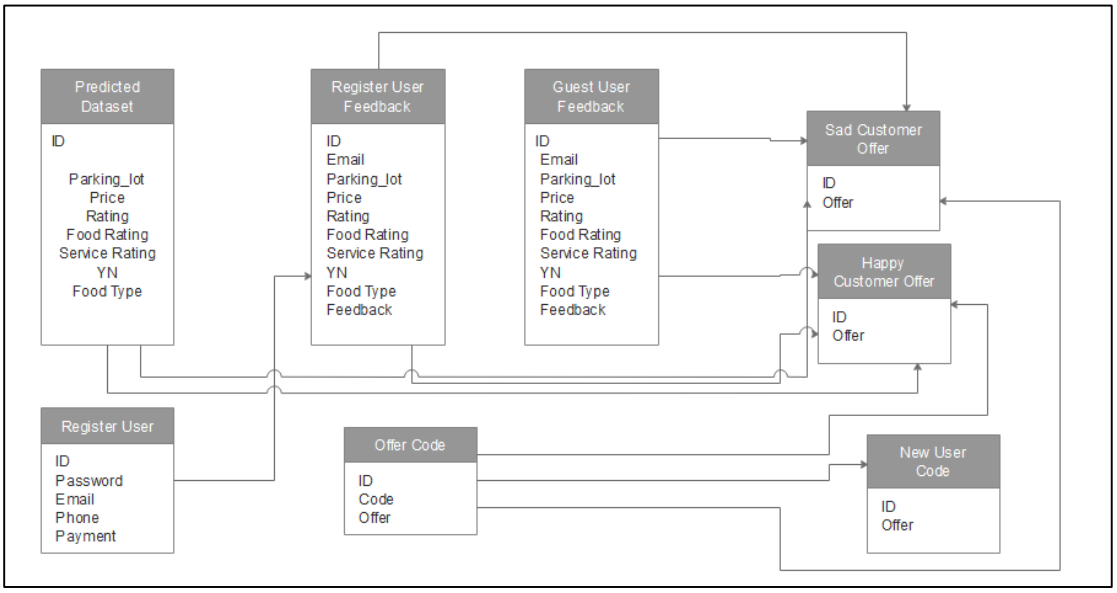


Fig 18: Relational Diagram for Customer Satisfaction Model

4.2. USER INTERFACE

Coding:-

- Homepage

```
<!-- Website template by freewebsitetemplates.com -->
<html>
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<title>Freeeze</title>
<link rel="stylesheet" href="css/style1.css" type="text/css">
<link rel="stylesheet" type="text/css" href="css/mobile.css">
<script src="js/mobile.js" type="text/javascript"></script>
</head>
<body>
<div id="page">
<div id="header">
<div>
<a href="index.html" class="logo"><img src="images/logo.png" alt=""></a>
<ul id="navigation">
<li class="selected">
<a href="index.html">HOME</a>
</li>
<li class="menu">
<a href="admin.html">ADMINISTRATOR</a>
</li>
<li class="menu">
<a href="login.html">FEEDBACK</a>
```

```
</li>
</ul>
</div>
</div>
<div id="body" class="home">
<div class="header">
<img src="images/newuserpromo.jpg" alt="">
<div>
<a href="singlepost.html">NEW USER BUMPER</a>
</div>
</div>
<div class="body">
<div>
<div>
<h1>Whats NEW?</h1>
<h2>The Twist For New Members and Old Members</h2>
<p>Guarenteed Big Offer for New Members and Old Members.</p>
</div>
<img src="images/yogurt.jpg" alt="">
</div>
</div>
<div class="footer"><div>
<ul>
<li>
<a href="coupon.html" class="product"></a>
<h1>COUPONS</h1>
</li>
<li>
```

```
<a href="about.html" class="about"></a>
<h1>OUR STORY</h1>
</li>
</ul>
</div>
</div>
</div>
<div id="footer">
<div>
<div class="connect">
<a href="" class="facebook">facebook</a>
<a href="" class="twitter">twitter</a>
<a href="" class="googleplus">googleplus</a>
<a href="" class="pinterest">pinterest</a>
</div>
<p>&copy;All Rights Reserved.</p>
</div></div>
</div>
</body></html>
```

- Feedback Result Page

```
<%@ page import ="java.sql.*" %>
<%@ page import ="java.util.*" %>

<% Class.forName("oracle.jdbc.driver.OracleDriver");
String uid = request.getParameter("uid");
 java.sql.Connection con = DriverManager.getConnection("jdbc:oracle:thin:@localhost:1521:xe","system", "sourabh007");
int rowcount=-1;
Statement stmt = con.createStatement();
ResultSet resultSet = stmt.executeQuery("SELECT COUNT(userid) FROM userfeed where userid='" + uid + "'");
 // Get the number of rows from the result set
 resultSet.next();
 rowcount = resultSet.getInt(1);
//out.print("Number of rows="+rowcount);
//if(!resultSet.next()) {
// out.println("Wait for the server. OR " + //  "Please <A HREF='self.jsp'>try again</A>.");//
} else {}
  if(rowcount>1)
{
%>
<b>Welcome OLD Customer<br></b>
<%
int rowcnt=-1;
Statement stmnt = con.createStatement();
ResultSet resultset = stmnt.executeQuery("select count(yn) from userfeed where userid='U1004' and yn='n'");
// Get the number of rows from the result set
```

```
resultset.next();

rowcnt = resultset.getInt(1);

int rwcnt=-1;

Statement st = con.createStatement();

ResultSet rs = st.executeQuery("select count(yn) from userfeed where userid='U1004' and yn='y'");

// Get the number of rows from the result set

rs.next();

rwcnt = rs.getInt(1);

if(rwcnt>rowcnt)

{

%>

<b>Customer Will Visit Again<br></b>

<p>Here is his next visit offer<br></p>

<%

}

else

{

%>

<b>Customer may not visit again<br></b>

<p>Here is his next time visit offer<br></p>

<%

}

%>

<%

}

 else

{

%>
```

Welcome New Customer

Here is your Exclusive Offer when you visit again

<% Statement st1 = con.createStatement();

ResultSet rs1 = st1.executeQuery("SELECT promo FROM (SELECT promo FROM newuserpromo ORDER BY dbms_random.value) WHERE rownum = 1") ;

rs1.next();

%>

<img src="<%out.println(rs1.getString(1));%>" alt="offer" height=350 width=500 align=center>

<%

}

%>

UI Outputs :-

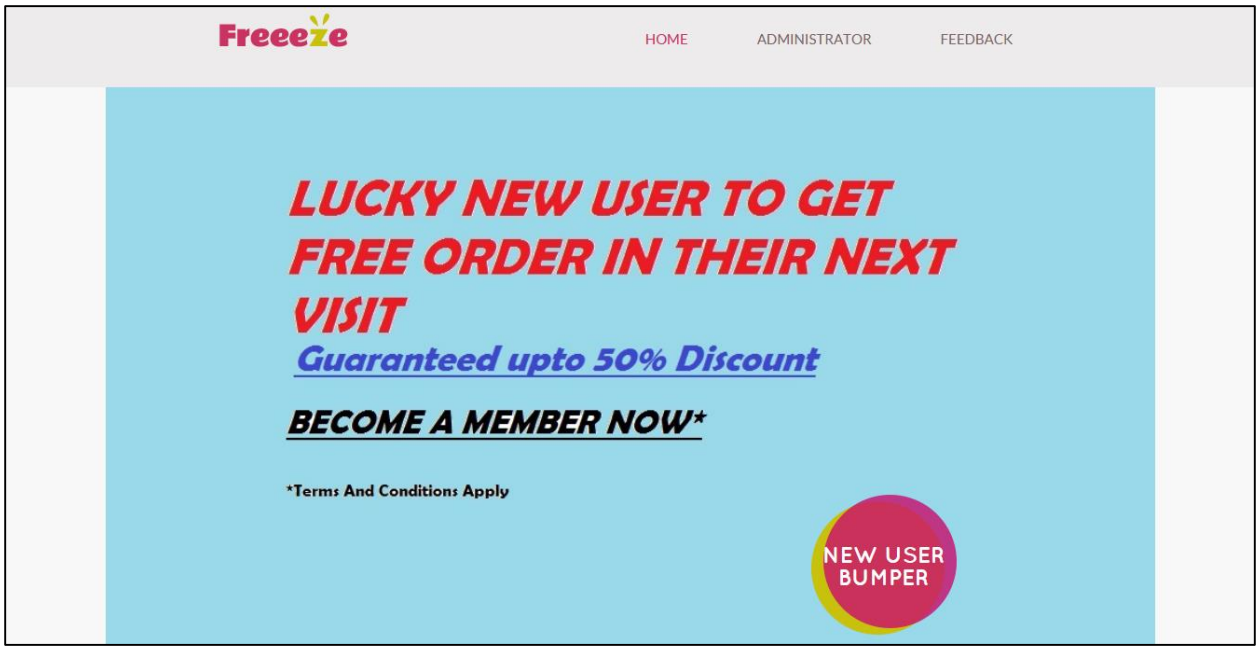
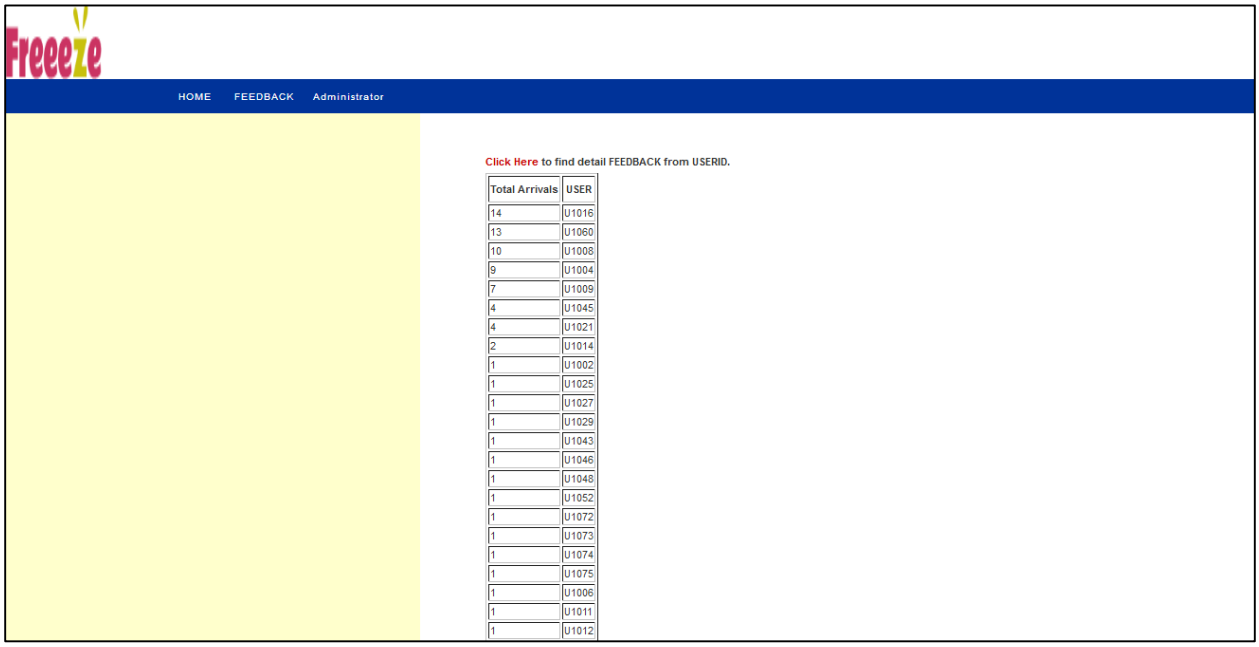


Fig 19: HomePage

Fig 20: Administrator Page



Total Arrivals	USER
14	U1016
13	U1060
10	U1008
9	U1004
7	U1009
4	U1045
4	U1021
2	U1014
1	U1002
1	U1025
1	U1027
1	U1029
1	U1043
1	U1046
1	U1048
1	U1052
1	U1072
1	U1073
1	U1074
1	U1075
1	U1006
1	U1011
1	U1012

Fig 21:Value User Page

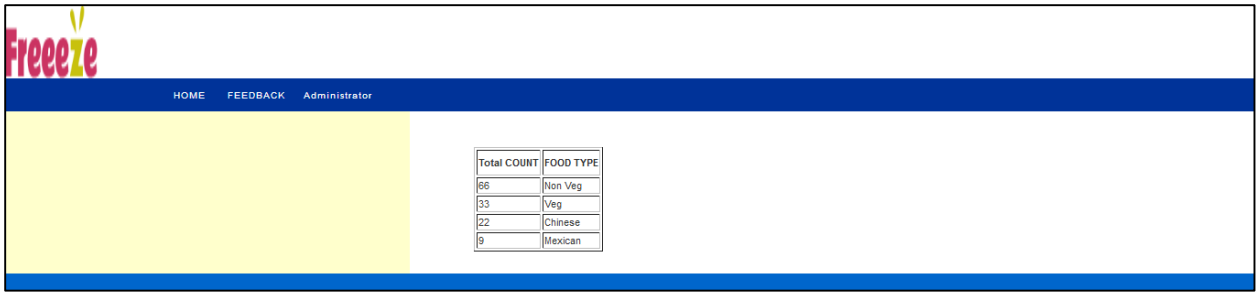


Fig 22:Value Food Page

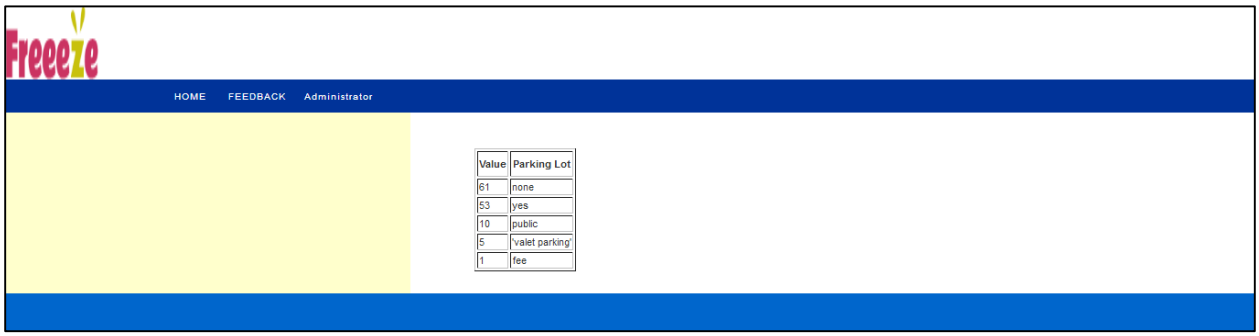


Fig 23:Value Parking Page

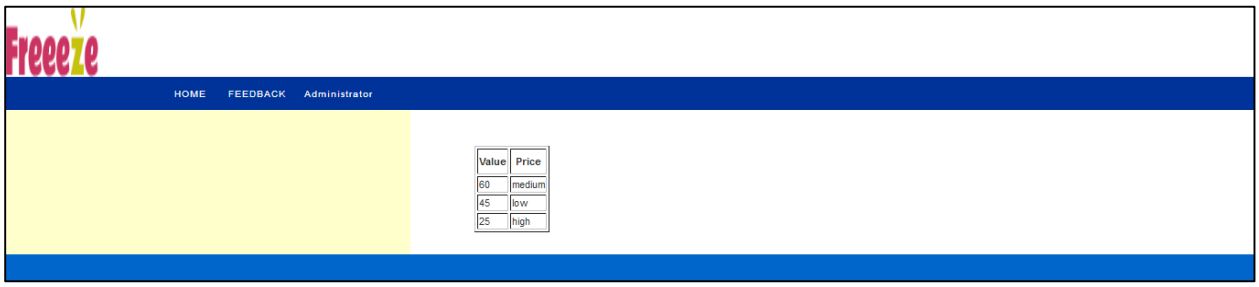


Fig 24: Value Price Page

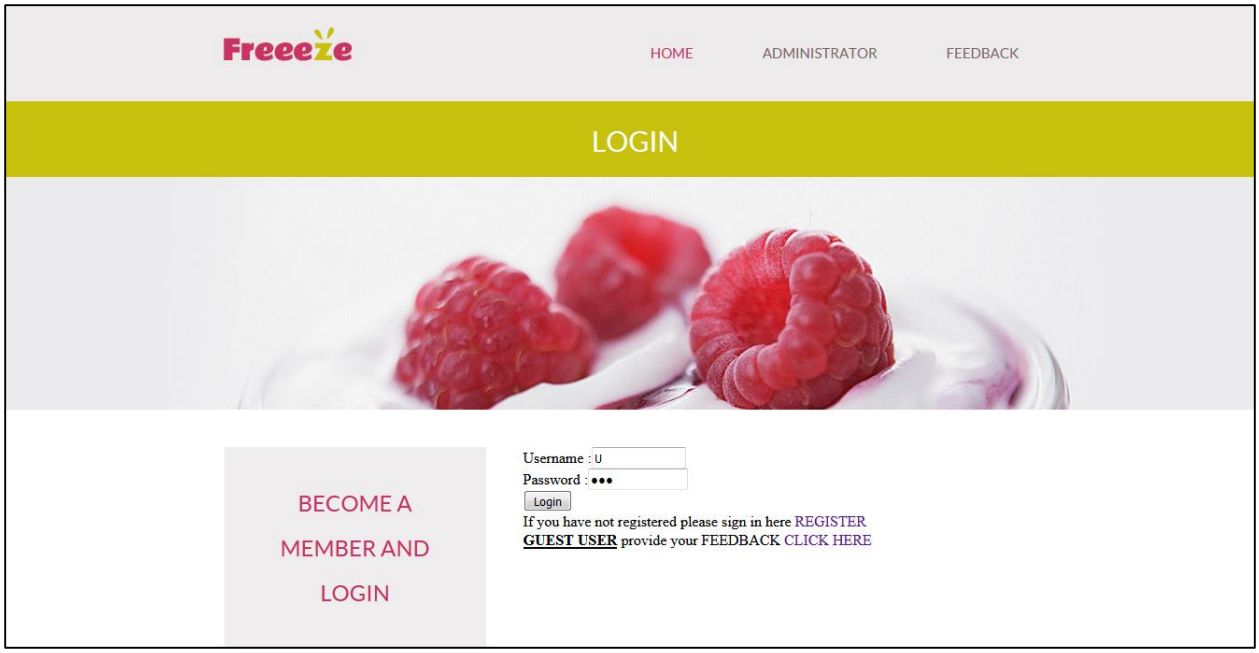


Fig 25: Login Page

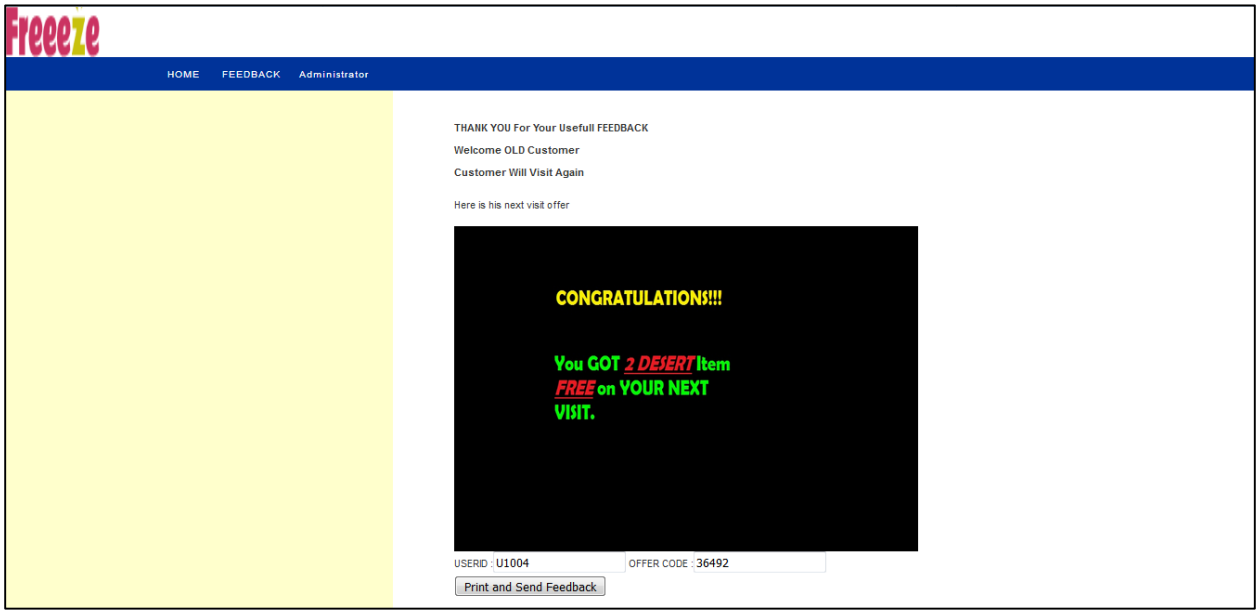


Fig 26:Prediction Page

4.3. TOOLS & TECHNOLOGIES

The Middleware or tools used to Build this application are as following:-

1. Weka V3.8
2. Oracle 10G Express Edition
3. Net-Beans IDE 8.0.2
4. Xampp
5. Selenium
6. Sonarqube

Some of the Middleware Applications output are provided below :-

- Weka.

	A	B	C	D	E	F	G	H	I
1	userID	parking_lc	price	rating	food_ratir	service_ra	y/n	Food_Type	
2	U1001	public	medium	2	2	2	y	Non Veg	
3	U1002	none	low	2	2	1	y	Veg	
4	U1003	none	medium	2	2	2	y	Non Veg	
5	U1004	none	low	1	2	2	y	Mexican	
6	U1004	none	medium	1	1	2	y	Veg	
7	U1004	none	high	0	0	0	n	Non Veg	
8	U1004	none	low	1	1	1	y	Veg	
9	U1004	yes	high	0	0	0	n	Non Veg	
10	U1004	valet park	low	1	1	1	y	Mexican	
11	U1004	valet park	medium	2	2	2	y	Veg	
12	U1004	public	medium	1	1	1	y	Non Veg	
13	U1004	none	low	1	2	2	y	Non Veg	
14	U1005	valet park	high	1	0	1	n	Veg	
15	U1006	valet park	high	0	0	0	n	Chinese	

Fig 27: Trained DataSet

	A	B	C	D	E	F	G	H	I
1	userID	parking_lo	price	rating	food_ratir	service_ra	y/n	Food_Type	
2	U1001	public	medium	1	2	2	_	Non Veg	
3	U1002	none	low	2	2	1	_	Veg	
4	U1003	none	medium	2	1	2	_	Non Veg	
5	U1004	none	low	1	1	2	_	Mexican	
6	U1004	none	medium	1	1	2	_	Veg	
7	U1004	none	high	0	2	0	_	Non Veg	
8	U1004	none	low	1	1	1	_	Veg	
9	U1004	yes	high	0	2	0	_	Non Veg	
10	U1004	valet park	low	1	1	1	_	Mexican	
11	U1004	valet park	medium	2	2	1	_	Veg	
12	U1004	public	medium	0	1	1	_	Non Veg	
13	U1004	none	low	1	2	2	_	Non Veg	
14	U1005	valet park	high	1	2	1	_	Veg	
15	U1006	valet park	high	0	2	0	_	Chinese	
16	U1007	yes	medium	1	1	0	_	Non Veg	
17	U1008	public	low	1	2	1	_	Non Veg	
18	U1008	yes	medium	1	1	2		Veg	

Fig 28: Test Data Set.

	A	B	C	D	E	F	G	H	I	J	K
1	@relation	'restaurants_model-weka.filters.unsupervised.attribute.Remove-R1-6,8-16,18,23-40_predicted'									
2											
3	@attribute parking_lot {public,none,yes,'valet parking',fee}										
4	@attribute price {medium,low,high}										
5	@attribute rating numeric										
6	@attribute food_rating numeric										
7	@attribute service_rating numeric										
8	@attribute 'prediction margin' numeric										
9	@attribute 'predicted y/n' {y,n}										
10	@attribute y/n {y,n}										
11											
12	@data										
13	public,medium,1,2,2,1,y,?										
14	none,low,2,1,1,1,y,?										
15	none,medium,2,2,2,1,y,?										
16	none,low,1,2,2,1,y,?										
17	none,medium,1,1,2,1,y,?										
18	none,high,2,0,0,-1,n,?										
19	none,low,1,1,1,1,y,?										
20	yes,high,0,2,0,0.6,y,?										
21	'valet parking',low,1,2,1,1,y,?										
22	'valet parking',medium,1,2,2,1,y,?										
23	public,medium,1,1,1,1,y,?										

Fig 29:Predicted Data Set

- Oracle 10G Express Edition

GUESTFEED

Table Data Indexes Model Constraints Grants Statistics UI Defaults Triggers Dependencies SQL

Add Column | Modify Column | Rename Column | Drop Column | Rename | Copy | Drop | Truncate | Create Lookup Table

Column Name	Data Type	Nullable	Default	Primary Key
GUESTID	VARCHAR2(4000)	Yes	-	-
GUEST_MAIL	VARCHAR2(4000)	Yes	-	-
PARKING_LOT	VARCHAR2(4000)	Yes	-	-
PRICE	VARCHAR2(4000)	Yes	-	-
RATING	NUMBER	Yes	-	-
FOOD_RATING	NUMBER	Yes	-	-
SERVICE_RATING	NUMBER	Yes	-	-
YN	VARCHAR2(4000)	Yes	-	-
FOOD_TYPE	VARCHAR2(4000)	Yes	-	-
FEEDBACK	VARCHAR2(4000)	Yes	-	-

1 - 10

Fig 30: Guest Feed Table

NEWUSERPROMO

Table Data Indexes Model Constraints Grants Statistics UI Defaults Triggers

Add Column | Modify Column | Rename Column | Drop Column | Rename | Copy | Drop | Trun

Column Name	Data Type	Nullable	Default	Primary Key
ID	NUMBER	No	-	1
PROMO	VARCHAR2(30)	Yes	-	-

1 - 2

Fig 31: New User Offer Table

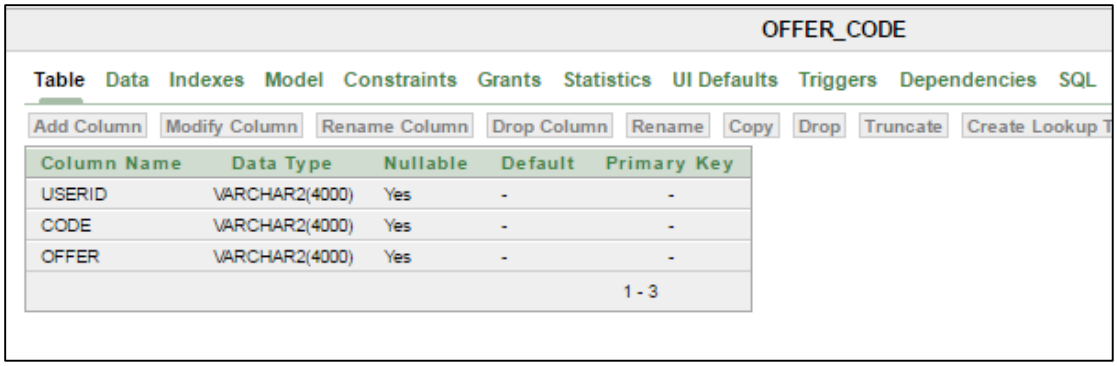


Fig 32: Offer Code Table

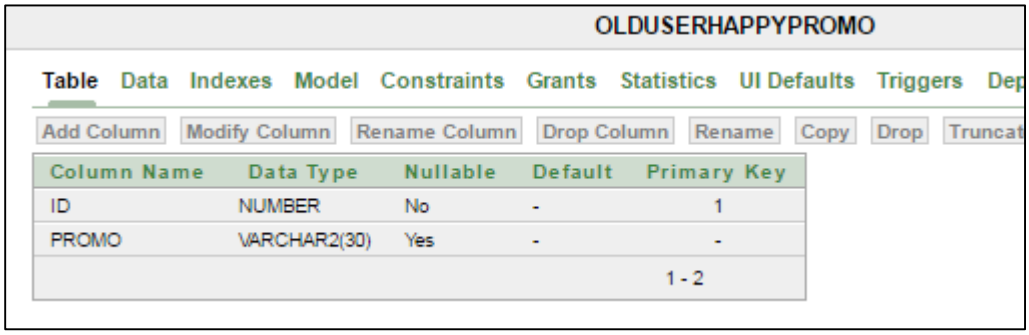


Fig 33: Happy Customer Offer Table

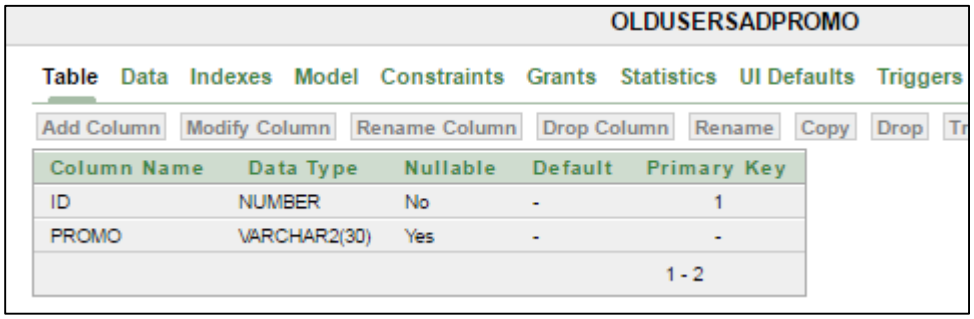


Fig 34: Sad Customer Offer Table

CHAPTER 5

VERIFICATION & VALIDATION RESULTS

5.1. UNIT TESTING

Unit testing is a level of software testing where individual units or components of a software are tested. Test cases for unit testing are :-

Test ID	Test Case	Procedure	Input	Expected output	Output	Remarks
UT101-UT110	Unit Testing For Homepage to check title and css element	Open homepage Add Command to check title Add command to check css file	Open Verify Title Assert Element	No Error	No Error	Passed
UT111-UT113	Unit Testing For Login Page To check inputs and elements.	Open homepage Click feedback page Enter credentials Click login	Open Click & wait Click & wait Type Click & wait	No Error (user details)	No Error (user details)	passed
UT114-UT116	Unit Testing For Login Page To check inputs and elements.	Open homepage Click feedback page Enter credentials Click login	Open Click & wait Click & wait Type Click & wait	No Error	Error (internal server error)	Failed

Table 3:Test Cases For Unit Testing

Output for Unit Testing

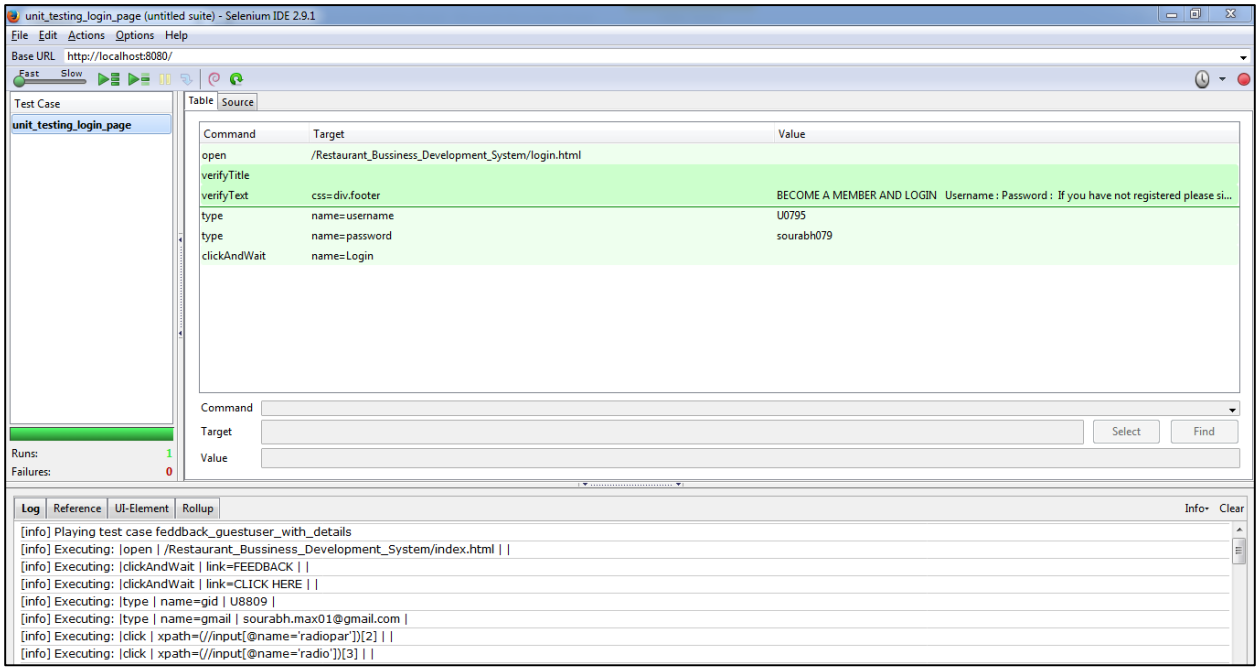


Fig 35: Unit Testing For the login Page

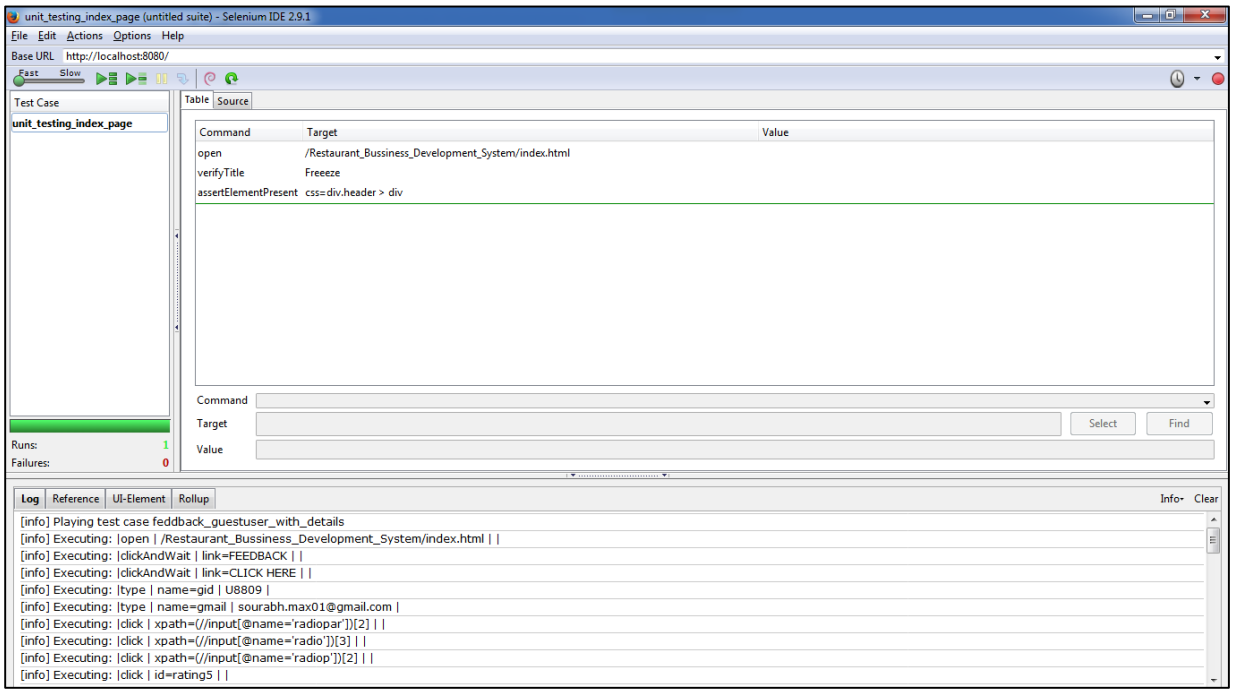


Fig 36: Unit Testing For the home page

5.2. INTEGRATION TESTING

Integration testing is the phase in software testing in which individual software modules are combined and tested as a group. Test case for integration testing are:-

Test ID	Test Case	Procedure	Input	Expected output	Output	Remarks
IT101-IT110	Integration Testing from homepage to admin page to valuable user page	Open homepage Click admin page Click valuable user	Open Click & wait Click & wait	No Error	No Error	Passed
IT111-IT113	Integration Testing from homepage to Admin Page to most valuable user page to search particular user	Open homepage Click admin page Click valuable user Click select user Enter userId Click search	Open Click & wait Click & wait Click & wait Type Click & wait	No Error (user details)	No Error (user details)	passed
IT114-IT116	Integration Testing from homepage to Admin Page to most valuable user page to search particular user	Open homepage Click admin page Click valuable user Click select user Enter userId Click search	Open Click & wait Click & wait Click & wait Type Click & wait	No Error (User details)	Error (internal server error)	Failed

Table 4:Test Cases For Integration Testing

Integration Testing Outputs:-

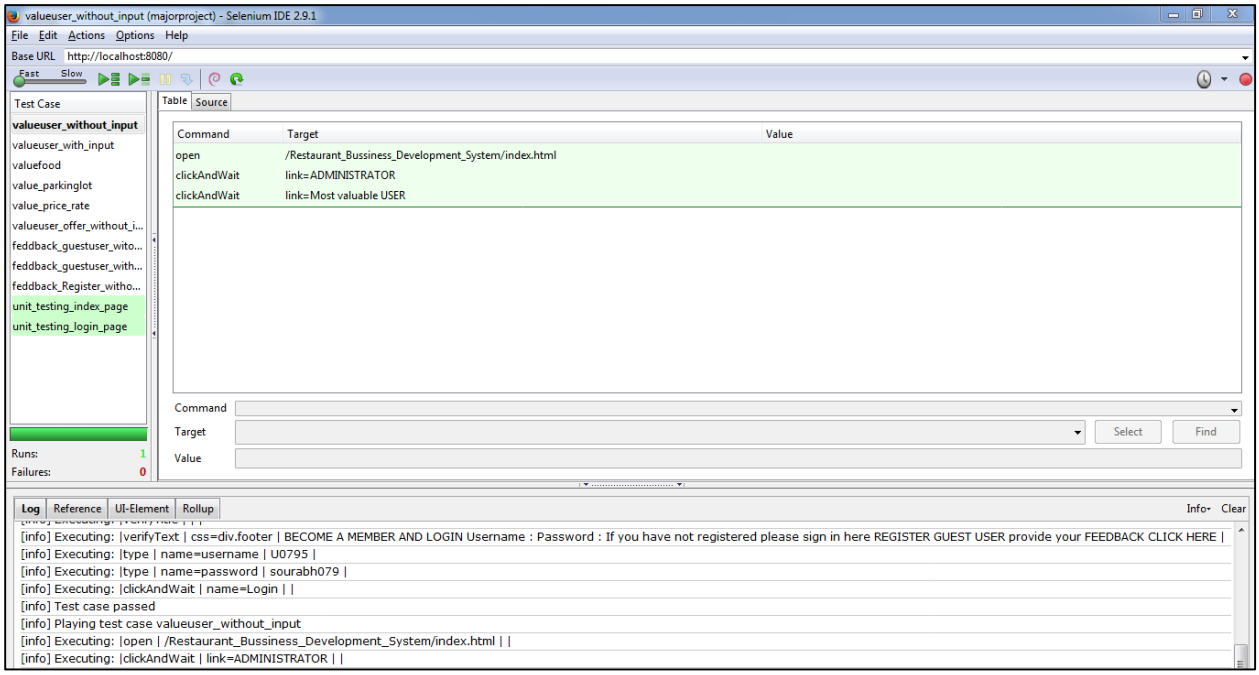


Fig 37: Integration Testing for Test-case IT101-IT110

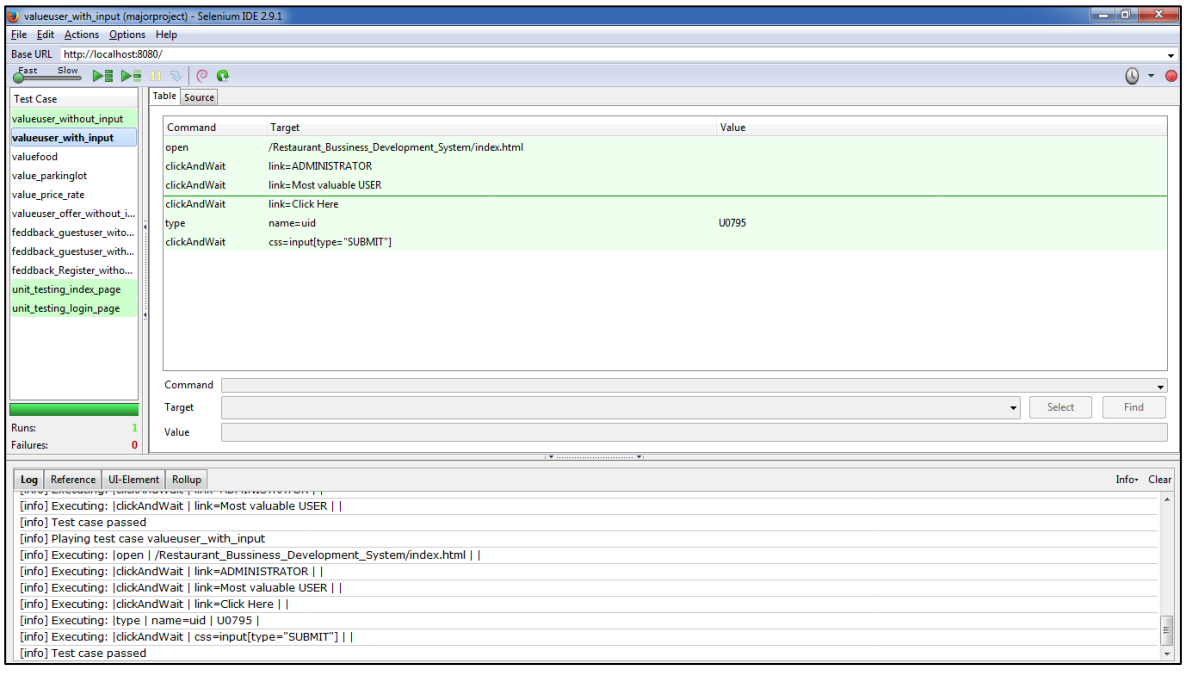


Fig 38: Integration Testing for Test-case IT111-IT113

5.3. USER TESTING

User acceptance testing (UAT) is the last phase of the software testing process. During UAT, actual software users test the software to make sure it can handle required tasks in real-world scenarios, according to specifications.

The Test case for user testing are:-

Test Id	User	Acceptance Requirement	Critical		Test Result		Comment
			Yes	No	Accept	Reject	
UT001	Student	The application should work till End	✓		✓		Application predicted but UI can be Good.
UT002	Student	The application should verify the offer code	✓		✓		Application verified the offer code satisfied.
UT003	Student	Application should display data with respect to different features	✓		✓		Detail description should be better.

Table 5:User Testing Test Casefor Customer Satisfaction Model

User Testing Report :-

User Report	
1. Report Identifier	Sourabh Agarwal
2. Summary	To satisfy maximum users with the application working and prediction.
3. Variances	Application may experience server errors due to listener problem causing inconsistency in performance of application.
4. Summary of Results	Maximum users are satisfied with the application and its prediction for the customers.
5. Evaluation	Many users rated it a 'B' level software in terms of its working and prediction.
6. Recommendations	Many users recommended to modify the GUI of the application and increase the detailing of attributes to admin section.
7. Summary of Activities	Many user find moving across the application is user friendly and is more convenient and flexible in terms of providing feedback.
8. Approval	Many users approved the application.

Table 6: User Testing Report for Customer Satisfaction Model

5.4. SIZE-LOC

- The Estimate lines of code was 2000.
- The new estimated value for line of code came to be 2090 using sonar qube.
- The sonar qube does not analyse the html, css and Jsp files.
- Therefore including the Html and Jsp files the lines of code reached to 5200

Outputs For Size-LOC :-

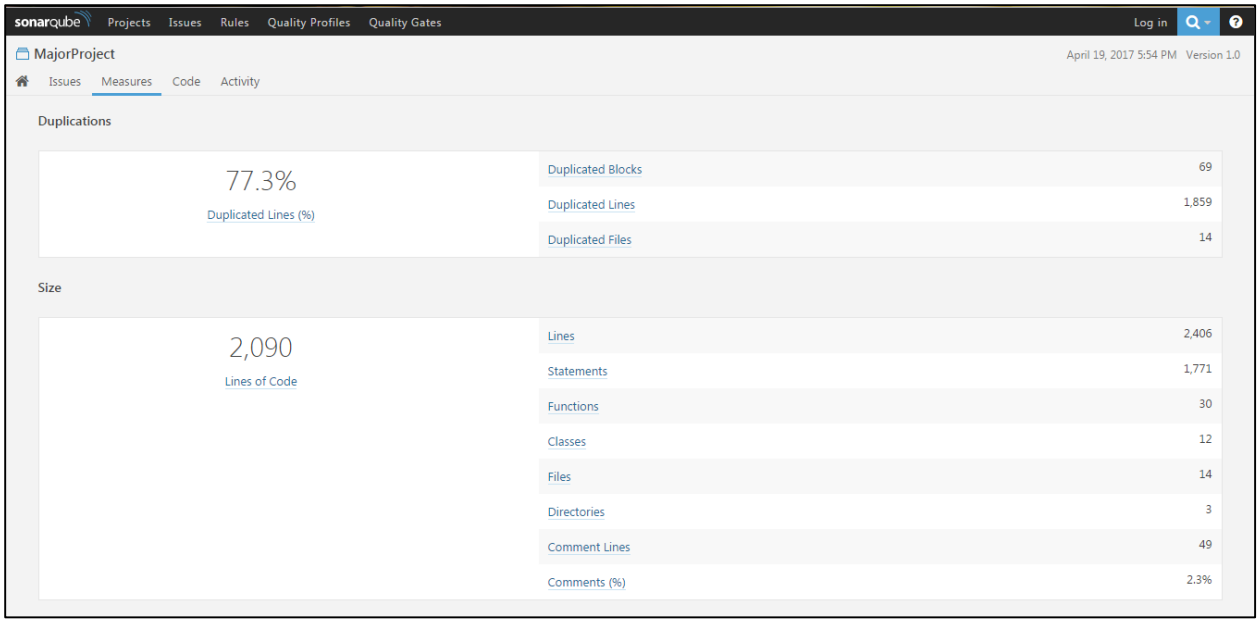


Fig 39: Lines of code by sonarqube for Customer Satisfaction Model

5.5. COST ANALYSIS

In cost analysis during the first cost estimation before the implementation it was estimated that cost of the project will go around Rs 16,746

Whereas after implementation it was found out the estimated cost for the software is Rs 19,010

Therefore difference between the cost between the phases comes out Rs 2,264 which comes around 2.264K between the analysis and validation phase.

Also, to estimate the cost before the implementation two models was used to determine the cost COCOMO model which gave around Rs 16,198 and Bohems Model which gave around Rs 16,746

Therefore the cost difference between this two model comes around Rs 548 which goes around 0.548K

Therefore we can say the estimated cost for the application before the implementation has very less Percentage of error when compared between 2 different models.

Also the cost estimated before the implementation and after implementation also has very few percentage of error when compared with same models amount.

Results

Software Development (Elaboration and Construction)

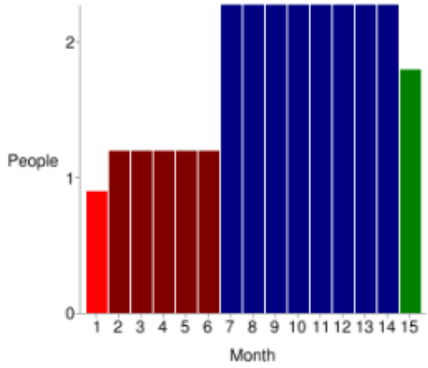
Effort = 26.1 Person-months
Schedule = 14.0 Months
Cost = $2613

Total Equivalent Size = 5200 SLOC

Acquisition Phase Distribution

Phase	Effort (Person-months)	Schedule (Months)	Average Staff	Cost (Dollars)
Inception	1.6	1.8	0.9	$157
Elaboration	6.3	5.3	1.2	$627
Construction	19.9	8.8	2.3	$1987
Transition	3.1	1.8	1.8	$314

Staffing Profile



Software Effort Distribution for RUP/MBASE (Person-Months)

Phase/Activity	Inception	Elaboration	Construction	Transition
Management	0.2	0.8	2.0	0.4
Environment/CM	0.2	0.5	1.0	0.2
Requirements	0.6	1.1	1.6	0.1
Design	0.3	2.3	3.2	0.1
Implementation	0.1	0.8	6.8	0.6
Assessment	0.1	0.6	4.8	0.8
Deployment	0.0	0.2	0.6	0.9

Fig 40: Cost analysis result for the COCOMO Model

5.6. DEFECT ANALYSIS

It is the process of handling the defects fount during the different phases of the testing.The defect report is a report with complete defect description and handling of the description. Defect Report for the application:-

Defect Report	
1. ID	DT001
2. Project Name	Major Project
3. Product Name	Restaurant business development system (RBDS)
4. Release Version	1.0
5. Module	DB Connectivity
6. Detect Build Version	1.0
7. Summary	Oracle 10G jar file unstable for connection
8. Description	After Sometimes of execution the link to database terminates which causes unexpected error to application
9. Steps to replicate	I. Add Oracle 10G Jar file to the libraries of application. II. Clean and Build the Project. III. Run the Application N no of time till the connection breaks. IV. Error occurs.
10. Actual Result	Internal Server error (Listener refuses problem)
11. Expected Result	Internal Server error (Listener refuses problem)
12. Attachment	-
13. Remarks	Execution failed
14. Defect Severity	High
15. Defect Priority	Primary
16. Reported By	Sourabh Agarwal
17. Assigned to	-
18. Status	pending
19. Fixed Build Version	Yet to release

Table 7:Defect Report For Customer Satisfaction Model

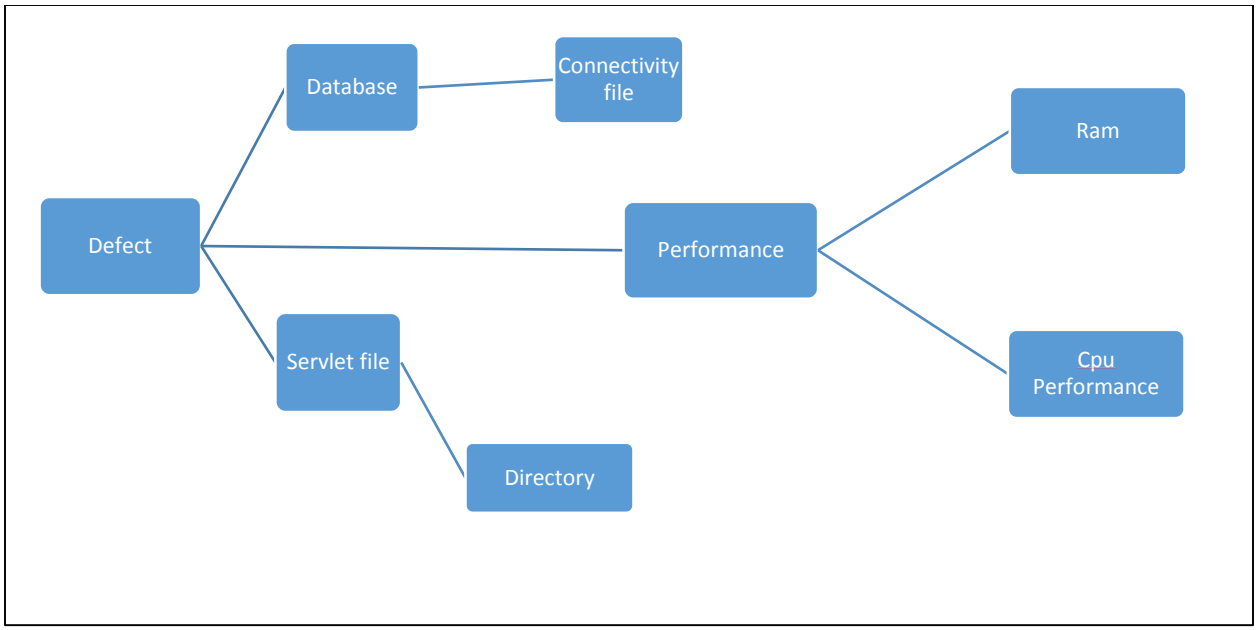


Fig 41: Fish Bone Diagram For Customer Satisfaction Model

5.7. MC CALLS'S QUALITY FACTOR

Mc Calls's Quality factor has 11 quality factors which helps in determining the quality of a software. The table for the application is below :-

MC Call's Quality Factor	
• Correctness	The application has the correctness property as it predicts the customers visit for every feedback.
• Reliability	The application is reliable and performs maximum functionality with correct precision.
• Efficiency	The application is not Efficient for poorly configured system. But it can be efficient if directly executed in server.
• Integrity	The application provides integrity to maximum extent by providing logging option on both ends. Still is vulnerable to hacking like (sql injection,etc).
• Usability	The usability factor for the application is optimum and can easily operated and is user friendly.
• Maintainability	The Application is highly maintainable as it requires updation of predicted datasets with certain interval of times.
• Testability	The application is highly testable due to its modularity and mostly being a web application.
• Flexibility	The flexibility of the application is optimum as it requires good knowledge of the code before making changes.
• Portability	The application is highly portable because of being web application and can run in many browsers.
• Reusability	The application is highly reusable of being distinguished modules which can be also used in different application.
• Interoperability	The application is highly interoperable due to web application it can easily connect to different modules through links and other systems.

Table 8:Mc Call's Quality Factor for Customer Satisfaction Model

Mc Call's Quality Factor Outputs :-

Fig 42: Reliability Rating And Graph

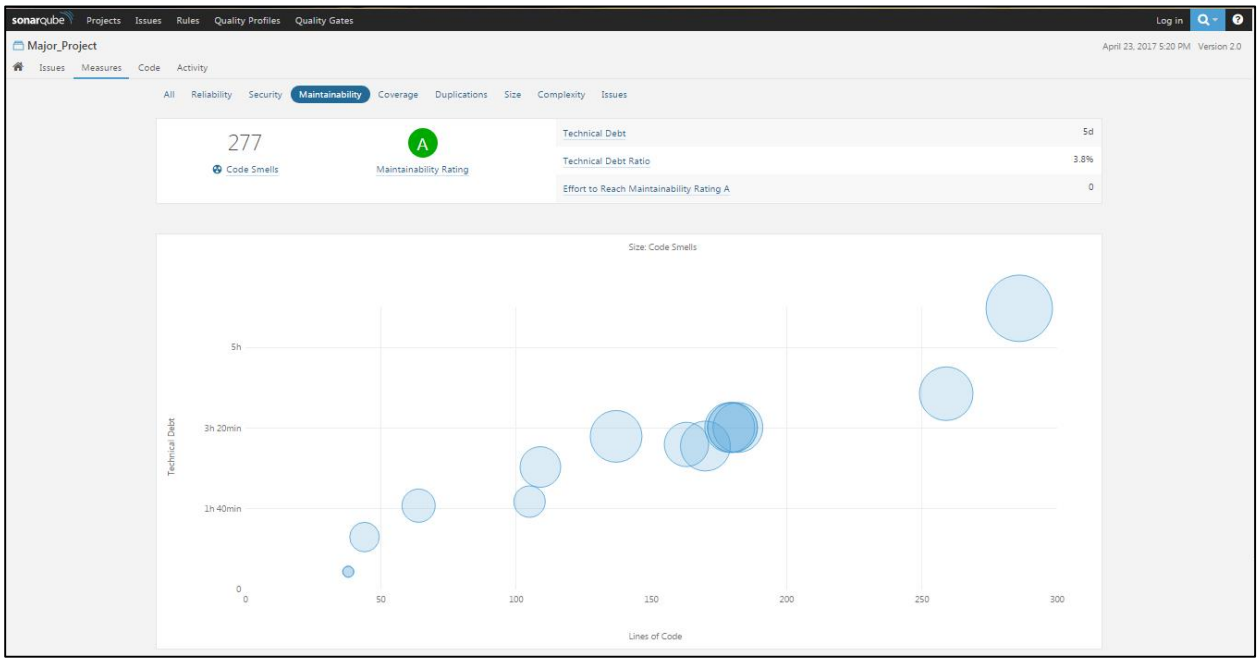


Fig 43: Maintainability Rating And Graph

CHAPTER 6

EXPERIMENT RESULTS & ANALYSIS

6.1 RESULTS

The Application can successfully predict the customers visit.

The Application can successfully provide the offers to customers on the basis of feedback.

The owner can keep track of the resources that will help him to keep customer happy.

Result Outputs :-

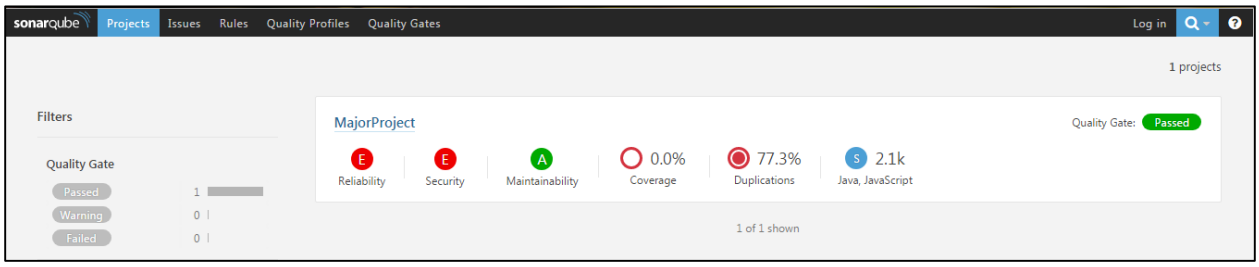


Fig 44: Quality Resultfor Customer Satisfaction Model.

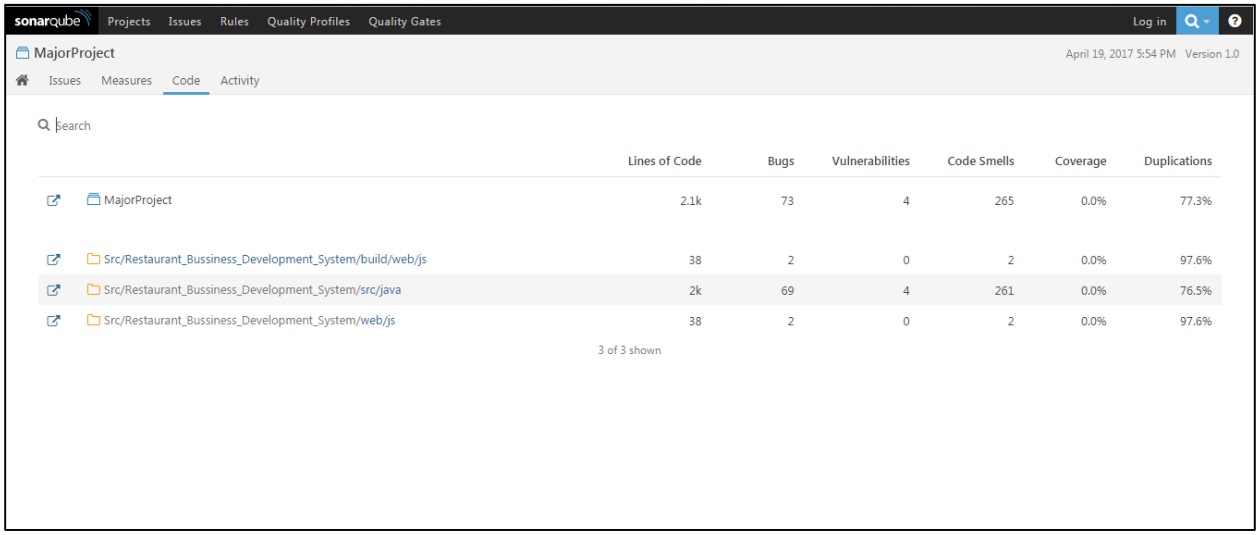


Fig 45: Information Resultfor Customer Satisfaction Model

6.2. RESULT ANALYSIS

Result analysis is done to compare the results that we have achieved is the only result or better results can be achieved.

The J48 or decision tree algorithm was selected because it had the 99.2308% correction value while in comparison to decision table algorithm which was used in referred journal it only produced 97.6923% correction value which ultimately leads us to the selection of J48 algorithm.

Result analysis output :-

```
=== Summary ===

Correctly Classified Instances         129               99.2308 %
Incorrectly Classified Instances         1                0.7692 %
Kappa statistic                          0.981
Mean absolute error                      0.0123
Root mean squared error                  0.0784
Relative absolute error                  3.012  %
Root relative squared error             17.3845 %
Total Number of Instances              130

=== Detailed Accuracy By Class ===

                 TP Rate  FP Rate  Precision  Recall   F-Measure
                 1.000    0.027    0.989      1.000    0.995
                 0.973    0.000    1.000      0.973    0.986
Weighted Avg.    0.992    0.019    0.992      0.992    0.992

=== Confusion Matrix ===

  a  b   <-- classified as
 93  0 |  a = y
  1 36 |  b = n
```

Fig 46: Result of J48 Algorithm.

```
=== Summary ===

Correctly Classified Instances         127               97.6923 %
Incorrectly Classified Instances         3                2.3077 %
Kappa statistic                          0.9438
Mean absolute error                      0.0684
Root mean squared error                  0.1411
Relative absolute error                 16.7317 %
Root relative squared error             31.2588 %
Total Number of Instances              130

=== Detailed Accuracy By Class ===

                 TP Rate   FP Rate   Precision   Recall  F-Measure
                 0.978     0.027     0.989       0.978     0.984
                 0.973     0.022     0.947       0.973     0.960
Weighted Avg.    0.977     0.025     0.977       0.977     0.977

=== Confusion Matrix ===

  a  b   <-- classified as
 91  2 |  a = y
  1 36 |  b = n
```

Fig 47: Result of Decision Table

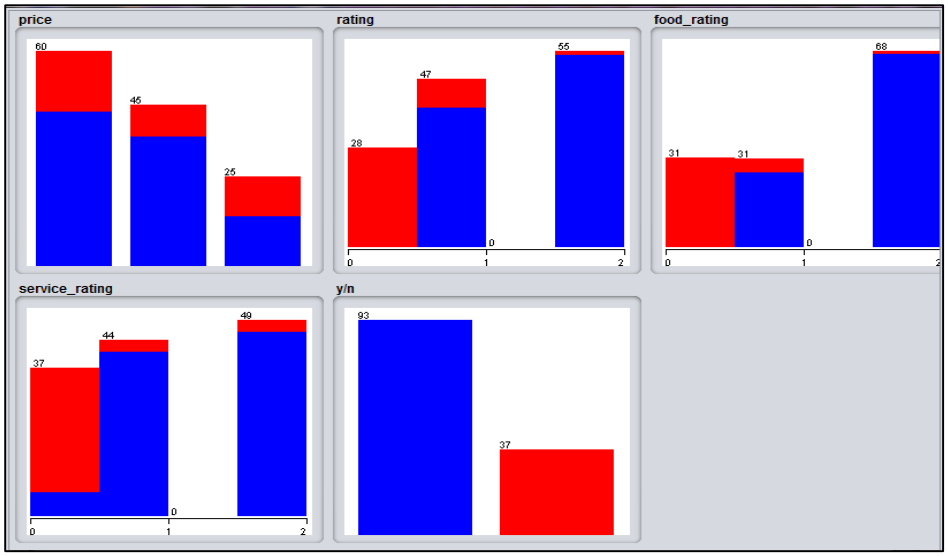


Fig 48: J48 Classification algorithm statistics

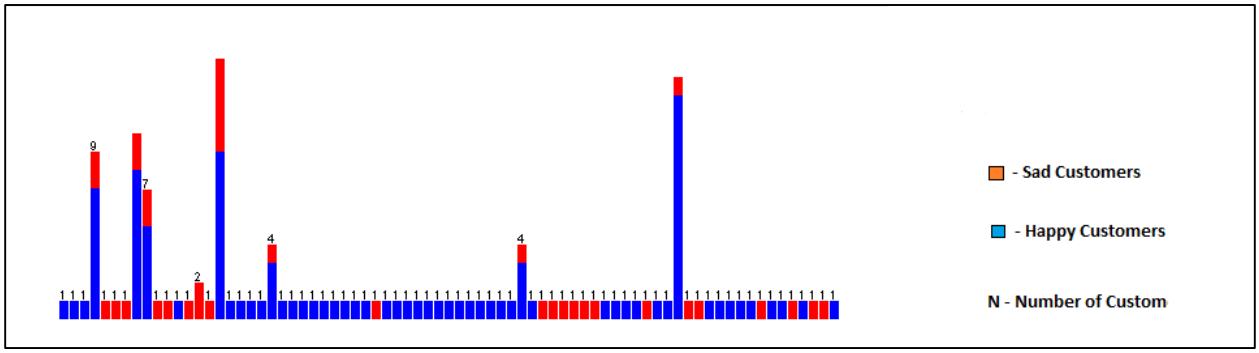


Fig 49: Customer Satisfied Result For Prediction Model

6.3. CONCLUSION & FUTURE WORK

In The End we were able to develop a software which can help restaurant organizations and customers also. This application can also encourage to develop similar kind of software for various organization also.

In Future the customers can come to restaurants and can access the application through remote device and order food without any assist or can customize their order to save time.

In Future organization can introduce swipe cards or RFID card to recharge their card and avail offers through it.

In Future organization or development team can make this product online by providing OTP instead of password.

-

CHAPTER 7

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