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A

Project Report

on

Foody Home

submitted as partial fulfillment for the award of

BACHELOR OF TECHNOLOGY DEGREE

SESSION 2023-24

in

COMPUTER SCIENCE AND ENGINEERING

By

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Under the supervision of

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KIET Group of Institutions, Ghaziabad

Affiliated to

Dr. A.P.J. Abdul Kalam Technical University, Lucknow

May, 2024

DECLARATION

This is to certify that Project Report entitled “Foody Home” which is submitted by Shorya Garg, Tyagi Satyam Lalit, Yash Sinha in partial fulfillment of the requirement for the award of degree B.Tech. in Department of Computer Science and Engineering of Dr. A.P.J. Abdul Kalam Technical University, Lucknow is a record of the candidates own work carried out by them under my supervision. The matter embodied in this report is original and has not been submitted for the award of any other degree

Signature :-

Name:- Shorya Garg(2000290100148)

Tyagi Satyam Lalit (2000290100172)

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Date:- May 11, 2024

CERTIFICATE

This is to certify that Project Report entitled “Foody Home” which is submitted by Shorya Garg,Tyagi Satyam Lalit,Yash Sinha in partial fulfillment of the requirement for the award of degree B. Tech. in Department of Computer Science & Engineering of Dr. A.P.J. Abdul Kalam Technical University, Lucknow is a record of the candidates own work carried out by them under my supervision. The matter embodied in this report is original and has not been submitted for the award of any other degree.

Supervisor Name: Dr. Vineet Sharma

Prof. Saurav Chandra (Head of Department)

(Assistant Professor)

Date:

ACKNOWLEDGEMENT

It gives us a great sense of pleasure to present the report of the B. Tech Project undertaken during B. Tech. Final Year. We owe special debt of gratitude to Prof.Saurav Chandra, Department of Computer Science & Engineering, KIET, Ghaziabad, for his constant support and guidance throughout the course of our work. His sincerity, thoroughness and perseverance have been a constant source of inspiration for us. It is only his cognizant efforts that our endeavors have seen light of the day.

We also take the opportunity to acknowledge the contribution of Dr. Vineet Sharma, Head of the Department of Computer Science & Engineering, KIET, Ghaziabad, for his full support and assistance during the development of the project. We also do not like to miss the opportunity to acknowledge the contribution of all the faculty members of the department for their kind assistance and cooperation during the development of our project.

We also do not like to miss the opportunity to acknowledge the contribution of all faculty members, especially faculty/industry person/any person, of the department for their kind assistance and cooperation during the development of our project. Last but not the least, we acknowledge our friends for their contribution in the completion of the project.

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ABSTRACT

The purpose of Online Food Ordering System (Foody Home) is to automate the existing manual system by the help of computerized equipment and full-fledged computer software, fulfilling their requirements, so that their valuable data/information can be stored for a longer period with easy accessing and manipulation of the same. The required software and hardware are easily available and easy to work with. The Foody Home's main purpose is to maintain track of information such as Item Category, Food, Delivery Address, Order, and Shopping Cart. It keeps track of information about the Item Category, the Customer, the Shopping Cart, and the Item Category. Only the administrator gets access to the project because it is totally built at the administrative level. The project's purpose is to develop software that will cut down on the time spent manually managing Item Category, Food, Customer, and Delivery Address. It saves the Delivery Address, Order, and Shopping Cart information.

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LIST OF ABBREVIATIONS

PHP	Hypertext Preprocessor(Open source scripting language).
MySQL	"My", the name of co-founder Michael Widenius daughter My, and “SQL’’ the abbreviation for Structured Query Language.
CGI	Common Gateway Interface.
CLI	Command-Line Interface.
CRM	Customer Relationship management.
XAMPP	for Cross-Platform (X), Apache (A), MariaDB (M), PHP (P) and Perl (P).(a free and open source cross-platform web server solution).
HTTP	Hypertext Transfer Protocol (set of rules for transferring files).
HTML	Hypertext Markup Language.
CSS	Cascading Style Sheets.
API	Application Programming Interface.
SCM	Source Code Management.
E-R Diagram	Entity Relationship Diagram

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Foody Home is an application for ordering food from a website. The product can either be food that has been specially prepared for direct consumption (such as vegetables straight from a farm or garden, frozen meats, etc.) or food that has not been (such as direct from a certified homekitchen, restaurant). The effort to create an online food ordering system aims to replace the manual method of taking orders with a digital one. The ability to rapidly and correctly create order summary reports whenever necessary is a key factor in the development of this project.

The potential of an online food ordering system is enormous. Any restaurant or fast food chain can use this PHP project to keep track of customer orders. This project is simple, quick, and precise. There is less disk space needed. MYSQL Server is used as the backbone by the online food ordering system, eliminating the risk of data loss and ensuring data security. Customers have the option of either having the food delivered or picked up. A customer starts by selecting the restaurant of their choice, then scans the menu, picks an item, and then decides whether they want it delivered or picked up. Then, when picking up the food, you can pay with cash at the restaurant or with a credit card or debit card using the app or website. The customer is informed by the website and app about the food's quality, how long it takes to prepare, and when it will be ready for pick-up or delivery.

1.2 Rationale

There are several good reasons to create an online food ordering application. There is a lot of

demand, which is why so many restaurants are utilizing online ordering. Customers enjoy how convenient it is to purchase food online and have it delivered to their place of residence or workplace. By providing the services, you may maintain your competitiveness in the restaurant business.[9]

1.3 Objectives

The management of the information regarding item category, food, delivery address, order, and shopping cart is the system's primary goal. It oversees the management of all customer, shopping cart, and item category information. Since the project was entirely developed on the administrative end,only the administrator is assured access. The goal is to develop an application program to simplify managing the food consumer item category. It keeps note of every delivery address requested.[3]

1.4 Needs of Online Food Order

Helping customers in placing meal orders whenever they want. Customers will be able to order their preferred foods at any time, but as we've already mentioned, this is only a limited option. As a result, restaurants need to have a specific system in place that will allow them to serve a large number of customers while streamlining operations. One of the best platforms is ordering, which offers all of these services in addition to a host of cutting-edge features that have helped countless small and large enterprises establish themselves as market leaders.[5]

1.5 Functionalities

- Provides search options based on a variety of criteria. like Food Item, Customer, Order, and Order Confirmation.[15]

- Online food ordering systems also manage payment information for order details, order

confirmation details, and food items online.

- It keeps track of all the data regarding Categories, Payments, Orders, etc.
- Manage the category's details.
- Displays the food item's information and description for the customer. Easy to manage the Food Item Category more effectively.
- It focuses on keeping track of order's data and transactions.
- Manage the food item's information.
- Improvements in editing, adding, and updating records lead to proper resource management of food item data.
- Manage the order's information by combining all Confirm Order data.[12]

1.6 Features

- Based on products and components.
- Easily creating and altering issues.
- Issue List can be queried in any detail.
- Reporting & Charting in a more thorough manner.
- User accounts are used to manage access and uphold security.
- Straightforward status & resolutions.
- Priorities and severity levels at various levels as well as targets and milestones for the programmers to follow.
- Attachments & Additional Comments for more information.
- A solid database back end.
- Various levels of reports are provided with many filtering options.
- It has more storage space.
- Accuracy in the work.
- Information retrieval is simple and quick. nicely crafted reports.
- Reduce the workload of the person using the current manual system.
- Individual access to any information.[13]

CHAPTER 2

LITERATURE REVIEW

2.1 Background of the Studies

The research papers we considered while doing our analysis are listed below. A wireless meal ordering system was designed and implemented together with consumer feedback for a restaurant. It makes it simple for restaurant operators to change menu presentations and set up the system in a WiFi setting. The configurable wireless meal ordering system has linked a smart phone with real- time customer feedback implementation to enable real-time contact between patrons of restaurants and business owners.

The goal was investigating the variables that affect internet users' perceptions of online food ordering among university students in Turkey. Davis' Technology Acceptance Model (TAM), which he created in 1986, was used to analyze how the Web environment for ordering food was adopted. Along with TAM, three additional primary factors—Trust, Innovation, and External Influences—are included to the paradigm.

The research project intends to automate the restaurant meal ordering procedure and enhance the patrons' dining experience. In this study, the design and implementation of a restaurant food ordering system were covered. The wireless data access to servers is implemented by this system. All the menu information will be available on the user's mobile Android application. Wirelessly, the kitchen and cashier receive the order information from the customer's mobile device. The central database is updated with these order specifics. The proprietor of the restaurant can quickly handle menu changes.

This research examines the initiatives made by restaurant owners to implement ICTs—such as PDAs, wireless LANs, and pricey multi-touch screens—to improve the dining experience. In order to address some of the drawbacks of the traditional paper-based and PDA-based food

ordering systems, a low-cost touch screen-based restaurant management system that uses an Android smartphone or tablet is suggested in this study.[7]

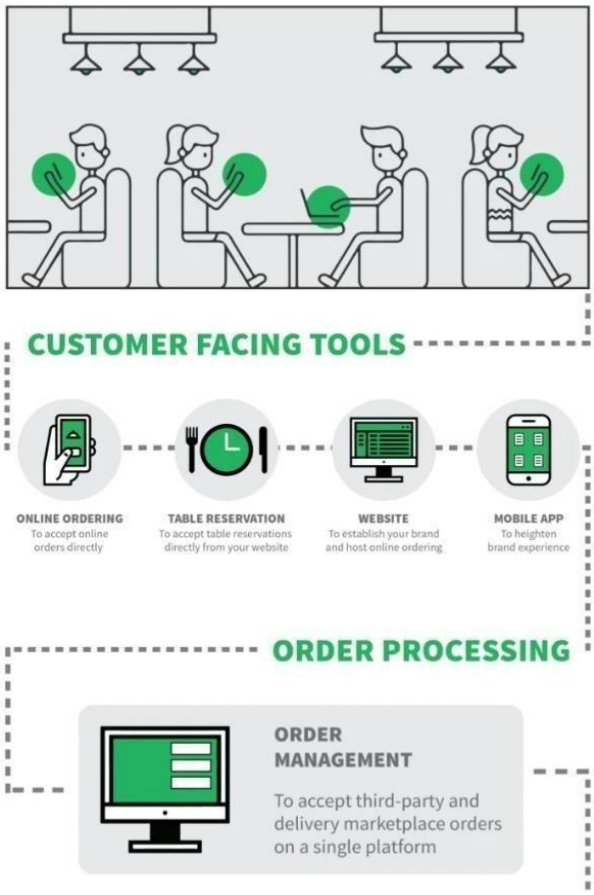
The study's objective was to determine whether the application is user-centered and based on user requirements. This system developed all problems pertaining to every user that it includes. Almost anyone may use the program if they know how to use an Android smartphone. The various problems with Mess service will be resolved by this system. The implementation of an online food ordering system is done to assist and resolve significant issues for consumers. Based on the application, it can be said that: This system makes placing orders simple; it gives customers the information they need to place orders. Through the program, it is able to receive orders and change their data, and it also aids the administrator in managing all the Food system.[8]

CHAPTER 3

PROPOSED METHODOLOGY

3.1 Complete Visualization of Online Food Ordering System

An easy-to-use table management system will also be included in a good restaurant reservation setup. This enables restaurants to see their restaurant hour by hour and receive reservations through a variety of ways.



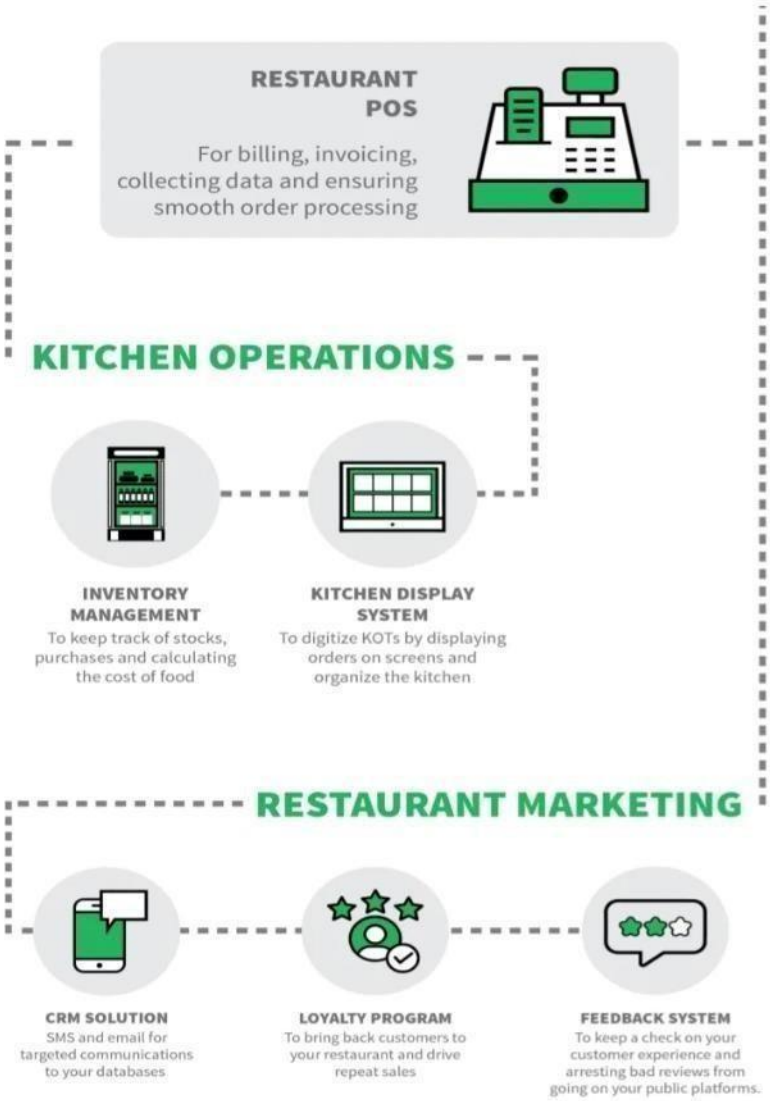


Figure 3.1.1: Complete Visualization Model

3.2 Tools and Technique

3.2.1 Php

3.2.2 XAMPP

3.2.3 MySQL vog

3.2.4 HTML

3.2.5 Bootstrap

3.2.6 Sublime Text

3.2.7 Git hub

3.2.8 Java Script

3.2.9 CSS

3.2.1 Php

Hypertext Preprocessor (or simply PHP) is a server-side scripting language used for general programming purposes as well as Web development. The PHP Group now produces the PHP reference implementation, which was first developed by Rasmus Lerdorf in 1994. Personal Home Page was the first meaning of PHP, however it has since evolved into PHP: Hypertext Preprocessor. PHP code can be used alone, in conjunction with different web template systems, web content management systems, and web frameworks, or it can be incorporated into HTML code. A PHP interpreter, which can be either a web server module or a Common Gateway Interface (CGI) executable, is typically used to process PHP code. The output of the interpreted and executed PHP code, which could be any kind of data, including graphics, is combined with the created web page by the web server. PHP code can be used to create standalone graphical apps and can also be run using a command-line interface (CLI).

3.2.2 XAMPP

XAMPP is a stack of free and open source PHP and Perl interpreters, the MariaDB database, and the Apache HTTP Server are the primary components of Apache Friends' free and open source cross-platform web server solution stack. Cross-Platform (X), Apache (A), MariaDB (M), PHP(P), and Perl make up the acronym XAMPP (P). It is a straightforward, lightweight installation of Apache that makes setting up a local web server for testing and deployment very simple for developers. An extractable file contains the server program (Apache), database (MariaDB), and scripting language (PHP) required to set up a web server. Cross-platform means that XAMPP functions equally well on Linux, Mac, and Windows. Since XAMPP uses the same component as with the majority of real web server deployments, switching from a local test server to a live server is also incredibly simple.

3.2.3 MySQL

MySQL Workbench is a comprehensive visual tool for DBAs, database architects, and developers. Data modeling, SQL creation, and extensive administrative tools for server configuration, user management, backup, and other tasks are all provided by MySQL Workbench. There are versions of MySQL Workbench for Windows, Linux, and Mac OS X.

3.2.4 XML

Extensible Markup Language (XML) is a markup language and file format for storing,transmitting, and reconstructing arbitrary data. It defines a set of rules for encoding documents in a format that is both human-readable and machine-readable. The World Wide Web Consortium's XML 1.0 Specification[2] of 1998[3] and several other related specifications[4]—all of them free open standards—define XML.

The design goals of XML emphasize simplicity, generality, and usability across the Internet.[6] It is a textual data format with strong support via Unicode for different human languages. Although the design of XML focuses on documents, the language is widely used for the representation of arbitrary data structures[7] such as those used in web services.

3.2.5 Bootstrap

Bootstrap is a front-end framework that is open-source and free to use while creating websites and web apps. It includes optional JavaScript extensions along with HTML and CSS-based design templates for navigation, buttons, forms, buttons, and other interface elements. It only addresses front-end development, unlike many web frameworks.

3.2.6 Java

Java is a high-level, class-based, object-oriented programming language that is designed to have

as few implementation dependencies as possible. It is a general-purpose programming language intended to let programmers write once, run anywhere (WORA), meaning that compiled Java code can run on all platforms that support Java without the need to recompile. Java applications are typically compiled to bytecode that can run on any Java virtual machine (JVM) regardless of the underlying computer architecture. The syntax of Java is similar to C and C++, but has fewer low-level facilities than either of them. The Java runtime provides dynamic capabilities (such as reflection and runtime code modification) that are typically not available in traditional compiled languages.

3.2.7 Sublime Text

Sublime Text is a commercial cross-platform source code editor that utilizes the Python programming language (API). Numerous programming and markup languages are supported natively, and users can add features through plugins, which are often developed and maintained by the local community under free-software licenses.

3.2.8 GitHub

GitHub is a Git-based version control hosting service on the internet. Code is where it is most frequently utilized. It has all of Git's distributed version control and source code management (SCM) features in addition to a few extras. Every project can benefit from access control and a variety of collaborative tools, including wikis, task management, issue tracking, and feature requests. Both private repositories and free accounts, which are frequently used to host opensource software projects, are available on GitHub.

3.2.9 CSS

Cascading Style Sheets (CSS) is a language for creating style sheets that describe how a document produced in a markup language like HTML will look. The World Wide Web's foundational

technologies, along with HTML and JavaScript, include CSS. Layout, color, and font may all be separated from content and presentation using CSS. By describing the pertinent CSS in a separate CSS file, this separation can make content more accessible, give definition of presentation features greater freedom and control, allow numerous web pages to share formatting, and reduce complexity and repetition in structural content.

3.3 Methodology Development Model

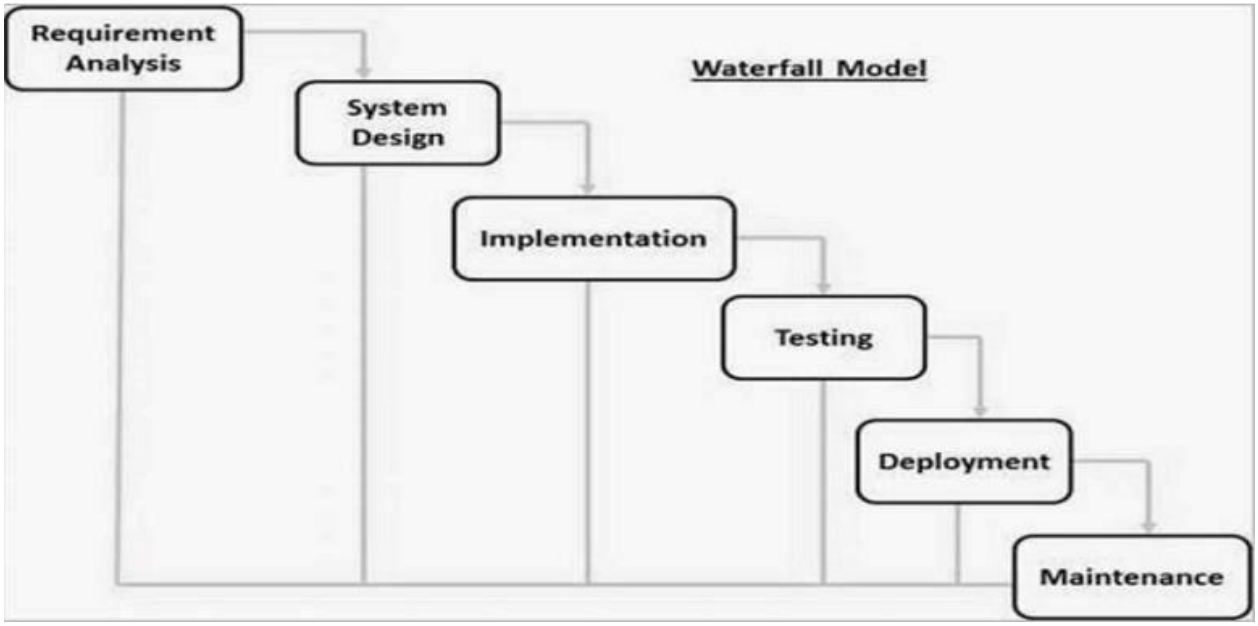


Figure 3.3.1: Methodology Development Model.

The Waterfall model's consecutive phases are:

Requirement Gathering and analysis − During this stage, all potential system needs are gathered and outlined in a requirement specification document.

- System Design − The system design is created in this phase after studying the requirement specifications from the first phase. This system design aids in determining the overall system architecture as well as the hardware and system requirements.
- Implementation − The system is initially built in discrete programs known as units, which are then combined in the following phase, using inputs from the system design. Unit

testing is the process of developing and evaluating each unit for functionality.

●Integration and Testing − Following the testing of each unit created during the implementation phase, the entire system is merged. The entire system is tested for errors and failures after integration.

●Deployment of system − Once the product has undergone functional and non-functional testing, it is either published to the market or deployed in the customer's environment.

●Maintenance − Various problems can arise in a client environment. Patches are published to address certain problems. Additionally, improved versions of the product are issued. To bring about these changes in the surroundings of the consumer, maintenance is performed.

3.4 System Design Model

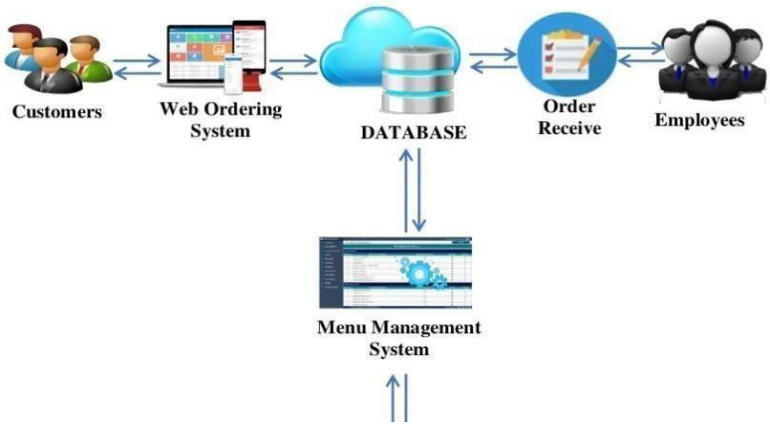


Figure 3.4.1: System Model Design

3.5 Admin workflow Process

User goes to home page of the domain. If he/she has an account then he/she can login in restaurant management system otherwise he/she need to register an account after successful registration, they can login in home page.

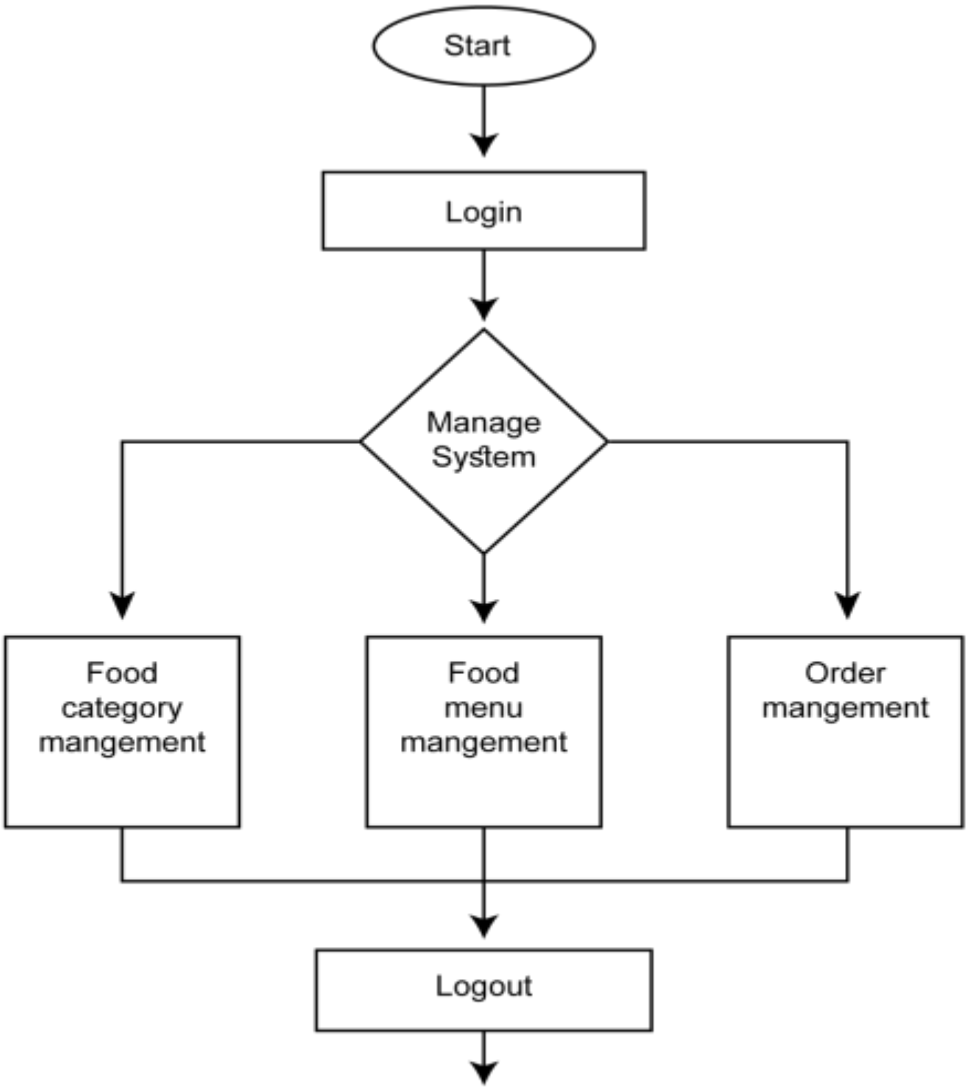


Figure 3.5.1: Admin workflow Process

Customer Workflow Process

Initially to visit the food categories or food menu, users don't need to login/register an account. After checking out the categories and menu items, if the user finds his/her desired menu and if

they want to order that particular item they can go to order page. During placing any order the customer needs to provide his/her required information mentioned the order section.

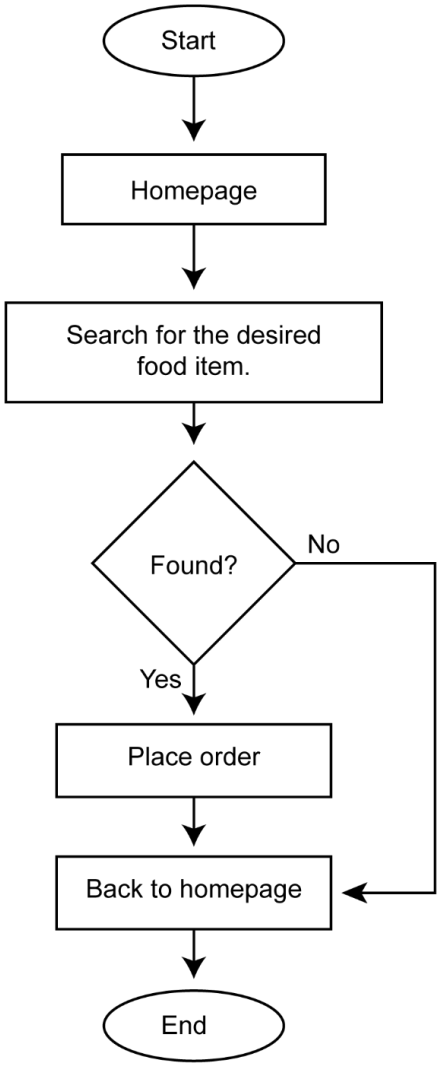


Figure 3.6.1: Customer Workflow Process

Diagram

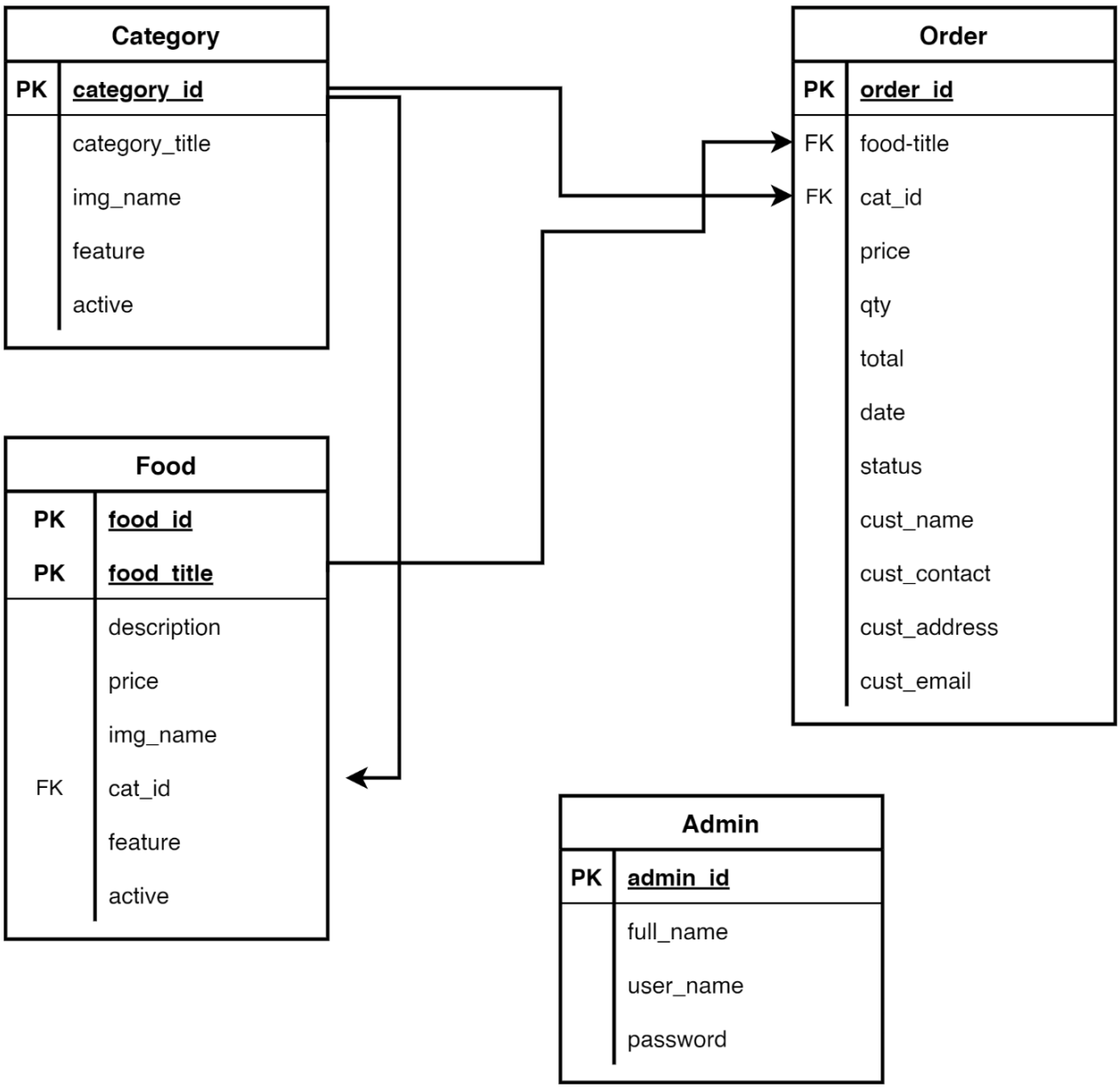


Figure 3.7.1.1 : Schema Diagram.

3.7.2 E-R Diagram

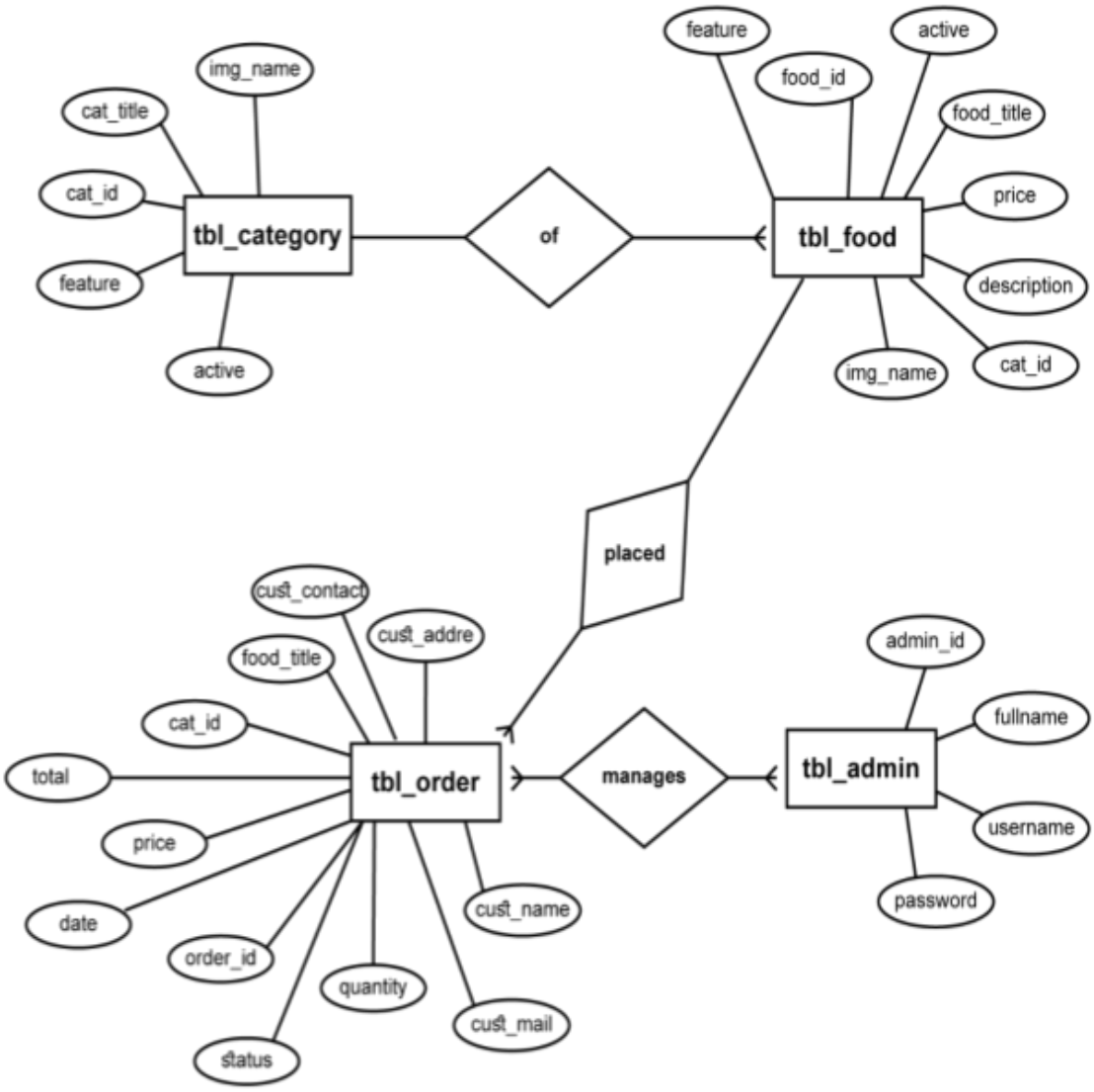


Figure 3.7.2.2 : E-R Diagram

3.8 Database Design

Database design is the management of information using a database paradigm. What data must be saved and how the various data items interact are determined by the database design that follows. Developer would start adjusting the data to the database model using this knowledge.
Data classification and relationship discovery are key components of database design.
3.8.1 Table

3.8.1.1 tbl_admin Table

id	full_name	username	Password

3.8.1.2 tbl_category Table

category_id	category_title	image_name	feature	active

3.8.1.3 tbl_food Table

food_id	food_title description	price	img_name	cat_id	feature	active

3.9.2 Table Creation

3.9.2.1 tbl_admin Table

```
CREATE TABLE `tbl_admin` (
`id` int(10) UNSIGNED NOT NULL,
`full_name` varchar(100) NOT NULL, `username` varchar(100) NOT NULL,
`password` varchar(255) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8;
//add value & table type
INSERT INTO `tbl_admin` (`id`, `full_name`, `username`, `password`) VALUES
(1, 'Steeve Moore', 'steeve', 'E10ADC3949BA59ABBE56E057F20F883E'),
(9, 'Liam Johnson', 'liam',
'E10ADC3949BA59ABBE56E057F20F883E'), (10, 'Ramsey', 'ramsey',
'E10ADC3949BA59ABBE56E057F20F883E'),
(12, 'Administrator', 'admin', 'E10ADC3949BA59ABBE56E057F20F883E');
```

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	**id**	int(10)		UNSIGNED	No	*None*		AUTO_INCREMENT
2	**full_name**	varchar(100)	utf8_general_ci		No	*None*		
3	**username**	varchar(100)	utf8_general_ci		No	*None*		
4	**password**	varchar(255)	utf8_general_ci		No	*None*		

3.9.2.2 tbl_category Table

```
CREATE TABLE `tbl_category` (
`id` int(10) UNSIGNED NOT NULL,
`title` varchar(100) NOT NULL,
`image_name` varchar(255) NOT NULL,
`featured` varchar(10) NOT NULL,
```

`active` varchar(10) NOT NULL

) ENGINE=InnoDB DEFAULT CHARSET=utf8;

// add value & table type

INSERT INTO `tbl_category` (`id`, `title`, `image_name`, `featured`, `active`) VALUES

(4, 'Pizza', 'Food_Category_790.jpg', 'Yes', 'Yes'),

(5, 'Burger', 'Food_Category_344.jpg', 'Yes', 'Yes'),

(9, 'Wraps', 'Food_Category_374.jpg', 'Yes', 'Yes'),

(10, 'Pasta', 'Food_Category_948.jpg', 'Yes', 'Yes'),

(11, 'Sandwich', 'Food_Category_536.jpg', 'Yes', 'Yes');

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	**category id**	int(10)		UNSIGNED	No	*None*		AUTO_INCREMENT
2	**title**	varchar(100)	utf8_general_ci		No	*None*		
3	**image_name**	varchar(255)	utf8_general_ci		No	*None*		
4	**featured**	varchar(10)	utf8_general_ci		No	*None*		
5	**active**	varchar(10)	utf8_general_ci		No	*None*		

3.9.2.3 tbl_food Table

CREATE TABLE `tbl_food` (

`id` int(10) UNSIGNED NOT NULL,

`title` varchar(100) NOT NULL,

`description` text NOT NULL,

`price` decimal(10,2) NOT NULL,

`image_name` varchar(255) NOT NULL,

`category_id` int(10) UNSIGNED NOT NULL,

`featured` varchar(10) NOT NULL,

`active` varchar(10) NOT NULL

) ENGINE=InnoDB DEFAULT CHARSET=utf8;

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	id	int(10)		UNSIGNED	No	None		AUTO_INCREMENT
2	title	varchar(100)	utf8_general_ci		No	None		
3	description	text	utf8_general_ci		No	None		
4	price	decimal(10,2)			No	None		
5	image_name	varchar(255)	utf8_general_ci		No	None		
6	category_id	int(10)		UNSIGNED	No	None		
7	featured	varchar(10)	utf8_general_ci		No	None		
8	active	varchar(10)	utf8_general_ci		No	None		

//add value & table type

INSERT INTO `tbl_food` (`id`, `title`, `description`, `price`, `image_name`, `category_id`, `featured`, `active`) VALUES

(4, 'Ham Burger', 'Burger with Ham, Pineapple and lots of Cheese.', '4.00', 'Food-Name-6340.jpg', 5, 'Yes', 'Yes'),

(5, 'Smoky BBQ Pizza', 'Best Firewood Pizza in Town.', '9.00', 'Food-Name-8298.jpg', 4, 'No', 'Yes'),

(9, 'Chicken Wrap', 'Crispy flour tortilla loaded with juicy chicken, bacon, lettuce, avocado and cheese drizzled with a delicious spicy Ranch dressing.', '5.00', 'Food-Name-3461.jpg', 9, 'Yes', 'Yes'),

(10, 'Cheeseburger', 'A cheeseburger is a hamburger topped with cheese. Traditionally, the slice of cheese is placed on top of the meat patty.', '4.00', 'Food-Name-433.jpeg', 5, 'Yes', 'Yes'), (11, 'Grilled Cheese Sandwich', 'Assembled by creating a cheese filling, often cheddar or American between two slices of bread and is then heated until the bread browns and cheese melts.', '3.00', 'Food-Name-3631.jpg', 11, 'Yes', 'Yes');

3.9.2.4 tbl_order Table

CREATE TABLE `tbl_order` (

`id` int(10) UNSIGNED NOT NULL,

`food` varchar(150) NOT NULL,

`price` decimal(10,2) NOT NULL,

`qty` int(11) NOT NULL,
`total` decimal(10,2) NOT NULL,
`order_date` datetime NOT NULL,
`status` varchar(50) NOT NULL,
`customer_name` varchar(150) NOT NULL,
`customer_contact` varchar(20) NOT NULL,
`customer_email` varchar(150) NOT NULL,
`customer_address` varchar(255) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8;

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	**id**	int(10)		UNSIGNED	No	*None*		AUTO_INCREMENT
2	**food**	varchar(150)	utf8_general_ci		No	*None*		
3	**price**	decimal(10,2)			No	*None*		
4	**qty**	int(11)			No	*None*		
5	**total**	decimal(10,2)			No	*None*		
6	**order_date**	datetime			No	*None*		
7	**status**	varchar(50)	utf8_general_ci		No	*None*		
8	**customer_name**	varchar(150)	utf8_general_ci		No	*None*		
9	**customer_contact**	varchar(20)	utf8_general_ci		No	*None*		
10	**customer_email**	varchar(150)	utf8_general_ci		No	*None*		
11	**customer_address**	varchar(255)	utf8_general_ci		No	*None*		

//add value & table type
INSERT INTO `tbl_order` (`id`, `food`, `price`, `qty`, `total`,`order_date`,`status`, `customer_name`, `customer_contact`, `customer_email`, `customer_address`) VALUES
(2, 'Best Burger', '4.00', 4, '16.00', '2020-11-30 03:52:43', 'Delivered', 'Kelly Dillard', '7896547800', 'kelly@gmail.com', '308 Post Avenue'),
(3, 'Mixed Pizza', '10.00', 2, '20.00', '2020-11-30 04:07:17', 'Delivered', 'Thomas Gilchrist', '7410001450', 'thom@gmail.com', '1277 Sunburst Drive'),

(4, 'Mixed Pizza', '10.00', 1, '10.00', '2021-05-04 01:35:34', 'Delivered', 'Martha Woods', '78540001200', 'marthagmail.com', '478 Avenue Street'),
(6, 'Chicken Wrap', '7.00', 1, '7.00', '2021-07-20 06:10:37', 'Delivered', 'Charlie', '7458965550', 'charlie@gmail.com', '3140 Bartlett Avenue'),
(7, 'Cheeseburger', '4.00', 2, '8.00', '2021-07-20 06:40:21', 'On Delivery', 'Claudia Hedley', '7451114400', 'hedley@gmail.com', '1119 Kinney Street'),
(8, 'Smoky BBQ Pizza', '6.00', 1, '6.00', '2021-07-20 06:40:57', 'Ordered', 'Vernon Vargas', '7414744440', 'venno@gmail.com', '1234 Hazelwood Avenue'),
(9, 'Chicken Wrap', '5.00', 4, '20.00', '2021-07-20 07:06:06', 'Cancelled', 'Carlos Grayson', '7401456980', 'carlos@gmail.com', '2969 Hartland Avenue'),
(10, 'Grilled Cheese Sandwich', '3.00', 4, '12.00', '2021-07-20 07:11:06', 'Delivered', 'Jonathan Caudill', '7410256996', 'jonathan@gmail.com', '1959 Limer Street')

CHAPTER 4

ANALYSIS RESULTS AND DISCUSSION

4.1 System Implementation Plan

A software design pattern called Model View Controller, or MVC as it is more formally known, is used to build online applications. There are three components to the Model View Controller pattern:

Model - The lowest level of the pattern, is in charge of maintaining the data.

View - This is in charge of showing the user all or part of the data.

Controller - The computer program that controls how the Model and View interact.

MVC is well-liked because it provides for duty separation by separating the application logic and user interface layers. The Controller accepts all requests from the application and collaborates with the Model to prepare any necessary data for the View. The View then constructs a final presentable response using the data produced by the Controller. The following is a graphic representation of the MVC abstraction. Model of MVC (Model View Controller Flow)

4.1.1 Project Planning

Here is an illustration of a software project plan: 1) How will the project be carried out within the company? What are the time, financial, and human resource limitations? What does having a market strategy entail? 2) Customer meetings: Weekly or as needed customer meetings that include a progress report presentation. Additionally taking into account customer input, adjustments and changes are made as necessary. The client is also shown project deliverables and milestones.

The steps listed below can be used to create successful software projects:

Select a project. The aims and objectives of project are as follows:

- Understanding specifications and requirements.
- Using analysis, design, and implementation methods.
- Using testing procedures.
- Documenting.
- Budget allocation or exceeding limits under control.
- Understanding project milestones and deliverables
- Project estimates.
- Cost and Time.

4.2 Facing Problem During Development the Project

During the construction of the web application "Online Food Order," the developer ran into a few issues. Here are a few issues in brief:

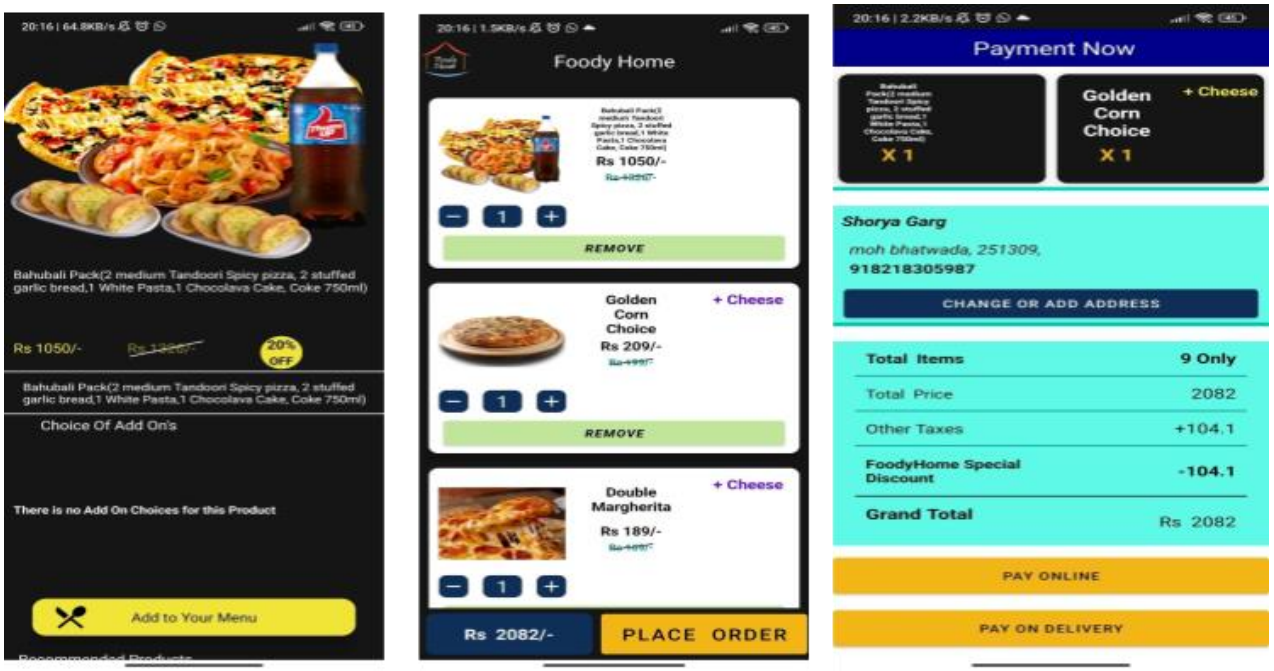
I. Requirement Gathering Phase: It is a crucial step. The project will fail if the requirements are poor. At that time, developer became disappointed when Developer was collecting information and data then what information and data will be helpful or appropriate for this project.

II. During Design Phase: At this moment, the developer struggled to decide which flowchart would be best for this project when creating it.

III. Development Phase: It is a very major component of the undertaking. Frequently, the developer misplaced the semicolon (;) at the conclusion of the statement.

IV. Testing Phase: It is an essential component of the project. This section will aid with project testing overall. During testing, developer has faced some bugs of the project.

4.3 Final Output



4.4 Result & Discussion

The final output is a complete web based Restaurant Management System, which can be used in any kind of restaurant. This Restaurant Management System can help to manage the Restaurant more effectively, efficiently and smoothly. This is more secured and there will be speedy and well ordered authentication procedure for the maintenance of records. At present time, in this technology based world, people likes and wants everything to be smooth and efficient through the use of data and information. In this perspective, our Restaurant Management System can be an ideal platform for the users. Its user friendly interface can help the customers to find his/her desired menu item and place order with a few click. Customers can easily place an online order by browsing the menu options, pick what they want sitting at home. And can also receive their food in a short period of time.

4.5 Application

❖ Restaurants, takeaways, and businesses that sell food to go profit from internet meal ordering software designed specifically for them. Customers like the ease of online meal ordering, which is why it is expanding quickly. Expand your sales channels by downloading our online food ordering application.

❖ Through this food ordering website, customers may place orders from their computers, tablets, and cellphones. They can look through your menu options, choose what they want, and submit an order online. Internet-based payment will also be accepted. Meals can be picked up in person or delivered to customers.

❖ Putting your company online will enable you to generate a lot more revenue, which will enhance your marketability. Your online menu will give current clients a terrific new option to place orders, and new customers will easily find you thanks to well-known search engines. To complement the style and feel of

your present website, the system is tailored. In the digital age, we help business owners grow their enterprises.

4.6 Advantages

- It is quick, simple, and pleasant.
- Managing an online menu is easier.
- Access is only a click away.

4.7 Limitations of the System

The system has certain other restrictions as well. There are only a few basic functions in the system's shopping cart, and it cannot be extensively customized. Additionally, practically all of the functionality of the application, including validation, is handled by server-side programming. It increases the server's workload, especially when a large number of users access the program. This issue can be resolved by using client-side languages, such as JavaScript or HTML 5, to check data. Additionally, the order model has been created.

CHAPTER 5

CONCLUSION AND FUTURE SCOPE

5.1 Conclusion

Restaurant Management System is a web-based technology that aids the restaurant industry in carrying out tasks effectively and efficiently. It aids in managing cash flow for managers. Managers can view analytics data to assess company growth. The manager can control orders and employee schedules by using this system. The full complement is a restaurant management system. It provides access to the Online Order platform, third-party connectors software, and comprehensive CRM solution, which together cover a sizable portion of your restaurant's requirements. They are not the outdated hardware and software sets for restaurants that were previously offered. They are the hottest things around, smooth, manageable, inexpensive, and quick.In the "Online Food Ordering Project," we made every effort to meet all the demands of the restaurant. Because it is straightforward and adaptable, the project is successful. The biggest benefit of my project is that it draws plenty of users because of its simplicity. A novice user may operate it with ease. Any type of restaurant can utilize our software. By automating meal ordering, billing, and inventory control, the restaurant management system assists the restaurant manager in managing the restaurant more successfully and efficiently. The system handles the transaction and stores the data produced. These data will be used to create reports that assist the restaurant manager in making wise business decisions. For example, the manager can decide whether more waiters, delivery men, delivery carts, and cooks are needed based on how many clients will be present during a specific time period. When this project is finished, all security concerns will be resolved. Additionally, a quick and secure authentication process will be used for record maintenance. Because it automatically pulls information about a consumer from the database on subsequent visits, data entry is quick and easy. As a result, our program will undoubtedly succeed in replacing the antiquated manual way of storing secure information. The work plan also specifies the specific front end and back end characteristics of the technology being used in the project. Future project goals and its scope have been elaborated.

5.2 Future Work

Each project should pay close attention to future development because it contains the system's most recent features. It lessens software issues and defects. It develops a close relationship with customers based on their comments or preferences. Developer will incorporate certain dynamic elements that are briefly described below into my restaurant management system.

Reporting module with real time mechanism.

- Modern architecture with smooth transitions.
- System for email and mobile confirmation.
- Selling Point

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“Restaurant Recommendation System Using Machine Learning Algorithms”

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Abstract: The essential nature of recommendation systems becomes apparent when making purchasing decisions or exploring unfamiliar locales. Restaurants, in particular, benefit from these systems both in terms of managerial efforts to attract a larger customer base and in assisting customers in discovering their preferred and renowned dishes. Navigating a diverse range of food options, particularly in new locations, poses a considerable challenge. This paper introduces a restaurant recommendation system that relies on the distribution of food and service ratings, assessing matrix density for improved accuracy. Additionally, a popularity-based recommender model is developed to propose restaurants to customers, utilizing a ranking scheme based on scores. The model's output includes suggestions for the most popular restaurants and their standout dishes. Collaborative filtering is integrated with singular value decomposition to enhance the model's effectiveness. Model evaluation is conducted using Root Mean Square Error (RMSE), leveraging a Kaggle dataset. Furthermore, a practical web-based application is constructed using Python's Flask web framework.

Keywords: - Recommender system; Machine Learning; Collaborative filtering; User inputs and behaviors; User feature, Ranking.

I.INTRODUCTION

Recommendation systems have garnered widespread popularity across diverse domains due to their versatile applications. These systems, driven by a set of algorithms, derive insights from input data to provide personalized suggestions to users. Essentially, they act as tools for recommending products to customers by taking into account factors like search history, user similarities, patterns, and ratings. Noteworthy examples in real-time applications include YouTube, Amazon, and Facebook, all of which heavily rely on historical data for their functionality.

The operation of these systems primarily involves analyzing past data. Items are ranked based on available data, and users receive the most pertinent recommendations. Recommendation systems can be broadly divided into two categories:

- Content-Based
- Collaborative Filtering (CF)

1. Collaborative Filtering:
Collaborative Filtering is exclusively grounded in past interactions between customers and products. It relies on historical data encompassing all transactions involving user engagement with targeted products. A matrix serves as the repository for this data, where rows represent customers and columns represent products. This technique relies solely on historical data, overlooking contemporary trends and cultural influences. [5]

At its core, Collaborative Filtering can be categorized into memory-based and model-based methods.The memory-based method is straightforward, leveraging only historical data with uncomplicated distance measurements. In contrast, the model-based approach utilizes a model to align with potential outcomes.[2]-[3]

2. Content Based Filtering:
Content-Oriented Using more information about clients and items is the process of filtering. It needs more data, such as gender, region, and date of birth, to improve predictions. The goal is to predict consumer characteristics and behavior with respect to a product based on favorable or unfavorable responses.[1]

People of all ages are drawn to food because it is a global emblem of cultures, values, and customs. Even if there are a lot of eateries that can accommodate a range of budgets and sizes, choosing the appropriate one is crucial to satisfying dietary requirements, guaranteeing excellence, and providing well-known meals in a certain area. This variety plays a significant role in the varying degrees of restaurant profitability. By successfully satisfying these requirements, some businesses are able to increase their earnings; similarly, eateries with lower profitability might benefit from the same approach.

Restaurants provide good cuisine, but at the same time, patrons are looking for tasty, high-quality meals. An interface becomes essential to ensure customer and restaurant owner satisfaction. Customers are methodically suggested the restaurant's distinctive features using this interface.[4]-[5]

It addresses problems pertaining to consumers' ignorance of both neighboring eateries and well-liked dishes. When visiting foreign countries, tourists frequently have significant trouble locating restaurants that serve traditional, well-regarded, high-quality local cuisine. Under these conditions, a useful workaround is to incorporate a machine algorithm using reviews into the recommender system.[4]

The study looks at an online restaurant recommendation system using real-time data. This application's main objective is to recommend the best foods to users based on their dietary restrictions and the specified location.

II. REVIEW OF RELATED WORK

Several approaches exist for creating a restaurant recommendation system. Numerous existing systems operate based on the following methods.

Within the framework of this recommender system, recommendations are tailored according to user preferences, deriving insight from the realization that a user's affinity for an item is molded by various factors articulated in reviews. The initial exploration entails a deep dive into topic modeling, unveiling concealed elements within the review text. [6]

Ultimately, the application of regression models facilitates the identification and comprehension of the intricate relationship between users and restaurants.

They underscored the widespread acclaim of the restaurant recommendation system, highlighting its continuous advancements in precision and intricacy. Their presentation showcased a personalized recommendation system based on location, seamlessly integrated into mobile technology. The in-depth study scrutinized user behavior patterns within recommendation systems, proposing various methods for refinement and improvement.[1][6]

In this study, they explained how the restaurant recommendation system works with fancy machine learning stuff. They tried different ways to find a good model that predicts how much you might like a restaurant. They used methods like Slope One, k-Nearest Neighbors, and something called multiclass SVM classification. After checking everything, they found that the multiclass SVM thing worked better than the others.[7]

They contrast item-based and user-based collaborative filtering methods for rating prediction. At last, architecture is provided to facilitate the construction of a real-time recommendation system.[7]

According to the user's location, the restaurant was predicted using SVM in the proposed system. It can be extremely helpful and fulfilling for a user to save a lot of time, money, and effort by having a suggestion system that could assist them in choosing which restaurant to attend.[5]

There exist multiple elements that influence a user's decision to visit a restaurant, such as the restaurant's cuisine, location, ambience, price range, popularity, ratings, and so on. On websites like Yelp and Zomato, this kind of data is gathered and made accessible.[5]

Utilizing a comprehensive, open-source dataset from Yelp that includes user-level data on their favorite restaurants in addition to restaurant reviews, the goal is to develop an effective software application recommendation system for Yelp users that will assist them in making predictions about whether or not they will enjoy dining out by utilizing machine learning techniques and algorithms.[6][10]

The study conducted in this research examined the various reasons why consumers utilize internet reviews. There are a lot of reviews available for many goods and services, making it challenging for buyers to choose which ones to read. According to an earlier study, internet review sites may be able to offer a personalized approach for ranking reviews based on the preferences of individual users.

III. METHODOLOGY

The Recommendation system under consideration, as outlined in this proposal, employs statistical techniques and exploratory data analysis to address the subsequent inquiries: determining the quantity of distinct users and restaurants, as well as assigning ratings that encompass aspects like cuisine, service, and quality.[6][9]

To enhance the model, we analyzed the occurrence of user reviews, the overall count of restaurant ratings, and the distribution of evaluations for food, service, and quality individually.

```
Unique users:  138
Unique restaurant:  130
Total no.of ratings given:  1161
Total no.of food ratings given:  1161
Total no.of service ratings given:  1161
```

Fig 1. Find out unique values of the entity.

```
U1061    18
U1106    18
U1134    16
U1024    15
U1022    14
```

Fig 2. Find Number of times user rated.

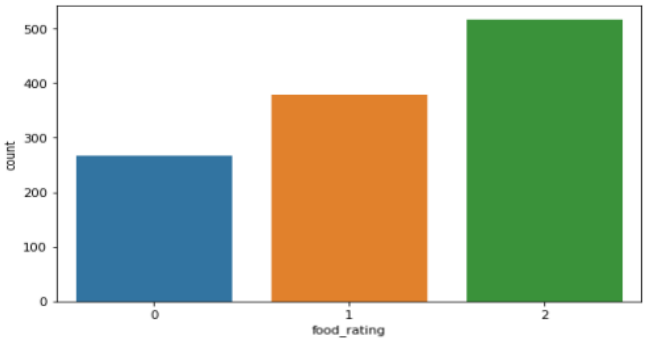


Fig 3. Food Rating.

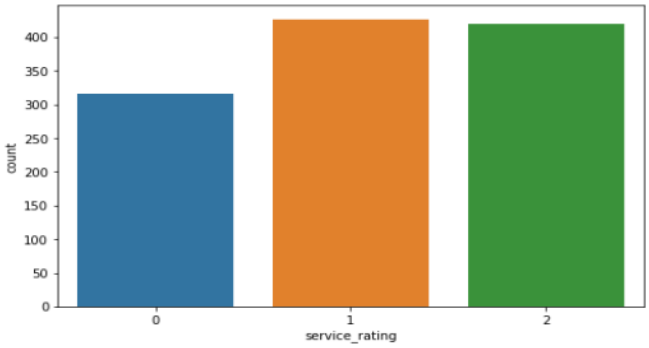


Fig 4. Service Rating.

	userID	placeID	rating	food_rating	service_rating
0	U1077	135085	2	2	2
1	U1077	135038	2	2	1
2	U1077	132825	2	2	2
3	U1077	135060	1	2	2
4	U1068	135104	1	1	2

Fig 5. Retrieving Users with food/Service Rating.

```
given_num_of_ratings:  884
possible_num_of_ratings:  16640
density: 5.31%
```

Fig 6. Density Matrix for the data set.

1. **Dataset:**
   The application will use the central dataset for this recommendation system, which comes from Kaggle, to provide restaurant recommendations.

   There are nine CSV files in the collection that cover different topics including user payments, food, and ratings. We concentrate on the rating file, which has 1161 instances and five attributes in particular. This dataset integrates seamlessly with our platform, allowing the machine learning algorithm to generate customer-relevant results.[4]

2. **Popularity Based Recommendation:**
   This is the typical baseline methodology. Rather than prioritizing a personalized strategy, the model provides clients with explicit suggestions for the top meals within a specific location, during specific hours of the day, or at appropriate dining establishments. As a result, customers are free to decide whether or not to use the product, depending on their preferences. The recommendations are predicated on what is in style or popular right now in the community.[4][6]

   This recommendation type proves especially valuable in scenarios where there is no available historical data for a particular user. It functions on the principles of popularity and stays aligned with current trends. The benefits of this approach include its ability to overcome the cold start problem and its independence from the need for customer historical data.

However, a drawback is its non-personalized nature, potentially recommending similar popular products to every customer.[8]-[9]

	placeID	score
123	135085	36
31	132825	32
80	135032	28
98	135052	25
33	132834	25

Fig 7. Assign score to the most popular places.

	placeID	score	Rank
123	135085	36	1.0
31	132825	32	2.0
80	135032	28	3.0
98	135052	25	4.0
33	132834	25	5.0

Fig 8. Rank based on the scores.

	placeID	score	Rank
123	135085	36	1.0
31	132825	32	2.0
80	135032	28	3.0
98	135052	25	4.0
33	132834	25	5.0

Fig 9. Prediction for most popular restaurants in popularity based recommendation.

3. Collaborative Filtering:
Collaborative filtering has emerged as a contemporary algorithm in recommendation systems. This method leverages inputs derived from various users with akin preferences, encompassing both user-based collaborative filtering and item-based collaborative filtering.[10]

This approach taps into users' inherent preferences by analyzing the latent features that characterize the input values. We employed a collaborative filtering model based on singular value decomposition.

placeID	132560	132561	132564	132572	132583	132584	132594	132608	132609
userID									
U1001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
U1002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
U1003	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
U1004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
U1005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Fig 10. Pivot table.

```
Below are the recommended places for user(user_id = 12):

                    user_ratings  user_predictions
Recommended Places
135046                       0.0          0.780975
135026                       0.0          0.465279
135058                       0.0          0.458938
135055                       0.0          0.455777
135045                       0.0          0.440416
```

Fig 11. Recommend places based on ratings and user

	Avg_actual_ratings	Avg_predicted_ratings	place_index
placeID			
132560	0.015625	-1.171132e-18	0
132561	0.023438	3.334107e-18	1
132564	0.023438	-1.491341e-18	2
132572	0.117188	9.900262e-02	3
132583	0.031250	3.323385e-02	4

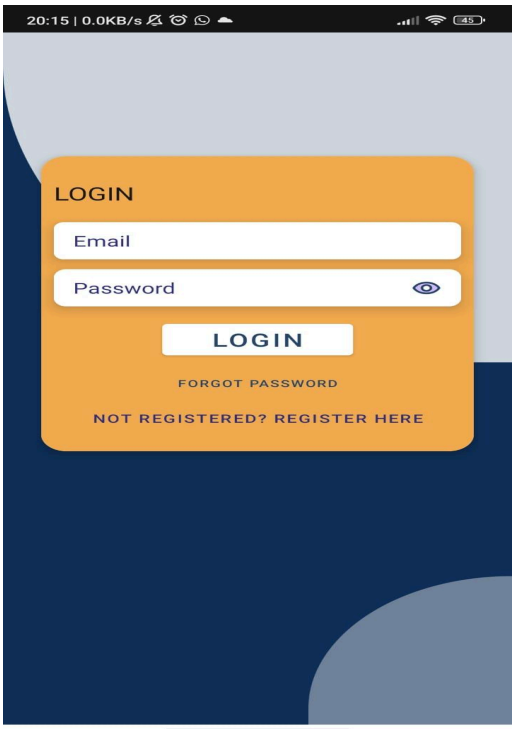
Fig 12. Actual ratings and Predicted ratings.

```
RMSE SVD Model = 0.01874
```

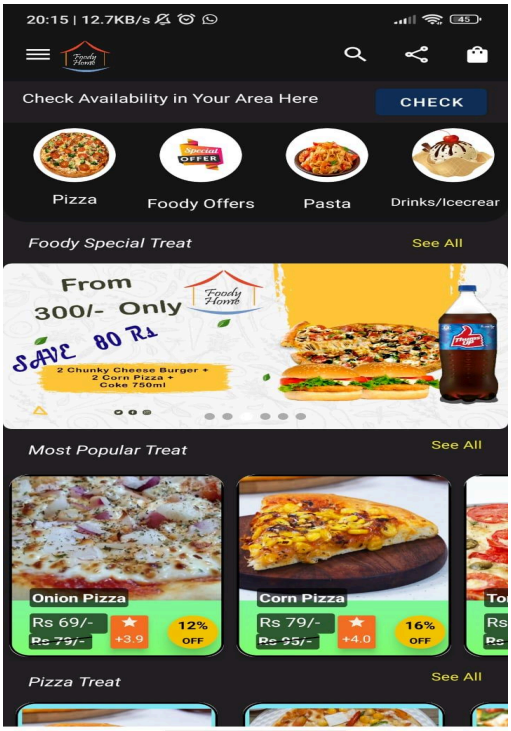
Fig 13. Evaluating the model with RMSE.

Python is utilized in this work to develop our machine learning algorithm, taking advantage of its extensive ecosystem of machine learning libraries. Python's versatility is demonstrated by its ability to display results in a number of formats, such as table view, graph view, and chart view. We use HTML, CSS, and JavaScript in conjunction with the Flask framework to construct the front end. Flask was chosen because it is simple to integrate with Python and offers a productive and smooth development environment.

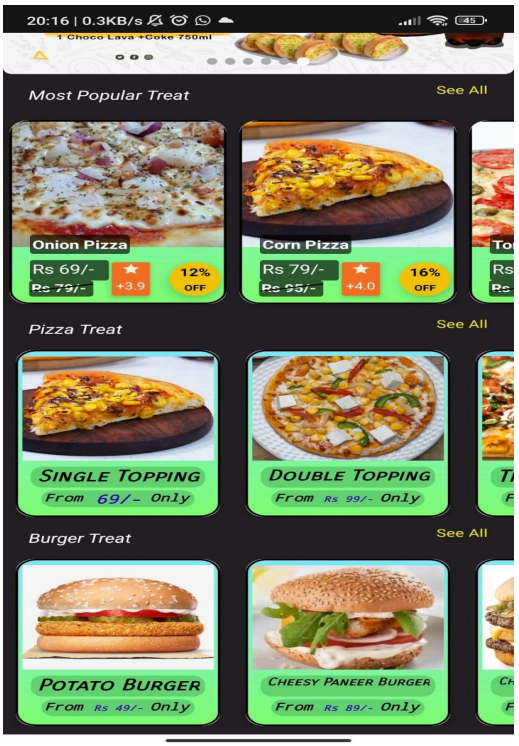
When in usage, the display is incredibly responsive and fast. We use SQLite for the database, creating unique tables for every client to keep track of logs, reviews, ratings, comments, and browsing history.



Login Page



Home Page



Menu

Payment options

IV. CONCLUSION

The primary goal of the research is to create a web-based application for clients that serves as a restaurant recommendation system with the integration of machine learning.

Users use this app to find restaurants that suit their needs, find famous foods in particular areas, and for personal preferences. Customers are assured of

having access to ratings.
By combining collaborative and popularity-based filtering, the effectiveness of recommendations is enhanced, making it easier for every user to predict restaurants when utilizing this program.
Users look for eateries around a lot of the time. We address this issue by adding restaurant locations to our dataset. This enables our machine learning algorithm to predict the best eateries for clients based on their current location with ease.

The web application for restaurant recommendations aims to enhance user experience by facilitating quick and efficient searches for neighboring eateries. By reducing user effort and time, this simplified method increases the experience's overall value.

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Restaurant Recommendation System Using Machine Learning Algorithms

by Sanjiv Sharma

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File name: Lakshya_RP_updated.pdf (1.07M)
Word count: 2000
Character count: 12403

Restaurant Recommendation System Using Machine Learning Algorithms

Prof. Saurav Chandra, Yash Sinha, Tyagi Satyam Lalit and Shorya Garg
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Abstract- The essential nature of recommendation systems becomes apparent when making purchasing decisions or exploring unfamiliar locales. Restaurants, in particular, benefit from these systems both in terms of managerial efforts to attract a larger customer base and in assisting customers in discovering their preferred and renowned dishes. Navigating a diverse range of food options, particularly in new locations, poses a considerable challenge. This paper introduces a restaurant recommendation system that relies on the distribution of food and service ratings, assessing matrix density for improved accuracy. Additionally, a popularity-based recommender model is developed to propose restaurants to customers, utilizing a ranking scheme based on scores. The model's output includes suggestions for the most popular restaurants and their standout dishes. Collaborative filtering is integrated with singular value decomposition to enhance the model's effectiveness. Model evaluation is conducted using Root Mean Square Error (RMSE), leveraging a Kaggle dataset. Furthermore, a practical web-based application is constructed using Python's Flask web framework.

Keywords: - Recommender system; Machine Learning; Collaborative filtering; User inputs and behaviors; User feature, Ranking.

I. INTRODUCTION

Recommendation systems have garnered widespread popularity across diverse domains due to their versatile applications. These systems, driven by a set of algorithms, derive insights from input data to provide personalized suggestions to users. Essentially, they act as tools for recommending products to customers by taking into account factors like search history, user similarities, patterns, and ratings. Noteworthy examples in real-time applications include YouTube, Amazon, and Facebook, all of which heavily rely on historical data for their functionality.

The operation of these systems primarily involves analyzing past data. Items are ranked based on available data, and users receive the most pertinent recommendations. Recommendation systems can be broadly divided into two categories:

- Content-Based
- Collaborative Filtering (CF)

1. Collaborative Filtering:
Collaborative Filtering is exclusively grounded in past interactions between customers and products. It relies on historical data encompassing all transactions involving user engagement with targeted products. A matrix serves as the repository for this data, where rows represent customers and columns represent products. This technique relies solely on historical data, overlooking contemporary trends and cultural influences. [5]

At its core, Collaborative Filtering can be categorized into memory-based and model-based methods. The memory-based method is straightforward, leveraging only historical data with uncomplicated distance measurements. In contrast, the model-based approach utilizes a model to align with potential outcomes.[2]-[3]

2. Content Based Filtering:
Content-Oriented Using more information about clients and items is the process of filtering. It needs more data, such as gender, region, and date of birth, to improve predictions. The goal is to predict consumer characteristics and behavior with respect to a product based on favorable or unfavorable responses.[1]

People of all ages are drawn to food because it is a global emblem of cultures, values, and customs. Even if there are a lot of eateries that can accommodate a range of budgets and sizes, choosing the appropriate one is crucial to satisfying dietary requirements, guaranteeing excellence, and providing well-known meals in a certain area. This variety plays a significant role in the varying degrees of restaurant profitability. By successfully satisfying these requirements, some businesses are able to increase their earnings; similarly, eateries with lower profitability might benefit from the same approach.

Restaurants provide good cuisine, but at the same time, patrons are looking for tasty, high-quality meals. An interface becomes essential to ensure customer and restaurant owner satisfaction. Customers are methodically suggested the restaurant's distinctive features using this interface.[4]-[5]

It addresses problems pertaining to consumers' ignorance of both neighboring eateries and well-liked dishes. When visiting foreign countries, tourists frequently have significant trouble locating restaurants that serve traditional, well-regarded, high-quality local cuisine. Under these conditions, a useful workaround is to incorporate a machine algorithm using reviews into the recommender system.[4]

The study looks at an online restaurant recommendation system using real-time data. This application's main objective is to recommend the best foods to users based on their dietary restrictions and the specified location.

II. REVIEW OF RELATED WORK

Several approaches exist for creating a restaurant recommendation system. Numerous existing systems operate based on the following methods.

Within the framework of this recommender system, recommendations are tailored according to user preferences, deriving insight from the realization that a user's affinity for an item is molded by various factors articulated in reviews. The initial exploration entails a deep dive into topic modeling, unveiling concealed elements within the review text. [6]

Ultimately, the application of regression models facilitates the identification and comprehension of the intricate relationship between users and restaurants.

They underscored the widespread acclaim of the restaurant recommendation system, highlighting its continuous advancements in precision and intricacy. Their presentation showcased a personalized recommendation system based on location, seamlessly integrated into mobile technology. The in-depth study scrutinized user behavior patterns within recommendation systems, proposing various methods for refinement and improvement.[1][6]

In this study, they explained how the restaurant recommendation system works with fancy machine learning stuff. They tried different ways to find a good model that predicts how much you might like a restaurant. They used methods like Slope One, k-Nearest Neighbors, and something called multiclass SVM classification. After checking everything, they found that the multiclass SVM thing worked better than the others.[7]

They contrast item-based and user-based collaborative filtering methods for rating prediction. At last, architecture is provided to facilitate the construction of a real-time recommendation system.[7]

According to the user's location, the restaurant was predicted using SVM in the proposed system. It can be extremely helpful and fulfilling for a user to save a lot of time, money, and effort by having a suggestion system that could assist them in choosing which restaurant to attend.[5]

There exist multiple elements that influence a user's decision to visit a restaurant, such as the restaurant's cuisine, location, ambience, price range, popularity, ratings, and so on. On websites like Yelp and Zomato, this kind of data is gathered and made accessible.[5]

Utilizing a comprehensive, open-source dataset from Yelp that includes user-level data on their favorite restaurants in addition to restaurant reviews, the goal is to develop an effective software application recommendation system for Yelp users that will assist them in making predictions about whether or not they will enjoy dining out by utilizing machine learning techniques and algorithms.[6][10]

The study conducted in this research examined the various reasons why consumers utilize internet reviews. There are a lot of reviews available for many goods and services, making it challenging for buyers to choose which ones to read. According to earlier study, internet review sites may be able to offer a personalized approach for ranking reviews based on the preferences of individual users.

III. METHODOLOGY

The Recommendation system under consideration, as outlined in this proposal, employs statistical techniques and exploratory data analysis to address the subsequent inquiries: determining the quantity of distinct users and restaurants, as well as assigning ratings that encompass aspects like cuisine, service, and quality.[6][9]

To enhance the model, we analyzed the occurrence of user reviews, the overall count of restaurant ratings, and the distribution of evaluations for food, service, and quality individually.

```
Unique users:  138
Unique restaurant:  130
Total no.of ratings given:  1161
Total no.of food ratings given:  1161
Total no.of service ratings given:  1161
```

Fig 1. Find out unique values of the entity.

```
U1061     18
U1106     18
U1134     16
U1024     15
U1022     14
```

Fig 2. Find Number of times user rated.

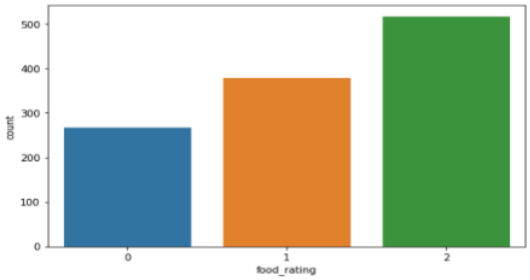


Fig 3. Food Rating.

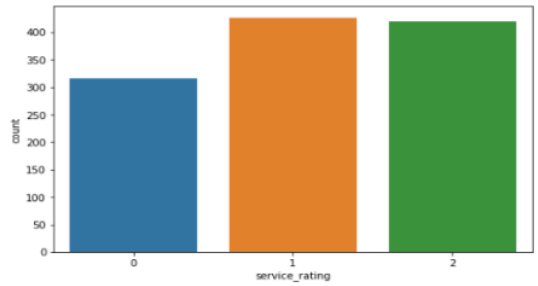


Fig 4. Service Rating.

	userID	placeID	rating	food_rating	service_rating
0	U1077	135085	2	2	2
1	U1077	135038	2	2	1
2	U1077	132825	2	2	2
3	U1077	135060	1	2	2
4	U1068	135104	1	1	2

Fig 5. Retrieving Users with food/Service Rating.

```
given_num_of_ratings:  884
possible_num_of_ratings:  16640
density: 5.31%
```

Fig 6. Density Matrix for the data set.

1. **Dataset:**
   The application will use the central dataset for this recommendation system, which comes from Kaggle, to provide restaurant recommendations.

   There are nine CSV files in the collection that cover different topics including user payments, food, and ratings. We concentrate on the rating file, which has 1161 instances and five attributes in particular. This dataset integrates seamlessly with our platform, allowing the machine learning algorithm to generate customer-relevant results.[4]

2. **Popularity Based Recommendation:**
   This is the typical baseline methodology. Rather of prioritizing a personalized strategy, the model provides clients with explicit suggestions for the top meals within a specific location, during specific hours of the day, or at appropriate dining establishments. As a result, customers are free to decide whether or not to use the product, depending on their preferences. The recommendations are predicated on what is in style or popular right now in the community.[4][6]

   This recommendation type proves especially valuable in scenarios where there is no available historical data for a particular user. It functions on the principles of popularity and stays aligned with current trends. The benefits of this approach include its ability to overcome the cold start problem and its independence from the need for customer historical data.

However, a drawback is its non-personalized nature, potentially recommending similar popular products to every customer.[8]-[9]

	placeID	score
123	135085	36
31	132825	32
80	135032	28
98	135052	25
33	132834	25

Fig 7. Assign score to the most popular places.

	placeID	score	Rank
123	135085	36	1.0
31	132825	32	2.0
80	135032	28	3.0
98	135052	25	4.0
33	132834	25	5.0

Fig 8. Rank based on the scores.

	placeID	score	Rank
123	135085	36	1.0
31	132825	32	2.0
80	135032	28	3.0
98	135052	25	4.0
33	132834	25	5.0

Fig 9. Prediction for most popular restaurants in popularity based recommendation.

3. Collaborative Filtering:

Collaborative filtering has emerged as a contemporary algorithm in recommendation systems. This method leverages inputs derived from various users with akin preferences, encompassing both user-based collaborative filtering and item-based collaborative filtering.[10]

This approach taps into users' inherent preferences by analyzing the latent features that characterize the input values. We employed a collaborative filtering model based on singular value decomposition.

placeID	132560	132561	132564	132572	132583	132584	132594	132608	132609
userID									
U1001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
U1002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
U1003	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
U1004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
U1005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Fig 10. Pivot table.

```
Below are the recommended places for user(user_id = 12):

                    user_ratings  user_predictions
Recommended Places
135046                       0.0          0.780975
135026                       0.0          0.465279
135058                       0.0          0.458938
135055                       0.0          0.455777
135045                       0.0          0.440416
```

Fig 11. Recommend places based on ratings and user

placeID	Avg_actual_ratings	Avg_predicted_ratings	place_index
132560	0.015625	-1.171132e-18	0
132561	0.023438	3.334107e-18	1
132564	0.023438	-1.491341e-18	2
132572	0.117188	9.900262e-02	3
132583	0.031250	3.323385e-02	4

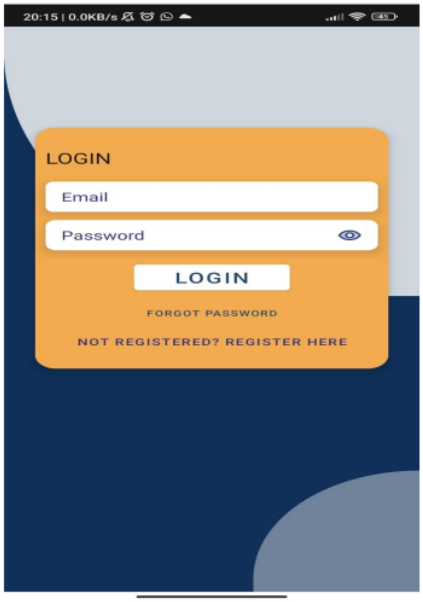
Fig 12. Actual ratings and Predicted ratings.

```
RMSE SVD Model = 0.01874
```

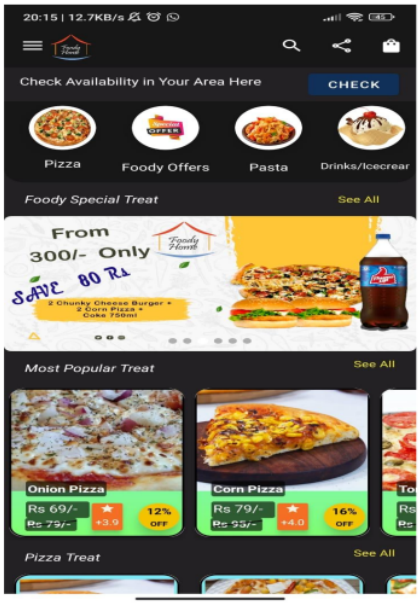
Fig 13. Evaluating the model with RMSE.

Python is utilized in this work to develop our machine learning algorithm, taking advantage of its extensive ecosystem of machine learning libraries. Python's versatility is demonstrated by its ability to display results in a number of formats, such as table view, graph view, and chart view. We use HTML, CSS, and JavaScript in conjunction with the Flask framework to construct the front end. Flask was chosen because it is simple to integrate with Python and offers a productive and smooth development environment.

When in usage, the display is incredibly responsive and fast. We use SQLite for the database, creating unique tables for every client to keep track of logs, reviews, ratings, comments, and browsing history.



Login Page



Home Page

Menu

Payment options

IV. CONCLUSION

The primary goal of the research is to create a web-based application for clients that serves as a restaurant recommendation system with the integration of machine learning.

Users use this app to find restaurants that suit their needs, find famous foods in particular areas, and for personal preferences. Customers are assured of having access to ratings.

By combining collaborative and popularity-based filtering, the effectiveness of recommendations is enhanced, making it easier for every user to predict restaurants when utilizing this program.
Users look for eateries around a lot of the time. We address this issue by adding restaurant locations to our dataset. This enables our machine learning algorithm to predict the best eateries for clients based on their current location with ease.

The web application for restaurant recommendations aims to enhance user experience by facilitating quick and efficient searches for neighboring eateries. By reducing user effort and time, this simplified method increases the experience's overall value.

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Restaurant Recommendation System Using Machine Learning Algorithms

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