



*Mini Project Report On*

## **Tastegy**

*Submitted in partial fulfillment of the requirements for the  
award of the degree of*

**Bachelor of Technology**

*in*

**Computer Science & Engineering**

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# **CERTIFICATE**

*This is to certify that the mini project report entitled "**Tastegy**" is a bonafide record of the work done by **Nandakishore T J (U2103145)**, **Niranjana S Nair (U2103159)**, **Nithin Kurisingal Cimu (U2103161)**, **Shanker Menon (U2103193)**, submitted to the APJ Abdul Kalam Technological University in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology (B. Tech.) in Computer Science and Engineering during the academic year 2023-2024.*

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## **Abstract**

The number of bachelors in India that eat healthy and homely foods are at an all time low. Ironically as the IT sector flourishes and Hustle culture is being promoted even though the financial independence of the youth of our country has risen, the overall lifestyle hasn't turned healthy. The tight work schedule and late night hours have a large contribution to it but there is also the fact that many of them don't have time or the expertise to cook foods. When we factor in the convenience provided by fast food chains and the lack of literacy in recipes among the youth we reach the situation of spending exorbitant amounts over unhealthy food all year long.

Thus we are presenting Tastegy, an innovative website which transforms cooking experiences by recommending recipes based on available ingredients that are specifically dedicated towards people that have limited ingredients in the kitchen and even less time to cook. The website's intuitive interface and personalized features seamlessly integrate ingredient-based cuisine exploration, expert-guided cooking, and tailored user profiles. To enhance user engagement, we have included the ability to take vibrant culinary photography and share it online among friends and family as a part of daily challenges. We will employ word embeddings and deep learning frameworks for personalized recipe recommendations and intelligent ingredient substitutions. In the realm of machine learning, Python is leveraged to implement the recommendation model. The website's commitment to continuous improvement and user-centric design ensures a seamless and enriching culinary journey, catering to users of all skill levels. Through a combination of innovation, community engagement, and personalized recommendations, this website redefines the cooking experience of our country.

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# **Chapter 1**

## **Introduction**

### **1.1 Background**

In India, the modern lifestyle, particularly among bachelors, prioritizes the fast-paced hustle culture over healthy eating habits. Despite the thriving IT sector and increased financial independence among youth, there's a significant gap in adopting nutritious dietary practices. Demanding work schedules and late-night hours leave minimal time for cooking wholesome meals. Tastegy aims to address this issue by revolutionizing cooking experiences for individuals with limited resources and time constraints.

Through its intuitive platform, Tastegy facilitates ingredient-based cuisine exploration, guided cooking, and personalized features. Tastegy ensures tailored recipe suggestions and intelligent ingredient substitutions. Committed to user-centric design and continuous improvement, Tastegy seeks to redefine the culinary landscape, promoting convenience without compromising on healthy eating practices.

### **1.2 Problem Definition**

To develop a Website for discovering recipes of simple and delicious dishes of various varieties using the ingredients on hand given as inputs as well as the dietary choices/preferences of a User.

### **1.3 Scope and Motivation**

#### **1.3.1 Scope**

Despite increased financial independence in India's youth, the prevalence of unhealthy eating habits among bachelors is rising, influenced by tight work schedules, late-night

hours, and a lack of cooking expertise. This website addresses the issue by recommending Indian recipes based on user-input ingredients, catering to different cooking skill levels.

### **1.3.2 Motivation**

The motivation for addressing unhealthy eating habits among Indian bachelors arises from the adverse impact on health due to busy schedules, late-night work, and a lack of cooking skills. By recognizing these challenges, the website aims to provide accessible solutions through personalized recipe recommendations, promoting healthier dietary choices despite time constraints. Ultimately, the goal is to improve the overall well-being and quality of life for this demographic.

### **1.4 Objectives**

1. Develop a system that suggests recipes to users based on given preferences and conditions.
2. Utilize algorithms such as TF-IDF & Cosine similarity to analyse and compare various recipes.
3. Utilize Cosine similarity to implement content based filtering to enhance one's experience as they interact more with their account.
4. Implement a website that accepts ingredients and return recipes whose constituents match the given ingredients as well as the user's unique preferences.
5. Perform adequate testing with the product with real users

### **1.5 Challenges**

This project would require a large data set comprising recipes of various dishes originating from an assortment of cuisines, which brings us to the matter of managing this large amount of data efficiently thereby ensuring scalability. Some other challenges faced include identifying relevant features from the recipes in order to efficiently implement content based filtering as well as choosing appropriate algorithms for vectorization and compiling these vectors.

## **1.6 Assumptions**

The assumptions taken during the design of Tastegy are the following,

1. Users provide accurate and complete information about their preferences and available ingredients.
2. Users accurately assess and input their cooking skill levels.
3. Users have a stable internet connection to access and interact with the website.
4. Users will access the website through devices with compatible browsers and specifications.
5. Users actively participate in challenges and social features.

## **1.7 Societal / Industrial Relevance**

The rise in unhealthy eating habits among bachelors in India is attributed to factors such as busy work schedules, late-night shifts, and limited culinary skills, despite their growing financial autonomy. To tackle this issue, the website offers a solution: suggesting Indian recipes tailored to users' available ingredients and varying levels of cooking proficiency.

## **1.8 Organization of the Report**

The report is structured as follows:

1. **Chapter 1 - Introduction:** Provides background, objectives, and challenges of the project.
2. **Chapter 2 - Software Requirements Specification:** Describes the project's overall description, including system features and nonfunctional requirements.
3. **Chapter 3 - System Architecture and Design:** Presents the project's architecture, user interfaces, and implementation strategies.

## **Chapter 2**

# **Software Requirements Specification**

### **2.1 Introduction**

#### **2.1.1 Purpose**

The Tastegy version 1.0 is an innovative website which transforms cooking experiences by recommending recipes based on available ingredients that are specifically dedicated towards people that have less ingredients in the kitchen and even less time to cook.

#### **2.1.2 Product Scope**

Despite increased financial independence in India's youth, the prevalence of unhealthy eating habits among bachelors is rising, influenced by tight work schedules, late-night hours, and a lack of cooking expertise.[5] This website addresses the issue by recommending Indian recipes based on user-input ingredients, catering to different cooking skill levels. It also features a competitive element through daily culinary challenges, encouraging users to share photos online.

### **2.2 Overall Description**

#### **2.2.1 Product Perspective**

Social media and online communities have fostered a culture of collaboration, including the sharing of cooking experiences and recipes. Recipe recommendation websites capitalize on this trend, allowing users to input ingredients, share tips, and connect over culinary experiences. Our website, part of various recommendation systems, stands out by providing a diverse database catering to different tastes. Unlike food delivery apps focused on ordering from restaurants, our platform extends its value by inspiring and guiding users in home cooking, enhancing the overall meal planning experience.

### **2.2.2 Product Functions**

1. Ingredient Matching:[4]
  - a. Allow users to input ingredients they have at home.
  - b. Suggest recipes that can be prepared using those ingredients, reducing food waste.
2. Dietary Preferences
  - a. Enable users to specify dietary preferences (e.g., vegetarian, vegan, gluten-free).
3. Difficulty Level and Cooking Time:[2]
  - a. Allow users to filter recipes by difficulty level and estimated cooking time.
  - b. Cater to users with different cooking skills and time constraints.
4. Cuisine Variety:
  - a. Offer a diverse range of cuisines for users to explore.
  - b. Tailor recommendations based on the user's preferred cuisines.
5. Social Sharing and Collaboration[3]:
  - a. Enable users to share their favorite recipes on social media.
  - b. Facilitate collaborative meal planning with friends or family.

### **2.2.3 Operating Environment**

The operating environments used by this website are,

1. Front-end: HTML and CSS
2. Back-end: Flask and Python

It will also use a combination of other tools such as development tools, model training tools, deployment platforms and web servers. The website will be available in most versions of web browsers and Operating systems.

#### **2.2.4 Design and Implementation Constraints**

This website necessitates careful consideration of various constraints such as creating an intuitive and responsive user interface that adheres to accessibility standards, optimizing performance and scalability, ensuring robust security measures to protect user data, implementing a content management system for recipe management while adhering to copyright and licensing regulations, providing personalized recommendations through machine learning techniques, integrating with external APIs for additional functionalities, supporting multiple regional cuisines for international users and, ensuring compliance with relevant regulations such as GDPR or CCPA, and managing costs effectively to stay within budget constraints while maintaining quality and reliability.

#### **2.2.5 Assumptions and Dependencies**

The assumptions taken during the design of Tastegy are the following,

1. Users provide accurate and complete information about their preferences and available ingredients.
2. Users accurately assess and input their cooking skill levels.
3. Users have a stable internet connection to access and interact with the website.
4. Users will access the website through devices with compatible browsers and specifications.
5. Users actively participate in challenges and social features.[2]

### **2.3 External Interface Requirements**

#### **2.3.1 User Interfaces**

Tastegy's user interface is designed to provide a seamless and intuitive cooking experience for users with varying levels of expertise and time constraints. The UI offers personalized recipe recommendations based on available ingredients, along with features for ingredient-based cuisine exploration and expert-guided cooking. Additionally, users can take part in daily challenges, share culinary photography, and interact with friends.

and family online.

Key Features:

1. Ingredient-based cuisine exploration.
2. Daily challenges and community engagement.
3. Seamless sharing of culinary photography.
4. Intuitive and user-friendly design. [3]

### **2.3.2 Hardware Interfaces**

Tastegy is a web-based application accessible via standard web browsers on various devices, including desktop computers, laptops, tablets, and smartphones. It does not require any specialized hardware components.

Compatibility:

1. Compatible with devices running modern web browsers (e.g., Chrome, Firefox, Safari).
2. Responsive design for optimal viewing on different screen sizes.
3. Support for touch interactions on touchscreen devices. [3]

### **2.3.3 Software Interfaces**

Tastegy leverages a combination of innovative technologies and frameworks to deliver its functionality. The core recommendation engine utilizes recurrent neural networking, word embeddings, and deep learning frameworks to provide personalized recipe recommendations and intelligent ingredient substitutions. The recommendation model is implemented using Python programming language. Additionally, the application is built using standard web development technologies such as HTML, CSS, JavaScript, and frameworks like Django or Flask.

Key Technologies:

1. Python for recommendation model implementation.
2. HTML, CSS, JavaScript for web application development.

3. Django or Flask for web framework.

4. Word embeddings. [3]

#### **2.3.4 Communications Interfaces**

Tastegy communicates with users primarily through HTTP-based protocols over the internet. Users interact with the application via their web browser, sending requests for recipe recommendations, exploring cuisines, participating in challenges, and sharing content. The application retrieves and processes user data and preferences, providing personalized responses and recommendations. Additionally, Tastegy may integrate with external services or APIs for features such as social media sharing or ingredient sourcing.

Communication Protocols:

1. HTTP/HTTPS for client-server communication.

2. Integration with external services or APIs for additional functionalities. [3]

### **2.4 System Features**

Tastegy empowers users to explore their culinary creativity with a robust set of features designed to streamline the recipe discovery and cooking process. This section dives into the core functionalities that bring Tastegy to life, outlining how each feature addresses user needs and fosters a dynamic user experience.

#### **2.4.1 Ingredient-Based Recipe Recommendations[4]:**

1. Description and Priority

(a) Priority: High. This feature is crucial for the core functionality of Tastegy, as it directly addresses the users' need for recipe suggestions and cooking guidance.

2. Stimulus/Response Sequences

(a) Stimulus: User inputs available ingredients.

(b) Response: System generates recipe suggestions based on input ingredients and provides step-by-step cooking guidance.

3.

### Functional Requirements

- (a) REQ-1: The system must have a database of recipes with associated ingredient lists.
- (b) REQ-2: The system must utilize algorithms to match available ingredients with suitable recipes.
- (c) REQ-3: The system must provide step-by-step cooking instructions for each recommended recipe.

#### **2.4.2 Tailored User Profiles**

##### 1. Description and Priority

Users can create personalized profiles to store dietary preferences, cooking skill levels, and favorite recipes.

- (a) Priority: Medium. While important for enhancing user experience and providing personalized recommendations, this feature may not be as critical as recipe recommendations.

##### 2. Stimulus/Response Sequences

- (a) Stimulus: User creates or updates profile information.
- (b) Response: System stores user preferences, skill levels, and favorite recipes associated with the user's profile.

##### 3. Functional Requirements

- (a) REQ-1: Users must be able to create, update, and delete their profiles.
- (b) REQ-2: The system must store and retrieve user profile information accurately.
- (c) REQ-3: Users should have the option to set privacy settings for their profile information.

## **2.5 Other Nonfunctional Requirements**

### **2.5.1 Performance Requirements**

1. Response Time: The system should respond to user queries for recipe recommendations in a minimal amount of time to provide a seamless user experience.
2. Model Optimization: Recipe recommendation algorithms should be optimized to process large datasets efficiently, ensuring timely generation of recommendations.

### **2.5.2 Safety Requirements**

1. Allergen Warnings: The system must provide clear warnings for recipes containing common allergens, ensuring user safety.
2. Safe Cooking Practices: Recipe instructions should adhere to standard safety guidelines to prevent accidents or injuries during cooking.

### **2.5.3 Security Requirements**

1. User Authentication: Users should be required to authenticate their identity before accessing personalized features such as saved recipes or profile settings.
2. Data Encryption: User data, including profile information and saved recipes, should be encrypted to protect against unauthorized access.
3. Privacy Compliance: The system must comply with relevant data protection regulations to safeguard user privacy and prevent unauthorized sharing of personal information.

### **2.5.4 Software Quality Attributes**

1. Accessibility: The system should have an intuitive user interface and clear navigation, making it easy for users to find recipes and interact with the platform.
2. Usability: The system should be accurately tested for its functionality offered to the users.

3. Reliability: The system should be reliable, with minimal downtime and accurate recipe recommendations.
4. Maintainability: The codebase should be well-organized and documented, making it easy for developers to maintain and update the system in the future.
5. Portability: The system should be accessible across various devices and platforms, including desktops, smartphones, and tablets.
6. The system should be able to integrate with external APIs or services for accessing additional recipe data or enhancing functionality.

# Chapter 3

## System Architecture and Design

### 3.1 System Overview

Tastegy helps users utilize ingredients they have on hand to cook dishes. This is achieved through a multi-step process. The architectural modules required are,

1. **Recipe Dataset:** This is the initial source of recipes that the system will use to learn from. It can be sourced from the web or from a database of recipes.
2. **Data Cleaning and Parsing:** This module is responsible for taking raw recipe data and transforming it into a usable format for the machine learning model. This may involve removing irrelevant information like HTML tags or advertisements, and converting the text into a structured format.
3. **Extract Features:** This module extracts features from the cleaned recipe data. Feature extraction is a technique in natural language processing (NLP) that converts text into numerical features that a machine learning model can understand. Some common feature extraction techniques used in recipe recommendation systems include TF-IDF (Term Frequency-Inverse Document Frequency) and CountVectorizer. These techniques create a numerical representation of a recipe based on the words it contains and how often those words appear in the dataset.
4. **User Inputs:** This module allows users to input the ingredients they have on hand. This information is then used by the model to recommend recipes that the user can make with their available ingredients.
5. **Data Cleaning and Parsing (for User Inputs):** Similar to the initial recipe dataset, this module cleans and parses the user input data to ensure it aligns with the format the model expects.

6. **Similarity Function:** This module takes the user's ingredient data and the recipe features and computes a similarity score between them. The similarity score indicates how well a recipe matches the user's ingredients.
7. **Top N Recipe Recommendations:** This module selects the N recipes from the dataset that have the highest similarity scores to the user's ingredients. These are the recipes that the system recommends to the user.

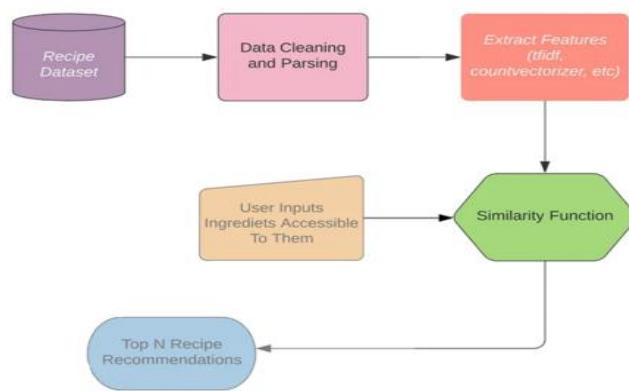


Figure 3.1: Architecture Diagram

## 3.2 Architectural Design

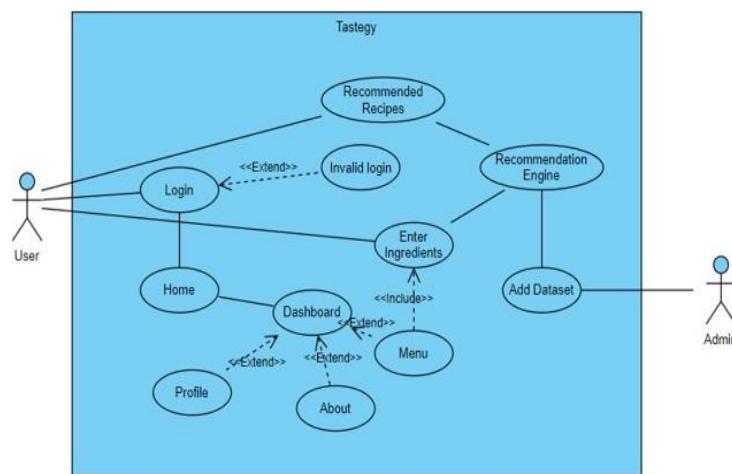


Figure 3.2: Use Case Diagram

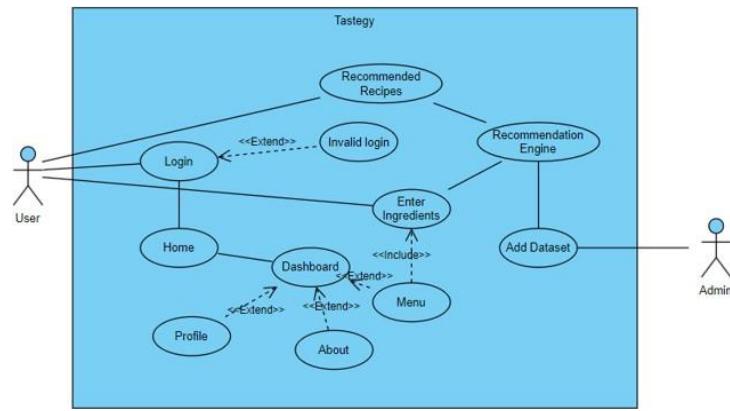


Figure 3.3: Sequence Diagram

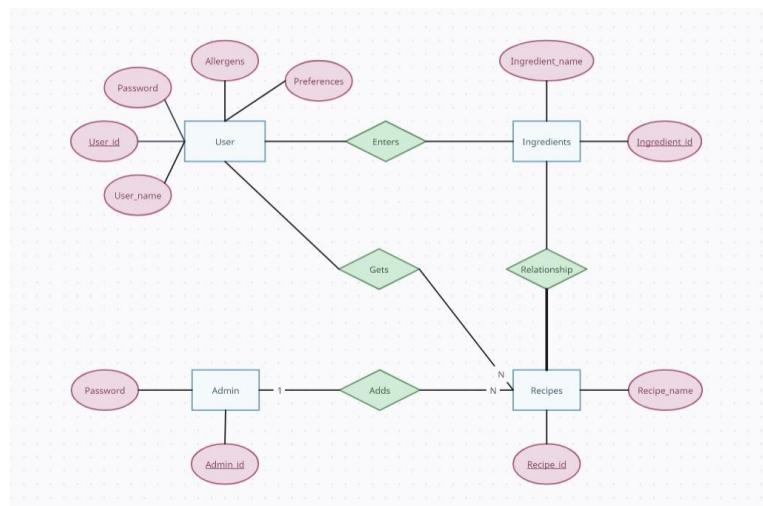


Figure 3.4: ER Diagram

### **3.3 Dataset identified**

The dataset has following fields - ['RecipeName', 'TranslatedRecipeName', 'Ingredients', 'TranslatedIngredients', 'Prep', 'Cook', 'Total', 'Servings', 'Cuisine', 'Course', 'Diet', 'Instructions', 'TranslatedInstructions']. The dataset contains a csv and a xls file.

Dataset name - IndianFoodDatasetXLS.xlsx

Dataset size - 5,407 KB

Disc.	Recipients	Turkmenistan's Asien Ingredients	Turkmenistan's Prog Possibilities	Costs/reasons	Total/Timelines	Settings	Cuisine	Diet	Indication	Transnationalization Chs.
1.	Rezaie, Kaveh	Mazda, Kaveh	Kaveh (Blue Ox) Bistro (Blue Ox)	11	10	10	6. Indian	Side Dish	Dietary friendly	To begin making the <a href="#">blue ox meat</a> and <a href="#">blue ox cheese</a>
2.	CEST (CENTRAL ASIA)	Apex Tacos Mexico	1-1/2 lbs ground - 4oz - 2-1/2 lbs coles - co	5	10	10	4. South Indian Recipe Main Course	Vegetarian	To begin making the <a href="#">vegan soft shell tacos</a> and <a href="#">vegan nachos</a>	To begin making the <a href="#">vegan nachos</a>
3.	Rey, Saman	Samay	1-1/2 lbs ground - 1/2 lbs coles - 1/2 lbs coles	20	30	30	4. South Indian Recipe Main Course	Vegetarian	To begin making the <a href="#">vegan samay</a> and <a href="#">vegan rice</a>	To begin making the <a href="#">vegan rice</a>
4.	Gorgan Chicken Co	Gorgan Chicken Co	3 lbs ground chicken - 2 lbs ground chicken	15	20	20	4. Indian	Lunch	Not Vegetarian	To begin making the <a href="#">chicken</a>
5.	WFO AMRIT AMRIT AMRIT AMRIT AMRIT	WFO AMRIT AMRIT AMRIT AMRIT	1 lb ground chicken	10	20	20	4. Indian	South Indian Breakfast	Inter state import	To begin making the <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a> and <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a>
6.	Pulka Khan	Pulka Khan	Fusilli - 1/2 cup - baked - 1/2 lbs meat	10	20	20	4. Indian	South Indian South Indian Breads High Protein Veggie	High protein	To begin making the <a href="#">Pulka Khan</a>
7.	Ukay Khan	Ukay Khan	Ukay (Aloo) 1/2 lbs Aloo 1/2 lbs meat 1/2 lbs green peas 1/2 lbs	10	30	40	4. Indian	Lunch	High protein	To begin making the <a href="#">Ukay Khan</a>
8.	Wesam Khan	Wesam Khan	Blue Mountain Blue Bistro	10	30	30	4. Mexican	Lunch	High protein	To begin making the <a href="#">Wesam Khan</a>
9.	Spiry Dining	Spiry Dining	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat - 1/2 lbs meat	10	20	20	3. South Indian Recipe Indian Breads	Breakfast	High protein	To begin making the <a href="#">Spiry Dining</a>
10.	WFO AMRIT AMRIT AMRIT AMRIT AMRIT	WFO AMRIT AMRIT AMRIT AMRIT	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat	5	20	20	3. South Indian Recipe Indian Breads Side Dish	Breakfast	High protein	To begin making the <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a> and <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a>
11.	Hennekale Gated & Innovations	B 233	peanut butter - 250 grams dry beans	60	60	120	4. Indian	High Protein Veggie	Vegetarian	To begin making the <a href="#">Hennekale Gated &amp; Innovations</a>
12.	Veg Deli Deli	Veg Deli Deli	Burger buns - 2 Burger buns - 2 Burger buns	10	45	55	4. Continental	Main Course	Vegetarian	To begin making the <a href="#">Veg Deli Deli</a>
13.	Andra Style Indian	Andra Style Indian	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat - 1/2 lbs meat	6	30	30	4. Indian	Lunch	High protein	To begin making the <a href="#">Andra Style Indian</a>
14.	Aar Kitchen	Aar Kitchen	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat - 1/2 lbs meat - 1/2 lbs meat	6	15	20	2. Bangladeshi	Dinner	High protein	To begin making the <a href="#">Aar Kitchen</a>
15.	Saint Louis	Saint Louis	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat - 1/2 lbs meat	10	15	20	2. Persian	Lunch	High protein	To begin making the <a href="#">Saint Louis</a>
16.	WFO AMRIT AMRIT AMRIT AMRIT AMRIT	WFO AMRIT AMRIT AMRIT AMRIT	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat	20	20	40	4. South Indian Recipe Side Dish	Breakfast	High protein	To begin making the <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a> and <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a>
17.	Hennay Egg Curry	Hennay Egg Curry	4 oz White Eggs - 4 oz White Eggs - 4 oz White Eggs	15	20	35	4. Indian	Lunch	High protein	To begin making the <a href="#">Hennay Egg Curry</a>
18.	WFO AMRIT AMRIT AMRIT AMRIT AMRIT	WFO AMRIT AMRIT AMRIT AMRIT	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat	15	15	30	4. Indian	Side Dish	High protein	To begin making the <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a> and <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a>
19.	Hennekale Tasty Tasty Tasty Tasty Tasty Tasty	Tasty Tasty Tasty Tasty Tasty Tasty	10 lbs protein (10 lbs protein)	15	45	60	8. Continental	Appetizer	Vegetarian	To begin making the <a href="#">Hennekale Tasty Tasty Tasty Tasty Tasty Tasty</a>
20.	Afghan Afghani	Afghan Afghani	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat - 1/2 lbs meat	15	45	60	4. Pakistani	Dinner	Vegetarian	To begin making the <a href="#">Afghan Afghani</a>
21.	WFO AMRIT AMRIT AMRIT AMRIT AMRIT	WFO AMRIT AMRIT AMRIT AMRIT	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat	5	10	15	3. Indian	Side Dish	High protein	To begin making the <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a> and <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a>
22.	Wahmeham Kafe	Wahmeham Kafe	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat	30	30	60	4. Malaysian	High Protein Indian Breads	Dietary friendly	To begin making the <a href="#">Wahmeham Kafe</a>
23.	Hennekale Healthy Hennekale Healthy	Hennekale Healthy	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat	15	15	30	4. Indian	Dinner	High protein	To begin making the <a href="#">Hennekale Healthy</a>
24.	South Indian S.Y.S South Indian S.Y.S	South Indian S.Y.S	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat	30	15	45	4. South Indian Recipe Side Dish	Vegetarian	To begin making the <a href="#">South Indian S.Y.S</a>	
25.	Kesar Kela	Kesar Kela	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat	15	15	25	2. Indian	Snack	Vegetarian	To begin making the <a href="#">Kesar Kela</a>
26.	WFO AMRIT AMRIT AMRIT AMRIT AMRIT	WFO AMRIT AMRIT AMRIT AMRIT	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat	5	20	20	10. Chinese	Snack	Vegetarian	To begin making the <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a> and <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a>
27.	WFO AMRIT AMRIT AMRIT AMRIT AMRIT	WFO AMRIT AMRIT AMRIT AMRIT	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat	5	20	20	10. Chinese	Snack	Vegetarian	To begin making the <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a> and <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a>
28.	WFO AMRIT AMRIT AMRIT AMRIT AMRIT	WFO AMRIT AMRIT AMRIT AMRIT	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat	5	20	20	3. North Indian Recipe Lunch	Breakfast	Vegetarian	To begin making the <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a> and <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a>
29.	Spiry Spice	Spiry Spice	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat	10	20	30	4. Indian	Spicy Apples	Vegetarian	To begin making the <a href="#">Spiry Spice</a>
30.	WFO AMRIT AMRIT AMRIT AMRIT AMRIT	WFO AMRIT AMRIT AMRIT AMRIT	1/2 lbs meat - 1/2 lbs rice - 1/2 lbs meat	20	45	65	3. Indian	Spicy Apples	Vegetarian	To begin making the <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a> and <a href="#">WFO AMRIT AMRIT AMRIT AMRIT</a>

Figure 3.5: Dataset

### **3.4 Proposed Methodology/Algorithms**

1. User Authentication. Prompt the user to enter their username and password.
  2. Verify the credentials against the database. If the credentials are valid, proceed to step 10.
  3. If the login credentials are invalid show error and direct the user to registration page.
  4. New user registration: Prompt user to enter a username and password.
  5. Recipes within the data-set are cleaned and converted into vectors.
  6. User is prompted to input ingredients.
  7. Ingredient set is converted to vector form and compared with recipe vectors from the data-set.

8. All recipes with the given ingredients are showcased in a new page sorted w.r.t their similarity functions.
9. The desired recipe may be selected by the User, which takes them to a result page showing the ingredients, techniques and steps in its preparation.

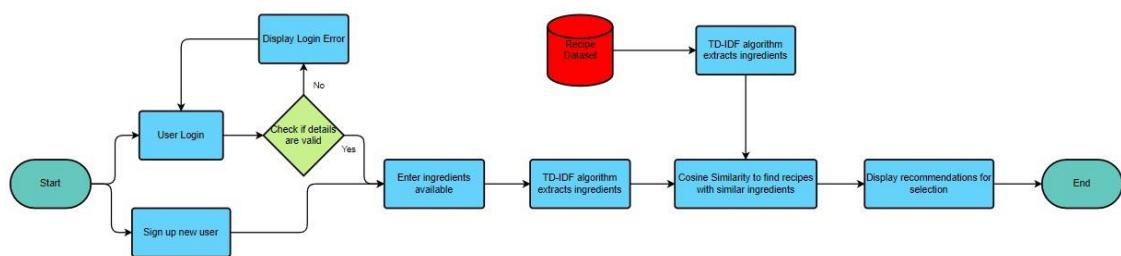


Figure 3.6: Algorithm Flowchart

### 3.5 User Interface Design

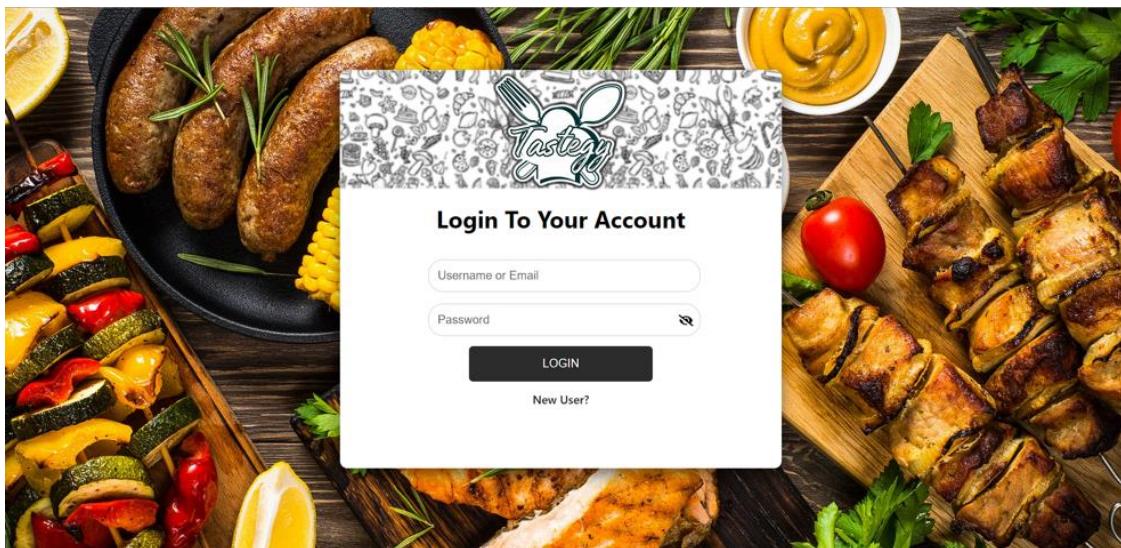


Figure 3.7: User Login

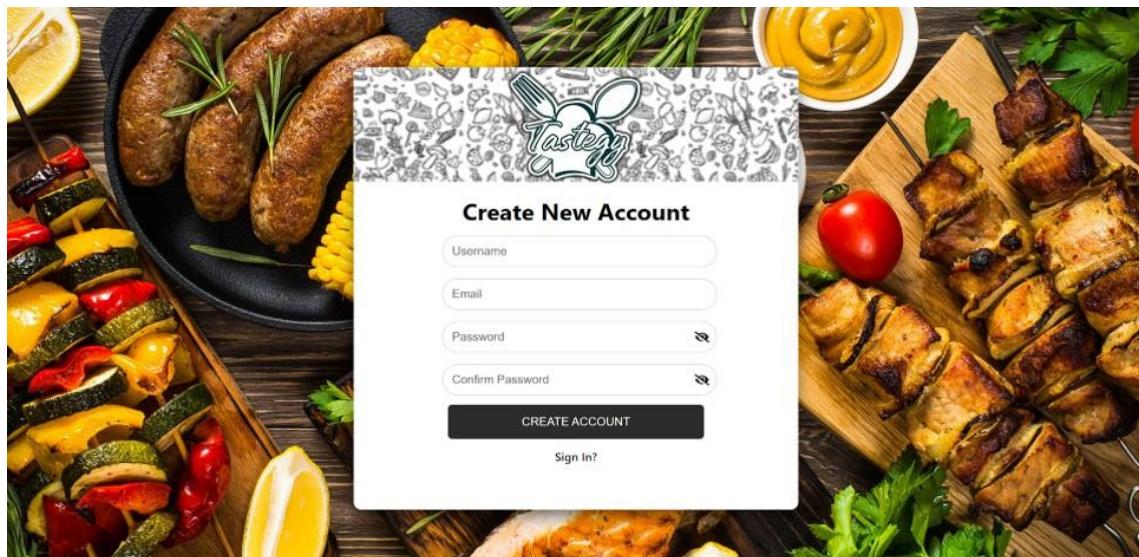


Figure 3.8: New User Sign Up



Figure 3.9: Main Menu

### **3.6 Database Design**

1. **userid** - Unique identifier for each user: The userid is the primary key for the table, which means it is a unique value assigned to each user. This field is crucial for distinguishing between different users in the database. It ensures data integrity and helps in efficiently managing and retrieving user records.
2. **username** - Username for login: The username field is used to store the unique login name chosen by the user. This name is used for authentication purposes during the login process. It is generally required to be unique across all users to prevent conflicts and ensure that each user can be uniquely identified by their username.
3. **password** - Secure password: The password field stores the user's password. This is a critical piece of information used to verify the user's identity. Due to security concerns, passwords should always be stored in a hashed and salted format rather than plain text to protect against unauthorized access.
4. **email** - Email address for communication: The email field stores the user's email address. This is used for communication purposes, such as sending password reset links, notifications, and other user-specific information. It may also serve as an additional identifier for the user.

<b>Field</b>	<b>Data Type</b>	<b>Description</b>
userid	varchar PRIMARY KEY	Unique identifier for each user
username	varchar	Username for login
password	varchar	Secure password
email	varchar	Email address for communication

Table 3.1: Users Table Schema

### 3.7 Description of Implementation Strategies

1. Data Loading and Preprocessing: The dataset is loaded into a Pandas DataFrame, and preprocessing is performed to clean and prepare the data for further analysis. This includes removing unnecessary text from the ingredients list and handling missing values.

```
df = pd.read_csv("IndianFoodDatasetCSV.csv")
ingredients = []
for ing_list in df['TranslatedIngredients'] :
    if not isinstance(ing_list, float) :
        clean_ings = [ing_list]
        ingredients.append(clean_ings)
    else :
        ingredients.append([])           df
['TranslatedIngredients'] = ingredients
```

2. Text Vectorization: The ingredients, dietary preferences, and cuisine type are combined into a single string for each recipe, and then a TF-IDF vectorizer is used to transform these strings into numerical vectors.

```
df['RecipeText'] = df['TranslatedIngredients'].apply("."join) + ' + df['Diet'] + ' +
df['Cuisine']
corpus = df['RecipeText'].tolist()
tfidf_vectorizer = TfidfVectorizer()
recipe_tfidf_matrix = tfidf_vectorizer.fit_transform(corpus)
```

3. Recommendation Algorithm: A recommendation function is defined that takes user inputs (ingredients, dietary preferences, cuisine type), transforms them into a TF-IDF vector, and calculates cosine similarity with the existing recipes. The top recommendations are then selected based on the highest similarity scores.

```
def recommend_recipes(user_ingredients, user_dietary_preference, user_cuisinetype) :
```

```

user_input = userIngredients + '' + user dietary preference + '' + user cuisinetype
user_input_tfidf_vector = tfidf_vectorizer.transform([user input])
similarity_scores = cosine_similarity(user input tfidf vector, recipe tfidfmatrix)
top_indices = similarity_scores.argsort()[0][-10:][::-1]
recommended_recipes = df.iloc[top indices]
for index, row in recommended_recipes.iterrows():
    recommended_recipes.at[index, 'IndexNo'] = index
return recommended_recipes

```

4. Web Interface with Flask: Flask is used to create a web interface for the recommendation system. Various routes are defined to render different pages and process user inputs.

```

app = Flask( name ,static folder = "static")
@app.route("/")
def home() :
    return render template("home.html")
@app.route("/search")
def findRecipes() :
    return render template("recipeSearchPage.html")
@app.route("/about")
def aboutUs() :
    return render template("aboutUs.html")
@app.route("/contact")
def contactUs() :
    return render template("contactUs.html")
@app.route("/login")
def login() :
    return render template("loginPage.html")
@app.route("/tips")
def tip() :
    return render template("tipPage.html")

```

```

@app.route("/recommend", methods = ["GET", "POST"])
def recommend() :
    user_ingredients = request.form["ingredients"]
    user_dietary_preference = request.form.get("diet", "")
    user_cuisine_type = request.form.get("cuisine", "")
    recommended_recipes = recommend_recipes(user_ingredients, user_dietary_preference, user_cuisine_type)
    for index, row in recommended_recipes.iterrows() :
        recipe_url = row['URL']
        image_urls = scrape_images(recipe_url)
        recommended_recipes.at[index, 'Image URLs'] = image_urls
    return render_template("listPage.html", recommended_recipes=recommended_recipes.to_dict('records'))

@app.route("/recipe/ < int : recipe_id > ")
def recipe_details(recipe_id) :
    recipe = get_recipe_details(recipe_id)
    image_url = scrape_images(recipe.URL)
    recipe['Image URLs'] = image_url[0]
    if recipe is None :
        return render_template("error.html", message = "Recipe not found"), 404
    else :
        return render_template("recipeDetails.html", recipe = recipe)

```

5. Image Scraping: A function is defined to scrape images from a given recipe URL. This function uses BeautifulSoup to parse the HTML content and extract image URLs based on a specified class name.

```

def scrape_images(url) :
    specific_image_urls = []
    response = requests.get(url)
    soup = BeautifulSoup(response.content, 'html.parser')
    class_name = 'img-fluid img-thumbnail'
    img_tags = soup.find_all('img', class_=class_name)

```

```

for img tag in img tags :
    img_url = img tag.get('src')
    if img_url :
        img_url = "https ://www.archanaskitchen.com/" + img_url
        specific_image_urls.append(img url)
return specific_image_urls

```

### **3.8 Module Division**

1. Data Collection Module: This module gathers data from given data sets.
2. Preprocessing Module: The collected data undergoes preprocessing to clean and standardize it. This involves tasks such as removing duplicate recipes, normalizing ingredient names, handling missing values, and converting text into a suitable format for further analysis.
3. Feature Extraction Module: This module extracts relevant features from the preprocessed data that can be used to represent recipes and users. Features may include ingredient vectors, flavor profiles, dietary restrictions, and user preferences.
4. Recommendation Engine Module: The recommendation engine is responsible for generating personalized recipe recommendations based on user preferences. It uses machine learning algorithms such as cosine similarities or content-based filtering to suggest recipes appealing to the user.
5. User Interface Module: This module provides the interface through which users interact with the system. The implemented website interface allows users to input their ingredients and preferences, and browse recipes.
6. Integration Module: This module integrates the recommendation system with external services or platforms as needed. Mainly, it integrates with social media platforms to share recipes with friends.
7. Login Module: The login module allows users to create accounts and log in to access personalized features. It enhances security by authenticating users before granting

access to certain functionalities, such as accessing account settings.

## Assignment:

1. Nandakishore T J: User Interface, Login
  2. Niranjana S Nair: Feature Extraction, Recommendation Engine
  3. Nithin Kurisingal Cimu: Recommendation Engine, Integration
  4. Shankar Menon: Data Collection, Preprocessing

### **3.9 Work Schedule - Gantt Chart**

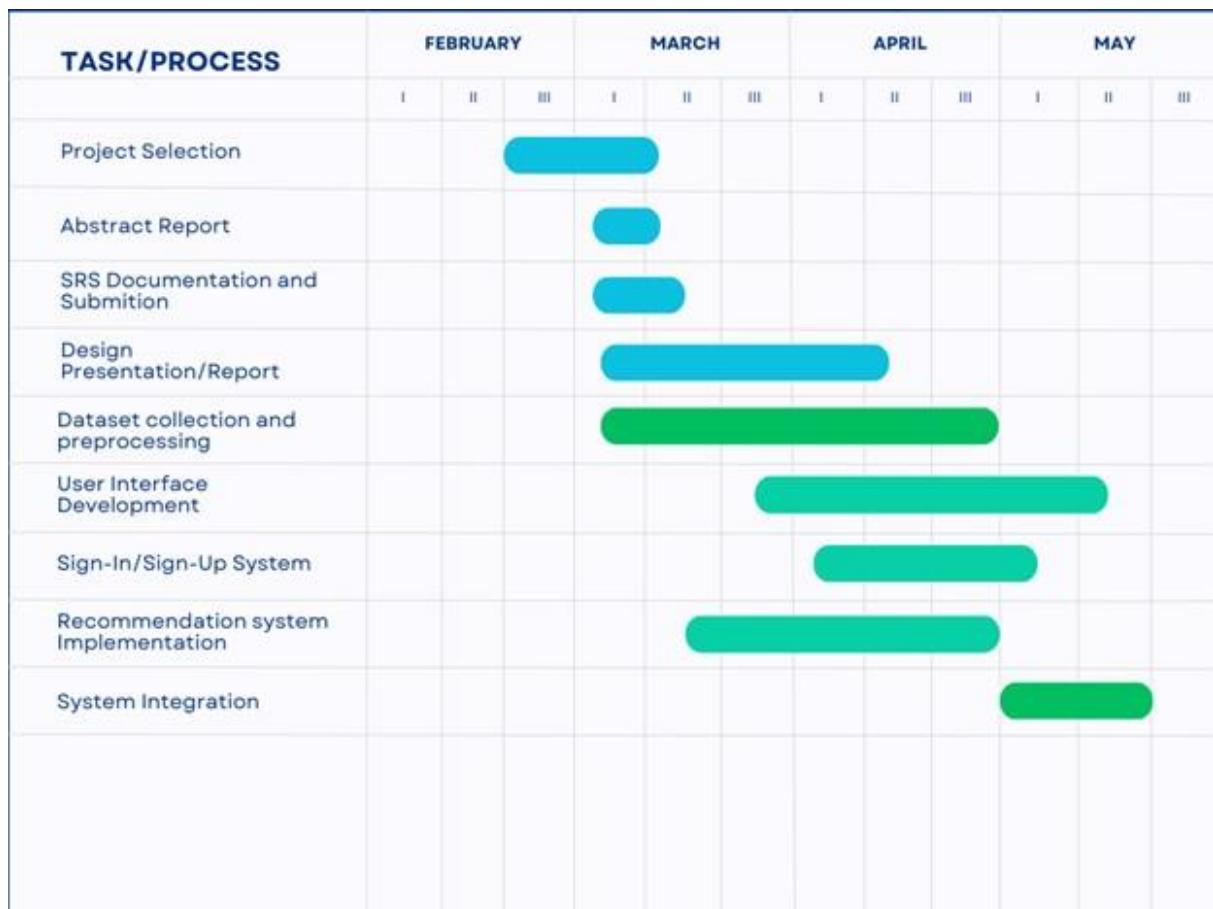


Figure 3.10: Work Schedule - Gantt Chart

# **Chapter 4**

## **Results and Discussions**

### **4.1 Overview**

"Tastegy" is a dynamic web application designed to revolutionize the way users engage with cooking and food exploration. At its core, Tastegy offers a sophisticated recommendation system that leverages advanced algorithms and machine learning techniques to provide personalized recipe suggestions tailored to each user's preferences. By analyzing user input, including preferred ingredients, dietary restrictions, and cuisine preferences, Tastegy ensures that every recommendation is relevant and enticing.

The user experience within Tastegy is seamless and intuitive, with a user-friendly interface that allows users to navigate effortlessly through various sections of the application. From the home page to recipe search, about, contact, login, and tips sections, Tastegy offers a comprehensive set of functionalities to cater to diverse user needs. Whether users are looking for quick meal ideas, exploring new cuisines, or seeking culinary inspiration, Tastegy provides a rich and engaging experience.

In addition to recipe recommendations, Tastegy offers valuable insights and tips to help users enhance their cooking skills and culinary knowledge. From cooking techniques and ingredient substitutions to meal planning strategies and kitchen hacks, Tastegy serves as a valuable resource for users at every skill level. By empowering users to discover, create, and savor delightful culinary experiences, Tastegy redefines the way users interact with food and cooking, fostering a vibrant and dynamic community of food enthusiasts and amateur chefs alike.

## 4.2 Testing

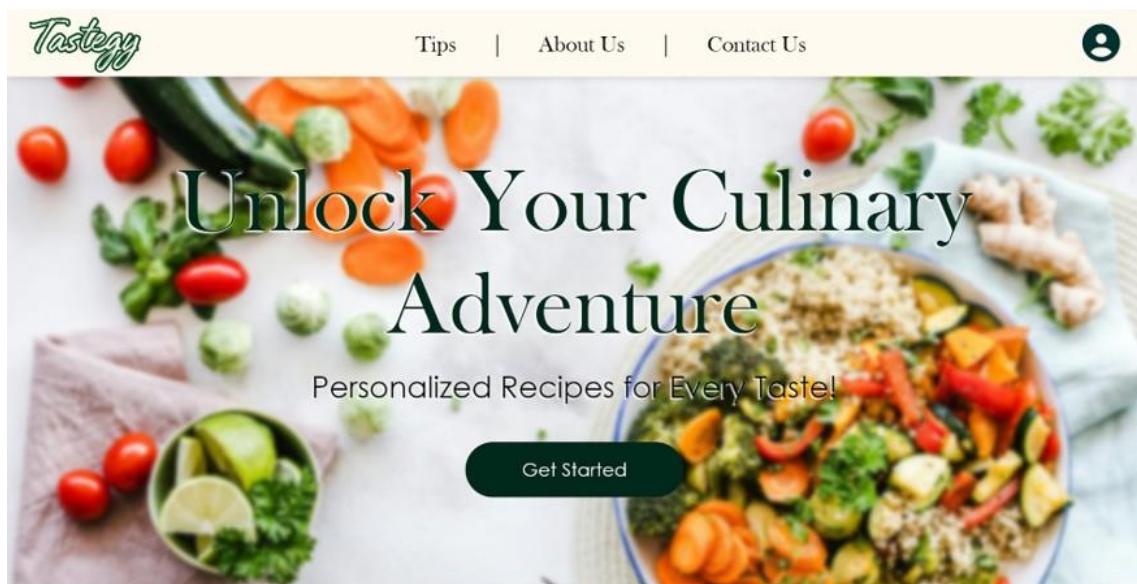


Figure 4.1: Main Menu

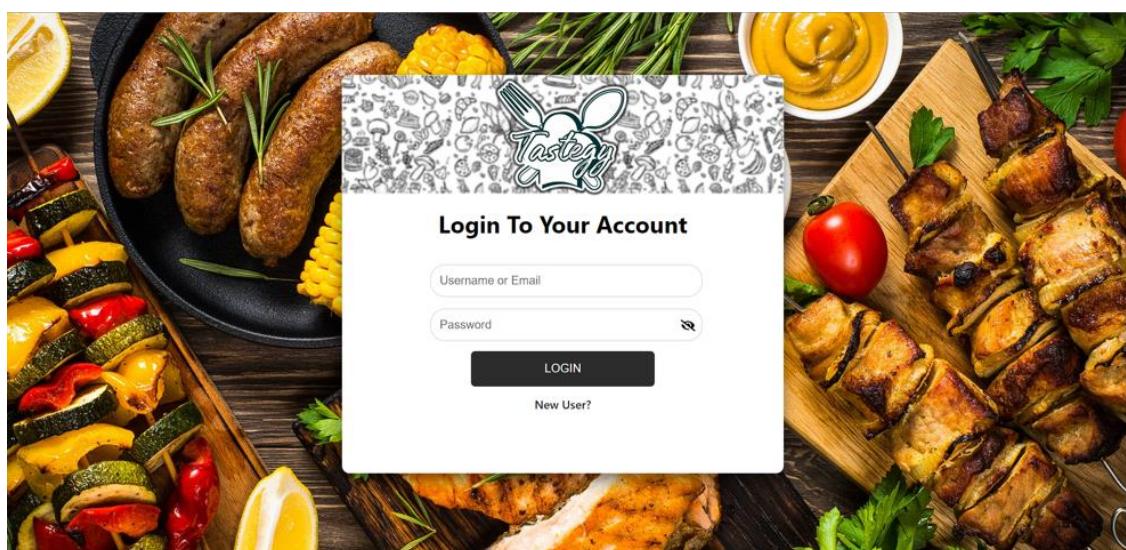


Figure 4.2: Login

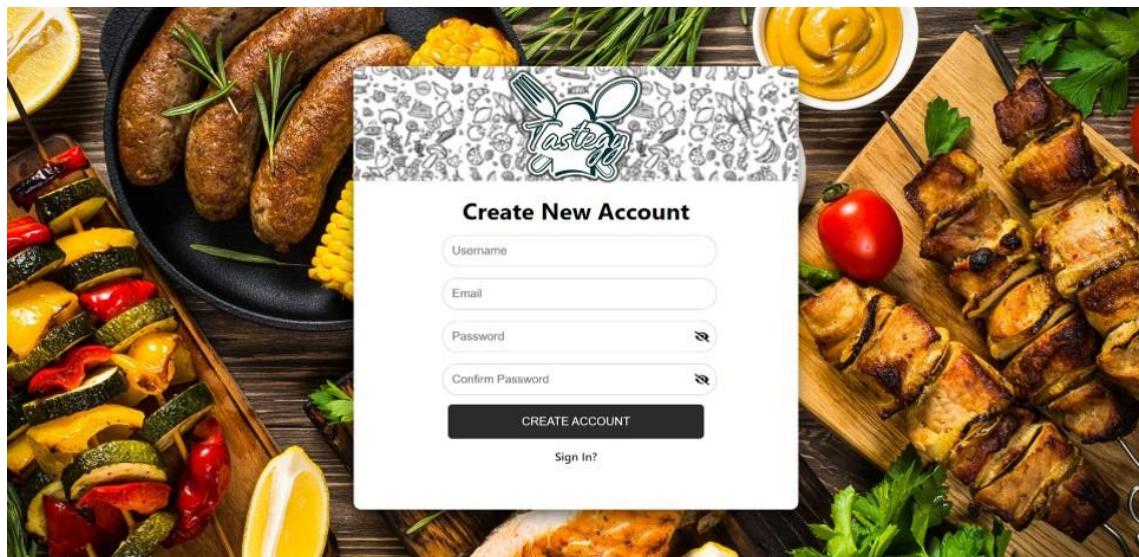


Figure 4.3: Create new Account

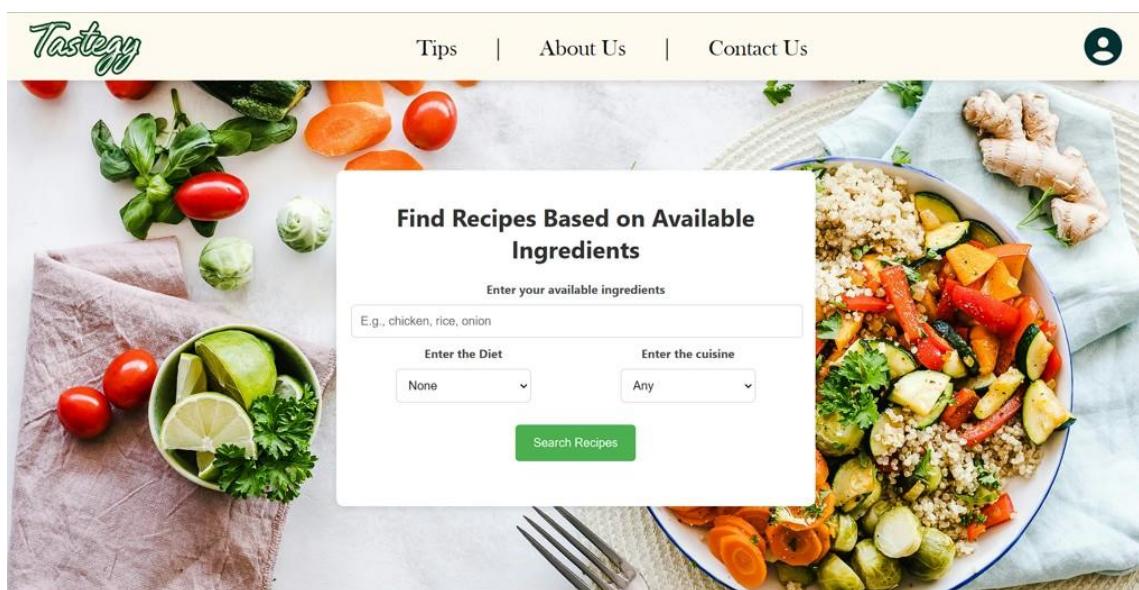


Figure 4.4: Recipe Search



## Recipe Recommendations

Sort by: Cooking Time (High to Low)



Aloo Paneer Kebab Recipe



Zucchini Tater Tots Recipe - A Delicious Party Appetizer



Chicken Malai Kabab Recipe



Figure 4.5: Recipe List



## Tempura Chicken Wings With Barbecue Sauce Recipe



Cuisine: Continental

Diet: Non Vegetarian

**Ingredients:** [8 Chicken Wings, 2 tablespoon Barbeque sauce, 1/2 cup Whole Wheat Bread crumbs, 1 teaspoon Chilli vinegar, 1 inch Ginger - chopped, 2 cloves Garlic - chopped, 4 tablespoons Corn flour, 1 Whole Egg, Salt and Pepper - to taste]

**Preparation Time:** 40 minutes**Instructions**

To begin making the Tempura Chicken Wings With Barbecue Sauce Recipe we will first boil the chicken wings in a sauce pan with some water. Boil the wings for about 20 minutes on medium flame until it's half done. This par boiling method will help the wings to absorb less oil once you fry them. Turn off the flame, strain the wings and pat dry them using a kitchen towel. Transfer the chicken wings into a bowl, add cornflour and season it well with salt and pepper and coat them completely. Heat a kadai with oil on medium heat. Beat egg in another bowl, dip the coated chicken wings in this egg and coat them again with bread crumbs and carefully slide it into the kadai with hot oil. Do the same for the rest and fry the wings until golden brown. Heat another sauce pan with oil on medium flame, add ginger and garlic and saute until it softens. Add the barbecue sauce and chili vinegar and once it start to sizzle, toss in

Figure 4.6: Recipe Details



Figure 4.7: Tips

### 4.3 Discussion

"Tastegy" is a versatile web application designed to cater to culinary enthusiasts, foodies, and amateur chefs alike. With an intuitive user interface and a robust recommendation engine at its core, Tastegy aims to revolutionize the way users discover, explore, and experiment with diverse cuisines and recipes.

At the heart of Tastegy lies its recommendation system, powered by sophisticated algorithms and machine learning techniques. Leveraging natural language processing (NLP) and text vectorization, the system analyzes user input, including preferred ingredients, dietary restrictions, and cuisine preferences. This data is seamlessly integrated into the recommendation process, ensuring that each user receives personalized and relevant recipe suggestions tailored to their unique tastes and preferences.

The user experience is further enhanced by Tastegy's intuitive navigation and user-friendly design. Users can easily browse through various sections of the application, including the home page, recipe search, about, contact, login, and tips sections, each offering a distinct set of functionalities. Whether users are looking for quick meal ideas, exploring new cuisines, or seeking culinary inspiration, Tastegy provides a seamless and engaging experience.

Additionally, Tastegy goes beyond recipe recommendations by offering valuable tips and insights to help users elevate their cooking skills and culinary knowledge. From cook-

ing techniques and ingredient substitutions to meal planning and kitchen hacks, Tastegy serves as a comprehensive resource for users at every skill level.

Overall, Tastegy represents a paradigm shift in the way users interact with food and cooking. By combining cutting-edge technology with user-centric design principles, Tastegy empowers users to discover, create, and savor delightful culinary experiences like never before. Whether users are passionate home cooks or casual food enthusiasts, Tastegy offers a dynamic platform for culinary exploration and discovery.

# **Chapter 5**

## **Conclusion**

### **5.1 Conclusion**

Our Indian recipe recommendation website is designed to provide culinary enthusiasts with a rich and diverse array of Indian recipes that cater to all tastes and dietary preferences. Whether you're a seasoned chef or a home cook, our platform offers a curated selection of traditional and contemporary Indian dishes, ensuring that every meal is a flavorful journey through India's vibrant culinary landscape. From the aromatic spices of the north to the tangy tamarind-infused dishes of the south, our recommendations are tailored to help you explore and master the art of Indian cooking with ease. The user-friendly interface, combined with detailed recipe instructions and ingredient lists, makes it simple for anyone to create authentic Indian meals at home.

In addition to offering a wide variety of recipes, our website also provides valuable tips and insights into Indian cooking techniques, ingredient sourcing, and cultural significance of various dishes. This holistic approach not only enhances your cooking skills but also deepens your appreciation for the rich cultural heritage behind each recipe. Whether you're looking to whip up a quick weekday meal or plan an elaborate festive feast, our recommendation system ensures you have access to the best Indian recipes, handpicked to suit your preferences and skill level. Embark on a culinary adventure with our website and discover the endless possibilities of Indian cuisine, right from the comfort of your kitchen.

## **5.2 Future Scope**

1. Enhanced Personalization and AI Integration: By leveraging advanced artificial intelligence and machine learning algorithms, our website can offer highly personalized recipe recommendations based on user preferences, dietary restrictions, and past interactions. This can include suggesting recipes based on available ingredients, seasonal produce, and even health goals such as weight loss or muscle gain. AI can also help in providing real-time cooking assistance and tips, making the cooking process more interactive and engaging.
2. Cultural and Educational Content: Expanding the content to include the history, culture, and stories behind various Indian dishes can make the website a rich educational resource. Videos, blogs, and articles about regional cuisines, traditional cooking methods, and cultural festivals can attract users interested in learning more about Indian heritage.
3. Community Building and Social Integration: Developing a strong community aspect where users can share their own recipes, cooking experiences, and tips can foster a vibrant and supportive environment. Integration with social media platforms can enable users to share their culinary creations and connect with other food enthusiasts. User-generated content, such as reviews and ratings, can help improve recipe recommendations and build trust.
4. Health and Wellness Features: Incorporating nutritional information and health benefits for each recipe can cater to health-conscious users. Features like meal planning, calorie counting, and dietary customization (e.g., gluten-free, vegan) can be added. Collaborations with nutritionists and dietitians to create specialized meal plans can also be a valuable addition.
5. Mobile App Development: Developing a mobile app with all the features of the website, plus additional functionalities like offline access to recipes and cooking timers, can make it more accessible to a broader audience. Push notifications for new recipes and cooking challenges can keep users engaged.

## **Bibliography**

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## **Appendix A: Presentation**

# l'astegy FINAL PRESENTATION

*Guide:*  
Ms. Liya Joseph

Nandakishoíe lJ  
Niánjana S Naií  
Nithin K Cimu  
Shankeí Menon

4/2/2024

Tastegy

## Contents

- Intíoduction
- Píoblem Definition
- Objectives
- Scope and Relevance
- System Aíchitectuíe
- Datasets
- UI Design
- Woík Division – Gantt Chaít
- Softwaíe/Haídwaíe Requiíements
- Conclusion
- Futuíe Enhancements
- Refeíences

Tastegy

# Intíoduction

- The prevalence of unhealthy eating habits among bacheloís is rising, influenced by tight work schedules, late-night hours, and a lack of cooking expertise.
- The Tastegy is an innovative website which recommends recipes based on available ingredients that are specifically dedicated towards people that have less ingredients in the kitchen and less time to cook.
- This website is our effort towards fixing one of the main issues influencing the new generation.
- Such a website will lead to a healthier nation.

Tastegy

# Píoblem Definition

To develop a Website for discovering recipes of simple and delicious dishes of various varieties using the ingredients on hand given as inputs as well as the dietary choices/preferences of a User.

Tastegy

# Objectives

- Ingredient Matching
- Dietary Preferences and Restrictions
- Sort by relevance, cooking time
- Provide kitchen, cooking and cutting tips

Tastegy

## Scope and Relevance

- **User-Centric Approach:** The scope of the website is to provide a user-friendly platform where individuals can discover Indian recipes tailored to the ingredients they already have. This caters to the growing demand for personalized cooking experiences that align with users' kitchen inventories.
- **Recipe Diversity and Exploration:** By focusing on Indian cuisine, the website aims to offer a diverse range of recipes, including regional specialties and traditional dishes. This scope encourages culinary exploration and exposes users to the rich and varied flavors of Indian cooking.

# Scope and Relevance

- **Sustainability and Food Waste Reduction:** An essential aspect of the website's scope is to promote sustainable cooking practices by helping users make use of ingredients they already possess. This contributes to reducing food waste and aligns with environmentally conscious cooking trends.
- **Health and Wellness Focus:** Indian cuisine, when prepared with fresh ingredients, offers nutritious and flavorful meal options. The website's relevance extends to supporting health-conscious individuals seeking wholesome cooking alternatives.

# Scope and Relevance

- **Practicality and Cost-Effectiveness:** The relevance is also tied to practicality and cost-effectiveness, helping users save time and money by utilizing ingredients on hand rather than purchasing additional items for cooking.

# System Design

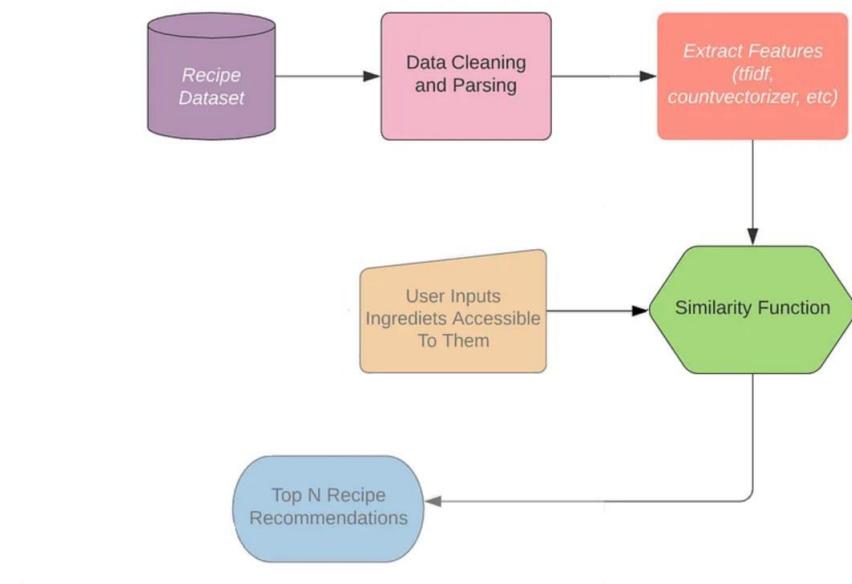
Tastegy

9

## System Overview

- The Recipe Recommender allows users to input ingredients and connect various culinary experiences.
- The website provides a diverse database catering to different tastes.
- Instead of placing ideas from restaurants, our platform extends its value by inspiring and guiding users in home cooking.

# Aíchitectuál Design



## Modules

- Data Collection Module:
  - This module gathers data from given data sets.
- Processing Module:
  - The collected data undergoes processing to clean and standardize it. This involves tasks such as removing duplicate recipes, normalizing ingredient names, handling missing values, and converting text into a suitable format for further analysis.

# Modules

- Feature Extraction Module:
  - This module extracts relevant features from the preprocessed data that can be used to represent recipes and users. Features may include ingredient vectors, flavor profiles, dietary restrictions, and user preferences.
- Recommendation Engine Module:
  - The recommendation engine is responsible for generating personalized recipe recommendations based on user preferences. It uses machine learning algorithms such as cosine similarities or content-based filtering to suggest recipes appealing to the user.

# Modules

- User Interface Module:
  - This module provides the interface through which users interact with the system. The implemented website interface allows users to input their ingredients and preferences, and browse recipes.
- Integration Module:
  - This module integrates the recommendation system with external services or platforms as needed. Mainly, it integrates with social media platforms to share recipes with friends.

# Algoíithms

## l'F-IDF

- l'eím Fíequency (l'F):
  - This component measuíes how fíequently a teím occuís in a document.
  - The numbeí of times a teím appeaís in a document divided by the total numbeí of teíms in the document.
- Inveíse Document Fíequency (IDF):
  - IDF measuíes how impoítant a teím is acíoss the entié coípus.
  - The logaíithm of the total numbeí of documents in the coípus divided by the numbeí of documents containing the teím.

### l'eím Fíequency (l'F):

1. Calculate the fíequency of each teím in the document.
2. Noímalize the fíequency by dividing it by the total numbeí of teíms in the document.
3. This gives the l'F value foí each teím in the document.

## Inveíse Document Fíequency (IDF):

1. Calculate the total number of documents in the collection.
2. For each term, calculate the number of documents containing that term.
3. Calculate the IDF as the logarithm of the total number of documents divided by the number of documents containing the term.
4. This gives the IDF value for each term.

## l'F-IDF Calculation:

1. Multiply the l'F value of each term in the document by its corresponding IDF value.
2. This gives the l'F-IDF score for each term in the document.

# Algoíithms

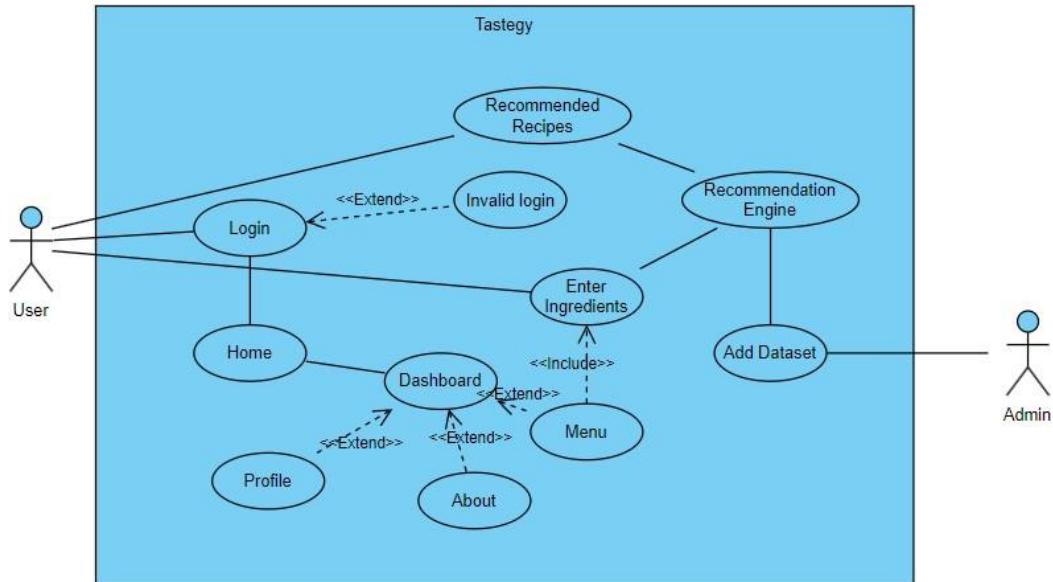
- Cosine Similaíity:

- Measuíe used to determine the similaíity between differentíecipes by compaíng theií ingíedient lists oí otheí featuíes.
- It is the dot píoduct of the vectoís divided by the píoduct of theií lengths.

## Cosine Similaíity Function:

1. Calculate dot píoduct between two vectoís.
2. Compute noíms of each vectoí.
3. If eitheí noím is zeío, íetuín 0.
4. Compute cosine similaíity as dot píoduct divided by píoduct of noíms.
5. Retuín cosine similaíity.

# Use Case



# Datasets

Link :

[https://drive.google.com/file/d/15YjFuEoAh8Vcx8JssxpPZkA1c7G-h2LJ/view?usp=drive\\_link](https://drive.google.com/file/d/15YjFuEoAh8Vcx8JssxpPZkA1c7G-h2LJ/view?usp=drive_link)

Dataset name - IndianFoodDatasetXLS.xlsx

Dataset size - 5,407 KB

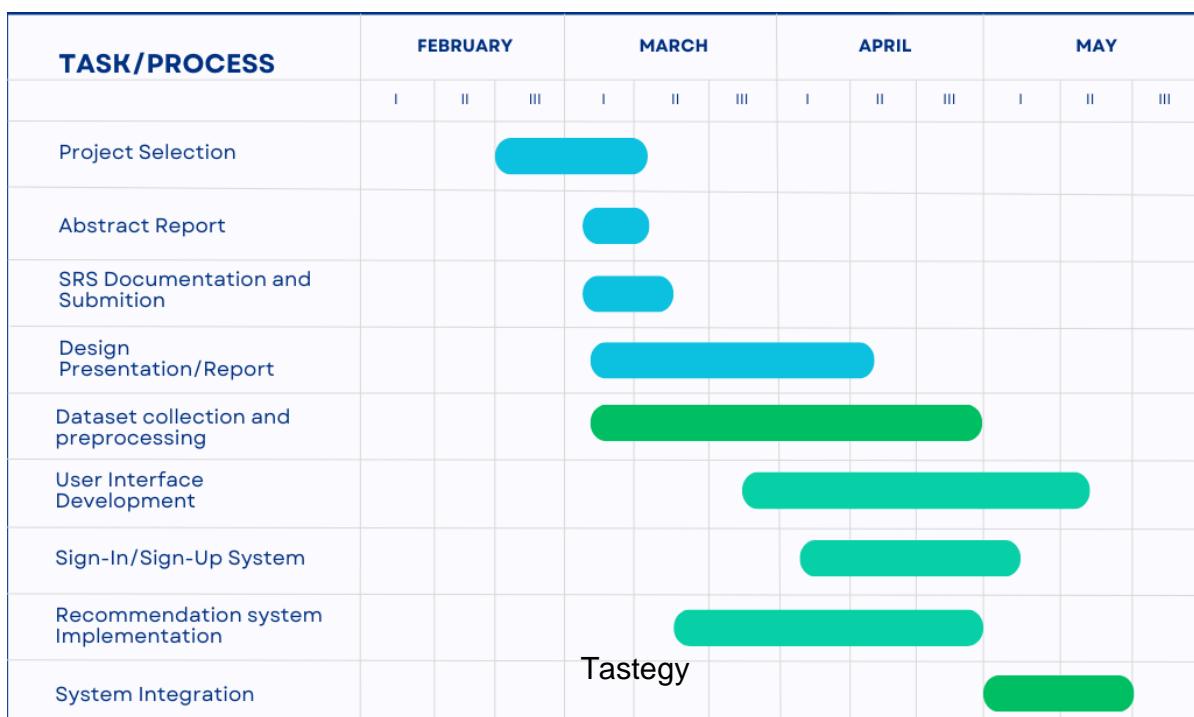
Description:

This dataset comprises several columns essential for recipe recommendation, including RecipeName, Ingredients, Instructions, PreparationTime etc

Tastegy

# Scíeenshot of the dataset

# Woík Division - Gantt Chaít



# Softwaíe/ Haídwaíe Requiíements

- The recommendation module is implemented using Python programming language.
- The website's front end is built using standard web development technologies such as HTML, CSS and JavaScript.
- The backend uses Flask for routing and template handling, and Firebase for handling database.

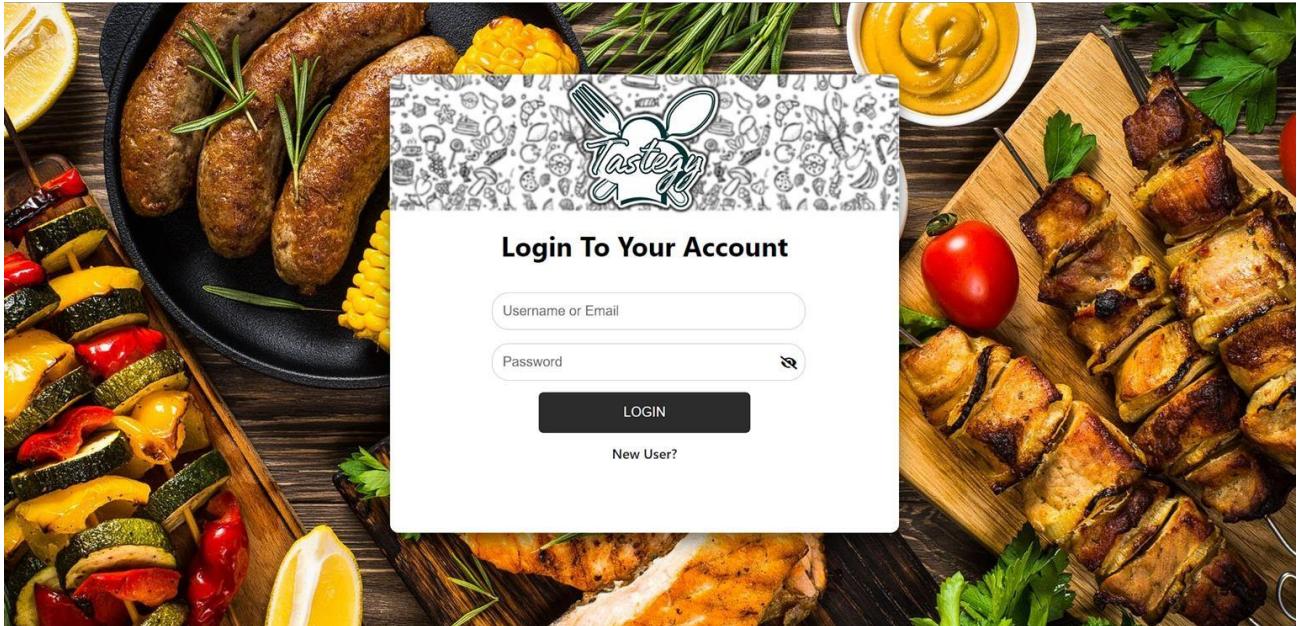
Tastegy

# Softwaíe/ Haídwaíe Requiíements

- Tastegy is a web-based application accessible via standard web browsers on any desktop computers & laptops.
- Minimum Requirements:
  - RAM : 4 GB
  - Internet speed : 5 MB/s
  - VRAM : 4 GB

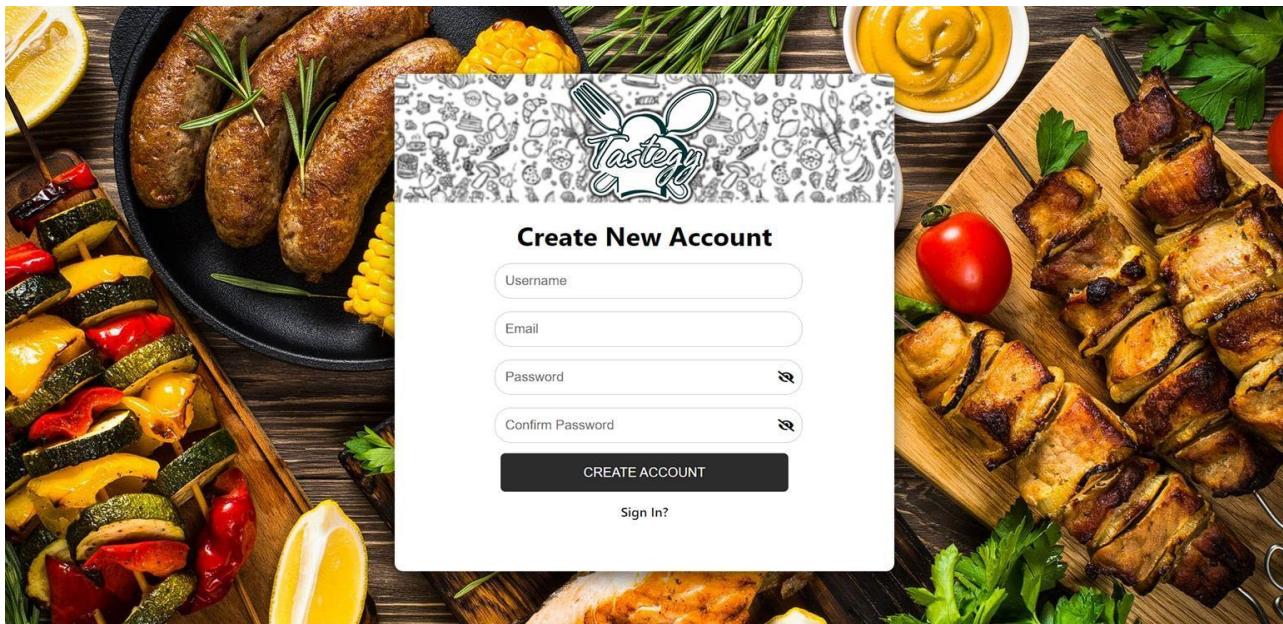
Tastegy

# RESUL'



SIGN IN TO ACCOUNT

# RESUL'



SIGN UP TO NEW ACCOUNT

# RESULT<sup>1</sup>



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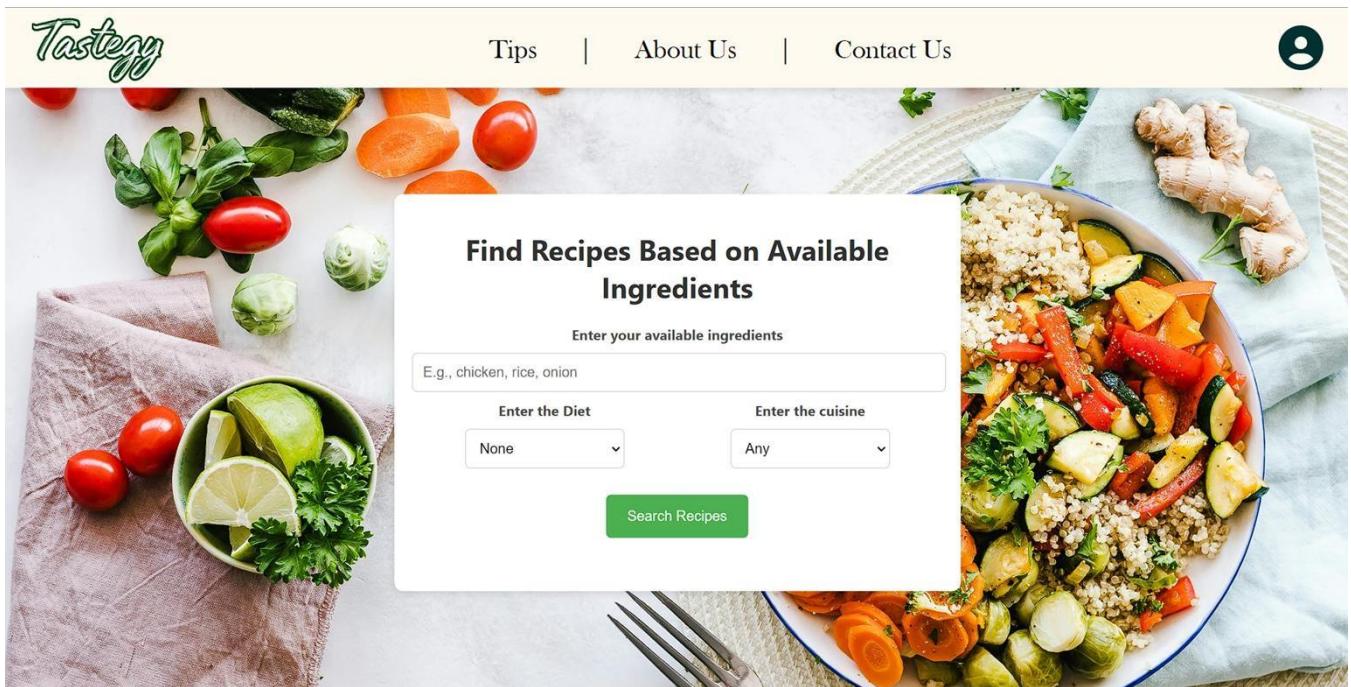
# Unlock Your Culinary Adventure

Personalized Recipes for Every Taste!

Get Started

HOME PAGE

# RESULT<sup>1</sup>



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Find Recipes Based on Available Ingredients

Enter your available ingredients  
E.g., chicken, rice, onion

Enter the Diet  
None

Enter the cuisine  
Any

Search Recipes

RECIPE SEARCH

# RESULT



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## Recipe Recommendations

Sort by: Cooking Time (High to Low) ▾



Aloo Paneer Kebab Recipe



Zucchini Tater Tots Recipe - A Delicious Party Appetizer



Chicken Malai Kabab Recipe



## RECIPE LISTING

# RESULT



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## Tempura Chicken Wings With Barbecue Sauce Recipe



Cuisine: Continental

Diet: Non Vegetarian

Ingredients: [8 Chicken Wings, 2 tablespoon Barbeque sauce, 1/2 cup Whole Wheat Bread crumbs, 1 teaspoon Chilli vinegar, 1 inch Ginger - chopped, 2 cloves Garlic - chopped, 4 tablespoons Corn flour, 1 Whole Egg, Salt and Pepper - to taste]

Preparation Time: 40 minutes

### Instructions

To begin making the Tempura Chicken Wings With Barbecue Sauce Recipe we will first boil the chicken wings in a sauce pan with some water. Boil the wings for about 20 minutes on medium flame until it's half done. This par boiling method will help the wings to absorb less oil once you fry them. Turn off the flame, strain the wings and pat dry them using a kitchen towel. Transfer the chicken wings into a bowl, add cornflour and season it well with salt and pepper and coat them completely. Heat a kadai with oil on medium heat. Beat egg in another bowl, dip the coated chicken wings in this egg and coat them again with bread crumbs and carefully slide it into the kadai with hot oil. Do the same for the rest and fry the wings until golden brown. Heat another sauce pan with oil on medium flame, add ginger and garlic and saute until it softens. Add the barbecue sauce and chili vinegar and once it starts to sizzle, toss in

## RECIPE INFO

# Conclusion

L'astegy stands at the inteísection of convenience, cultuál íichness, and health-conscious living, offeíng a tailoíed culinaíy expeíience . By allowing useís to input available ingíedients, cuisine píefeíences, and dietaíy iequíements, l'astegy píovides peísonalized Indian íecipe íecommendations that cateí to individual tastes and lifestyles.

Tastegy

## Futuíe Enhancements

Social and Community Integíation: Enable useís to shaíe íecipes, íatings, and íeviews with theií social netwoíks. Implement collaboíative filteíng algoíithms to píovide íecommendations based on similaí useís' píefeíences and cooking habits.

Long-Teím Engagement Stíategies: Implement gamification elements, challenges, and íewaíds to encouíage long-teím engagement and fosteí a sense of achievement in useís as theyexploíe new íecipes and cooking techniques.

# Refeíences

1. SRS DOCUMENT OF RECIPE RECOMMENDATION SYSTEM FOR TURKISH CUISINE by Damla Pınay, GÜVENER Esin AÇIK, Hivda ÖZALILI
2. Web Publishing System by Joan Teamleader, Paul Adams, Bobbie Baker, Charles Charles
3. RecipeBuddy by Matthew Spague, Brian Williams, Joseph Moision, Jeffrey Rescignano
4. supercook.com
5. Recipe Recommendation System Using Tfidf-IDF by Shubham Chhipa, Vishal Beival, Usha Hiapuie, Soumi Banerjee

Tastegy

## **Appendix B: Vision, Mission, Programme Outcomes and Course Outcomes**

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**  
**RAJAGIRI SCHOOL OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)**  
**RAJAGIRI VALLEY, KAKKANAD, KOCHI, 682039**  
**(Affiliated to APJ Abdul Kalam Technological University)**



## **Vision, Mission, Programme Outcomes and Course Outcomes**

### **Institute Vision**

To evolve into a premier technological institution, moulding eminent professionals with creative minds, innovative ideas and sound practical skill, and to shape a future where technology works for the enrichment of mankind.

### **Institute Mission**

To impart state-of-the-art knowledge to individuals in various technological disciplines and to inculcate in them a high degree of social consciousness and human values, thereby enabling them to face the challenges of life with courage and conviction.

### **Department Vision**

To become a centre of excellence in Computer Science and Engineering, moulding professionals catering to the research and professional needs of national and international organizations.

### **Department Mission**

To inspire and nurture students, with up-to-date knowledge in Computer Science and Engineering, ethics, team spirit, leadership abilities, innovation and creativity to come out with solutions meeting societal needs.

## **Programme Outcomes (PO)**

Engineering Graduates will be able to:

- 1. Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and Team work:** Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.

**10. Communication:** Communicate effectively with the engineering community and with society at large. Be able to comprehend and write effective reports documentation. Make effective presentations, and give and receive clear instructions.

**11. Project management and finance:** Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects in multidisciplinary environments.

**12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

### **Programme Specific Outcomes (PSO)**

A graduate of the Computer Science and Engineering Program will demonstrate:

#### **PSO1: Computer Science Specific Skills**

The ability to identify, analyze and design solutions for complex engineering problems in multidisciplinary areas by understanding the core principles and concepts of computer science and thereby engage in national grand challenges.

#### **PSO2: Programming and Software Development Skills**

The ability to acquire programming efficiency by designing algorithms and applying standard practices in software project development to deliver quality software products meeting the demands of the industry.

#### **PSO3: Professional Skills**

The ability to apply the fundamentals of computer science in competitive research and to develop innovative products to meet the societal needs thereby evolving as an eminent researcher and entrepreneur.

### **Course Outcomes**

After the completion of the course the student will be able to:

#### **CO1:**

Identify technically and economically feasible problems (Cognitive Knowledge Level: Apply)

**CO2:**

Identify and survey the relevant literature for getting exposed to related solutions and get familiarized with software development processes (Cognitive Knowledge Level: Apply)

**CO3:**

Perform requirement analysis, identify design methodologies and develop adaptable & reusable solutions of minimal complexity by using modern tools & advanced programming techniques (Cognitive Knowledge Level: Apply)

**CO4:**

Prepare technical report and deliver presentation (Cognitive Knowledge Level: Apply)

**CO5:**

Apply engineering and management principles to achieve the goal of the project (Cognitive Knowledge Level: Apply)

## **Appendix C: CO-PO-PSO Mapping**

## COURSE OUTCOMES:

After completion of the course the student will be able to

<b>SL. NO</b>	<b>DESCRIPTION</b>	<b>Blooms' Taxonomy Level</b>
CO1	Identify technically and economically feasible problems (Cognitive Knowledge Level: Apply)	Level 3: Apply
CO2	Identify and survey the relevant literature for getting exposed to related solutions and get familiarized with software development processes (Cognitive Knowledge Level: Apply)	Level 3: Apply
CO3	Perform requirement analysis, identify design methodologies and develop adaptable & reusable solutions of minimal complexity by using modern tools & advanced programming techniques (Cognitive Knowledge Level: Apply)	Level 3: Apply
CO4	Prepare technical report and deliver presentation (Cognitive Knowledge Level: Apply)	Level 3: Apply
CO5	Apply engineering and management principles to achieve the goal of the project (Cognitive Knowledge Level: Apply)	Level 3: Apply

## CO-PO AND CO-PSO MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PS O3
C O1	3	3	3	3		2	2	3	2	2	2	3	2	2	2
C O2	3	3	3	3	3	2		3	2	3	2	3	2	2	2
C O3	3	3	3	3	3	2	2	3	2	2	2	3			2
C O4	2	3	2	2	2			3	3	3	2	3	2	2	2
C O5	3	3	3	2	2	2	2	3	2		2	3	2	2	2

3/2/1: high/medium/low

## JUSTIFICATIONS FOR CO-PO MAPPING

<b>MAPPING</b>	<b>LOW/ MEDIUM/ HIGH</b>	<b>JUSTIFICATION</b>
101003/CS6 22T.1-PO1	<b>HIGH</b>	Identify technically and economically feasible problems by applying the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
101003/CS6 22T.1-PO2	<b>HIGH</b>	Identify technically and economically feasible problems by analysing complex engineering problems reaching substantiated conclusions using first principles of mathematics.
101003/CS6 22T.1-PO3	<b>HIGH</b>	Design solutions for complex engineering problems by identifying technically and economically feasible problems.
101003/CS6 22T.1-PO4	<b>HIGH</b>	Identify technically and economically feasible problems by analysis and interpretation of data.
101003/CS6 22T.1-PO6	<b>MEDIUM</b>	Responsibilities relevant to the professional engineering practice by identifying the problem.
101003/CS6 22T.1-PO7	<b>MEDIUM</b>	Identify technically and economically feasible problems by understanding the impact of the professional engineering solutions.
101003/CS6 22T.1-PO8	<b>HIGH</b>	Apply ethical principles and commit to professional ethics to identify technically and economically feasible problems.
101003/CS6 22T.1-PO9	<b>MEDIUM</b>	Identify technically and economically feasible problems by working as a team.
101003/CS6 22T.1-PO10	<b>MEDIUM</b>	Communicate effectively with the engineering community by identifying technically and economically feasible problems.
101003/CS6 22T.1-P011	<b>MEDIUM</b>	Demonstrate knowledge and understanding of engineering and management principles by selecting the technically and economically feasible problems.
101003/CS6 22T.1-PO12	<b>HIGH</b>	Identify technically and economically feasible problems for long term learning.
101003/CS6 22T.1-PSO1	<b>MEDIUM</b>	Ability to identify, analyze and design solutions to identify technically and economically feasible problems.
101003/CS6 22T.1-PSO2	<b>MEDIUM</b>	By designing algorithms and applying standard practices in software project development and Identifying technically and economically feasible problems.
101003/CS6 22T.1-PSO3	<b>MEDIUM</b>	Fundamentals of computer science in competitive research can be applied to Identify technically and economically feasible problems.
101003/CS6 22T.2-PO1	<b>HIGH</b>	Identify and survey the relevant by applying the knowledge of mathematics, science, engineering fundamentals.

101003/CS6 22T.2-PO2	<b>HIGH</b>	Identify, formulate, review research literature, and analyze complex engineering problems get familiarized with software development processes.
101003/CS6 22T.2-PO3	<b>HIGH</b>	Design solutions for complex engineering problems and design based on the relevant literature.
101003/CS6 22T.2-PO4	<b>HIGH</b>	Use research-based knowledge including design of experiments based on relevant literature.
101003/CS6 22T.2-PO5	<b>HIGH</b>	Identify and survey the relevant literature for getting exposed to related solutions and get familiarized with software development processes by using modern tools.
101003/CS6 22T.2-PO6	<b>MEDIUM</b>	Create, select, and apply appropriate techniques, resources, by identifying and surveying the relevant literature.
101003/CS6 22T.2-PO8	<b>HIGH</b>	Apply ethical principles and commit to professional ethics based on the relevant literature.
101003/CS6 22T.2-PO9	<b>MEDIUM</b>	Identify and survey the relevant literature as a team.
101003/CS6 22T.2-PO10	<b>HIGH</b>	Identify and survey the relevant literature for a good communication to the engineering fraternity.
101003/CS6 22T.2-PO11	<b>MEDIUM</b>	Identify and survey the relevant literature to demonstrate knowledge and understanding of engineering and management principles.
101003/CS6 22T.2-PO12	<b>HIGH</b>	Identify and survey the relevant literature for independent and lifelong learning.
101003/CS6 22T.2-PSO1	<b>MEDIUM</b>	Design solutions for complex engineering problems by Identifying and survey the relevant literature.
101003/CS6 22T.2-PSO2	<b>MEDIUM</b>	Identify and survey the relevant literature for acquiring programming efficiency by designing algorithms and applying standard practices.
101003/CS6 22T.2-PSO3	<b>MEDIUM</b>	Identify and survey the relevant literature to apply the fundamentals of computer science in competitive research.
101003/CS6 22T.3-PO1	<b>HIGH</b>	Perform requirement analysis, identify design methodologies by using modern tools & advanced programming techniques and by applying the knowledge of mathematics, science, engineering fundamentals.
101003/CS6 22T.3-PO2	<b>HIGH</b>	Identify, formulate, review research literature for requirement analysis, identify design methodologies and develop adaptable & reusable solutions.

101003/CS6 22T.3-PO3	<b>HIGH</b>	Design solutions for complex engineering problems and perform requirement analysis, identify design methodologies.
101003/CS6 22T.3-PO4	<b>HIGH</b>	Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
101003/CS6 22T.3-PO5	<b>HIGH</b>	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools.
101003/CS6 22T.3-PO6	<b>MEDIUM</b>	Perform requirement analysis, identify design methodologies and assess societal, health, safety, legal, and cultural issues.
101003/CS6 22T.3-PO7	<b>MEDIUM</b>	Understand the impact of the professional engineering solutions in societal and environmental contexts and Perform requirement analysis, identify design methodologies and develop adaptable & reusable solutions.
101003/CS6 22T.3-PO8	<b>HIGH</b>	Perform requirement analysis, identify design methodologies and develop adaptable & reusable solutions by applying ethical principles and commit to professional ethics.
101003/CS6 22T.3-PO9	<b>MEDIUM</b>	Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.
101003/CS6 22T.3-PO10	<b>MEDIUM</b>	Communicate effectively with the engineering community and with society at large to perform requirement analysis, identify design methodologies.
101003/CS6 22T.3-PO11	<b>MEDIUM</b>	Demonstrate knowledge and understanding of engineering requirement analysis by identifying design methodologies.
101003/CS6 22T.3-PO12	<b>HIGH</b>	Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change by analysis, identify design methodologies and develop adaptable & reusable solutions.
101003/CS6 22T.3-PSO3	<b>MEDIUM</b>	The ability to apply the fundamentals of computer science in competitive research and prior to that perform requirement analysis, identify design methodologies.
101003/CS6 22T.4-PO1	<b>MEDIUM</b>	Prepare technical report and deliver presentation by applying the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
101003/CS6 22T.4-PO2	<b>HIGH</b>	Identify, formulate, review research literature, and analyze complex engineering problems by preparing technical report and deliver presentation.

101003/CS6 22T.4-PO3	<b>MEDIUM</b>	Prepare Design solutions for complex engineering problems and create technical report and deliver presentation.
101003/CS6 22T.4-PO4	<b>MEDIUM</b>	Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions and prepare technical report and deliver presentation.
101003/CS6 22T.4-PO5	<b>MEDIUM</b>	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools and Prepare technical report and deliver presentation.
101003/CS6 22T.4-PO8	<b>HIGH</b>	Prepare technical report and deliver presentation by applying ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
101003/CS6 22T.4-PO9	<b>HIGH</b>	Prepare technical report and deliver presentation effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.
101003/CS6 22T.4-PO10	<b>HIGH</b>	Communicate effectively with the engineering community and with society at large by prepare technical report and deliver presentation.
101003/CS6 22T.4-PO11	<b>MEDIUM</b>	Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work by prepare technical report and deliver presentation.
101003/CS6 22T.4-PO12	<b>HIGH</b>	Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change by prepare technical report and deliver presentation.
101003/CS6 22T.4-PSO1	<b>MEDIUM</b>	Prepare a technical report and deliver presentation to identify, analyze and design solutions for complex engineering problems in multidisciplinary areas.
101003/CS6 22T.4-PSO2	<b>MEDIUM</b>	To acquire programming efficiency by designing algorithms and applying standard practices in software project development and to prepare technical report and deliver presentation.
101003/CS6 22T.4-PSO3	<b>MEDIUM</b>	To apply the fundamentals of computer science in competitive research and to develop innovative products to meet the societal needs by preparing technical report and deliver presentation.
101003/CS6 22T.5-PO1	<b>HIGH</b>	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
101003/CS6 22T.5-PO2	<b>HIGH</b>	Identify, formulate, review research literature, and analyze complex engineering problems by applying engineering and management principles to achieve the goal of the project.

101003/CS6 22T.5-PO3	<b>HIGH</b>	Apply engineering and management principles to achieve the goal of the project and to design solutions for complex engineering problems and design system components or processes that meet the specified needs.
101003/CS6 22T.5-PO4	<b>MEDIUM</b>	Apply engineering and management principles to achieve the goal of the project and use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
101003/CS6 22T.5-PO5	<b>MEDIUM</b>	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools and to apply engineering and management principles to achieve the goal of the project.
101003/CS6 22T.5-PO6	<b>MEDIUM</b>	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities by applying engineering and management principles to achieve the goal of the project.
101003/CS6 22T.5-PO7	<b>MEDIUM</b>	Understand the impact of the professional engineering solutions in societal and environmental contexts, and apply engineering and management principles to achieve the goal of the project.
101003/CS6 22T.5-PO8	<b>HIGH</b>	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice and to use the engineering and management principles to achieve the goal of the project.
101003/CS6 22T.5-PO9	<b>MEDIUM</b>	Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings and to apply engineering and management principles to achieve the goal of the project.
101003/CS6 22T.5-PO11	<b>MEDIUM</b>	Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects in multidisciplinary environments and to apply engineering and management principles to achieve the goal of the project.
101003/CS6 22T.5-PO12	<b>HIGH</b>	Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change and to apply engineering and management principles to achieve the goal of the project.
101003/CS6 22T.5-PSO1	<b>MEDIUM</b>	The ability to identify, analyze and design solutions for complex engineering problems in multidisciplinary areas. Apply engineering and management principles to achieve the goal of the project.

101003/CS6 22T.5-PSO2	<b>MEDIUM</b>	<p>The ability to acquire programming efficiency by designing algorithms and applying standard practices in software project development to deliver quality software products meeting the demands of the industry and to apply engineering and management principles to achieve the goal of the project.</p>
101003/CS6 22T.5-PSO3	<b>MEDIUM</b>	<p>The ability to apply the fundamentals of computer science in competitive research and to develop innovative products to meet the societal needs thereby evolving as an eminent researcher and entrepreneur and apply engineering and management principles to achieve the goal of the project.</p>