

Project Report Format

1. INTRODUCTION

1.1 Project Overview

The project aims to create a Web application based out of cloud that would have the ability to calculate the nutritional requirements and to guide first line nutritional management to patients and clients automatically.

Nutritional science is the study of food and nutrition. They focus generally on humans, although there are those who study the food and nutrition requirements of animals, it can also be stated as the study of food, nutrients, and other food substances, the intake and biochemical processing of food substances.

People nowadays are keeping an eye on what they eat, how much calories do they eat, what is the quantity of proteins they get out of it and so on. They just cannot keep all such data in their mind for almost all foods that they eat. This cloud-based web application aims to solve this issue.

The users can use this application and check all the data of the food that they eat. The image of the food is uploaded in the cloud-based web application and as an outcome the data of the food is shown.

In this project, we are creating a cloud-based web application which uses a flask, HTML, Python, Recipe food Nutrition API and IBM cloud.

1.2 Purpose

- Nutrition is about eating a healthy and balanced diet. Food and drink provide the energy and nutrients you need to be healthy.

- Nutrients are chemical compounds in food that are used by the body to function properly and maintain health. Examples include proteins, fats, carbohydrates, vitamins, and minerals.
- Antoine Laurent de Lavoisier is the father of nutrition and chemistry; he discovered metabolism in 1770. He demonstrated that energy from food is derived due to oxidation of it
- Nutrition science also includes behaviors and social factors related to food choices. The foods we eat provide energy (calories) and nutrients such as protein, fat, carbohydrate, vitamins, minerals, and water.
- Nutrition and its proper maintenance are very important for sustaining life on earth. A few of the reasons explaining the importance of nutrition are:
 - (i) Nutrition is necessary for the growth of new cells and the replacement or repair of worn-out cells.
 - (ii) Nutrition gives energy for different metabolic processes in the body.
 - (iii) Nutrition is required to produce resistance against different diseases.
- Foods that naturally are nutrient-rich include fruits and vegetables. Lean meats, fish, whole grains, dairy, legumes, nuts, and seeds also are high in nutrients.

2. LITERATURE SURVEY

2.1 Existing problem

Due to the ignorance of healthy food habits, obesity rates are increasing at an alarming speed, and this is reflective of the risks to people's health. People need to control their daily calorie intake by eating healthier foods, which is the most basic method to avoid obesity.

However, although food packaging comes with nutrition (and calorie) labels, it's still not very convenient for people to refer to App-based nutrient dashboard systems which can analyze real-time images of a meal and analyze it for nutritional content which can be very handy and improves the dietary habits, and therefore, helps in maintaining a healthy lifestyle.

This project aims at building a web App that automatically estimates food attributes such as ingredients and nutritional value by classifying the input image of food. Our method employs Clarifai's AI-Driven Food Detection Model for accurate food identification and Food API's to give the nutritional value of the identified food.

Workflow of the Project:

- User interacts with the Web App to Load an image.
- The image is passed to the server application, which uses Clarifai's AI-Driven Food Detection Model Service to analyze the images and Nutrition API to provide nutritional information about the analyzed Image.
- Nutritional information of the analyzed image is returned to the app for display.

Existing system:

The existing system has the following functionalities:

- The user can get details about a number of nutrients, vitamins etc of a fruit or vegetable.
- The user can add his recipes or get recipes using the API.
- The System basically helps the user in what to eat and which is good, what will help him etc., the system will help him filter things easily.
- The System also allows the user to make a diet plan and remind him of his food timings.

Proposed System:

- Customized and easy to access interface.
- Individual chat rooms with options of fixing appointments for counselling.
- Options of capturing data from counselling session for future references.
- Counselling for disease oriented diet plans like Ketogenic diet.
- Suggest diet plans.
- Calorie counter for selected food item.
- Alternative dish with required calories.
- Calorie values of more than 1000 International and Indian cuisines.
- Interesting notes on selected food items.
- Recorded health history.

2.2 References

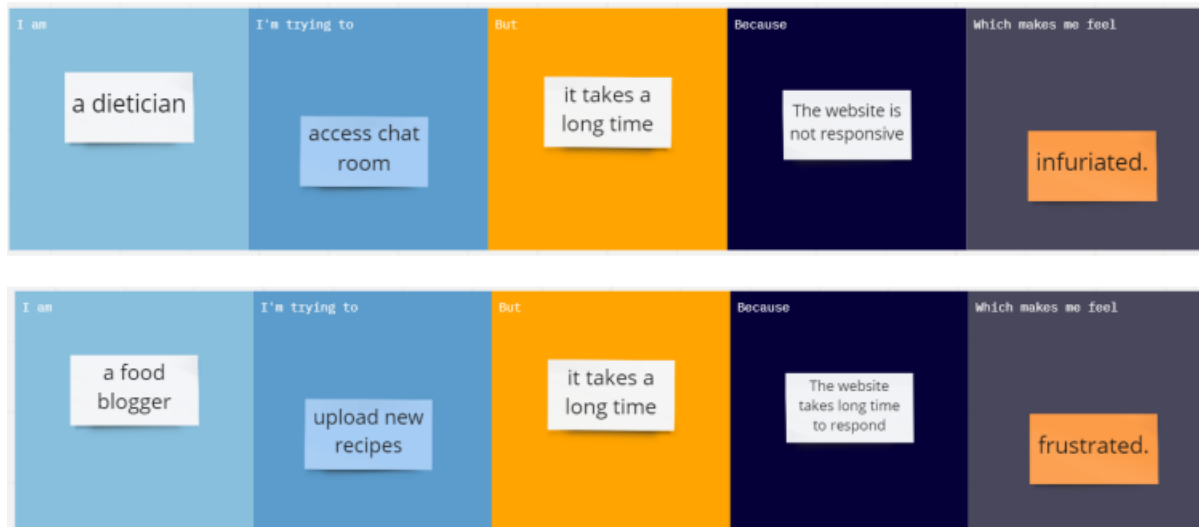
1. https://coddyschool.com/upload/Flask_Web_Development_Developing.pdf

2. <https://pythonbooks.org/>

2.3 Problem Statement Definition

- This project aims at building a web App that automatically estimates food attributes such as ingredients and nutritional value by classifying the input image of food. Our method employs Clarifai's AI-Driven Food Detection Model
- There are millions of varieties of nutrition; every single variety could be valuable one day or the other.
- Human beings cannot exist without the proper knowledge about nutrition, because we need it to heal us from various health issues.

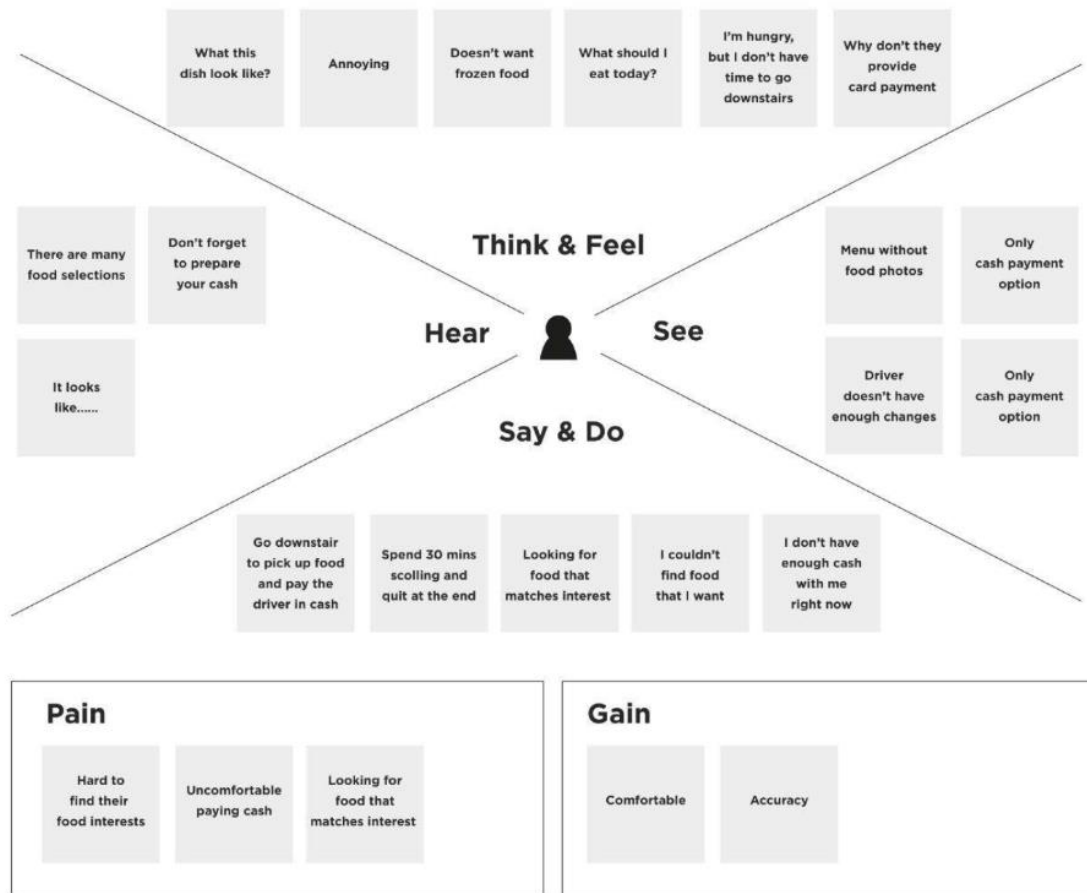
Customer Problem Statement Template:



3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

Nutrition Assistant Application:



3.2 Ideation & Brainstorming



Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

🕒 10 minutes to prepare

🕒 1 hour to collaborate

👤 2-8 people recommended



Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

10 minutes

A

Team gathering

Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B

Set the goal

Think about the problem you'll be focusing on solving in the brainstorming session.

C

Learn how to use the facilitation tools

Use the Facilitation Superpowers to run a happy and productive session.

[Open article](#) →

1

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

🕒 5 minutes

PROBLEM

Nutrition Assistant project aims at building a web App that automatically estimates food attributes such as ingredients and nutritional value by classifying the input image of food. Our method employs Clarifai's AI-Driven Food Detection Model for accurate food identification and Food API's to give the nutritional value of the identified food.



Key rules of brainstorming

To run an smooth and productive session

- | | |
|---|---|
|  Stay in topic. |  Encourage wild ideas. |
|  Defer judgment. |  Listen to others. |
|  Go for volume. |  If possible, be visual. |

Team Lead- Sharvesh A Pareek

User Interacts with the Web App to Load an Image.

Customized and easy to access Interface.

The user can add his recipes or get recepies using the API.

The System basically helps the user in what to eat and which is good, what will help him and etc, the system will help him filter things easily.

Team member 1- Sowbarnigha J

The System also allows the user to make a diet plan and remind him his food timings.

The user can get details about a number of nutrients, vitamins etc of a fruit or vegetable.

Individual chat rooms with options of fixing appointments for counselling.

Options of capturing data from counselling session for future references.

Team member 2- Vijayasri D R

Counselling for disease oriented diet plans like Ketogenic diet.

Suggest diet plans.

Calorie counter for selected food item.

Alternative dish with required calories.

Team member 3- Vishaamber R A

Calorie values of more than 1000 International and Indian cuisines.

Interesting notes on selected food items.

Recorded health history.

User canet calories for selected food item.

Prediction and analysis

Predicting the number of nutrients and vitamins in the food item uploaded by the user.

Providing the best diet plans and reminds the user about his food timings.

Services

Individual chat rooms with options of fixing appointments for counselling.

24*7 customer care service.

Features

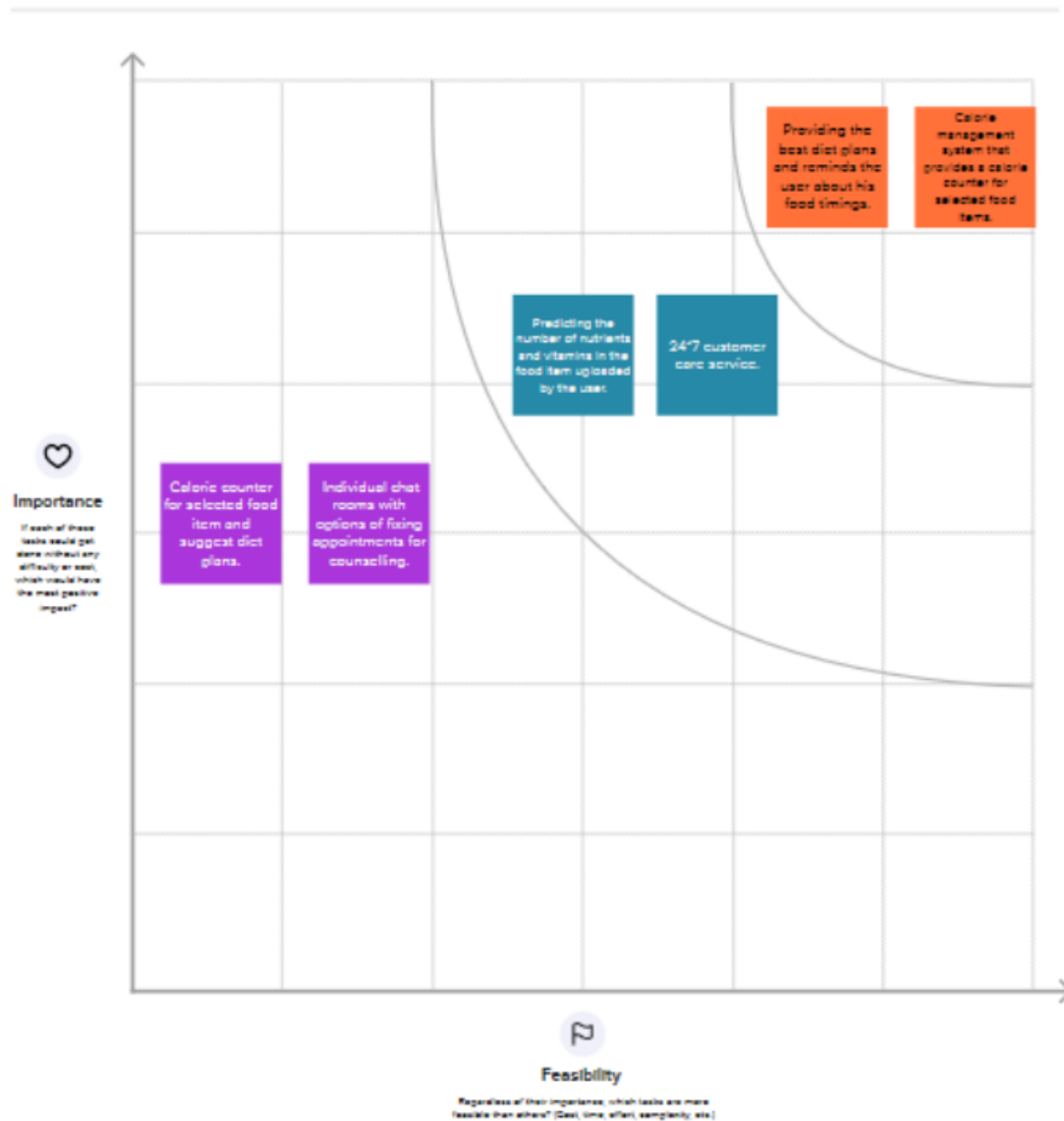
Calorie values of more than 1000 International and Indian cuisines.

Calorie counter for selected food item and suggest diet plans.

Management

Customer feedback system management.

Calorie management system that provides a calorie counter for selected food items.



3.3 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	<ul style="list-style-type: none"> The project aims at building a web App that automatically estimates food attributes such as ingredients and nutritional value by classifying the input image of food.

		<ul style="list-style-type: none"> • Our method employs Clarifai's AIDriven Food Detection Model for accurate food identification and Food API's to give the nutritional value of the identified food.
2.	Idea / Solution description	<ul style="list-style-type: none"> • Customized and easy to access interface. • Individual chat rooms with options of fixing appointments for counselling. • Options of capturing data from counselling session for future references. • Counselling for disease-oriented diet • plans like Ketogenic diet. • Suggest diet plans. • Calorie counter for selected food item. • Alternative dish with required calories. • Calorie values of more than 1000 International and Indian cuisines. • Interesting notes on selected food items. • Recorded health history.
3.	Novelty / Uniqueness	<p>The following features adds uniqueness to this project:</p> <ul style="list-style-type: none"> • User interacts with the Web App to Load an image. • The image is passed to the server application, which uses Clarifai's AIDriven Food Detection Model Service to analyse the images and Nutrition API to provide nutritional information about the analysed Image. • Nutritional information of the analysed image is returned to the app for display.

4.	Social Impact / Customer Satisfaction	<ul style="list-style-type: none"> • The customer satisfaction is very well improved for getting appropriate response from the nutritionist immediately. • As soon as the user uploads the image, within few seconds the prediction result page will be displayed which highly improves the customer satisfaction. • The key customer satisfaction factor is consistency. The consistency is the secret ingredient to make customers happy.
5.	Business Model (Revenue Model)	<ul style="list-style-type: none"> • Different algorithms are used to correctly map the food items that has been uploaded by the user. • Appropriate algorithms are used to display the prediction result page
6.	Scalability of the Solution	<ul style="list-style-type: none"> • The project is capable of handling growth, especially in handling more users and evolving concurrently with the business needs. • It also relates to the app's backend, database and the servers they are hosted on which is highly satisfied by this project.

3.4 Problem Solution fit

1. CUSTOMER SEGMENT(S)

- ❖ Working peoples
- ❖ Organizations
- ❖ Students and families
- ❖ Common people with all ages can able to track their expenses.

2. JOBS-TO-BE-DONE / PROBLEMS

- ❖ People have to track their expenses regularly.
- ❖ They need to keep their receipts and bills which shows their amount they spent.
- ❖ Also they need to manually add or remove the desired categories.

3. TRIGGERS

- ❖ Realizing that excessive spending leading to lack of money in case of emergencies.
- ❖ Lack of Budgeting knowledge.

4. EMOTIONS: BEFORE / AFTER

Before

- ❖ Excessive expenditure
- ❖ Afraid of spending

After

- ❖ Being aware of what they are spending.
- ❖ Satisfied and happy with their budget expenditure.
- ❖ There will not be any frustrations any more since the process is quick and flexible.

5.CUSTOMER CONSTRAINTS

- ❖ Network Issues
- ❖ Data Privacy
- ❖ Spending power
- ❖ Available devices

6.PROBLEM ROOT CAUSE

- ❖ The root cause for this problem is the delay in the budget.
- ❖ There may be a chance of getting errors in human calculations.
- ❖ No one alerts if their spending exceeds particular limit.
- ❖ They do not have enough time for calculating their expenditure.

7.YOUR SOLUTION

- ❖ A cloud-based web application which keeps track of user's personal expenses. This system attempts to free the user with as much as possible the burden of manual calculation and to keep the track of the expenditure.
- ❖ User just need to enter their day-to-day expenses. They also have an option to set the limit. If their expenditure exceeds that limit, notification will be sent through mail.
- ❖ This system also eliminates sticky notes, bills.

8.AVAILABLE SOLUTIONS

People makes use of sticky notes or diary for calculating their expenditure.

Pros:

1. Didn't need any devices for calculations.

Cons:

1. Time consuming.
2. Manual errors occur sometimes.

9.BEHAVIOUR

- ❖ People should know their budget for each month and set appropriate saving goals.
- ❖ Collect receipts regularly without fail.

10.CHANNELS OF BEHAVIOUR

ONLINE

- ❖ Provide the details of day-to-day expenses.
- ❖ Select the area where customers use.
- ❖ Maintain the expenses for budgeting.

OFFLINE

- ❖ Maintain the required documents regularly.
- ❖ Inspect the expenses for budgeting.

4. REQUIREMENT ANALYSIS

4.1 Functional Requirement

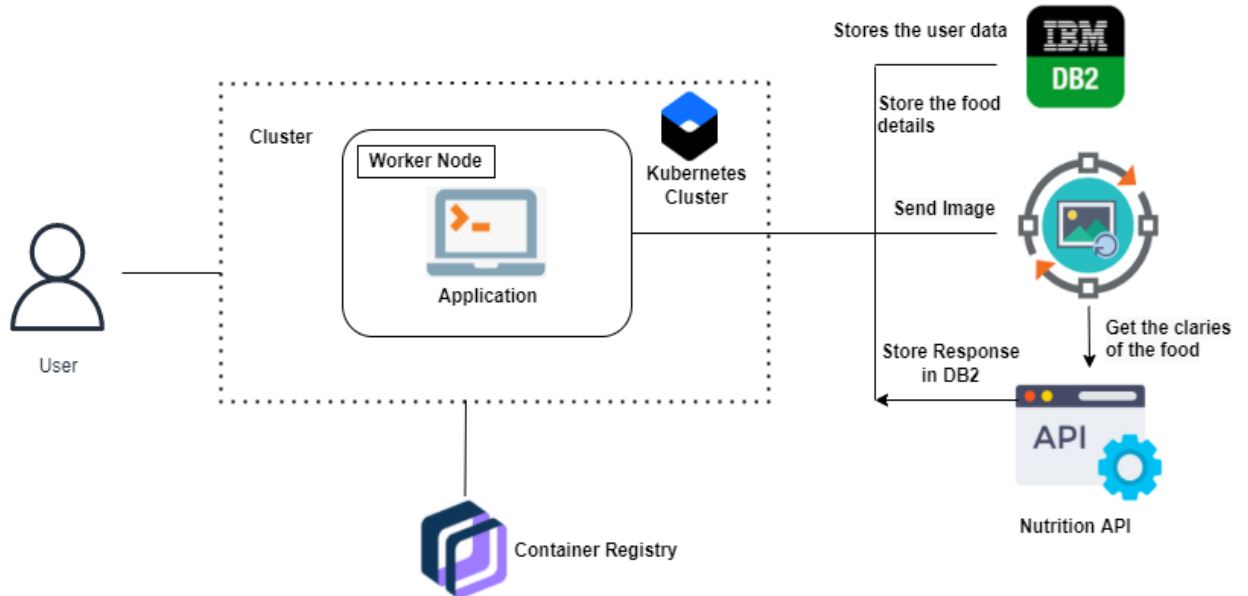
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User can search for nutrients in a food item	Search via dashboard
FR-4	User can chat with the dietician	Chat via chat box

4.2 Non Functional Requirement

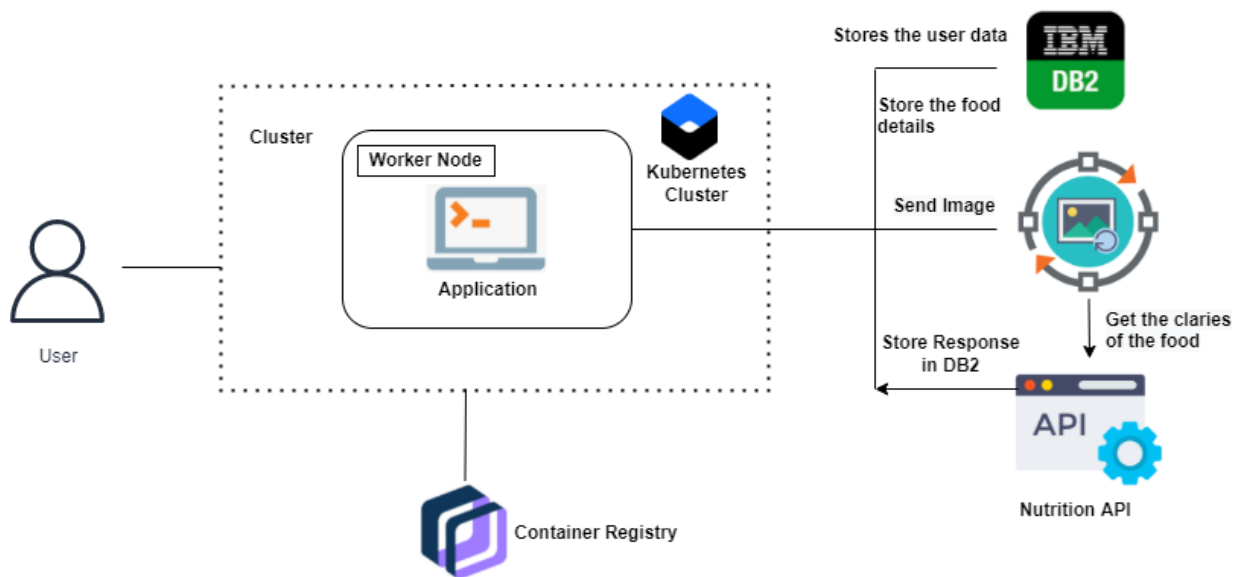
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Anyone can use the application with ease.
NFR-2	Security	User data provided during registration is safe and secure in this application.
NFR-3	Reliability	The application is reliable as it can withstand any kind of failure.
NFR-4	Performance	This application can handle any number of users with ease.
NFR-5	Availability	This application has the ability to meet customer demand.
NFR-6	Scalability	This will work both as web and mobile application.

5. PROJECT DESIGN

5.1 Data Flow Diagrams



5.2 Solution & Technical Architecture



5.3 User Stories

User Stories

Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
	Login	USN-3	As a user, I can log into the application by entering email & password		High	Sprint-1
	Dashboard	USN-4	As a user, I can easily search for recipes of food items in the dashboard.		Low	Sprint-1
Customer (Web user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
	Login	USN-3	As a user, I can log into the application by entering email & password		High	Sprint-1
	Dashboard	USN-4	As a user, I can easily search for recipes of food items in the dashboard.		Low	Sprint-1
Administrator	Service	USN-1	As a user, I can get the required response from the user.		High	Sprint-1

6. PROJECT PLANNING AND SCHEDULING

6.1 Sprint Planning and Estimation

TITLE	DESCRIPTION	DATE
Literature Survey & Information Gathering	Literature survey on the selected project & gathering information by referring the, technical papers, research publications etc.	3 SEPTEMBER 2022
Prepare Empathy Map	Prepare Empathy Map Canvas to capture the user Pains & Gains, Prepare list of problem statements	10 SEPTEMBER 2022
Ideation	List the by organizing the brainstorming session and prioritize the top 3 ideas based on the feasibility & importance.	10 SEPTEMBER 2022
Proposed Solution	Prepare the proposed solution document, which includes the novelty, feasibility of idea, business model, social impact, scalability of solution, etc.	10 SEPTEMBER 2022
Problem Solution Fit	Prepare problem - solution fit document.	1 OCTOBER 2022

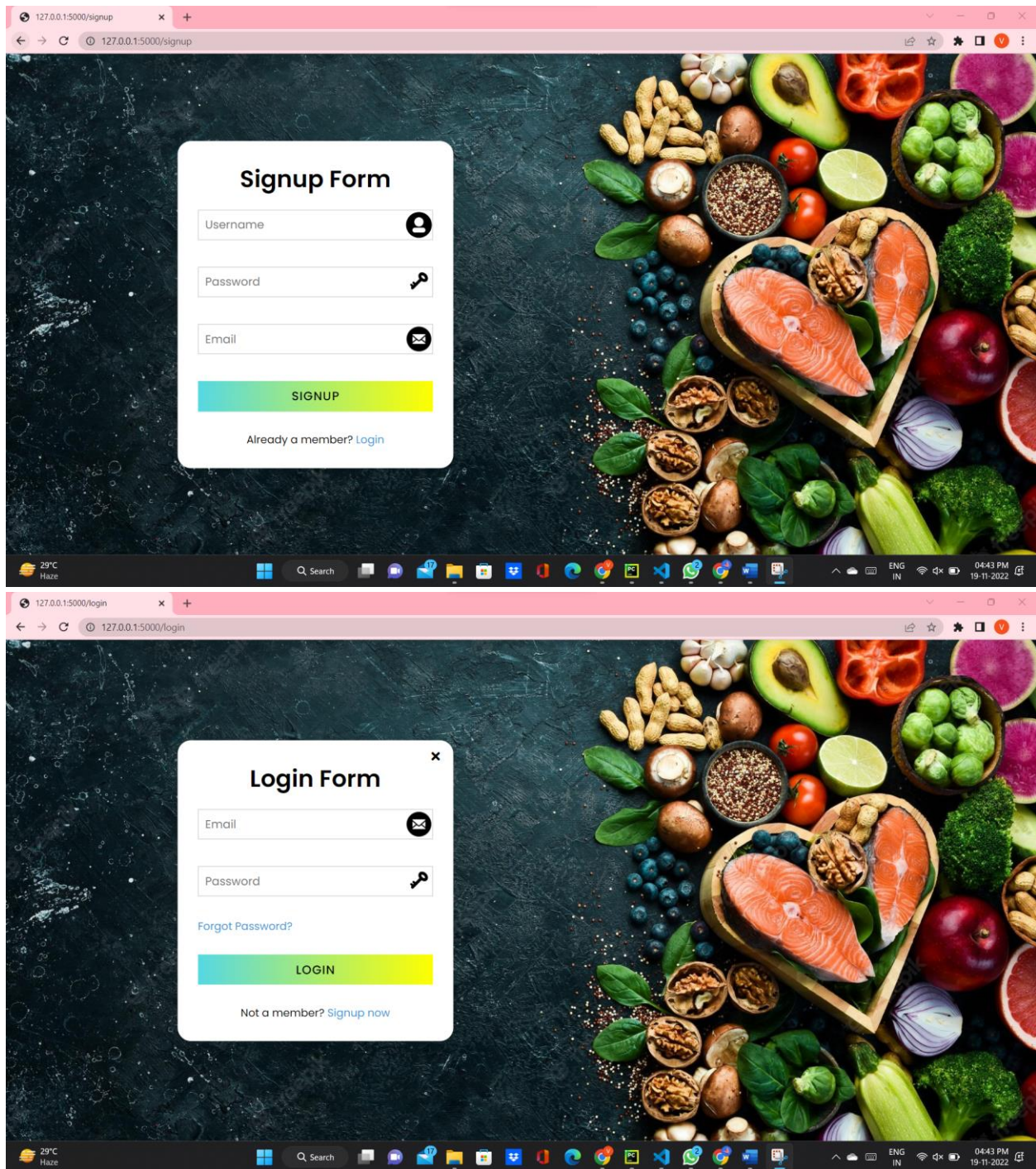
Solution Architecture	Prepare solution architecture document.	19 OCTOBER 2022
Customer Journey	Prepare the customer journey maps to understand the user interactions & experiences with the application.	15 OCTOBER 2022
Data Flow Diagrams	Draw the data flow diagrams and submit for review.	18 OCTOBER 2022
Technology Architecture	architecture diagram.	19 OCTOBER 2022
Prepare Milestone & Activity List	Prepare the milestones & activity list of the project.	28 OCTOBER 2022
Project Development - Delivery of Sprint-1, 2, 3 & 4	Develop & submit the developed code by testing it.	IN PROGRESS..

6.2 Sprint Delivery Scheduling:

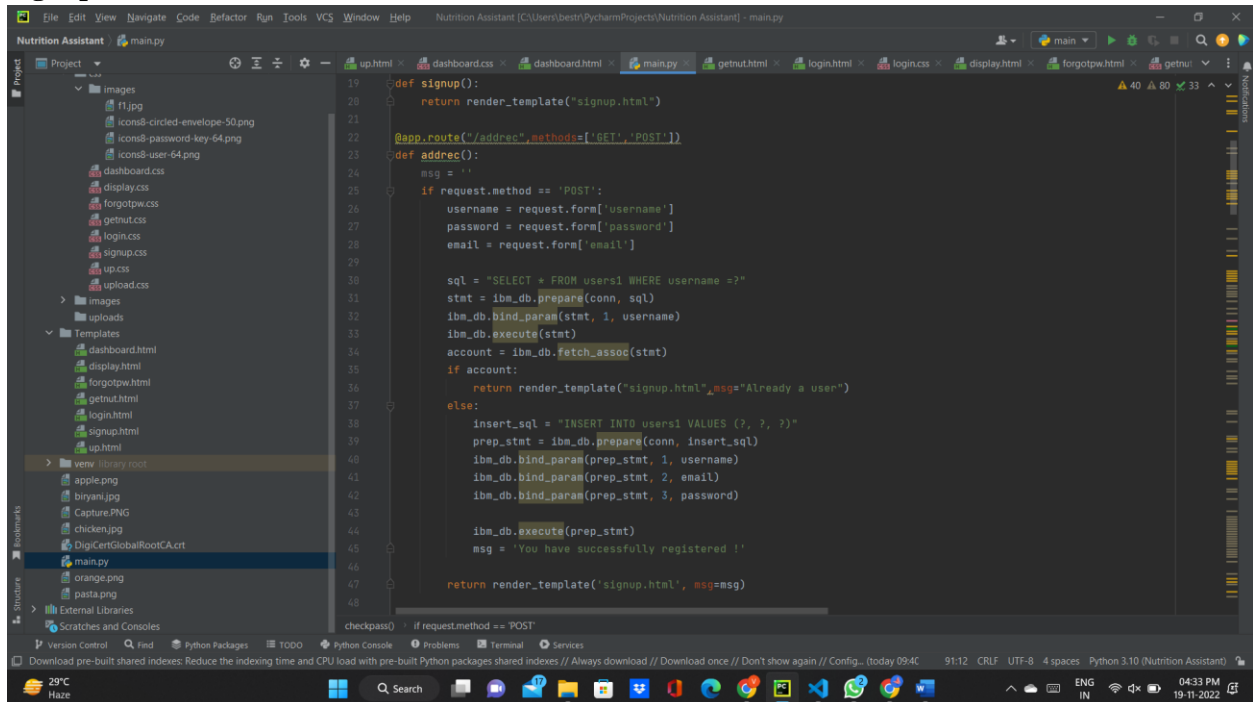
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	Sharvesh A Pareek Sowbarnigha J Vijayasri D R Vishaamber R A
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	1	High	Sharvesh A Pareek Sowbarnigha J Vijayasri D R Vishaamber R A
Sprint-1	Login	USN-3	As a user, I can log into the application by entering email & password	1	High	Sharvesh A Pareek Sowbarnigha J Vijayasri D R Vishaamber R A
Sprint-2	User details	USN-4	As a user , I can fill the Details.	2	High	Sharvesh A Pareek Sowbarnigha J Vijayasri D R Vishaamber R A
Sprint-3	Push notification	USN-5	As a user, I will search the food items.	2	Medium	Sharvesh A Pareek Sowbarnigha J Vijayasri D R Vishaamber R A
Sprint-4	Shown the nutrition details and Recipe for	USN-6	As a user, I can scan the food an get the nutrition details and recipe for related scanned	1	High	Sharvesh A Pareek Sowbarnigha J

7.Coding and solutioning :

7.1 Feature 1:

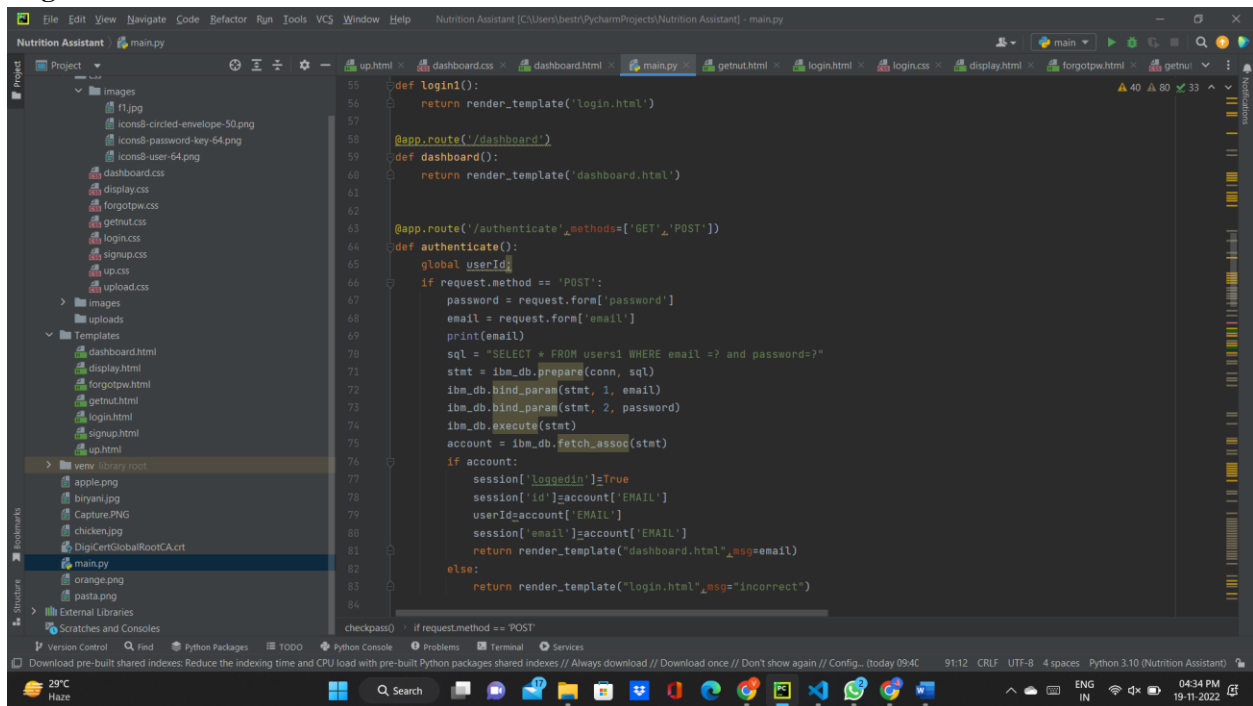


Signup code:



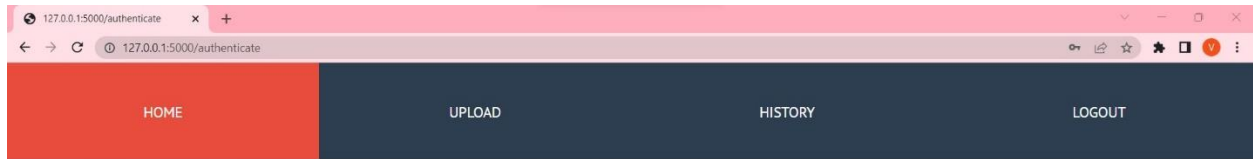
```
19 def signup():
20     return render_template("signup.html")
21
22 @app.route("/address", methods=['GET', 'POST'])
23 def address():
24     msg = ''
25     if request.method == 'POST':
26         username = request.form['username']
27         password = request.form['password']
28         email = request.form['email']
29
30         sql = "SELECT * FROM users1 WHERE username =?"
31         stmt = ibm_db.prepare(conn, sql)
32         ibm_db.bind_param(stmt, 1, username)
33         ibm_db.execute(stmt)
34         account = ibm_db.fetch_assoc(stmt)
35         if account:
36             return render_template("signup.html", msg="Already a user")
37         else:
38             insert_sql = "INSERT INTO users1 VALUES (?, ?, ?)"
39             prep_stmt = ibm_db.prepare(conn, insert_sql)
40             ibm_db.bind_param(prepare_stmt, 1, username)
41             ibm_db.bind_param(prepare_stmt, 2, email)
42             ibm_db.bind_param(prepare_stmt, 3, password)
43             ibm_db.execute(prepare_stmt)
44             msg = 'You have successfully registered !'
45
46     return render_template("signup.html", msg=msg)
47
48 if request.method == 'POST'
```

Login code:



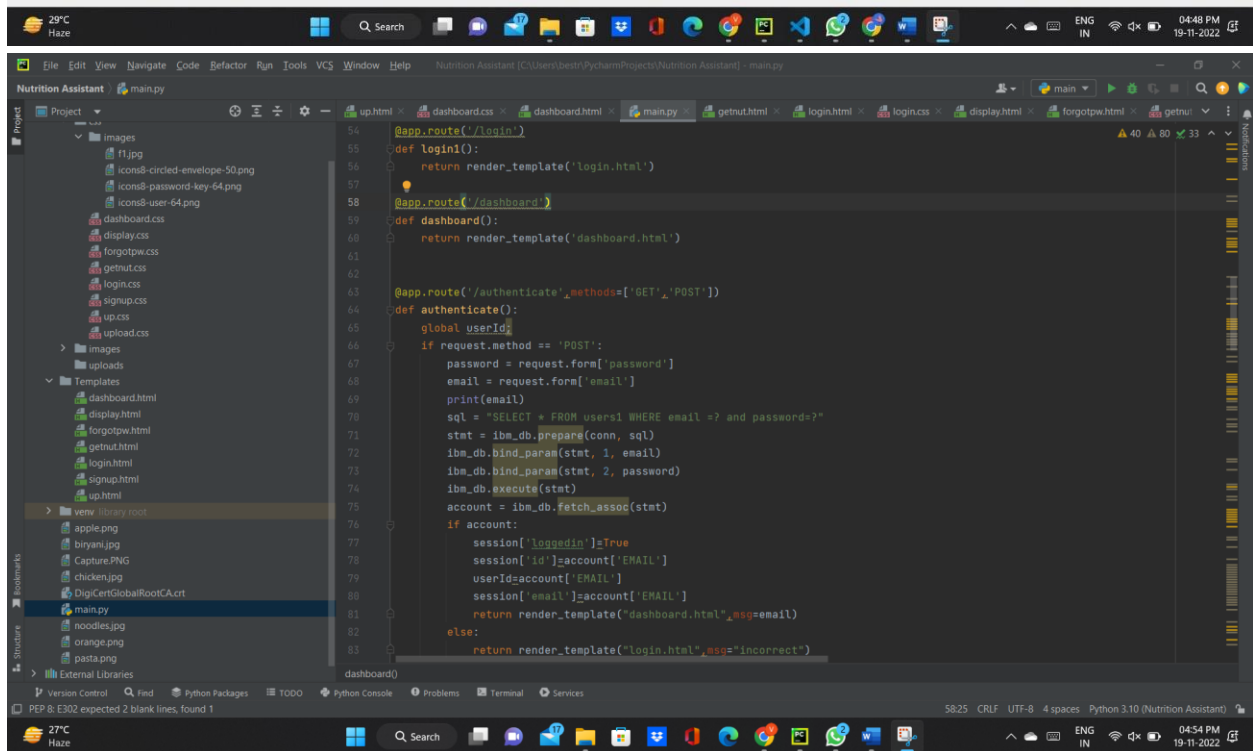
```
55 def login():
56     return render_template('login.html')
57
58 @app.route('/dashboard')
59 def dashboard():
60     return render_template('dashboard.html')
61
62 @app.route('/authenticate', methods=['GET', 'POST'])
63 def authenticate():
64     global userId
65     if request.method == 'POST':
66         password = request.form['password']
67         email = request.form['email']
68         print(email)
69         sql = "SELECT * FROM users1 WHERE email =? and password=?"
70         stmt = ibm_db.prepare(conn, sql)
71         ibm_db.bind_param(stmt, 1, email)
72         ibm_db.bind_param(stmt, 2, password)
73         ibm_db.execute(stmt)
74         account = ibm_db.fetch_assoc(stmt)
75         if account:
76             session['loggedin'] = True
77             session['id'] = account['EMAIL']
78             userId = account['EMAIL']
79             session['email'] = account['EMAIL']
80             return render_template('dashboard.html', msg=email)
81         else:
82             return render_template("login.html", msg="incorrect")
83
84 if request.method == 'POST'
```

7.2 Feature 2:

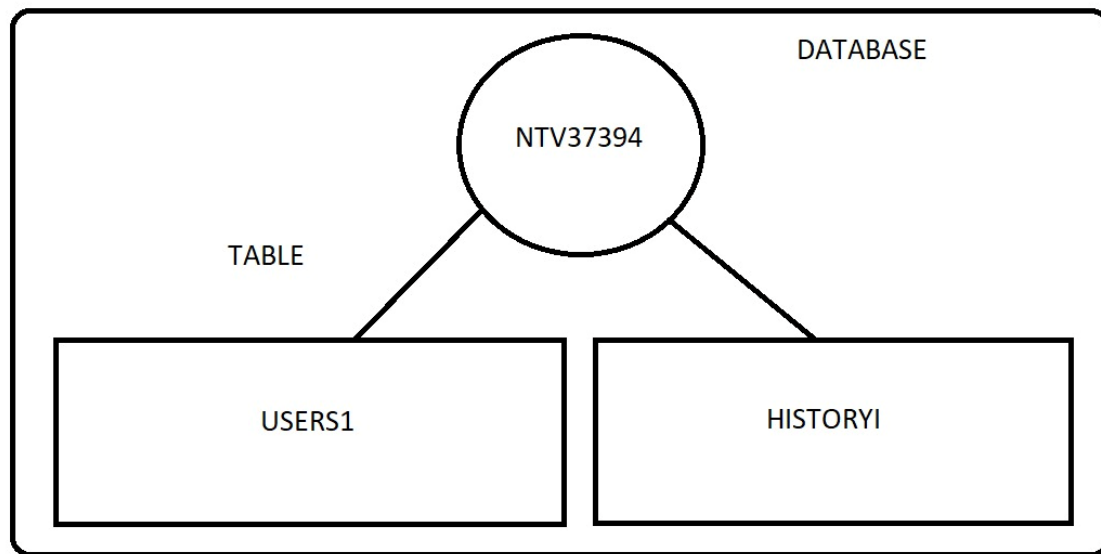


ABOUT

Due to the ignorance of healthy food habits, obesity rates are increasing at an alarming speed, and this is reflective of the risks to people's health. People need to control their daily calorie intake by eating healthier foods, which is the most basic method to avoid obesity. However, although food packaging comes with nutrition (and calorie) labels, it's still not very convenient for people to refer to App-based nutrient dashboard systems which can analyze real-time images of a meal and analyze it for nutritional content which can be very handy and improves the dietary habits, and therefore, helps in maintaining a healthy lifestyle. This project aims at building a web App that automatically estimates food attributes such as ingredients and nutritional value by classifying the input image of food. Nutritional support is the provision of adequate nutrients to maintain a healthy body weight and avoid malnutrition. The continuous delivery of high-quality and cost-effective nutritional care to patients has been shown to be an increasingly difficult task. It is observed that dieticians are requested to carry out the nutritional assessment, to manually calculate the nutritional needs and to design the everyday meal plan for each patient. In most cases, these time-consuming tasks are not completed due to lack of time or inadequate number of personnel. Development of a computer assisted information tool with cloud-based on-line diet consultation module and comparison of its efficacy with one-to-one counselling would be efficiently utilized for client education intervention programs. The nutrient content calculation was planned to undertake with commonly consumed traditional as well as junk foods

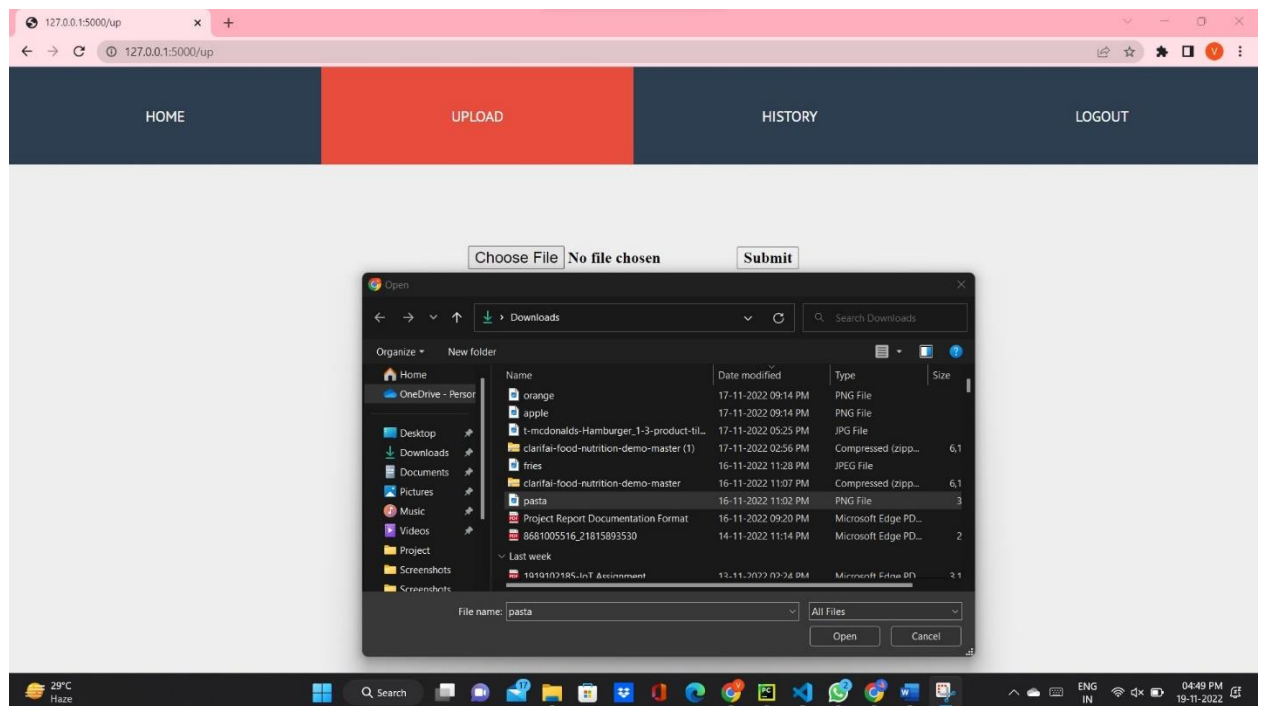


7.3 Database schema

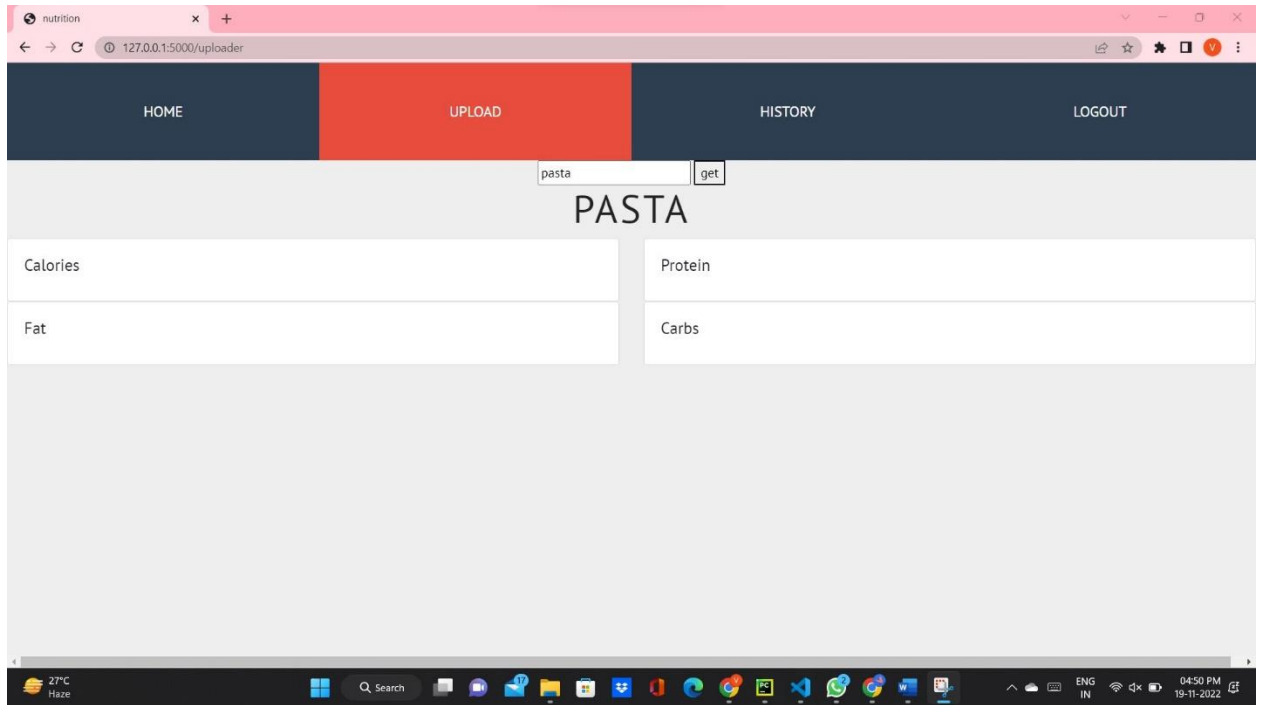


8. Testing :

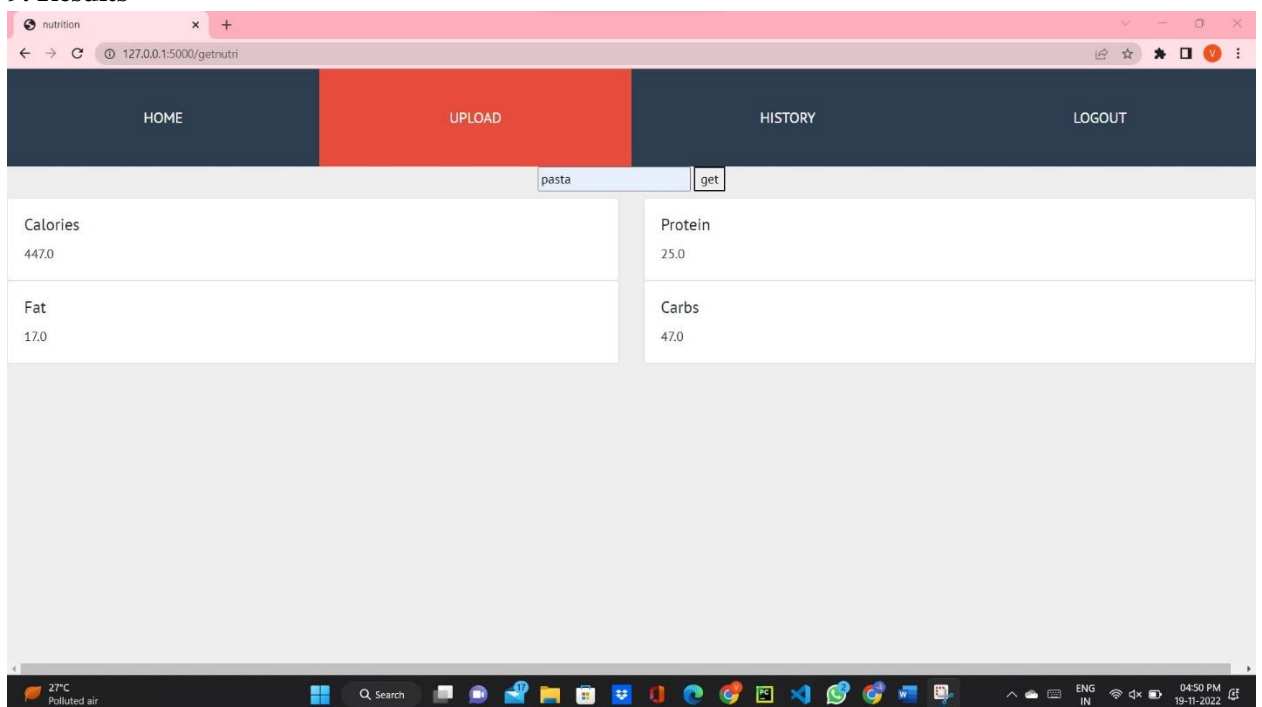
8.1 Test cases



8.2 User acceptance testing



9. Results



The screenshot shows a web browser window with a search history tab. The URL is 127.0.0.1:5000/display. The application has a dark blue header with four tabs: HOME, UPLOAD, HISTORY (highlighted in red), and LOGOUT. Below the header is a table with five columns: Name, Calories, Proteins, Fats, and Carbs. The table contains four rows of data.

Name	Calories	Proteins	Fats	Carbs
pasta	447	25	17	47
pasta	447	25	17	47
pasta	447	25	17	47
noodles	466	25	17	53

10. Conclusion

Due to the ignorance of healthy food habits, obesity rates are increasing at an alarming speed, and this is reflective of the risks to people's health. People need to control their daily calorie intake by eating healthier foods, which is the most basic method to avoid obesity. However, although food packaging comes with nutrition (and calorie) labels, it's still not very convenient for people to refer to App-based nutrient dashboard systems which can analyze real-time images of a meal and analyze it for nutritional content which can be very handy and improves the dietary habits, and therefore, helps in maintaining a healthy lifestyle. Hence, our application aims in providing calories, proteins, fats and carbohydrates so that users can follow a healthy diet.

11. Future Scope

Fitness is important in all eras. Good nutrition leads to fitness. It is important to know the composition of the food we intake everyday and everytime.

12. Appendix

Source code

Github and project demo link:

<https://github.com/IBM-EPBL/IBM-Project-26461-1660027252>

https://drive.google.com/file/d/18JtFAWLeEuR1hBFb43B3wQ_jATrFzv6h/view?usp=share_link