NUTRITION ASSISTANT APPLICATION

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CHAPTER 1

INTRODUCTION

Food is one of the most basic requirements of human life. It is often regarded as much more than a means of survival, and proper food intake is essential for human health and fitness. Our health is closely dependent on the 4 types or amount of food we intake. There are numerous fields such as sociology, psychology, nutrition sciences, and medicine in which healthy food consumption is explored. Food choices are negatively influenced by a busy lifestyle, bad habits, and low self-control. However, excessively unhealthy lifestyles and bad dietary habits, such as increased food intake with high energy and high fat, lead to various health issues.

With a large variety of healthy diet options proposed by either nutrition experts or fitness models, people are convinced to adopt a diet that promises them fascinating benefits and huge transformations. However, it is hard for people to find the diet that best fits them out of all the promising choices despite the difficulty of strictly following their chosen diet.

1.1 PROJECT OVERVIEW

Food is the key element of every human body. So, diet must be always taken into consideration. The knowledge about total intake of calories and nutrients to be consumed to maintain a fit and healthy life is needed. But, in most of the cases, unfortunately people face difficulties during estimation and measurement of the amount of food intake due to the mainly lack of nutritional information. Now-a-days obesity in adults is increasing at a shocking rate. The primary source of obesity is the disparity between the amount of meal intake and the energy burnt through physical activity.

The main objective of this project is to help the people to maintain their health with proper diet. Millions of people live in this world with incapacities of understanding the environment due to visual impairment. Although they can develop alternative approaches to deal with daily routines, they also suffers from certain navigation difficulties as well as social awkwardness. For example, it is very difficult for them to identify the food item in front of them. By making smart food choices, we can help protect ourselves from these health problems.
In our project, we build a real-time food identification application with a goal to provide the name of the food item and also its nutrition content values such as carbohydrates, calories, fats, proteins. This information will help a visually impaired person to identify what food item is front of him.

1.2 SCOPE OF THE PROJECT

The scope of this project is to built a web App that automatically estimates food attributes such as ingredients and nutritional value by classifying the input image of food. 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. A well balanced diet with an estimated nutrient intake is vital for infants and children which reduces the risks of deadly diseases namely cancer, diabetes, obesity and cardiovascular diseases. Unlike adults, infants require some assistance in their food intake. The main purpose of this proposed system is to improve the accuracy of pre-training model. Clarifai's AI-Driven Food Detection Model Service is used to analyze the food image which given by the user as a input and Nutrition API is used to provide nutritional information about the analyzed user image. Nutritional information of the analyzed image is returned to the app for display.

CHAPTER 2
LITERATURE SURVEY

2.1 EXISTING PROBLEM

While people in some regions of the world consume insufficient amounts of food to meet their calorie, vitamin, and mineral needs for optimal health, others consume excessive amounts of food for their health and wellbeing. A lot of salty, sugary, and/or fatty foods. Reflective visual feedback has a greater overall impact on healthy behaviour than the recommender, according to an analysis of various application features. With a qualitative analysis of semistructured in-depth interviews, we further pinpoint system shortcomings that affect this outcome, including a lack of diversity, scepticism toward healthiness and personalization, real-life contexts, and unique user characteristics.

2.2 REFERENCES

[1] Hamirul Binti Hambali, Salwa Khalid Abdulateef and Massudi Mahmuddin, “Segmentation of Multi Food Images Using Integrated Active Contour and K-means”, Journal of Engineering and Applied Sciences, 2021, pp. 3146-3151.

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[6] David SK, Rafiullah MR. Innovative health informatics as an effective modern strategy in diabetes management: a critical review. Int J Clin Pract. (2016) 70:434–49. doi: 10.1111/ijcp.12816

[7] Ministry of Food and Drug Safety. Ministry of Food and Drug Safety White Paper 2016. Cheongju: Ministry of Food and Drug Safety (2016).

2.3 PROBLEM STATEMENT DEFINITION

Healthy habits and wellness have gained popularity. Fitness application interest and revenue are increasing at the same rate as the number of people who are trying to get in shape. Food recommender systems that address, among other things, nutritional health with various techniques have recently attracted the attention of researchers studying recommender systems. While encouraging good eating habits, these systems have the ability to assist users in navigating the expanding volume of multimedia food material. The user's preferences are learned by traditional recommender systems, which may force recommendations for unhealthy food. Therefore, health-conscious recommender systems must also include various taste and health-related parameters in their algorithms. The use of nutrition support systems is promising because prior research has demonstrated that.

CHAPTER 3

IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviours and attitudes. Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.

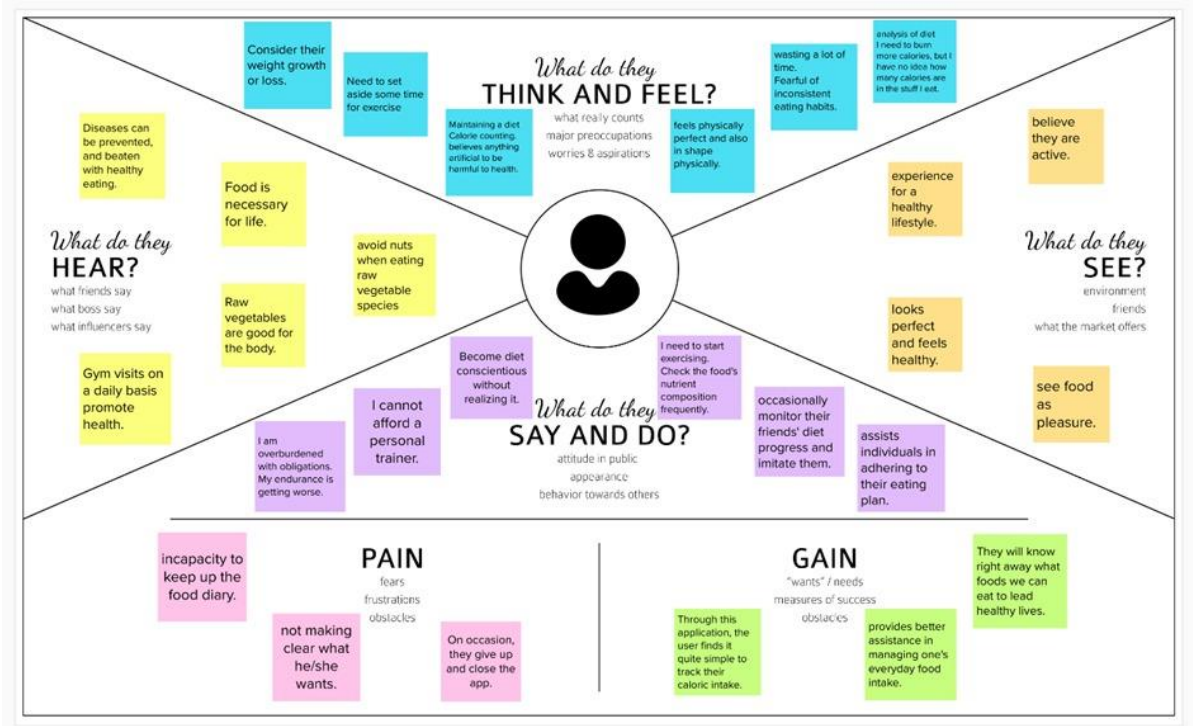


Fig 3.1 Empathy map diagram

3.2 IDEATION & BRAINSTORMING

Ideation and the activity of brainstorming, a particular method for coming up with fresh ideas, are frequently closely connected. The main distinction between ideation and brainstorming is that whereas brainstorming is nearly often done in groups, ideation is typically seen as being more of a solo activity. A group of individuals are frequently gathered for a brainstorming session to generate either fresh, broad ideas or solutions to specific problems or circumstances.

Fig 3.2 Brainstorming diagram

Fig 3.3 Brainstorming diagram

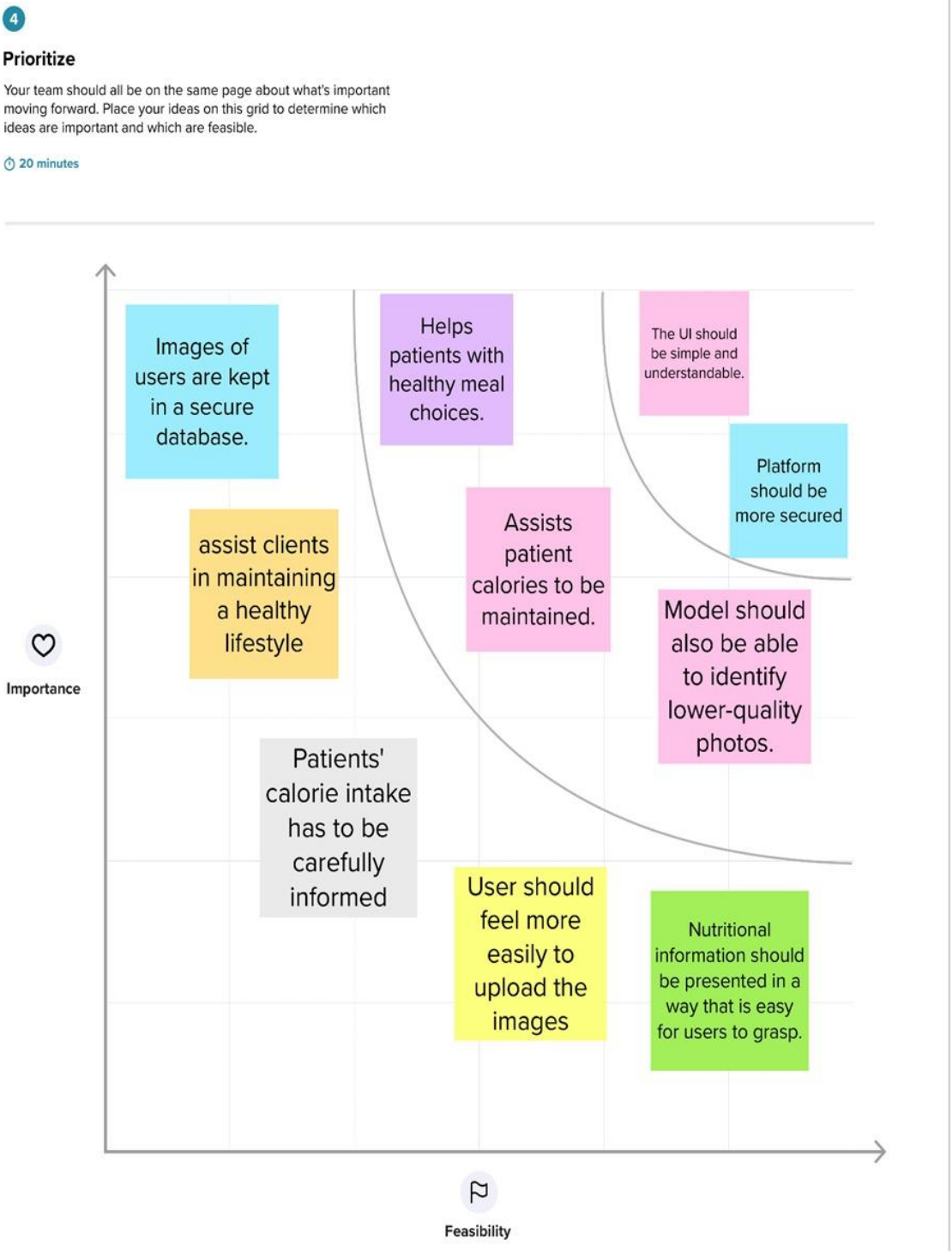


Fig 3.4 Brainstorming diagram

3.3 PROPOSED SOLUTION

The phrase "proposed solution" refers to the combination of all services (including any installation, implementation, training, maintenance, and support services) necessary to fulfil the goal specified by the vendor in its proposal, as well as any software, hardware, other goods or equipment.

Project team shall fill the following information in proposed solution;

1) Problem Statement (Problem to be solved):

Food is the key element of every human body. So, diet must be always taken into consideration. The knowledge about total intake of calories and nutrients to be consumed to maintain a fit and healthy life is needed. A well balanced diet with an estimated nutrient intake is vital for infants and children which reduces the risks of deadly diseases namely cancer, diabetes, obesity and cardiovascular diseases.

2) Idea / Solution description:

An interactive web application uses Clarifai's AI-Driven Food Detection Model to analyse the food image which is given by the user as input. The Nutrition API is used to provide nutritional information about the analysed user image, which helps to maintain a proper diet.

3) Novelty / Uniqueness:

Uses a Clarifai’s AI- Driven model to analyse the food images. Also able to identify the lower quality photos. Provides customised nutritional options. Assign health related tasks and activities. Users can get in touch with dietician through our portal for more information.

4) Social Impact / Customer Satisfaction:

It focuses on providing the exact calorie rate, surveillance of a healthy diet, guidelines for healthy eating and proper response from a nutritionist.

5) Business Model (Revenue Model):

Revenue is obtained on a premium subscription basis, as it provides the facility to interact with experts to gain detailed information.

6) Scalability of the Solution:

Additional features can be implemented, such as delivery of hygienic food according to their nutrition level, suggesting food to be consumed for patients based on their disease.

3.4 PROBLEM SOLUTION FIT

The Problem-Solution is a tool for entrepreneurs, marketers, and corporate innovators that helps to find ideas with higher odds of solution adoption, minimise time spent on solution testing, and gain a better understanding of the existing situation. Such information is generally acquired "on the fly," following rounds of revisions and consumer interviews, but it is critical to your success. This canvas contains everything you need to find patterns and realise what would work and why, based on the ideas of Lean Startup, and User Experience design. Simply be where your consumers are and address a genuine need, whether it's the same problem done differently or something new presented in a familiar way. In this project this are the needs for that.

Fig 3.5 Problem Solution Fit diagram

CHAPTER 4

REQUIREMENT ANALYSIS

4.1 FUNCTION REQUIREMENT

An explanation of the service that the software must provide is contained in a functional requirement (FR). It describes a piece of software or a software system. A computation, data manipulation, business process, user interaction, or any other specialised feature can identify the likely function of a system. In software engineering, functional specifications are another name for functional requirements.

4.1.1 USER REGISTERATION:

- Registration through Form
- Registration through Gmail

4.1.2 USER CONFERMITION:

- Confirmation via Email
- Confirmation via OTP

4.1.3 FOOD DETECTION

Scanning by Clarifai’s AI-Driven Food Detection Model

4.1.4 NUTRIENTS DISPLAY

Display nutrients through IBM Cloud

4.1.5 USER BMI CALCULATION

Calculating BMI accurately.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Food Detection	Scanning by Clarifai's AI-Driven Food Detection Model
FR-4	Nutrients Display	Display nutrients through IBM Cloud
FR-5	User BMI Calculation	Calculating BMI accurately

Table 4.1 Functional requirement

4.2 NON-FUNCTIONAL REQUIREMENT

Non-functional requirements are quality characteristics that specify how your product should behave.

4.2.1 USABILITY:

Python as a programming language Flask as a Python framework IBM DB2 as a database support IBM Cloud as a cloud storage Docker as a software platform.

4.2.2 SECURITY:

Securely retain user identifiers such as user name and user details.

4.2.3 RELIABILITY:

Reliable since it calculates BMI correctly and displays diet clearly.

4.2.4 PERFORMANCE:

Give the user the best diet plan and relevant food analysis to encourage them to eat healthily.

4.2.5 AVAILABILITY:

Because all a user needs is a smartphone with a strong network connection, it is easily accessible.

4.2.6 SCALABILITY:

Accordingly, the database can be updated. Authorized users may at any time alter the input data.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Python as a programming language Flask as a Python framework IBM DB2 as a database support IBM Cloud as a cloud storage Docker as a software platform
NFR-2	**Security**	Securely retain user identifiers such as user name and user details.
NFR-3	**Reliability**	Reliable since it calculates BMI correctly and displays diet clearly.
NFR-4	**Performance**	Give the user the best diet plan and relevant food analysis to encourage them to eat healthily.
NFR-5	**Availability**	Because all a user needs is a smartphone with a strong network connection, it is easily accessible.
NFR-6	**Scalability**	Accordingly, the database can be updated. Authorized users may at any time alter the input data.

Table 4.2 Non-Functional requirement

CHAPTER 5

PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS

In a data flow diagram, the information flows inside a system are typically represented visually (DFD). A clear and unambiguous DFD can graphically express the right amount of system need. It illustrates how data enters and departs the system, where it is stored, and what changes the data.

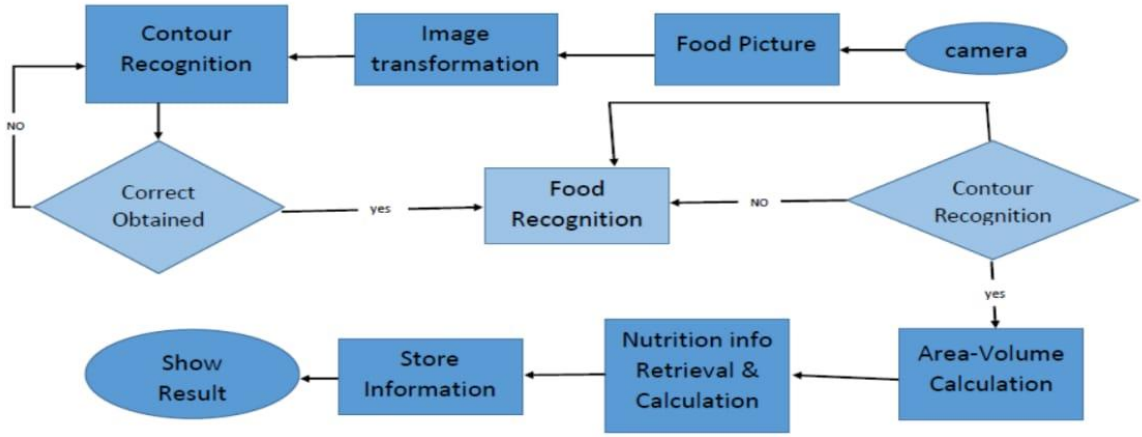


Fig 5.1 Data flow diagram

5.2 SOLUTION & TECHNICAL ARCHITECTURE

A solutions architect creates the broad technical vision for a specific strategy to address a business problem. A solutions architect creates the broad technical vision for a specific strategy to address a business problem. They design, describe, and supervise the solution.

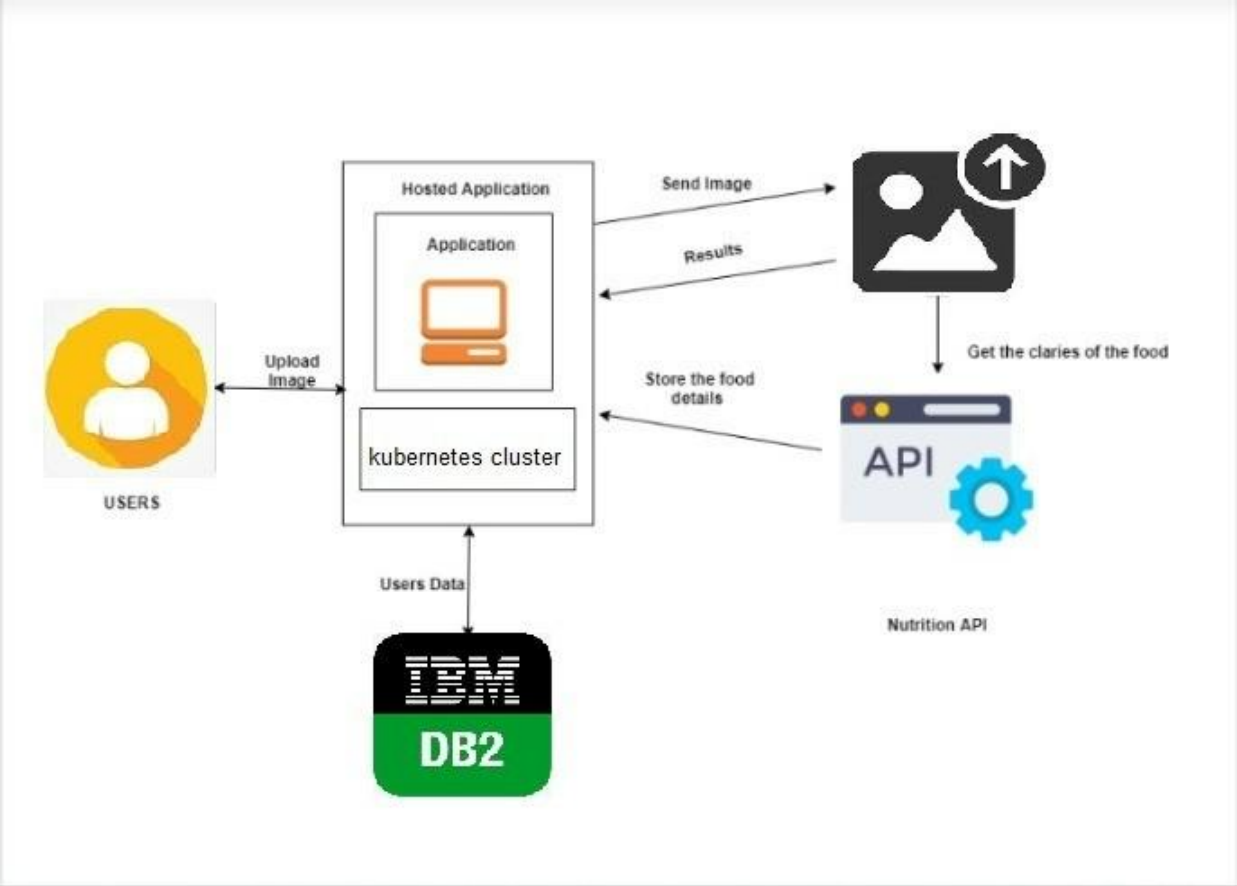


Fig 5.2.1 Solution Architecture

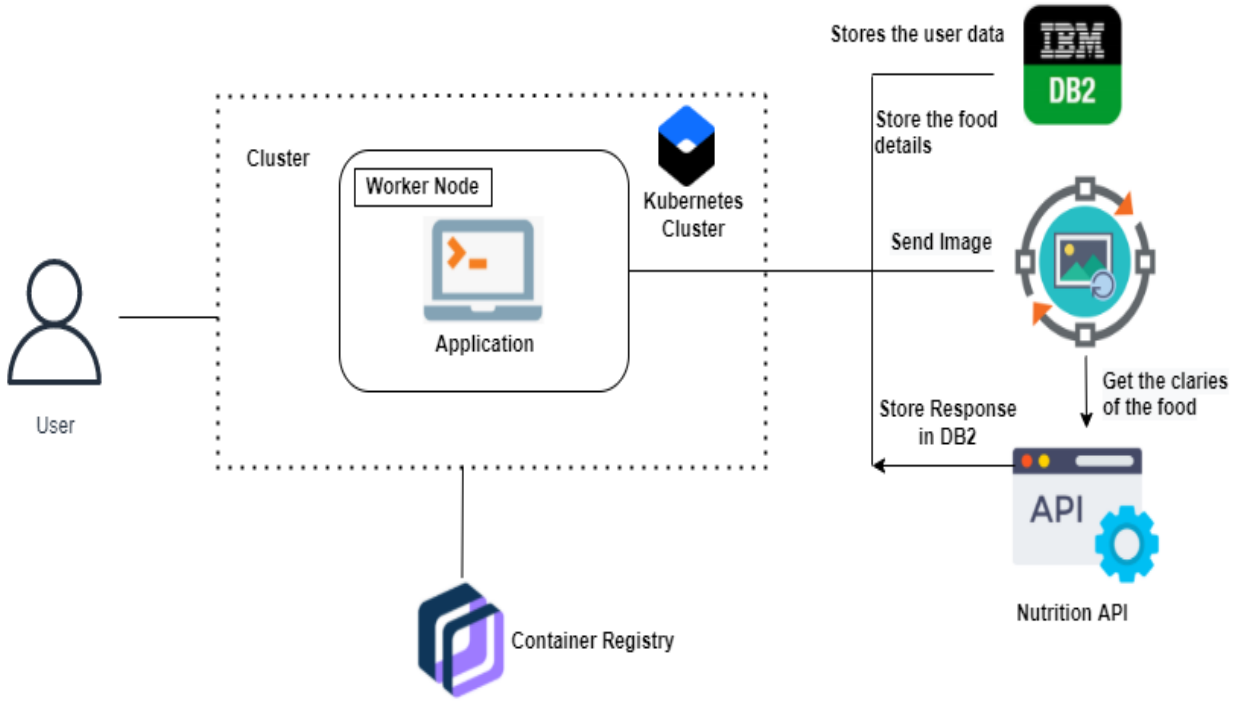


Fig 5.2.2 Technical Architecture

5.3 USER STORIES

An informal, generalised explanation of a software feature written from the client's or end user's point of view is known as a "user narrative." According to a user story, a piece of work will provide the client with a certain value.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer	Registration	USN-1	As a user, I can register for the application by entering my name, age, gender, e-mail, password and confirming my password	I can access my account / dashboard	High	Sprint-1
	Registration	USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	Medium	Sprint-1
	Login	USN-3	As a user, I can login to the application through Gmail with login credentials	I can access my account /dashboard	Medium	Sprint-1
	Profile Updating	USN-4	As a user, I have to enter my height, weight and daily activity details	I can update this information on dashboard	High	Sprint-2
	Database	USN-5	As a user, I can upload or capture live image of the meal	I can get the nutritional value of that particular meal	High	Sprint-2
	Dashboard	USN-6	As a user, I can track my daily calories intake	I can access my account / dashboard	Medium	Sprint-2
Administrator	Maintaining details for users	USN-7	Maintaining details for users	I can access database	High	Sprint-3
	Security	USN-8	As a user, I feel the site is very secure	I can access my account with my login credentials	High	Sprint-3

Table 5.3 User Stories

CHAPTER 6

PROJECT PLANNING & SCHEDULING

6.1 SPRINT PLANNING & ESTIMATION:

In the scrum process, sprint planning marks the beginning of the sprint. Sprint planning's goal is to specify what can be completed in a sprint and how it will be done. The sprint planning meeting establishes the focus and agenda for the sprint. If done well, it also produces a setting in which the team is inspired, challenged, and capable of success.

6.1.1 Product Backlog, Sprint Schedule, and Estimation:

Template to create product backlog and sprint schedule

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 sign up the application by entering my email, password, and confirming my password.	2	High	DEEPIKALA V ARTHY N ANJANA S
Sprint 1	New user	USN-2	When I register for the application as a user, I will get a confirmation email.	1	High	ANJANA S DEEPIKALA V KEERTHIYA R
Sprint-2	Gmail Registration	USN-3	I can sign up for the application as a user using Gmail.	2	Medium	KEERTHIYA R ANJANA S
Sprint-2	Login	USN-4	I can access the application as a user by providing my email address and password.	2	Medium	KEERTHIYA R ARTHY N
Sprint-3	Suggestion	USN-5	I can recommend things as a user, like a dietary plan, etc.	1	High	ANJANA S ARTHY N
Sprint-4	Image upload	USN-6	As a user, I must input photographs of food items in order to calculate calories and provide suggestions for a balanced diet.	2	High	KEERTHIYA R ANJANA S DEEPIKALA V
Sprint-4	Dashboard	USN-7	Nutrition API will be used to deliver the information.	2	High	DEEPIKALA V ARTHY N

Table 6.1.1 Sprint schedule table

6.2 SPRINT DELIVERY SCHEDULE:

6.2.1 Project Tracker, Velocity & Burndown Chart:

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Table 6.2.1 Project tracker table

Velocity:

We have a 24-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day). **AV=Sprint Duration/ Velocity=24/20 =1.2**

AV =Sprint Duration = 24/20 =1.2

6.3 REPORTS FROM JIRA:

6.3.1 Burndown Chart:

A burn down chart plots the amount of work remaining to perform against the amount of time. In agile software development approaches like Scrum, it is frequently employed. Burn down charts, however, can be used for any project that makes observable progress over time.

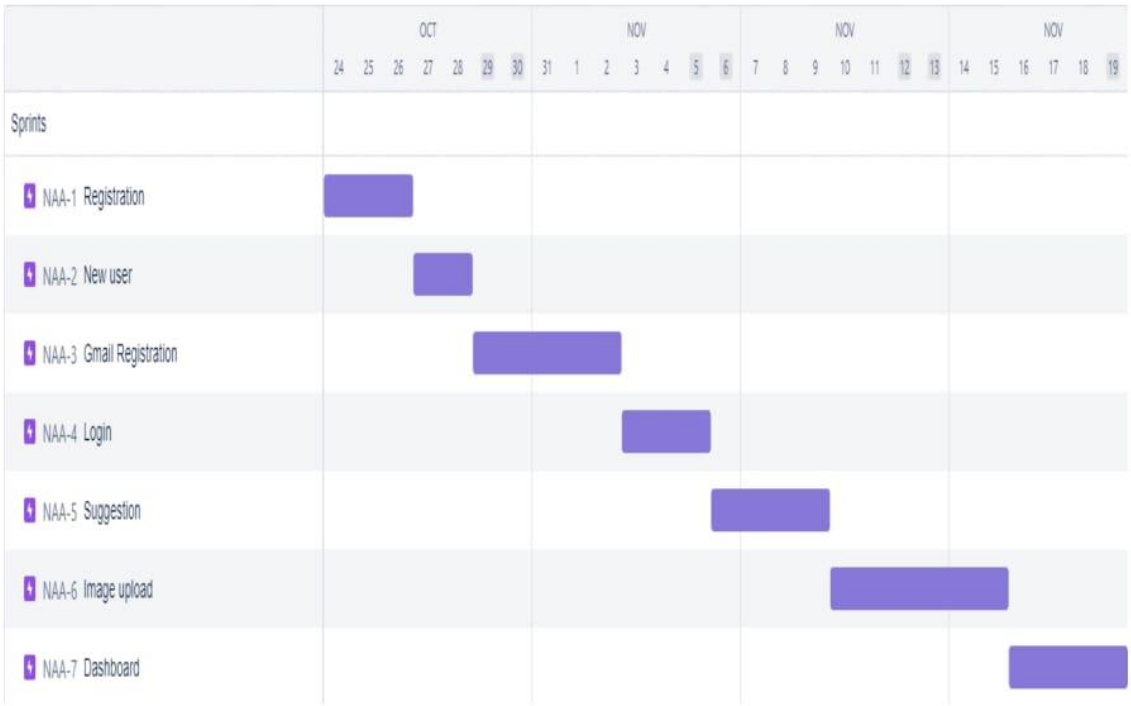


Fig 6.3.1 Burndown chart

CHAPTER 7

CODING & SOLUTIONING

7.1 Feature 1

- 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.

Code:

```
<!DOCTYPE html>
<html>
<head>
    <meta charset="utf-8">
    <meta name="viewreport" content="width=device-width, initial-scale=1.0">
    <title>
        Nutrition Assistant Manager
    </title>
    <link rel="stylesheet" type="text/css" href="https://stackpath.bootstrapcdn.com/bootstrap/4.3.1/css/bootstrap.min.css" />
    <link href="https://fonts.googleapis.com/css?family=Raleway&display=swap" rel="stylesheet" />
    <style>

body{
    margin:0;
```

```
        padding:0;
        background:#fff;
        font-family: 'Raleway',sans-serif;
        color: #fff;
}
.banner{
        height: 100vh;
        width: 100%;
        background-image: url('../static/background1.jpg');
        background-position: top;
        background-size:cover;
        /background-attachment: fixed;/
        background-repeat: no-repeat;
}
.banner .navbar{
        margin-top:4%;
}
.banner .navbar-brand{
        color: #fff;
        font-size:1.8em;
        font-weight: 700;
        margin-left: 10%;
}
.banner .nav{
```

```
        margin-right:10%;
}
.banner .nav li a{
        color:#aaa;
        font-size: 1.2em;
}
.banner .info{
        margin-top:15%;
        transform: translateY(-15%);
}
.banner .info h1{
        font-size: 2.5em;
        font-weight: 700;
        color: #fff;
        letter-spacing: 2px;
}
.banner .info p{
        font-size: 2em;
        font-weight: 500;
        color: white;
        letter-spacing: 2px;
}
.banner .info a{
        margin-left:50%;
```

```
        transform: translateX(-50%);
        color: #fff;
        background: #e91d43;
        padding:10px 20px;
        font-size: 2em;
        font-weight: 600;
}
.banner .info a:hover{
        background: #e91e63;
}
        </style>
</head>
<body>
        <div class="container-fluid banner">
                <div class="row">
                        <div class="col-md-12">
                                <nav class="navbar navbar-md">
                                        <div class="navbar-brand">NUTRITION ASSISTANT APPLICATION</div>
                                </nav>
                        </div>
                        <div class="col-md-8 offset-md-2 info">
                                <h1 class="text-center">NUTRIOOZE</h1>
                                <p class="text-center">
```

"To eat is a necessity, but to eat intelligently is an art."

</p>

GET STARTED

</body>

</html>

7.2 Feature 2

● It uses Nutrition API to provide nutritional information about the analyzed Image.

● Nutritional information of the analyzed image is returned to the app for display.

Code:

<!DOCTYPE html>

<html>

<head>

<link class="jsbin" href="http://ajax.googleapis.com/ajax/libs/jqueryui/1/themes/base/jquery-ui.css" rel="stylesheet" type="text/css" />

<link href="https://fonts.googleapis.com/css?family=Roboto:300,400,500,700" rel="stylesheet">

<script class="jsbin" src="http://ajax.googleapis.com/ajax/libs/jquery/1/jquery.min.js"></script>

```
<script class="jsbin" src="http://ajax.googleapis.com/ajax/libs/jqueryui/1.8.0/jquery-ui.min.js"></script>
<meta charset=utf-8 />
<title>Nutrition Assitant Manager</title>
<!--[if IE]>
  <script src="http://html5shiv.googlecode.com/svn/trunk/html5.js"></script>
<![endif]-->
<style>
   html, body{
     display: flex;
     font-family: Roboto, Arial, sans-serif;
     font-size: 15px;
      background-image: url('https://image.freepik.com/free-photo/diet-food-background-concept-healthy-carbohydrates-carbs-products-fruits-vegetables-cereals-nuts-beans-dark-blue-concrete-background-copy-space-frame_136595-2921.jpg');
     background-repeat: no-repeat;
     background-attachment: fixed;
     background-size: cover;
   }
   label{
     display: inline-block;
     background-color: #8ebf42;
     color: white;
```

```
  padding: 0.5rem;
  font-family: sans-serif;
  border-radius: 0.3rem;
  cursor: grabbing;
  margin-top: 400px;
  margin-left: 150px;
}
fileChosen{
  margin-left: 0.3rem;
  font-family: sans-serif;
}
button{
  display: inline-block;
  background-color: #8ebf42;
  color: white;
  padding: 14px 0;
  margin: 10px 0;
  margin-left: 150px;
  border: none;
  cursor: grabbing;
  width: 50%;
  border-radius: 0.3rem;
 }
 span, h2{
```

```
    color: white;
    }
   img{
    margin-left: -400px;
    margin-bottom: 70%;
    margin-top: 50px;
    text-indent: -9999px;
    }
    .alt{
    color: transparent;
    }
</style>
</head>
<body>
<h2> Welcome, to Nutriooze </h2>
<form action="out" method="POST" enctype="multipart/form-data">
   <label >{{data}}</label>
  <button type="submit">GetNutritionInfo</button>
   <p>{{error}}</p>
</form>
<img id="blah" src="#" alt="your image" />
</body>
</html>
```

CHAPTER 8

TESTING

8.1 TEST CASES

Test case ID	Feature Type	Component	Test Scenario	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Executed By
Registration page_TC_001	Functional	register Page	As a user, I can sign up the application by entering my email, password, and confirming my password.	1.Enter URL and click go 2.Click signup to	http://127.0.0.1:5000	Landing page should display	Working as expected	Pass	Arthy
Login_TC_002	Functional	login page	Verify user is able to log into application with InValid credentials	1.Enter URL and click go 2.Click on Add Product Page button 3.Enter valid password in password text box 4.Click on login button	Username: test@gmail password: Test123	verify the user login page is working	Working as expected	Pass	Deepikala
Gmail Registration _TC_003	Functional	register page	As a user, I can sign up the application by entering my email, password and other details and confirming my password.	1.Enter URL and click go 2.Click on login button 3.Enter InValid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: rigor@gmail password: Testing123	Application should show 'Incorrect email or password ' validation message.	Working as expected	Pass	Anjana
Suggestion _TC_004	Functional	Home page	I can recommend things as a user, like a dietary plan, etc.	1.Enter URL and click go 2.Click on Admin button 3.Enter InValid username/email in Email text box 4. I can recommend things as a user, like a dietary plan, etc. 5.Click on login button	Username: testrigor01@gmail password: Testing123	Shows suggestions about food image.	Working as expected	Pass	Anjana
Image upload_TC_005	Functional	index page	As a user, I must input photographs of food items in order to calculate calories and provide suggestions for a balanced diet.	1.Enter URL and click go 2.Click on User login in button 3.Verify login/Singup with below UI elements: 4. user have to upload food image	http://127.0.0.1:5000	Nutritional values display	Working as expected	Pass	deepikala
Dashboard_TC_006	Functional	index page	Nutrition API will be used to deliver the information	1.Enter URL and click go 2.Click on User login in button 3.Verify login/Singup with below UI elements: 4. in dashboard click on nutrition tab.		full dashboard user can utilize it.	Working as expected	pass	keerthiya

Table 8.1 Test case table

8.2 USER ACCEPTANCE TESTING

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	10	5	1	4	20
Duplicate	2	0	1	0	3
External	3	2	0	7	12
Fixed	16	7	2	6	31
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	0	1
Won't Fix	0	4	0	0	4
Totals	28	18	6	17	72

Table 8.1 Defect Analysis table

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	6	0	0	6
Client Application	9	0	0	9
Security	3	0	0	3
Outsource Shipping	2	0	0	2
Exception Reporting	3	0	0	3
Final Report Output	6	0	0	6
Version Control	1	0	0	1

Table 8.2 Test Case Analysis Table

CHAPTER 9

RESULTS

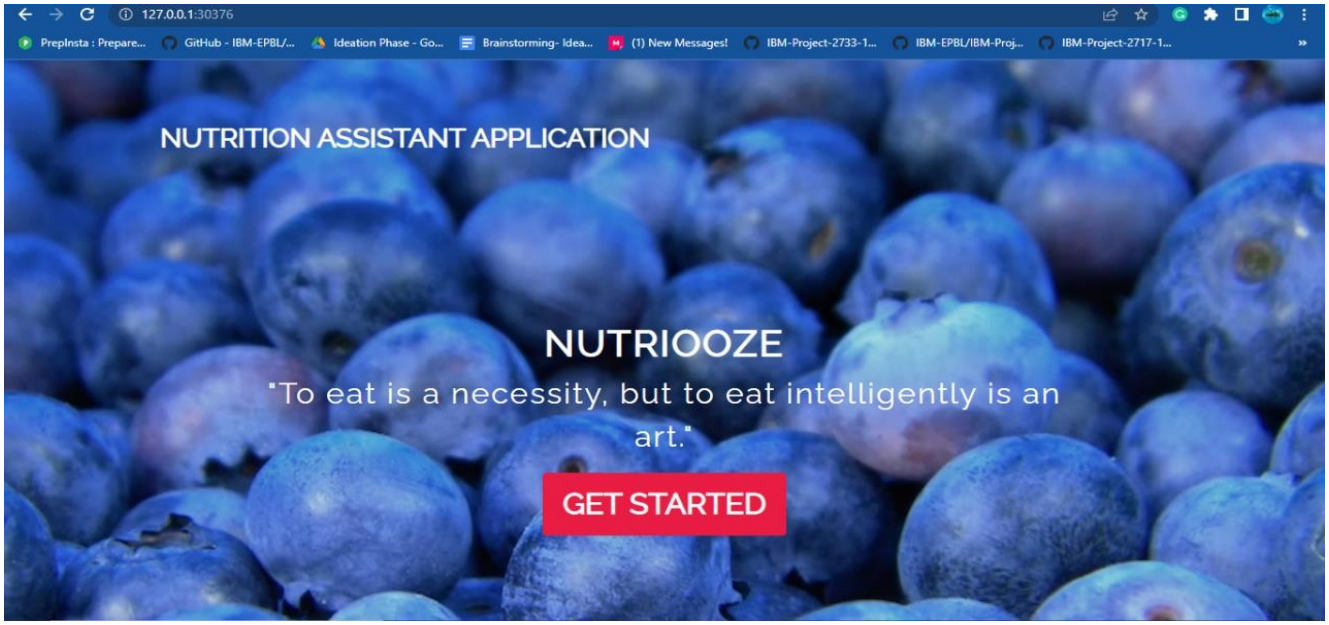
The quantity of labour left to do versus the length of time is plotted on a burn down chart. It is commonly used in Scrum and other agile software development methodologies. On the other hand, burn down charts can be applied to any project that makes noticeable progress over time.

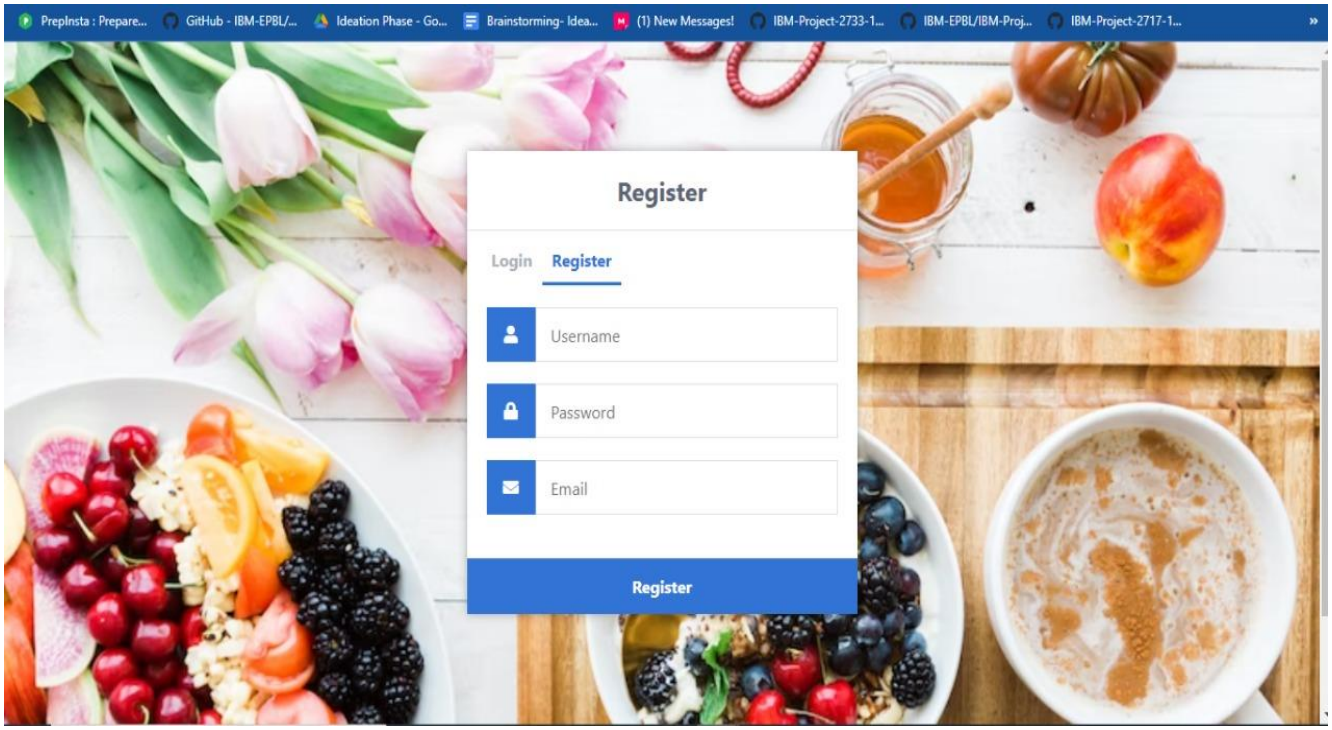
9.1 Performance Metrics:

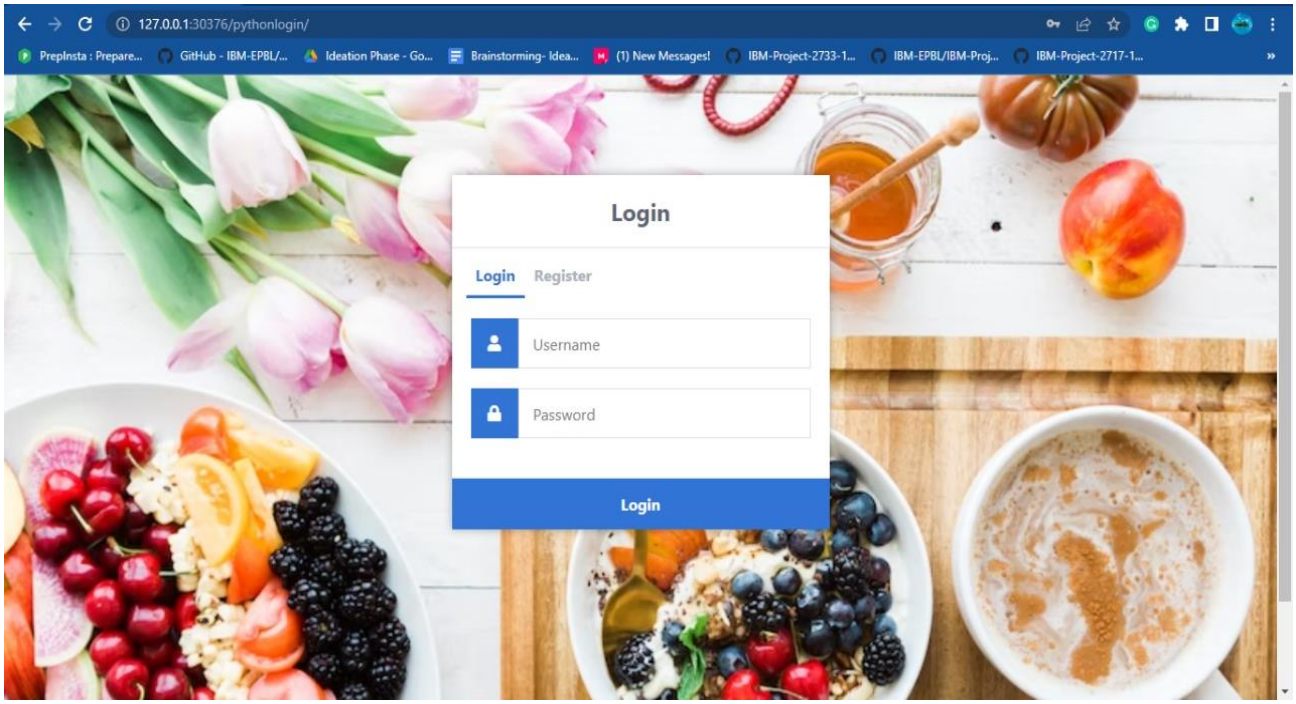
S.No	Parameter	Values
1.	Model Summary	To build a web App that automatically estimates food attributes such as ingredients and nutritional value by classifying the input image of food.
2.	Accuracy	Training Accuracy – 89% Validation Accuracy – 95%
3.	Confidence Score	Class Detected – 93% Confidence Score – 90%

Table 4.1 Performance Metrics

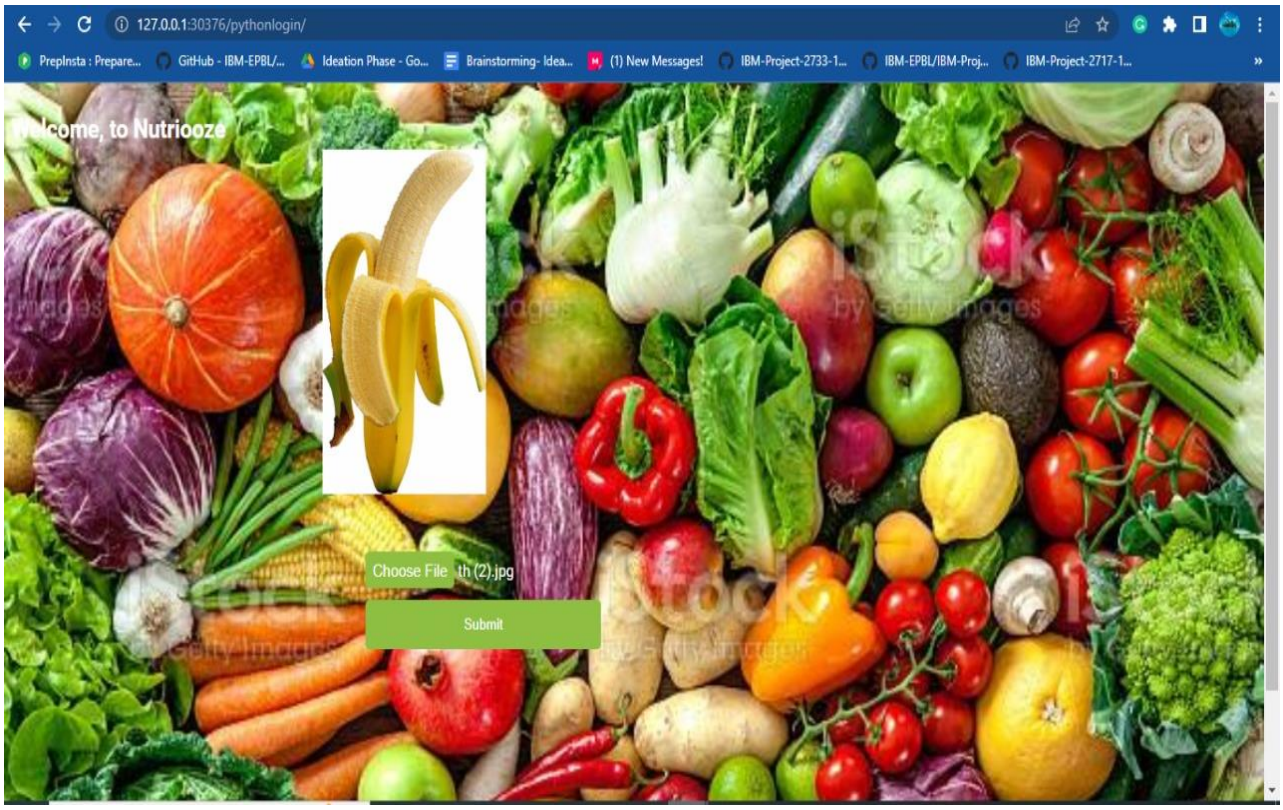
9.2 SCREENSHOTS

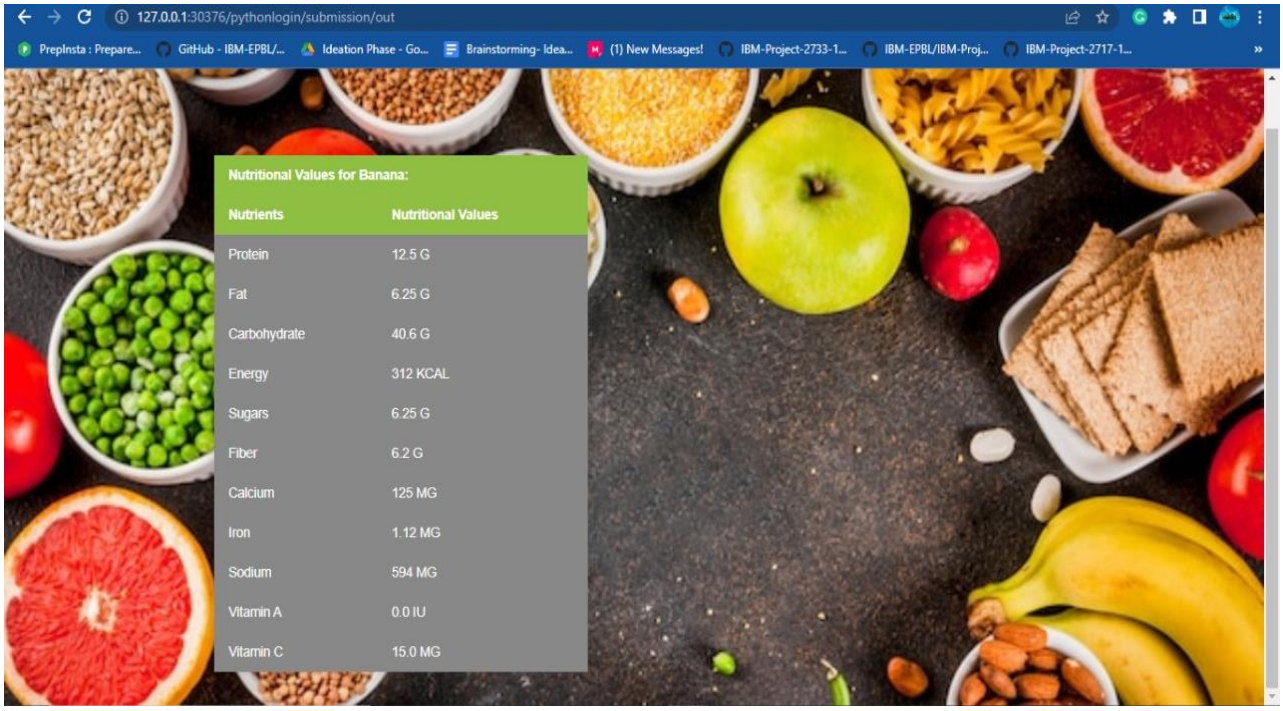





127.0.0.1:30376/pythonlogin/
Login
Login
Register
Username
Password
Login


127.0.0.1:30376/pythonlogin/
Welcome, to Nutriooze
Choose File
No file chosen
Submit


127.0.0.1:30376/pythonlogin/
Welcome, to Nutriooze
Choose File th (2).jpg
Submit


127.0.0.1:30376/pythonlogin/submission/out
Nutritional Values for Banana:
Nutrients
Nutritional Values
Protein
12.5 G
Fat
6.25 G
Carbohydrate
40.6 G
Energy
312 KCAL
Sugars
6.25 G
Fiber
6.2 G
Calcium
125 MG
Iron
1.12 MG
Sodium
594 MG
Vitamin A
0.0 IU
Vitamin C
15.0 MG

CHAPTER 10

ADVANTAGE & DISADVANTAGE

Advantage:

- ✓ Users are enabled to make their own profile under this feature.
- ✓ Since users have become advanced, so have these applications by allowing them to integrate their fitness with these application.
- ✓ With the help of this feature the admin can make better decisions regarding food choices.
- ✓ User can control their daily calorie intake by eating healthier foods, which helps users to avoid obesity and other diseases
- ✓ This application is easy to use because of the interface that is simple and well developed.
- ✓ It shows nutritional information about the user input Image are provided, which helps user to maintain proper diet.

Disadvantage:

- ✓ The system has limited cuisine varieties mixed food images have not been considered.
- ✓ User should send images in a clear manner.
- ✓ Inaccuracies are still possible.

CHAPTER 11
CONCLUSION

By incorporating image classification model with the mobile app, we propose a way to simplify the process of recording everyday calories and eating habits. The solution to the difficulties that stop people from keeping a consistent diet plan can be solved by using the food recognition feature to identify the specific food and its nutritional information from user taken photos of their food either to post on social media or just for a personal record. In order to accommodate to various difficulties faced with extracting data from user photos, methods proposed by other computer vision researchers can be utilized to extract volume information from a food photo and to extract multiple food items' information from a single photo.

The characteristics of food nutrition cloud platform and disease and nutrition intake in detail and puts forward the shortcomings of traditional association rule algorithm in dietary nutrition cloud platform, and proposes an improved immune algorithm based on clustering to find the association between nutrition intake and disease. The algorithm can improve the searching speed of association rules, and can directly find the specified number of frequent item sets. Due to the limited time and ability, there are still some problems in the experimental design.

CHAPTER 12
FUTURE SCOPE

Technically, there are numerous opportunities to extend this work. In the near term, our goal is to continue to improve our eating gesture detection by experimenting with methods such as Dynamic Time Warping (DTW) and new feature representations. One area we believe is particularly promising in the context of eating moment recognition is personalization. Eating styles vary from person to person to a large degree and we intend to investigate the effect of a truly personalized model on performance results. Finally, we are interested in fusing on-body inertial sensing with additional sensing modalities for eating moment recognition, such as location, and continuing to explore approaches for identifying not only when individuals are eating but also what they are consuming.

In future, including a calorie counter, diet trackers, nutrition planner apps, and marketplace platforms that connect users and nutrition coaches. Meal planning apps differ from the earlier ones in that they track users' calorie intake even before they eat. Users of this app must enter information about their desired weight, diet, and food preferences.

CHAPTER 13

APPENDIX

13.1 SOURCE CODE:

```
from flask import Flask, render_template, request, redirect, url_for, session
import requests, json, os
import ibm_db
import re
import cv2
app = Flask(_name_)
app.secret_key = 'a'
conn = ibm_db.connect("DATABASE=bludb;HOSTNAME=6667d8e9-9d4d-4ccb-ba32-21da3bb5aafc.c1ogj3sd0tgtu0lqde00.databases.appdomain.cloud;PORT=30376;SECURITY=SSL;SSLServerCertificate=DigiCertGlobalRootCA.crt;UID=qfn70649;PWD=aXek5nfjbJy0IGQV","","")
@app.route('/')
def home():
    return render_template('home.html')
@app.route('/pythonlogin/', methods=['GET', 'POST'])
def login():
    global userid
    msg=''

    if request.method =='POST':
        username = request.form['username']
        password =request.form['password']
        sql ="SELECT * FROM users WHERE username =? AND password=?"
        stmt = ibm_db.prepare(conn, sql)
```

```
        ibm_db.bind_param(stmt,1,username)
        ibm_db.bind_param(stmt,2,password)
        ibm_db.execute(stmt)
        account = ibm_db.fetch_assoc(stmt)
        print (account)
        if account:
            session['loggedin']=True
            session['id'] = account ['USERNAME']
            userid = account['USERNAME']
            session['username'] = account['USERNAME']
            msg = 'logged in successfully !'
            return render_template('submission.html',msg = msg)
        else:
            msg ='Incorrect username / password !'
    return render_template('login.html',msg=msg)
@app.route('/pythonlogin/register', methods=['GET', 'POST'])
def register():
    msg = ''
    if request.method == 'POST':
        username = request.form['username']
        email = request.form['email']
        password = request.form['password']
        sql = "SELECT * FROM users WHERE username = ?"
        stmt = ibm_db.prepare(conn,sql)
        ibm_db.bind_param(stmt,1,username)
        ibm_db.execute(stmt)
        account = ibm_db.fetch_assoc(stmt)
        print(account)
        if account:
            msg ='Account already exists !'
```

```
            elif not re.match(r'[^@]+@[^@]+\.[^@]+',email):
                msg ='Invaild email address !'
            elif not re.match(r'[A-Za-z0-9]+',username):
                msg = 'Name must contain only characters and numbers!'
            else:
                insert_sql = "INSERT INTO users VALUES (?,?,?)"
                prep_stmt= ibm_db.prepare(conn, insert_sql)
                ibm_db.bind_param(prep_stmt, 1 , username)
                ibm_db.bind_param(prep_stmt, 2, email)
                ibm_db.bind_param(prep_stmt, 3, password)
                ibm_db.execute(prep_stmt)
                msg = ' you have successfully registered !'
        elif request.method == 'POST':
            # Form is empty... (no POST data)
            msg = 'Please fill out the form!'
        # Show registration form with message (if any)
        return render_template('register.html', msg=msg)
    @app.route('/submission')
    def submission():
        return render_template('submission.html')
    @app.route('/pythonlogin/submission/display', methods = ["POST", "GET"])
    def display():
        if request.method == "POST":
            image = request.files["food"]
            image.save('static/Out/Test.jpg')
            import tensorflow as tf
            classifierLoad = tf.keras.models.load_model('model.h5')
            import numpy as np
            from keras.preprocessing import image
```

```
test_image = image.load_img('static/Out/Test.jpg', target_size=(200, 200))
img1 = cv2.imread('static/Out/Test.jpg')
# test_image = image.img_to_array(test_image)
test_image = np.expand_dims(test_image, axis=0)
result = classifierLoad.predict(test_image)
      print(result)

out = ''
fer = ''
if result[0][0] == 1:
   out = "APPLES"
elif result[0][1] == 1:
   out = "Badam"
elif result[0][2] == 1:
   out = "Badam Drink"
elif result[0][3] == 1:
   out = "Banana"
elif result[0][4] == 1:
   out = "Beef Steak"
elif result[0][5] == 1:
   out = "BeetrootFry"

elif result[0][6] == 1:
   out = "Biriyani"
elif result[0][7] == 1:
   out = "Biscuits"
elif result[0][8] == 1:
   out = "BitterGuardFry"
elif result[0][9] == 1:
```

```
    out = "Boiledegg"
elif result[0][10] == 1:
    out = "Bread with Peanutbutter"

elif result[0][11] == 1:
    out = "BreadandJam"
elif result[0][12] == 1:
    out = "Badam"
elif result[0][13] == 1:
    out = "Burger"
elif result[0][14] == 1:
    out = "CapsicumCurry"
elif result[0][15] == 1:
    out = "Cashew"
elif result[0][16] == 1:
    out = "Chappathi"

elif result[0][17] == 1:
    out = "Cheeseballs"
elif result[0][18] == 1:
    out = "ChilliBeef"
elif result[0][19] == 1:
    out = "Chocolate"
elif result[0][20] == 1:
    out = "ChocolateIcecream"
elif result[0][21] == 1:
    out = "ChoolapooriwithChanna"
elif result[0][22] == 1:
    out = "CoffeeorLatte"
```

```
            elif result[0][23] == 1:
                out = "CrabMasala"
            elif result[0][24] == 1:
                out = "Cucumber"
            elif result[0][25] == 1:
                out = "Curdrice"
            elif result[0][26] == 1:
                out = "Dosa"
            foodName= out
          session["out"]=foodName
          return render_template('Result.html', data=session["out"])
else:
            return render_template('submission.html')
@app.route("/pythonlogin/submission/out", methods=['GET', 'POST'])
    def out():
        if request.method == "POST":
            nutrients = {}
            USDAapiKey                                                    =
'9f8yGs19GGo5ExPpBj7fqjKOFlXXxkJdMyJKXwG3'
          foodName = session["out"]
            response = requests.get(

'https://api.nal.usda.gov/fdc/v1/foods/search?api_key={}&query={}&require
AllWords={}'.format(USDAapiKey,

foodName,
                                                                  True))
data = json.loads(response.text)
            concepts = data['foods'][0]['foodNutrients']
```

```
            arr = ["Sugars", "Energy", "Vitamin A", "Vitamin D", "Vitamin B",
        "Vitamin C", "Protein", "Fiber", "Iron",
                "Magnesium",
                "Phosphorus", "Cholestrol", "Carbohydrate", "Total lipid (fat)",
        "Sodium", "Calcium", ]
            for x in concepts:
              if x['nutrientName'].split(',')[0] in arr:
                if (x['nutrientName'].split(',')[0] == "Total lipid (fat)"):
                  nutrients['Fat'] = str(x['value']) + " " + x['unitName']
                else:
                  nutrients[x['nutrientName'].split(',')[0]] = str(x['value']) + " " +
        x['unitName']
return render_template('display.html', x=foodName, data=nutrients,
account=session['username'])
if _name=='main_':
    app.run(host='0.0.0.0',debug = True, port = 30376)
```

13.2 GITHUB & PROJECT DEMO LINK:

https://github.com/IBM-EPBL/IBM-Project-2717-1658481855

http://192.168.130.113:30376

https://www.youtube.com/watch?v=MGOgbfIM_tY