PROJECT REPORT

Project Name : NUTRITION ASSISTANT APPLICATION

Team Id : PNT2022TMID51683

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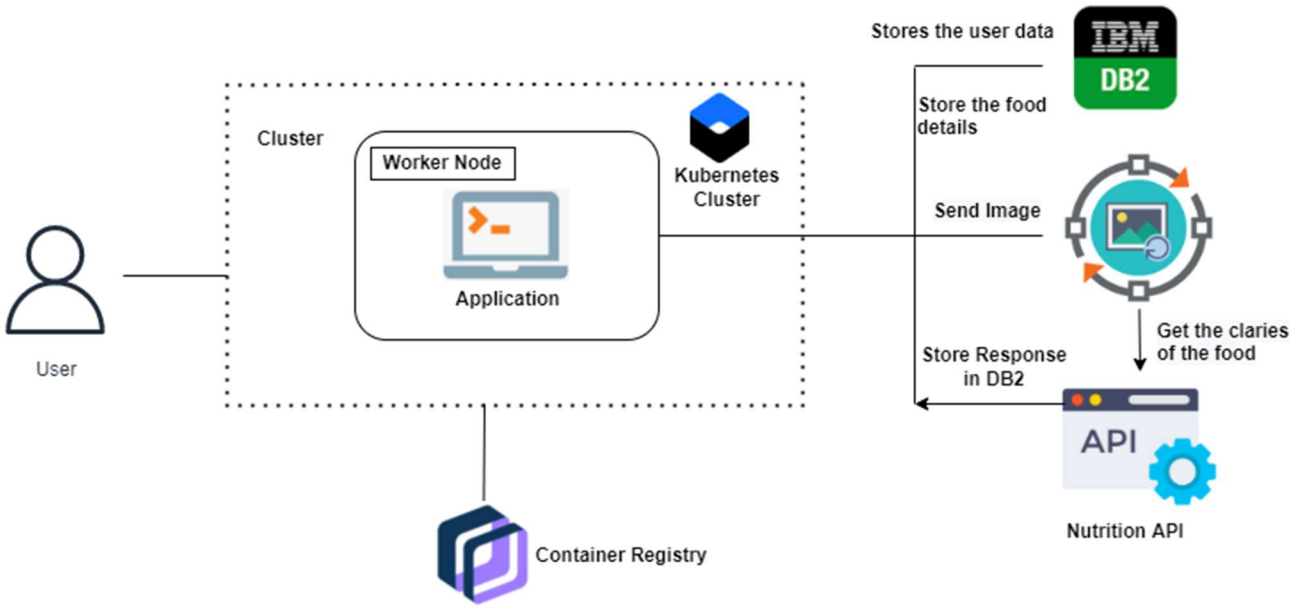
1. INTRODUCTION

1.1 Project Overview

Our 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. Since due to the ignorance of healthy food habits, obesity rates are increasing at an alarming speed. People need to control their daily calorie intake by eating healthier foods 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 and therefore, helps in maintaining a healthy lifestyle.



1.2 Purpose

Nutrition assistants help dieticians with providing proper nutrition at healthcare facilities. They determine patients' nutritional needs, assess risk factors, and plan meals. They also ensure proper sterilization of plates and utensils. Nutrition apps can help make life easier for individuals who need to track their food intake for health reasons. Eating a balanced diet is not always easy, especially when eating out, trying to cook new recipes, or managing the demands of a busy life.

2. Literature Survey:

S. No	Title	Authors and Year Published	Design Methodology	Survey Outcome
1.	Personalized dietary assistant — An intelligent space application	1.Balazs Tusor 2.Gabriella Simon Nagy 3.J.T. Toth 4.A.R. Varkonyi -Kouzy Published: 20-23 October 2017	• In this paper, the framework for an Intelligent Space application is proposed that helps its users to achieve a healthier diet in the long term by introducing gradual changes into their consumption habits. • The application observes the daily nutrition intake of its users, applies data mining in order to learn their personal tastes, and educates them about the effects of their current diet on their health. • Then it analyzes the knowledge base to find different food or drink items that align with the perceived preferences, considering their physical properties, activities, and health conditions (e.g. diabetes, celiac disease, food allergies, etc). Finally, the system uses the findings to make suggestions about adding items from the consumption list, or change one item to another.	A graph-based architecture is used to materialise the knowledge base, with each node standing for a concept or actual instance in the real world. The relationships between the concepts are described by the edges linking the nodes, which may also assign numerical or fuzzy look-up table classifies carry out data mining and idea recognition.

2.	An integrated Approach of diet and exercise recommendations For diabetes patients.	1.Irshad Faiz 2.Hamid Mukhtar 3.Sharifullah Khan Published: 15-18 October 2014	• Diabetes is among one of the fastest growing diseases all over the world. • Controlled diet and proper exercise are considered as a treatment to control diabetes. • We have implemented an ontology based integrated approach to combine knowledge from various domains to generate diet and exercise suggestions for diabetics. • The solution is developed as a Semantic Healthcare Assistant for Diet and Exercise (SHADE). For each domain (person, diabetes, food and exercise) we have defined separate ontology along with rules and then an integrated ontology combines these individual ontologies. • Finally, diet recommendations are presented in the form of various alternative menus such that each menu is a healthy and balanced diet.	Controlled diet and proper exercise are picked up by patients based on their own food habits. Due to the fact that it is based on data that more accurately reflects the patient's habits, this could result in better therapeutic guidance.
3.	Mobile Application Based Teli-nutrition System for Covid-19 Pandemic	1.Taslima Akter Tamanna 2.Srijani Choudhury 3.Afsana 4.Mohammad Monirujjaman Khan Published:	• In Bangladesh, lack of healthy sustenance devastatingly affects people's wellbeing and prosperity and the monetary improvement of nations. • With so many people becoming ill from the (COVID-19), poor weight control plans exacerbate pre-existing conditions, putting them at greater risk. • Individuals living with chronic illnesses who have been diagnosed with COVID-19 must improve their health and count calories to ensure that they remain in good health. • Look for direct and psychosocial support from suitably prepared wellbeing care experts, including	This nutrition tool may be used to save data for expectant moms and their new-borns, and it offers the right technique to educate mothers of their nutrition messages based on their ANC, PNC state, and the age of the new born kid. Nutritionists using this programme can easily carry out the proper work of communicating dietary messages to mothers.

		27-30 October 2021	community-based lay and peer guides. • COVID-19 transmission will offer assistance to protect the role of nutritious nourishment as a partner against sickness. • Any health worker in Bangladesh can easily use this application. • Our health laborers regularly neglect to convey legitimate nourishment data to moms. • The design of this application can provide a legitimate office for conveying sustenance messages to mothers and workers. • This framework may have to be examined occasionally to meet the progression of client prerequisites and be applied properly.	
4.	Medicine Assistant and Diet Remainder for Secure Healthcare	1.T Haritha 2.Surendra Babu Sajja 3.Morampudi L.V. Arun Chandu 4.Narendra Nath Jagarlamudi 5.Abburi Nithin Published: 27-28 August 2021	• Real-time assistants are getting smarter every day but getting more complicated for a certain string of people to use. • This assistant helps the end-user to get the medicines and diet remainders. • There are a lot of remainders available in the market, but this work mainly helps elderly people who are not aware of modern technology. • The assistant consists of MSP430f5529 Launchpad as main controller unit. • It consists of operations such as the date, time functionality, displays on the LCD, the audio alerts are given by using a buzzer, the intended medicines, are handed out by using continuous rotation servo and this task is performed using the Ultrasonic sensor.	Wrong intake of medicines or overdose which may lead to death can be avoided as this assistant helps to give out the required medicine at the right time according to the patient's schedule prescribed by the doctor.

2.2 Problem Statement Definition:

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.

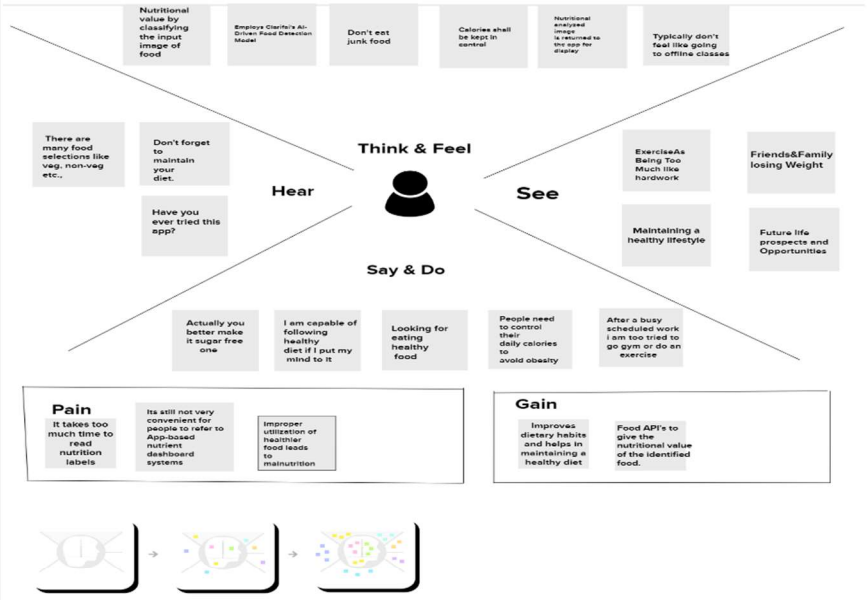
This project aims at building a web App that automatically estimates food attributes such as ingredients and nutritional value by classifying the input image of food. Our method employs Clarifai's AI-Driven Food Detection Model for accurate food identification and Food API's to give the nutritional value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

2. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

Develop shared understanding and empathy

Summarize the data you have gathered related to the people that are impacted by your work. It will help you generate ideas, prioritize features, or discuss decisions.



3.2 Ideation and Brainstorming

Ideation:-

	Problem Statement(PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	People suffering from obesity	Customer -1	Control daily calories	I couldn't stop eating junk food	Modern workplace cultures have encouraged eating it.	Upset
PS-2	Other illnesses (including diabetes, thyroid etc.,)	Customer-2	Adhere a healthy eating plan	I can't maintain a healthy life style	people are not aware of proper nutritional foods	Tired

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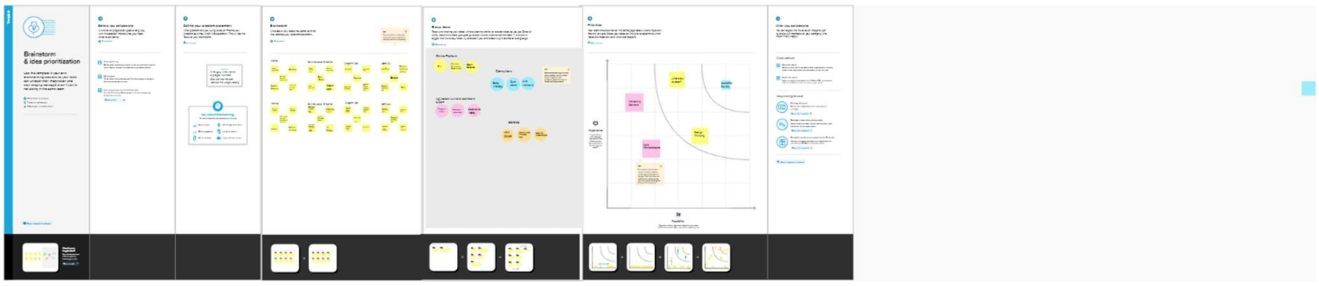
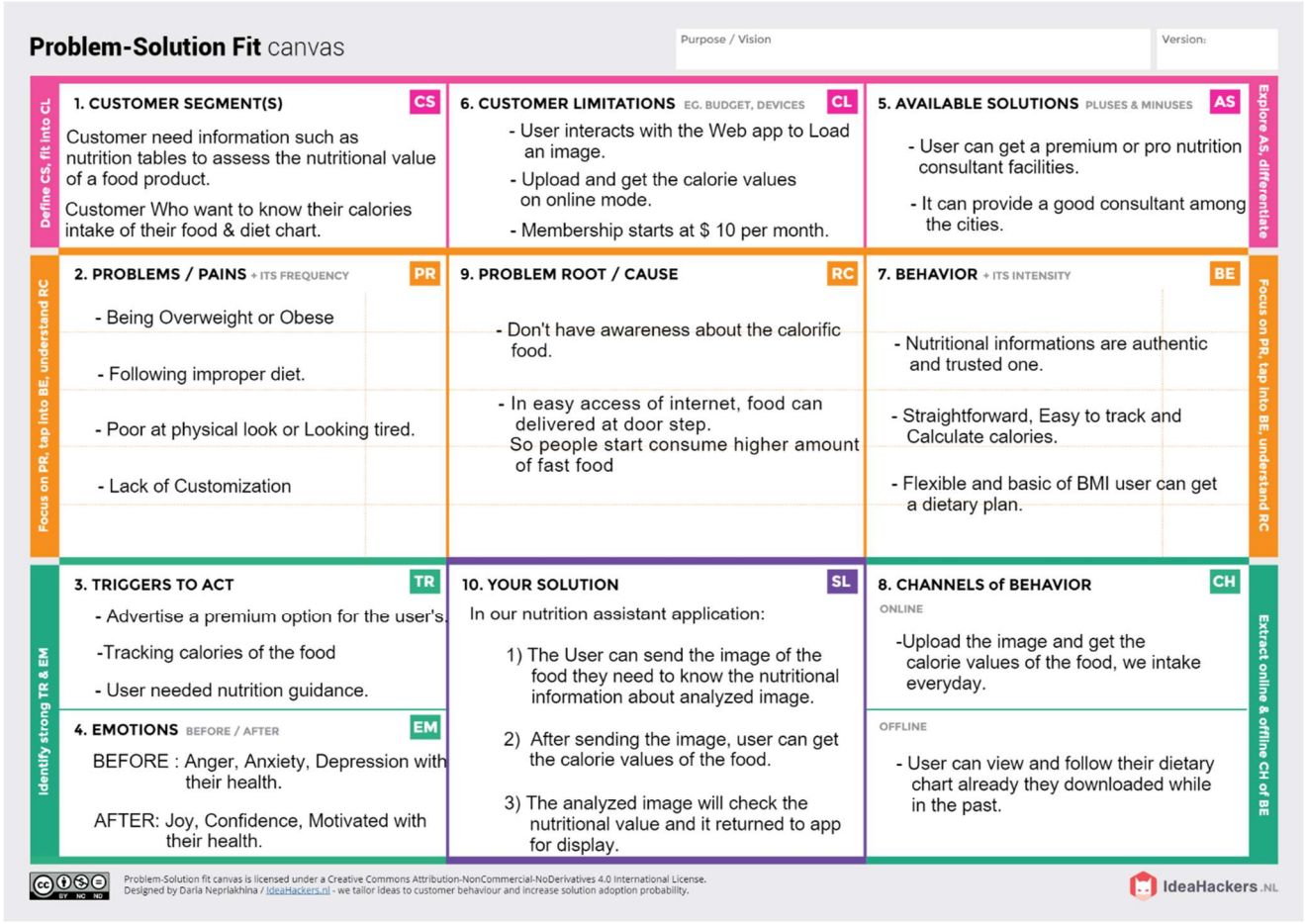
Brainstorming :-



3.3 Proposed Solution:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be Solved)	❖ Nowadays people are not eating nutrition rich foods with respect to their health condition. Assuming that it happens constantly implies, it will prompt obesity. ❖ To avoid the intake of unhealthy foods, the framework will identify and perceive the food and assessing the nutrient values present in the food.
2.	Idea/Solution Description	❖ To store the food and subtleties of the nutrients present in it. ❖ Then examine the continuous food and recover the comparing food's nutrient values.
3.	Novelty/Uniqueness	❖ Help make life easier for individuals who need to track their food intake for health reasons.
4.	Social Impact/ Customer Satisfaction	❖ The application which gives awareness among the people about the obesity and various health problems.
5.	Business Model (Revenue Model)	❖ In market, this application gives a better benefit across the people health and economical wise.
6.	Scalability of the solution:	❖ The application which creates an impact among the healthy lifestyle. ❖ Nutritional plan based on user needs and preferences.

3.4 Problem solution fit



4. REQUIREMENT ANALYSIS:

4.1 Functional Requirements:-

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through form Registration through Gmail Registration through Linkedln
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User Links Social media	Confirmation via in-app notifications
FR-4	User tracks calories consumed	Working calorie tracer, both manual and AI driven.
FR-5	User upgrades to premium	Working payment gateway, multiple modes of payment.
FR-6	User finds and competes with friends	Working in app social tab, with achievements and medals or badges.

4.2 Non Functional Requirements :-

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Widely usable for people of all ages, and easily accessible through any browser.
NFR-2	**Security**	A layer of security to protect the confidential passwords used to login to social media and Gmail.
NFR-3	**Reliability**	Highly reliable, with the app being a browser based application.
NFR-4	**Performance**	Application relies upon network and internet level of high.
NFR-5	**Availability**	Available all the time since it is on the internet. There may be short maintenance breaks for updating or fixing bugs, that will be notified in advance.
NFR-6	**Scalability**	Highly scalable with scaling depending on the foot traffic of the website application itself.

5. PROJECT DESIGN

5.1 Data Flow Diagram

A data flow diagram (DFD) maps out the flow of information for any process or system. It uses defined symbols like rectangles, circles and arrows, plus short text labels, to show data inputs, outputs, storage points and the routes between each destination. Data flowcharts can range from simple, even hand-drawn process overviews, to in-depth, multi-level DFDs that dig progressively deeper into how the data is handled. They can be used to analyze an existing system or model a new one. That’s why DFDs remain so popular after all these years. While they work well for data flow software and systems, they are less applicable nowadays to visualizing interactive, real-time or database-oriented software or systems.

Example : Data Flow Diagram(Nutrition Assistant Application)

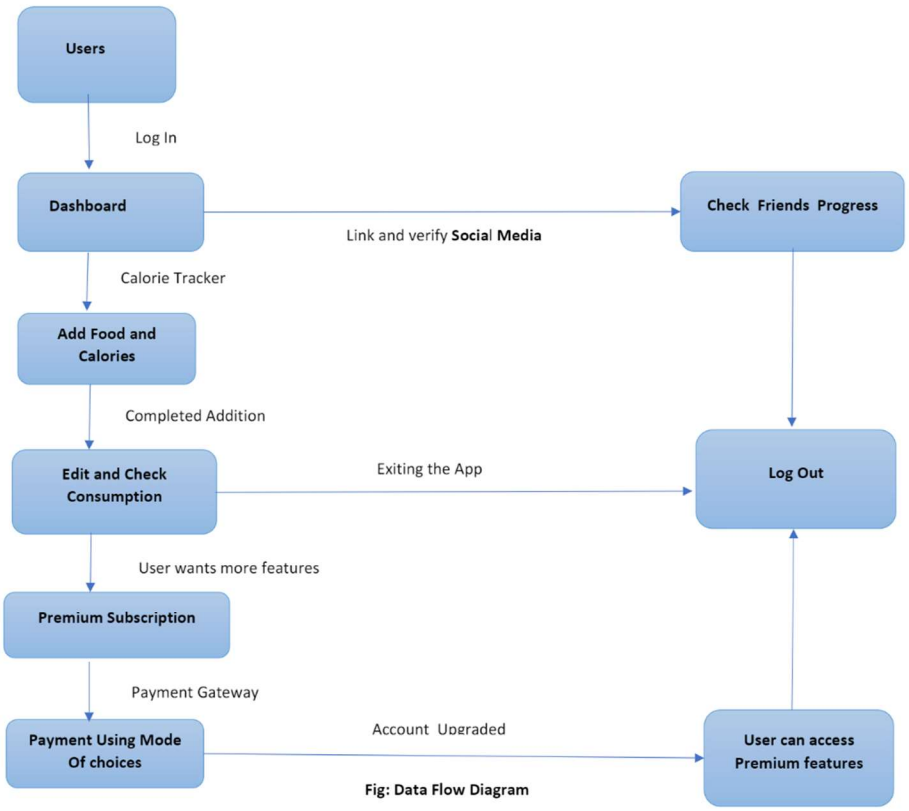


Fig: Data Flow Diagram

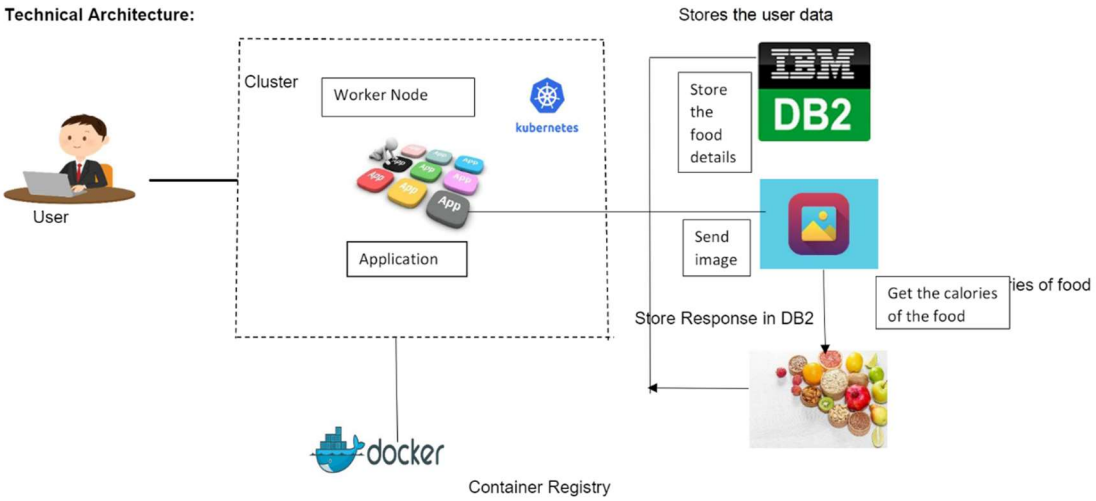
5.2 Solution & Technical Architecture

Technology architecture associates application components from application architecture with technology components representing software and hardware components. It provides a more concrete view of the way in which application components will be realized and deployed. It enables the migration problems that can arise between the different steps. It provides a more precise means of evaluating responses to constraints .

Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	20th October 2022
Team ID	PNT2022TMID51683
Project Name	Nutrition Assistant Application
Maximum Marks	4 Marks

Technical Architecture:



6. PROJECT PLANNING AND SCHEDULING:

Sprint planning & Estimation:

MILESTONE AND ACTIVITY LIST:

TITLE	DESCRIPTION	DATE
Literature Survey and Information gathering	Literature survey on the selected project & gathering information by referring the technical paper research publications etc.	2nd September 2022
Prepare Empathy Map	Prepare empathy map canvas to capture the user Pains & Gains and prepare list of Problem Statements.	10th September 2022
Ideation Phase	List the idea by organizing the brainstorming session and prioritize the top 3 ideas based on the feasibility & importance.	17th September 2022
Proposed Solution	Prepare the proposed solution document, which includes the novelty, feasibility of idea, business model, social impact, scalability of solution etc.	18th September 2022
Problem Solution Fit	Prepare problem – solution fit document.	19th September 2022
Solution Architecture	Prepare solution architecture document.	01 October 2022
Customer Journey	Prepare the customer journey maps to understand the user interaction and experiences with the application.	14th October 2022
Data Flow Diagrams Draw the data flow	Draw the data flow diagram of the project.	15th October 2022
Technology Architecture	Architecture diagram	15th October 2022
Prepare Milestone and Activity List	Prepare the milestones and activity lists of the project.	18th October 2022

Project Development – Delivery of Sprint 1, 2, 3 and 4.	Develop and submit the developed code by testing it.	1. 29th October 2022 2. 5th November 2022 3. 12th November 2022 4. 19th November 2022

6.2 Sprint Delivery 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 register for the application by entering my email, password, and confirming my password.	2	High	ABINA S DIVINE LOVE PRISCILLA J ANGELIN ABI M JEMI J L
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	1	High	ABINA S DIVINE LOVE PRISCILLA J ANGELIN ABI M JEMI J L
Sprint-1	Login	USN-3	As a user, I can log into the application by entering email & password	1	High	ABINA S DIVINE LOVE PRISCILLA J ANGELIN ABI M JEMI J L
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	ABINA S DIVINE LOVE PRISCILLA J ANGELIN ABI M JEMI J L
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	1	High	ABINA S DIVINE LOVE PRISCILLA J ANGELIN ABI M JEMI J L
Sprint-1	Login	USN-3	As a user, I can log into the application by entering email & password	1	High	ABINA S DIVINE LOVE PRISCILLA J ANGELIN ABI M JEMI J L

7. CODING & SOLUTIONING

7.1 Feature Code 1- Email Service:

To the project we have incorporated an email service. This service sends email messages with nutrition- related information directly to customer's inboxes.

```
Def custom_send_mail(email,data):
    sg=sendgrid.SendGridAPIClient(SENDGRID_API_KEY)
    from_email=Email("nutritioninyourlife.abina366……")
    to_email=To(email) #Change to your recipient
    subject="Nutrition is a basic human need and a prerequisite for healthy life"
    content = Content("text/plain",f"{data}")
    mail=Mail(from_email, to_email, subject, content)
    # Get a JSON-ready representation of the Mail object
    Mail_json=mail.get()
    Sg.client.mail.send.post(request_body=mail_json)
```

7.2 Feature -2 Keeping Records:

We store the nutrition- related information on the database,so users can access the data when they need it.

Adding results into database:

```
insert_sql="INSERT INTO PERSON VALUES(?,?,?,?)"
prep_stmt= ibm_db.prepare(conn,insert_sql)
ibm_db.bind_param(prep_stmt,1,session['name'])
ibm_db.bind_param(prep_stmt,2,session['email'])
ibm_db.bind_param(prep_stmt,3,complete_value])
ibm_db.bind_param(prep_stmt,4,current_time)
ibm_db.execute(prep_stmt)
```

Getting information from the database:

```
def get_history():
    history =[]
    sql = f"SELECT * FROM PERSON WHERE  email='{session['email]}"
    stmt = ibm_db.exec_immediate(conn,sql)
    dictionary = ibm_db.fetch_both(stmt)
    while dictionary:
        history.append(dictionary)
        dictionary = ibm_db.fetch_both(stmt)
    return history
```

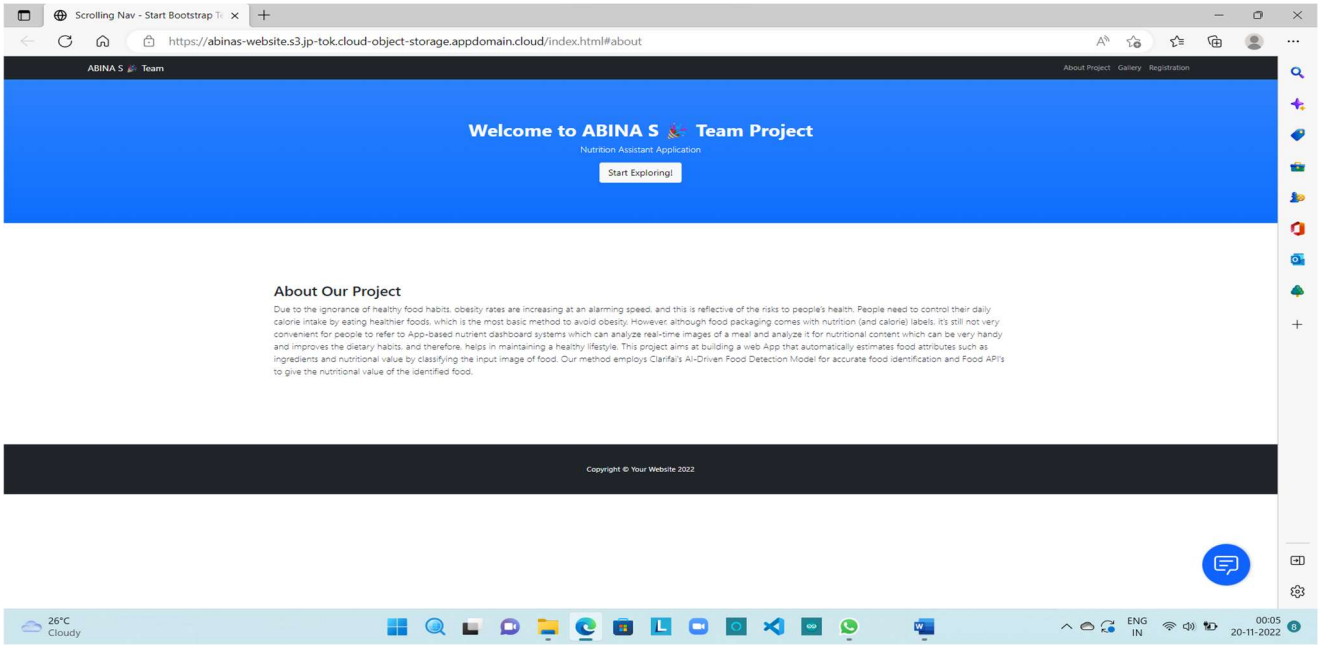
8 TESTING

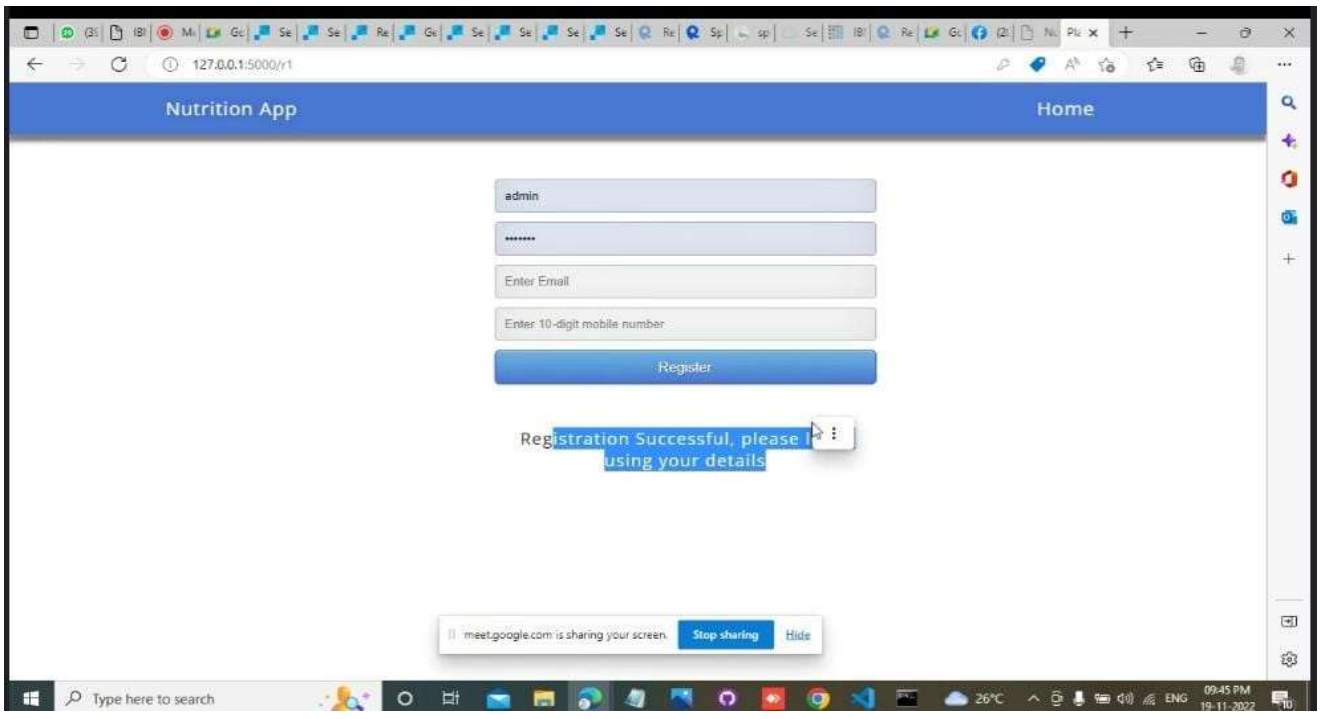
8.1 Test case

```
import unittest
try:
  from app import app
except Exception as e:
   print('Some modules missing{}'.format(e))

class FlaskTest(unittest.TestCase):

#check if response is 200
def test_index(self):
     tester = app.test_client(self)
     response = tester.get("/")
     statuscode = response.status_code
     self.assertEqual(statuscode,200)

#check content type
def test_index_consent(self):
     tester = app.test_client(self)
     response=tester.get("/")
     self.assertEqual(response.content_type,'text/html;
 charset=utf-8')

    def test_register(self):
         tester = app.test_client(self)
         response = tester.post('/register', data=dict(email='username', password ='password),
follow_redirects=True)
          self.assertTrue(b' email' in response.data)

#check log in
def test_login(self):
      tester = app.test_client(self)
      response = tester.post('/', data=dict(email='username', password ='password'),
follow_redirects=True)
      self.assertTrue(b'email' in response.data)

if_name_=='__main__':
    unittest.main()
```

9. RESULT:

Open Weather:






Dashboard
Welcome Deva
Log Out
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Delete All History
History
Thu, 17 Nov 2022 18:29:50
View
Delete
2022-11-18 01:10:40.288940
View
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2022-11-18 15:54:03.314245
View
Delete
Clear Image
Upload Image
Choose file
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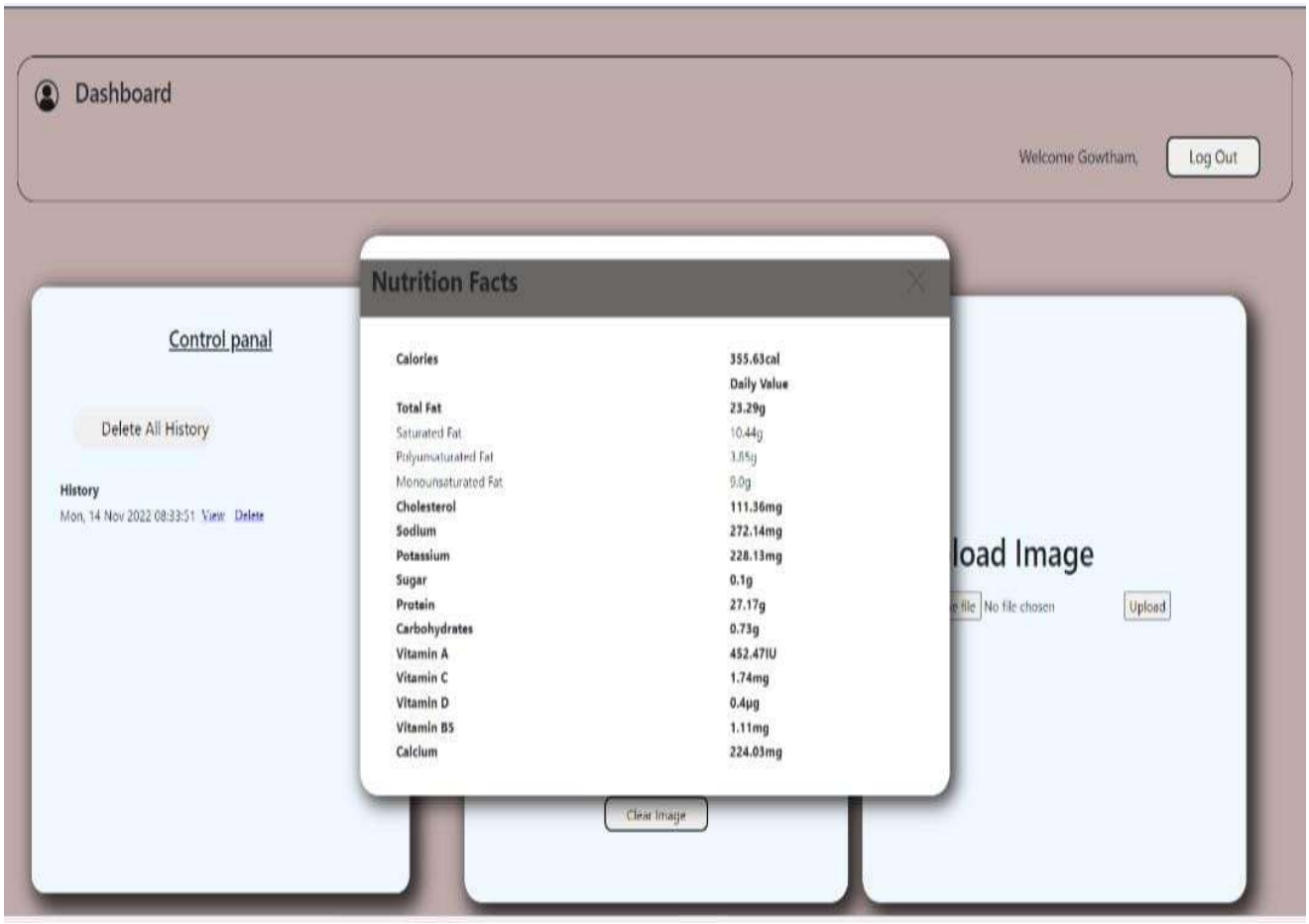
Upload


Dashboard
Welcome Gowtham
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Delete All History
History
Mon, 14 Nov 2022 08:33:51 View Delete
Nutrition Facts
Calories 355.63cal
Daily Value
Total Fat 23.29g
Saturated Fat 10.44g
Polyunsaturated Fat 3.85g
Monounsaturated Fat 9.0g
Cholesterol 111.36mg
Sodium 272.14mg
Potassium 228.13mg
Sugar 0.1g
Protein 27.17g
Carbohydrates 0.73g
Vitamin A 452.47IU
Vitamin C 1.74mg
Vitamin D 0.4µg
Vitamin B5 1.11mg
Calcium 224.03mg
Clear Image
load Image
No file chosen
Upload

10.ADVANTAGES & DISADVANTAGES

Advantages:

1. Low energy consumption.
2. Works under low data connection.
3. User friendly web application.
4. Data privacy.
5. Easy to understand.

Disadvantages:

1. It cannot be used without internet connection.
2. Usage of 3rd party API may cause the time delay.

11.CONCULSION:

Good nutrition promotes not only better physical health and reduced susceptibility to disease, but has also been demonstrated to contribute to cognitive development and academic success. Left to their own devices, children will not automatically select healthy foods. At last I want to conclude that food and health both are related to each other. Our health depends upon what food we eat and how much we eat. Therefore we should be careful while eating.

We have developed a cloud based nutrition application which detects the nutrition in food. It clarifies the calories in the food which affects our health.

12.FUTURE SCOPE:

Nutrition plays a vital role in leading a healthy life. It is an element required in every Nutritious food intake and metabolism of nutrients are associated with the decreased risk of both infectious and non-communicable diseases. Nutritious diet is a major determinant of future health – physical, mental and social health, not merely an absence of diseases. A Nutrition Application can offer guidance to people, families, and organizations on how to change food, lifestyle, and mindset for optimum health

promotion. They can work with a licensed healthcare provider to help individuals with previously diagnosed disease recognize biochemical imbalances and toxicity which lead to poor health.

Future scope is for the graduates, undergraduates and the working professionals. They may want to review or reconsider their future options and goals in terms of its suitability now, may be with different perspective of their options in terms of time, resources, inclination etc.
You can work as a Nutritionist/Dietitian there and take control of the food intake and also the food quality consumed by the people. With a degree in food and nutrition you can act as a Public Health Nutritionist in non governmental organizations .

APPENDIX

Github link: https://github.com/IBM-EPBL/IBM-Project-43297-1660715