

AI-POWERED NUTRITION ANALYZER FOR FITNESS ENTHUSIASTS

DOMAIN : ARTIFICIAL INTELLIGENCE

TEAM ID : PNT2022TMID41641

PROJECT REPORT

submitted by

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1.INRODUCTION

1.1 Project Overview

Food is essential for human life and has been the concern of many healthcare conventions. Nowadays new dietary assessment and nutrition analysis tools enable more opportunities to help people understand their daily eating habits, exploring nutrition patterns and maintain a healthy diet. Nutritional analysis is the process of determining the nutritional content of food. It is a vital part of analytical chemistry that provides information about the chemical composition, processing, quality control and contamination of food.

The main aim of the project is to build a model which is used for classifying the fruit depends on the different characteristics like colour, shape, texture etc. Here the user can capture the images of different fruits and then the image will be sent the trained model. The model analyses the image and detect the nutrition based on the fruits like (Sugar, Fibre, Protein, Calories, etc.).

1.2 Purpose

Nutrition Analyzer helps in the detailed and perfect determination of the component nutrients present in any food item. Food components have vast bio metabolic roles and could affect human health severely.

Purpose of the AI powered Nutrition Analyzer is to help individuals who needs a proper nutrition assistant to achieve fitness ,to cure diseases through foods or to lead a healthy lifestyle. With the help of Artificial Intelligence , it was possible to achieve a proper nutrition analyzer which is capable of showing the nutrition content of the food when we give the picture of it.

2.LITERATURE SURVEY

2.1 Existing Problem

Controlled intake of nutrition is recommended as a condition forbeing a healthy individual. Knowing and monitoring how much food is consumed during the day, following the calorie and nutrition of these foods helps tocontrol healthy nutrition. However there is no proper assistance to achieve it. Nutritional intake is fundamental to human growth and health, and the intake of different types of nutrients and micro-nutrients can affect health. The content of the diet affects the occurrence of disease, with the incidence of many diseases

increasing each year while the age group at which they occur is gradually decreasing. The consumption of a wide variety of food items is necessary in order for the human body to obtain the right amounts of nutrients. Failing to follow such a well- balanced diet, in combination with a generally unhealthy way of living, has been shown to increase the risk for cardiovascular disease, type II diabetes and some forms of cancer.

2.2 References

1. "Approximate Estimation of the Nutritious of Consumed Food by Deep Learning" by Ibrahim Berkan Aydılek Published in [2017 International Conference on Computer Science and Engineering \(UBMK\)](#), IEEE, 2017.
2. "Validation of a deep learning system for the full automation of bite and meal duration analysis of experimental meal videos" D Konstantinidis, K Dimitropoulos, B Langlet, P Daras... - Nutrients, 2020
3. "Precision Nutrient Management Using Artificial Intelligence Based on Digital Data Collection Framework" by Hsiu-An Lee, Tzu-Ting Huang, Lo-Hsien Yen, Pin-Hua Wu, Kuan-Wen Chen, Hsin-Hua Kung, Chen-Yi Liu and Chien-Yeh Hsu Appl.Sci.2022,12,4167
4. "AI Nutrition Recommender System" by Thamos Theodoridis, Vassilios Solachidis, Kosmos Dimitropoulos, Lazaros Gymnopoulos and Petros Daras in the 12th Pervasive Technologies Related to Assistive Environments Conference

2.3 Problem Statement Definition

Ideal situation:

Ideally, a Nutrition Analyzer is available which will help people in assisting the nutrition analysis and help them in maintaining good health.

Reality: Currently there is no ideal nutrition analyzer available. Those which are available, fail to satisfy the needs of the people. Some are not personalized while some are very complicated to be accessed by everyone. Hence, there is no Nutrition analyzer to guide and assist people.

Consequences:

People tend to consume food without the knowledge of nutrition content of the food. This results in nutrition imbalance leading to nutrition deficiencies and diseases.

Proposal:

Our project of Nutrition Analyzer for Fitness Enthusiasts Focus on Developing a simple Nutrition Analyzer which is capable of analyze the nutrition in the food by giving the picture of the food. This is achieved by Artificial Intelligence with Python, Deep learning ,CNN etc..

PROBLEM STATEMENT -1 :



PROBLEM STATEMENT -2 :



PROBLEM STATEMENT -3:



PROBLEM STATEMENT -4 :



3.IDEATION AND PROPOSED SOLUTIONS

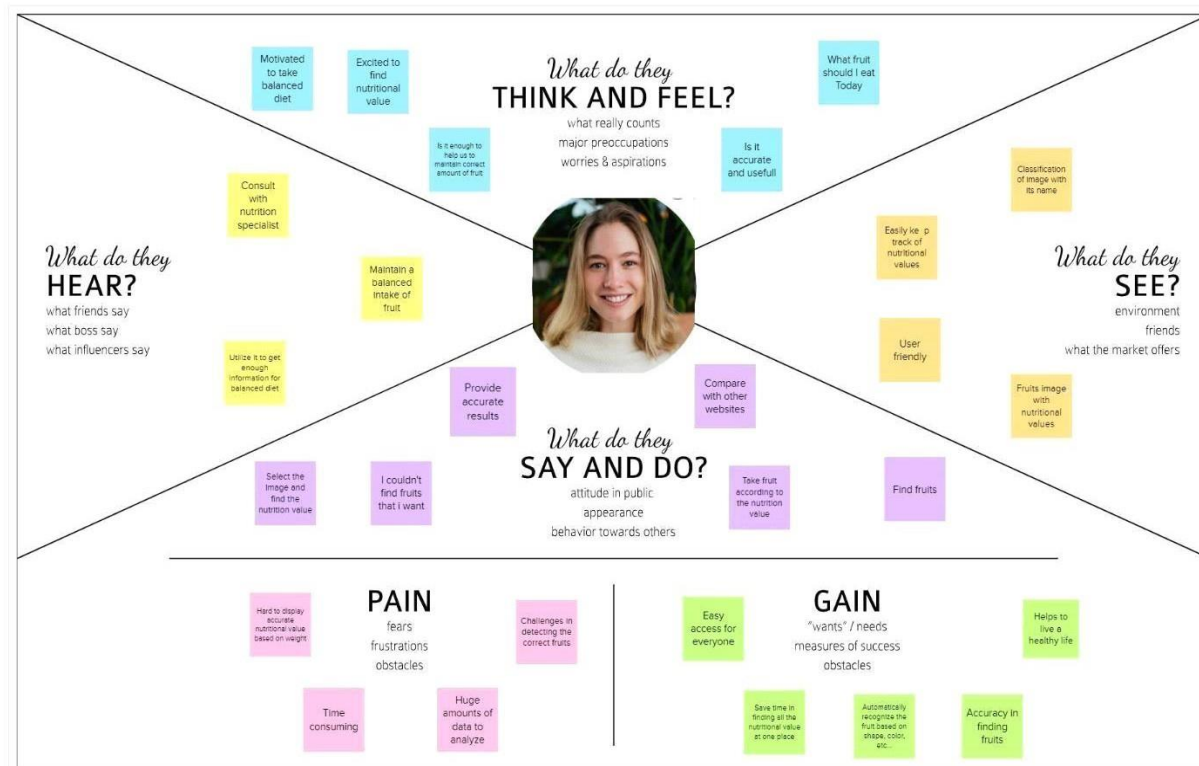
3.1 Empathy Map Canvas

Empathy mapping is a simple yet effective workshop that can be conducted with a variety of different users in mind, anywhere from stakeholders, individual use cases, or entire teams of people. It can be conducted by many different teams such as design teams, sales, product development or customer service. Essentially, it is an exercise that seeks to get inside the head of the customer as they interact with your product/service

Nutrition Analyzer does the process of determining the nutritional content of the food that provides information about chemical composition, processing, quality control and contamination of food


The following empathy map helped us to understand the customer needs and their expectations and to develop our Nutrition Analyser.

EMPATHY MAP



3.2 Ideation and Brainstorming

Step-1: Team Gathering, Collaboration and Select the Problem Statement



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
How might we [your problem statement]?

Key rules of brainstorming
To run an smooth and productive session

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

Step-2: Brainstorm, Idea Listing and Grouping

2 Brainstorm
Write down any ideas that come to mind that address your problem statement.

10 minutes

TIP
You can select a sticky note and hit the pencil (arrow to delete) icon to start drawing!

BRIDHAR M

- Imagining a better world
- Creating a better world
- Real World Technology
- Real World Technology

DINESH ROHT K B

- Smart Data
- Smart Data
- Smart Data
- Smart Data

RAVINDRAN E

- Creating a better world
- Creating a better world
- Creating a better world
- Creating a better world

ANANTHA KRISHNAN S

- Smart Data
- Smart Data
- Smart Data
- Smart Data

SURYA P

- Smart Data
- Smart Data
- Smart Data
- Smart Data

3 Group ideas
Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

20 minutes

BRIDHAR M

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- Creating a better world
- Real World Technology
- Real World Technology

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Step-3: Idea Prioritization

4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

🕒 20 minutes



3.3 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Nutritional analysis is the process of determining the nutritional content of food. Consumption of fruits in day-to-day dietary plays an important role in the nutritional supplement intake of humans. Estimation of right nutrient intake through fruits consumption has become increasingly significant in order to maintain the proper health of well-being. The model should help to analyse the image and detect the nutrition based on the fruits.
2.	Idea / Solution description	The user can capture images of different fruits and then the image will be sent to the trained model. The model analyses the image and detects the nutrition based on the fruits. In this project we use AI and image classification technology to identify the fruit correctly and accurately. It also calculates the amount of nutrition like sugar, fiber, protein, calories, etc.
3.	Novelty / Uniqueness	This model is user friendly. It is more accurate in identifying the fruits. It will display the nutritional values of the fruit. The model also displays the benefit of eating the fruit. This will help the fitness enthusiast to know the medicinal value of the fruit and motivate them to take the fruit.

4.	Social Impact / Customer Satisfaction	<p>People will get motivated while using this model. They can do weight management, strengthen their bones and muscles, manage chronic health condition & disabilities. The fitness enthusiast and other people can easily use this model. They can find the all the nutritional value at one place which attract more people to use this model. This will provide more accuracy in identifying the correct image. This will make the customer touse this model with full satisfaction.</p> <p>This helps the people to maintain healthy diet to live a healthy life.</p>
5.	Business Model (Revenue Model)	<p>Social media is the best way to spread the word about our application. And with the influencers we can attract the normal people. It helps in Clustering and targeting the fitness people with the help of local gyms. We can also provide this model with subscription basis so that the user can get additional information to keep their body fit and healthy.</p>
6.	Scalability of the Solution	<p>This model can be easily accessed by all the people. This will attract more people to use this model. It keeps the people motivated and engaged. By tracking the nutritional value, the people can have correct intake of fruits which helps them to live a healthy life.</p>

3.4 Problem-Solution Fit

1. Customers Segment: Fitness enthusiasts are our customers. The people interested in maintaining fitness are of different age groups so it is suitable for all age groups

2. Problems/ Pains: The problem occurs when the model doesn't identify the image and doesn't display the accurate nutritional value

3. Triggers: By getting awareness to maintain their body fit. Seeing their neighbour using this to maintain balanced diet. Through internet, by seeing the feedback of others.

4. Emotions: BEFORE: Eating lot of food leads to many health issues. So they worry about their health, they become anxiety and fear. AFTER: Customer feels motivated while using this model to live a healthy life. So they will be happy

5. Available solution: Available solution takes lot of time in identifying the image. But this model identifies the image accurately in minimum amount of time.

6. Customer Constraints: Customer may feel lazy to check the nutritional value everytime. Less awareness about their health.

7. Behaviour: Directly related: They may stop using the model Indirectly related: customer verify the nutritional value with well known person.

8. Channels of behaviour:

Online:

User get all the nutritional values at one place. Time consuming is less. Easy process to maintain balanced diet.

Offline:

Customer need to go to doctor to maintain balanced diet. It takes time to check each nutritional values.

9. Problem Root Cause: User may feel lazy to check the nutritional value everytime. They may think whether the nutritional values are accurate. They may think it will be time taking process

10. Your Solutions:

Existing solution takes time to identify the image. But this model takes less time than the existing one. It will also display the benefit of eating that fruit.

4. REQUIREMENT ANALYSIS

4.1 Functional Requirements

Following are the functional requirements for the proposed solution.

FR NO.	FUNCTIONAL REQUIREMENTS(EPIC)	SUB REQUIREMENT(STORY/SUBTASK)												
FR-1	USER REGISTRATION	<div><input type="checkbox"/> Registration through Gmail</div> <div><input type="checkbox"/> Registration through Mobile Number</div> <div><input type="checkbox"/> Registration through Face-book</div>												
FR-2	USER CONFIRMATION	<div><input type="checkbox"/> Confirmation via Email</div> <div><input type="checkbox"/> Confirmation via OTP</div>												
FR-3	USER DETAILS	<div>PERSONAL DETAILS FOOD DETAILS</div> <table><tr><td>Age</td><td>Food</td></tr><tr><td>Height</td><td>Recipe</td></tr><tr><td>Weight</td><td>Added ingredients</td></tr><tr><td>Diseases if any</td><td>Age</td></tr><tr><td>Conditions is any</td><td></td></tr><tr><td>Allergies is any</td><td></td></tr></table>	Age	Food	Height	Recipe	Weight	Added ingredients	Diseases if any	Age	Conditions is any		Allergies is any	
Age	Food													
Height	Recipe													
Weight	Added ingredients													
Diseases if any	Age													
Conditions is any														
Allergies is any														
FR-4	USER REQUIREMENTS	<div><input type="checkbox"/> The user simply inputs your recipe ingredients and amounts. The software will instantly produce an accurate readout of your dish in terms of nutritional analysis in a readable format that consumers are familiar with.</div> <div><input type="checkbox"/> With already given details the system can alert the consumer if any content of their allergies ,it can alert the consumer</div>												

4.2 Non Functional Requirements

Following are the functional requirements for the proposed solution.

FR.NO	NON-FUNCTIONAL REQUIREMENTS	DESCRIPTION
NFR-1	USABILITY	<ul style="list-style-type: none">➤ No training is required to access the Nutrition Analyzer.➤ The results should be loaded within 30 seconds.➤ It should be user friendly and comfortable.➤ It should be simple and easy to use.➤ The results should be self explanatory so that it can be understood by common people.
NFR-2	SECURITY	<ul style="list-style-type: none">➤ AI powered nutrition analyzer for fitness should contain more security in which our data which entered or maintained should be more security.➤ With the help of the username and password it provides more security in which it can access more securable and the data are private.➤ It should be social-economic which should access to sufficient and safe to use.
NFR-3	RELIABILITY	<ul style="list-style-type: none">➤ It is Important that the AI powered nutrition analyzer for fitness provides should Must reliable.➤ How a person can find it is reliable? It is easy to find that is he/she can compare the nutrition based food with other

		<p>nutrition related application so, it can easily rectify whether it is reliable or not.</p> <ul style="list-style-type: none"> ➤ But it take too much time, to avoid this a reliable application should made in which it itself produces whether we can get correct solution or not. So, it is necessary that the AI powered nutrition analyzer for fitness should have proper data and information in which we can get a correct information about it and also get a proper guidance about it. ➤ With the proper guideness and proper information in which we can get a nutrition properly and we can have get a proper fitness plan. ➤ It should also provides the information on nutrition and health which it should prevent from health information on diseases, health risks and prevention guidelines. It should also provides an extension a research based online learning network with several resource areas, so it provides more reliability in that area. For more reliable it can also contains the calorie information, balanced diet plans, what type food can consumed at what time etc..... So, by this way it can reliable.
NFR-4	PERFORMANCE	<ul style="list-style-type: none"> ➤ It should provide more number of users to consume at any time and at any place. ➤ It should provide Reliability, Scalability, Security and Usability. ➤ It should contain minimum data while over-paging the websites or application and it is necessary that it should not exceed more than 20mb. ➤ While consuming the page it should provide the response as much as possible without any delay or time traffic.

		<ul style="list-style-type: none"> ➤ The connection should be properly maintained so that it can be used while travelling or in remote places. ➤ The nutritious food to meet their dietary needs and the food preferences for an active and healthy life. ➤ It should be consistently accessible, availability and affordability of foods ➤ and beverages that promote well-being and prevent from diseases. ➤ It should be suitable in all situations that exist for all people, at all times.
NFR-5	AVAILABILITY	<ul style="list-style-type: none"> ➤ Easy to access Data. ➤ Avoids Data redundancy and inconsistency. ➤ Fast and Efficient. ➤ User Friendly.

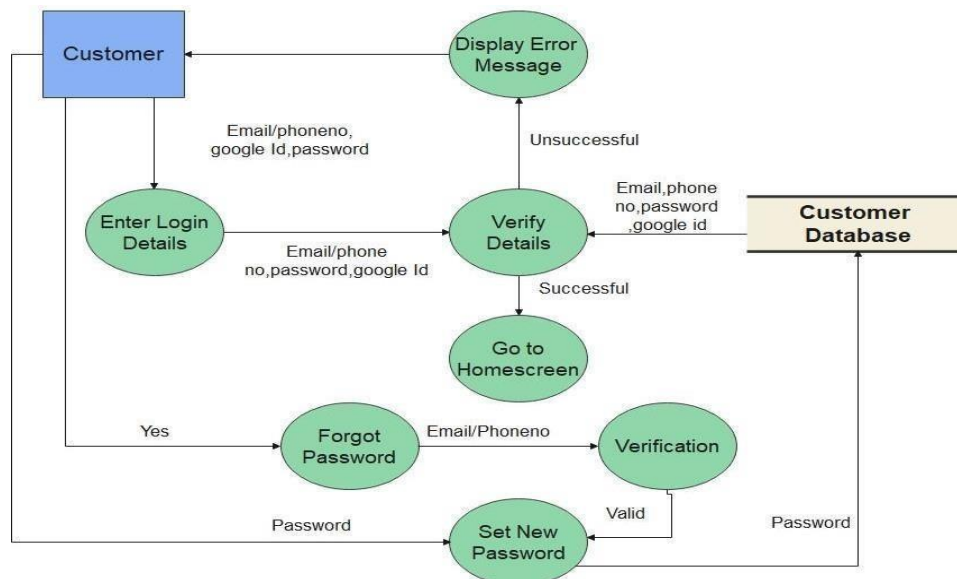
NFR-6	SCALABILITY	<ul style="list-style-type: none">➤ The architecture for AI powered Nutrition Analyzer for fitness provides the clear procedure daily consumption of food and helps the user to maintain a healthy diet.➤ According to their tracking system implemented in architecture provide the proper mechanism to the every individual of their nutrients intake which can be increased or decreased. The premium amount for analyzer is very much optimum.
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5. PROJECT DESIGN

5.1 Data flow diagrams

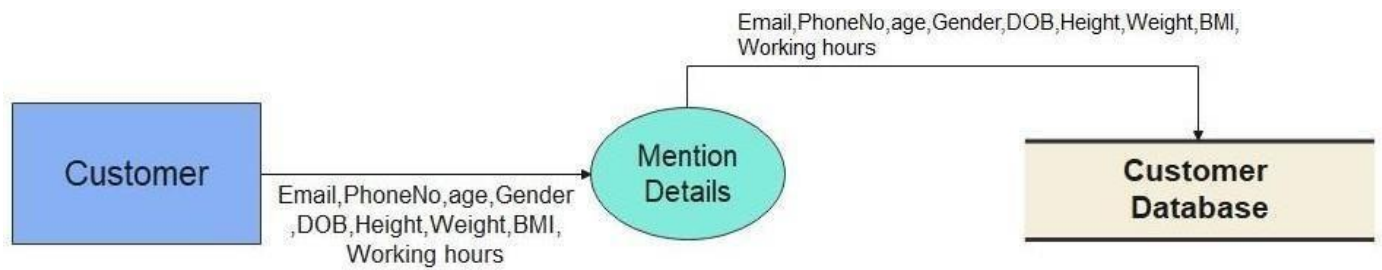
Simplified Data flow:

DFD-1(Login):

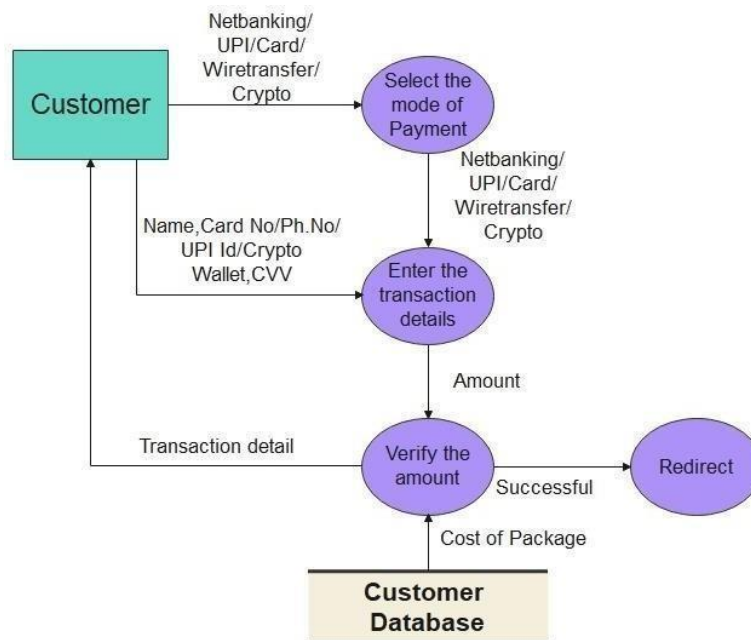


1. The application starts from the user login. the user must enter their mail id and the password to use the nutrition analyzer
2. The next step is user should capture the food and upload the food in the specified capture image icon.
3. The third step is click the "Analyze Food" and wait for sometime. The AI database process the image.
4. The tool figuring out image and page automatically give the information about food such that the quality off the food, Nutrition , then issue the diet and fitness plan for the user.

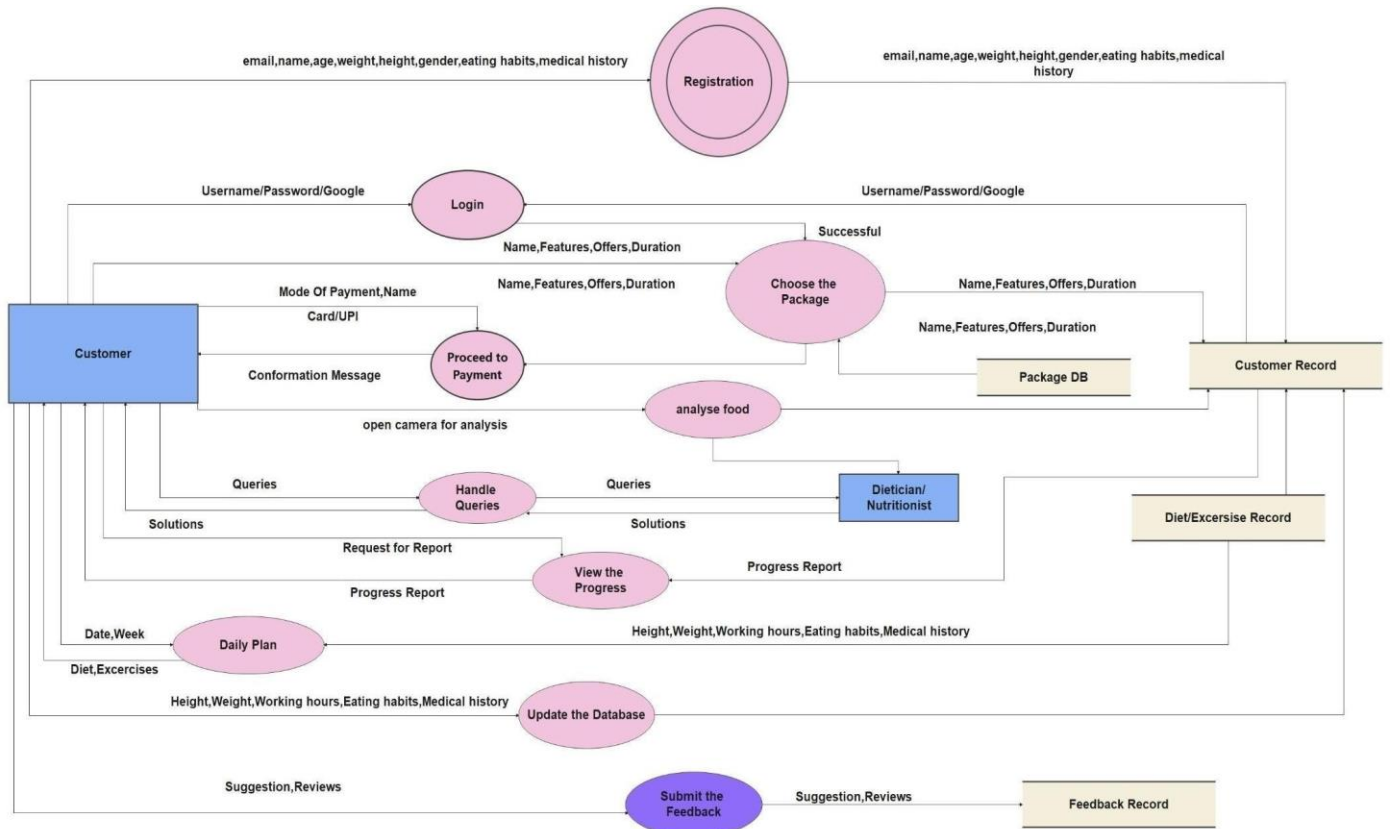
DFD-1(Registration):



DFD-1(Payment):



DFD-0:



5.2 Technical and Solution Architecture

Technical Architecture:

ABSTRACT :

- The main aim of the project is to building a model which is used for classifying the fruit, vegetables, spinach, fish, meat, Green leafy vegetables etc..... depends on the different characteristics like colour, shape, texture etc.
- Here the user can capture the images of different fruits, vegetables, spinach, Green leafy vegetables, fish, meat , etc.. and then the image will be sent the trained model. The model analyses the image and detect the nutrition based on the fruits like (Sugar, Fibre, Protein, Calories, etc.).
- Food is essential for human life and has been the concern of many healthcare conventions. Nowadays new dietary assessment and nutrition analysis tools enable more opportunities to help people understand their daily eating habits, exploring nutrition patterns and maintain a healthy diet.
- Nutritional analysis is the process of determining the nutritional content of food. It is a vital part of analytical chemistry that provides information about the chemical composition, processing, quality control and contamination of food.
- This solution helps fitness enthusiasts to do Nutritional analysis of food which provides information about the chemical composition, processing, and quality control of food.
- The chance of occurrence of error is minimal since the model provides more precise reports of the analysis.

OBJECTIVES:

- Being healthy should be an integral component of your life. A Healthy intake of food can assist in the prevention of chronic diseases and long-term ailments.
- What you eat is closely related to your health. Eating a healthy diet can help boost your immune systems, help you maintain a healthy weight and can improve your overall health.
- The importance of diet can't be overstated for a healthy lifestyle. People get the vitamins, minerals and nutrients they need to function and thrive from the foods they eat, so choosing foods that offer the most of those components helps improve quality of life.
- It's just as important to limit foods that are high in fat, sugar, sodium and cholesterol as it is to choose healthy foods.

- Nutrition helps in functioning, maintaining, or improving important bio metabolisms like building muscles, producing energy, thriving body cells, improving body health, replenish malnourishment, and strengthening immunity. If food is the reason, Nutrition is the result.
- Consumers have become more concerned over the quality and compositions of their food purchases, the contained ingredients, and the presence of additives and contaminants. Therefore, knowledge of the chemical and biochemical composition of foods is important to the health, well-being, and safety of the consumers.
- We consume food so that we can obtain proper nutrition. Hence it is very important for us to know the composition of nutrients in our food.
- Through a nutrition analyzer we can measure the nutrients and with that information we can make a healthy diet by adding nutrients required for our body and excluding which is not good for health.

TECHNOLOGY ARCHITECTURE

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	How user interacts with application e.g. Web UI, Mobile App, etc.	HTML, CSS, JavaScript.
2.	Application Logic-1	Logic for a process in the application	Python
3.	Application Logic-2	Logic for a process in the application	IBM Watson STT service
4.	Application Logic-3	Logic for a process in the application	IBM Watson Assistant
5.	Database	Data Type, Configurations etc.	MySQL, NoSQL, etc.
6.	Cloud Database	Database Service on Cloud	IBM Cloudant.
7.	File Storage	File storage requirements	IBM Block Storage or Other Storage Service or Local Filesystem
8.	External API-1	Purpose of External API used in the application	Rapid API, etc.
9.	External API-2	Purpose of External API used in the application	Rapid API, etc.
10.	Machine Learning Model	Purpose of Machine Learning Model	Object Recognition Model, etc.
11.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Cloud Server Configuration :	Local, Cloud Foundry, Kubernetes, etc.

Table-2: Application Characteristics:

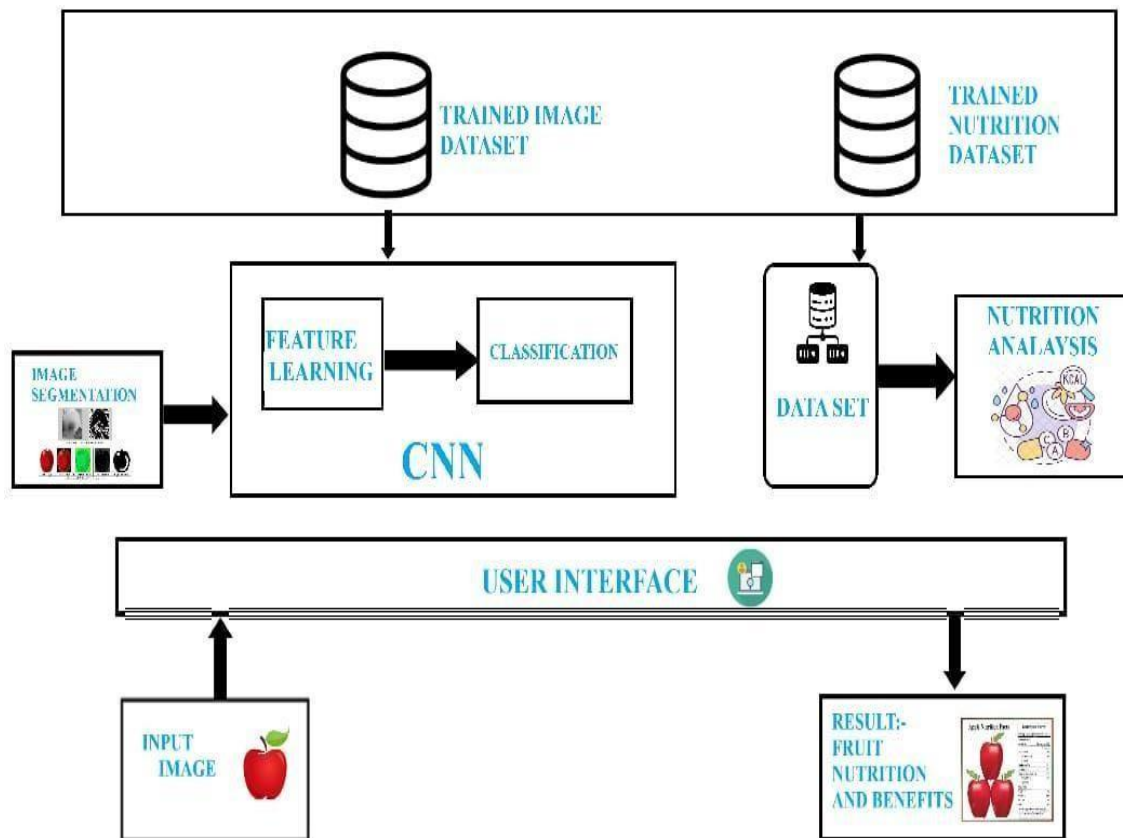
S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks used	Technology of Opensource framework
2.	Security Implementations	List all the security / access controls implemented, use of firewalls etc.	e.g. SHA-256, Encryptions, IAM Controls, OWASP etc.
3.	Scalable Architecture	Justify the scalability of architecture (3 – tier, Micro-services)	Technology used
4.	Availability	Justify the availability of application (e.g. use of load balancers, distributed servers etc.)	Technology used

Solution Architecture:

Being healthy should be an integral component of your life. A Healthy intake of food can assist in the prevention of chronic diseases and long-term ailments. What you eat is closely related to your health. Eating a healthy diet can help boost your immune systems, help you maintain a healthy weight and can improve your overall health. The importance of diet can't be overstated for a healthy lifestyle. People get the vitamins, minerals and nutrients they need to function and thrive from the foods they eat, so choosing foods that offer the most of those components helps improve quality of life. It's just as important to limit foods that are high in fat, sugar, sodium and cholesterol as it is to choose healthy foods. Nutrition helps in functioning, maintaining, or improving important bio metabolisms like building muscles, producing energy, thriving body cells, improving body health, replenish malnourishment, and strengthening immunity. If food is the reason, Nutrition is the result. Consumers have become more concerned over the quality and compositions of their food purchases, the contained ingredients, and the presence of additives and contaminants. Therefore, knowledge of the chemical and Biochemical composition of foods is important to the health, well-being, and safety of the consumers. We consume food so that we can obtain proper nutrition. Hence it is very important for us to know the composition of nutrients in our food. Through a nutrition analyzer we can measure the nutrients and with that information we can make a healthy diet by adding nutrients required for our body and excluding which is not good for health.

- This solution helps fitness enthusiasts to do Nutritional analysis of food which provides information about the chemical composition, processing, and quality control of food.
- The chance of occurrence of error is minimal since the model provides more precise reports of the analysis.
- First, the user captures the images of the food and uploads it.
- Next, the image will be sent to the trained model.
- The model will classify the food based on the different characteristics like colour

DIAGRAM:



RELIABILITY:

- ❑ It is Important that the AI powered nutrition analyzer for fitness provides should Must reliable.
- ❑ How a person can find it is reliable? It is easy to find that is he/she can compare the nutrition based food with other nutrition related application so, it can easily rectify whether it is reliable or not.
- ❑ But it take too much time, to avoid this a reliable application should made in which it itself produces whether we can get correct solution or not. So, it is necessary that the AI powered nutrition analyzer for fitness should have proper data and information in which we can get a correct information about it and also get a proper guidance about it.
- ❑ With the proper guidness and proper information in which we can get a nutrition properly and we can have get a proper fitness plan.
- ❑ It should also provides the information on nutrition and health which it should prevents from health information on diseases, health risks and prevention guidelines. It should also provides an extension a research based online learning network with several resource areas, so it provides more reliability in that area. For more reliable it can also contains the calorie information, balanced diet plans, what type food can consumed at what time etc..... So, by this way it can reliable.

SCALABILITY:

- ❑ The architecture for AI powered Nutrition Analyzer for fitness provides the clear procedure daily consumption of food and helps the user to maintain a healthy diet.
- ❑ According to their tracking system implemented in architecture provide the proper mechanism to the every individual of their nutrients intake which can be increased or decreased.
- ❑ The premium amount for analyzer is very much optimum.

PERFORMANCE:

- ❑ It should provide more number of users to consume at any time and at any place.
- ❑ It should provide Reliability, Scalability, Security and Usability.
- ❑ It should contain minimum data while over-paging the websites or application and it is necessary that it should not exceed more than 20mb.
- ❑ While consuming the page it should provide the response as much as possible without any delay or time traffic.

- The connection should be properly maintained so that it can be used while travelling or in remote places.
- The nutritious food to meet their dietary needs and the food preferences for an active and healthy life.
- It should be consistently accessible, availability and affordability of foods and beverages that promote well-being and prevent diseases.
- It should be suitable in all situations that exist for all people, at all times.

SECURITY:

- AI-powered nutrition analyzer for fitness should contain more security in which our data which is entered or maintained should be more secure.
- With the help of the username and password it provides more security in which it can access more securely and the data are private.
- It should be social-economic which should be accessible to sufficient and safe to use.

USABILITY:

- No training is required to access the Nutrition Analyzer.
- The results should be loaded within 30 seconds.
- It should be user-friendly and comfortable.
- It should be simple and easy to use.
- The results should be self-explanatory so that it can be understood by common people.

5.3 User Stories

Functional Requirement (Epic)	User Story Number	User Story / Task
Data Collection & Image Processing		
	USN-1	Collect images of different food items organized into subdirectories based on their respective names
	USN-2	Import and configure the Image data generator library from Keras
	USN-3	Apply Image data generator functionality to training set and testing set
	USN-4	Improving the image data that suppresses unwilling distortions or enhances some image features important for further processing
Model Building & Testing		
	USN-5	Importing the model building libraries and Initializing the model
	USN-6	Adding CNN layers, Dense layers & other necessary layers and Compile the model
	USN-7	Train & Test the model based on the image dataset
Application building		
	USN-8	Create HTML pages to design the front-end part of the web page
	USN-9	Create the flask application and loading the model file
	USN-10	Routing to the HTML page and Running the application
Cloud integration		
	USN-11	Train the model on Cloud

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Product Backlog, Sprint Schedule, and Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Data Collection	USN-1	Dataset - Collecting images of food items apples , banana, orange, pineapple,watermelon for analysis	5	High	Sudharsan S
Sprint-1	Image Preprocessing	USN-2	Image data augmentation - Increasing the amount of data by generating new datapoints from existing data	4	Medium	Murali R
Sprint-1		USN-3	Image Data Generator Class - Used for getting the input of the original data	4	Medium	Kavin V
Sprint-1		USN-4	Applying image data generator functionality to train set and test set	4	Medium	Dhinesh M
Sprint-2	Modeling Phase	USN-5	Defining the model architecture - Buildingthe model using deep learning approach and adding CNN layers	4	High	Sudharsan S
Sprint-2		USN-6	Training , saving, testing and predicting the model	5	High	Kavin V
Sprint-2		USN-7	Database creation for the input classes	4	High	Dhinesh M

6.2 Sprint Delivery Schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint- 2	Development phase	USN- 8	User database creation - It contains the details of users	3	Medium	Murali R
Sprint-2		USN- 9	Home page creation - It shows options of the application	2	Low	Kavin V
Sprint-2		USN- 10	Login and registration page creation - User can register and login through gmail with Id and password	2	Low	Sudharsan S
Sprint-3		USN- 11	Dashboard creation – Dashboard contains the information of user profile and features of the application	2	Low	Dhinesh M
Sprint-3		USN- 12	User Input Page Creation - It is for the user to feed the input images	4	Medium	Sudharsan S
Sprint-3		USN- 13	Analysis and prediction page creation -It shows the prediction of given user input	4	Medium	Kavin V
Sprint-3		USN- 14	Creation of about us , feedback and rating page – It shows application historyand feedback page to users	4	Medium	Murali R
Sprint-3	Application Phase	USN- 15	Building the python code and importing the flask module into the Project	6	High	Dhinesh M
Sprint-4		USN- 16	Create the Flask application and loading the model	5	High	Sudharsan S
Sprint-4		USN- 17	API integration - Connecting front end and back end and perform routing and run the application	5	High	Kavin V
Sprint-4	Deployment Phase	USN- 18	Cloud deployment – Deployment of application by using IBM cloud	4	High	Murali R

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-4	Testing Phase	USN-19	Functional testing – Checking usability and accessibility	3	Medium	Dhinesh M
		USN-20	Non Functional testing – Checking scalability and performance of the application	3	Medium	Murali R

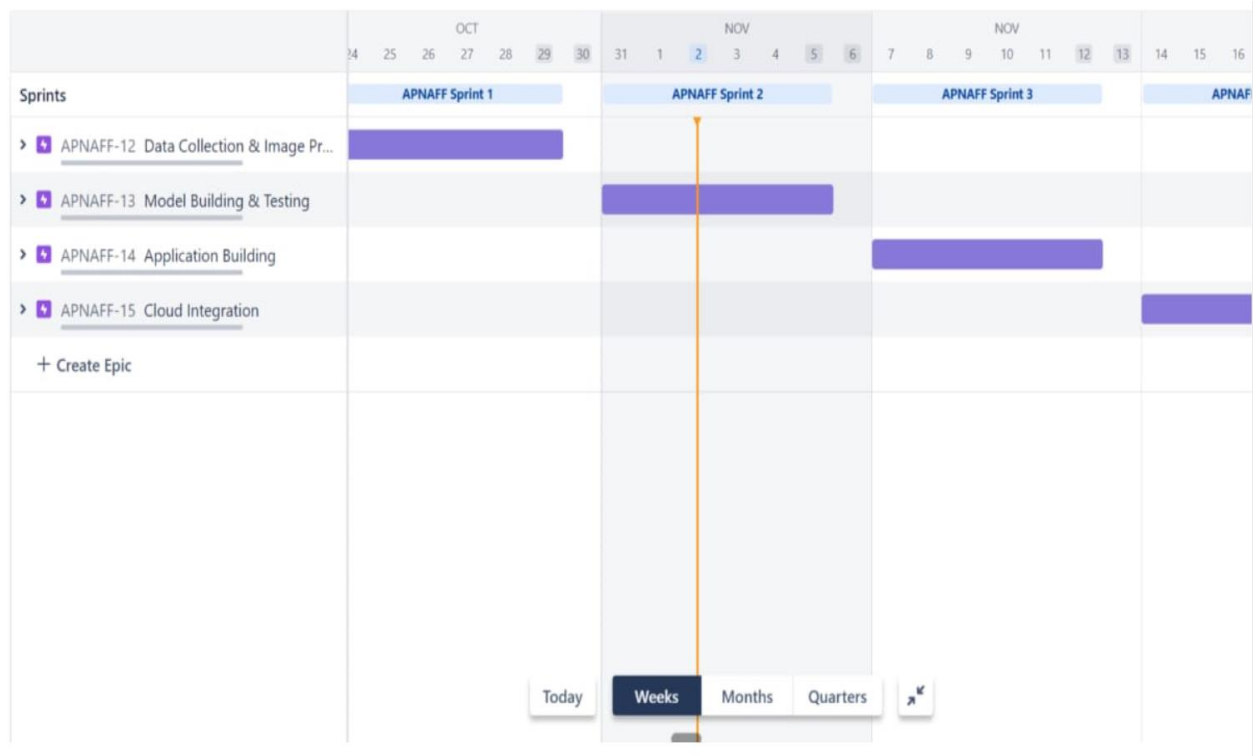
Project Tracker, Velocity & Burn down Chart:

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	08	5 Days	29 Oct 2022	02 Nov 2022	20	3 Nov 2022
Sprint-2	15	5 Days	03 Oct 2022	07 Nov 2022	20	8 Nov 2022
Sprint-3	15	5 Days	08 Nov 2022	12 Nov 2022	20	11 Nov 2022
Sprint-4	25	5 Days	13 Nov 2022	17 Nov 2022	20	16 Nov 2022

Velocity:

Average Velocity= $12/4 = 3$

6.3 Reports from JIRA



7. CODING & SOLUTIONING

7.1.Feature 1

- AI-powered Nutrition Analyzer for Fitness Enthusiasts
- The main aim of the project is to building a model which is used for classifying the fruit depends on the different characteristics like colour, shape, texture etc. Here the user can capture the images of different fruits and then the image will be sent the trained model. The model analyses the image and detect the nutrition based on the fruits like (Sugar, Fibre, Protein, Calories, etc.).
- Languages : Python
- Tools/IDE : Google collaboratory , Spyder
- Libraries : Recommendation

```
from flask import Flask,render_template,request
```

```
# Flask-It is our framework which we are going to use to run/serve our application.
```

```

#request-for accessing file which was uploaded by the user on our application.
import os
import numpy as np #used for numerical analysis
from tensorflow.keras.models import load_model#to load our trained model
from tensorflow.keras.preprocessing import image
import requests
app = Flask(__name__,template_folder="templates") # initializing a flask app
# Loading the model
model=load_model('nutrition.h5')
print("Loaded model from disk")
@app.route('/')# route to display the home page
def home():
    return render_template('home.html')
@app.route('/image1',methods=['GET','POST'])# routes to the index html
def image1():
    return render_template("image.html")
@app.route('/predict',methods=['GET', 'POST'])# route to show the predictions in a web UI
def launches():
    if request.methods=='POST':
        f=request.files['file'] #requesting the file
        basepath=os.path.dirname('__file__')#storing the file directory
        filepath=os.path.join(basepath,"uploads",f.filename)#storing the file in uploads folder
        f.save(filepath)#saving the file
        img=image.load_img(filepath,target_size=(64,64)) #load and reshaping the image
        x=image.img_to_array(img)#converting image to an array
        x=np.expand_dims(x,axis=0)#changing the dimensions of the image
        pred=np.argmax(model.predict(x), axis=1)
        print("prediction",pred)#printing the prediction
        index=['APPLES','BANANA','ORANGE','PINEAPPLE','WATERMELON']
        result=str(index[pred[0]])
        x=result
        print(x)
        result=nutrition(result)
        print(result)
        return render_template("0.html",showcase=(result))
import http.client
conn = http.client.HTTPSConnection("calorieninjas.p.rapidapi.com")
headers = {

```

```

        'X-RapidAPI-Key': "e5805fbf62mshf8d7308c0600c2dp197087jsn93407e3cce35",
        'X-RapidAPI-Host': "calorieninjas.p.rapidapi.com"
    }
    conn.request("GET", "/v1/nutrition?query=Pineapple", headers=headers)
    res = conn.getresponse()
    data = res.read()
    print(data.decode("utf-8"))
import requests
url = "https://calorieninjas.p.rapidapi.com/v1/nutrition"
querystring = {"query": "Pineapple"}
headers = {
    "X-RapidAPI-Key": "e5805fbf62mshf8d7308c0600c2dp197087jsn93407e3cce35",
    "X-RapidAPI-Host": "calorieninjas.p.rapidapi.com"
}
response = requests.request("GET", url, headers=headers, params=querystring)
print(response.text)
if __name__ == "__main__":
    # running the app
    app.run(debug=False)

```

7.1.Feature 2

home.html

```

<!DOCTYPE
html>

<html>
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<meta http-equiv="X-UA-Compatible" content="ie=edge">
<title>Home</title>
<link href="https://cdn.bootcss.com/bootstrap/4.0.0/css/bootstrap.min.css"
rel="stylesheet">
<script src="https://cdn.bootcss.com/popper.js/1.12.9/umd/popper.min.js">
</script>
<script src="https://cdn.bootcss.com/jquery/3.3.1/jquery.min.js"></script>
<script src="https://cdn.bootcss.com/bootstrap/4.0.0/js/bootstrap.min.js"></script>
<link href="{{ url_for('static', filename='css/main.css') }}" rel="stylesheet">

```

```
<style>
body
{
background-image: url("https://img.freepik.com/free-photo/top-view-healthy-balanced-vegetarian-food_1150-370.jpg");
background-size: cover;
background-repeat: no-repeat;
background-attachment: fixed;
background-size: 100% 100% ;
}
.bar
{
margin: 0px;
padding:5px;
background-color: #c0df84;
color:black;
font-family:'Roboto',sans-serif;
font-style: italic;
border-radius:20px;
font-size:25px;
text-align:center;
width: 400px;
}
h3
{
margin: 0px;
padding:5px;
background-color:#c0df84;
width: 400px;
color:#000000;
font-family:'Roboto',sans-serif;
font-style: italic;
border-radius:20px;
font-size:15px;
}
a
{
color:#c0df84;
float:center;
text-decoration:none;
font-style:normal;
padding-right:20px;
}
a:hover{
```

```
background-color:black;
color:white;
border-radius:15px;0
font-size:30px;
padding-left:10px;
}
.div1{
background-color: lightgrey;
width: 500px;
border: 10px solid peach;
padding: 20px;
margin: 20px;
height: 500px;
}
```

```
.header {position: relative;
top:0;
margin:0px;
z-index: 1;
left: 0px;
right: 0px;
position: fixed;
background-color: #8B008B ;
color: white;
box-shadow: 0px 8px 4px grey;
overflow: hidden;
padding-left:20px;
font-family: 'Josefin Sans'
font-size: 2px;
width: 100%;
height:8%;
text-align: center;
}
.topnav {
overflow: hidden;
background-color: #FCAD98;
}

.topnav-right a {
```

```
float: left;
color: black;
text-align: center;
padding: 14px 16px;
text-decoration: none;
font-size: 10px;
}
```

```
.topnav-right a:hover {
background-color: #FF69B4;
color: black;
}
```

```
.topnav-right a.active {
background-color: #DA70D6;
color: black;
}
```

```
.topnav-right {
float: right;
padding-right: 100px;
}
```

```
</style>
```

```
</head>
```

```
<body>
```

```
<!--Brian Tracy-->
```

```
<div class="header">
```

```
<div style="width:50%;float:left;font-size:2vw;text-align:left;color:black; padding-top:1%;
padding-left:5%;">Nutrtion Image Analysis</div>
```

```
<div class="topnav-right" style="padding-top:0.5%;">
```

```
<a class="active" href="{{ url_for('home') }}">Home</a>
```

```
<a href="{{ url_for('image1') }}">Classify</a>
```

```
</div>
```

```
</div>
```

```
</div>
```

```
<br>
```

```
<br>
```

```
<br>
```

```
<br>
```

```
<br>
```


<h1>

<center>

<h3>Food is essential for human life and has been the concern of many healthcare conventions. Nowadays new dietary assessment and nutrition analysis tools enable more opportunities to help people understand their daily eating habits, exploring nutrition patterns and maintain a healthy diet. Nutritional analysis is the process of determining the nutritional content of food. It is a vital part of analytical chemistry that provides information about the chemical composition, processing, quality control and contamination of food. It ensures compliance with trade and food laws.</h3>

</center>

</h1>

</body>

</html>

image.html

<div style="float:left">

<h5>

Upload image to classify</h5>

<div>

<form id="upload-file" method="post" enctype="multipart/form-data">

<label for="imageUpload" class="upload-label">

Choose...

</label>

<input type="file" name="file" id="imageUpload" accept=".png, .jpg, .jpeg">

```

</form>

<center> <div class="image-section" style="display:none;">
<div class="img-preview">
<div id="imagePreview">
</div></center>
</div>
<center><div>
<button type="button" class="btn btn-primary btn-lg "
id="btn-predict">Classify</button>
</center></div>
</div>

<div class="loader" style="display:none;margin-left: 450px;"></div>

<h3 id="result">

<span><p style="padding-top: 25px;"><h4>Food Classified is : <h4><b><u>{{showcase}}{{showcase1}}
</h3>

</div>
</div>

```

ImagePrediction.html

```

!DOCTYPE html>

<html>
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<meta http-equiv="X-UA-Compatible" content="ie=edge">
<title>Predict</title>
<link href="https://cdn.bootcss.com/bootstrap/4.0.0/css/bootstrap.min.css"
rel="stylesheet">
<script src="https://cdn.bootcss.com/popper.js/1.12.9/umd/popper.min.js">
</script>
<script src="https://cdn.bootcss.com/jquery/3.3.1/jquery.min.js"></script>
<script src="https://cdn.bootcss.com/bootstrap/4.0.0/js/bootstrap.min.js">
</script>
<link href="{{ url_for('static', filename='css/main.css') }}" rel="stylesheet">

```



```
<style>
body
{
    background-image: url("https://i.pinimg.com/originals/be/21/1a
/be211ad5043a8d05757a3538bdd8f450.jpg");
    background-size: cover;
}
.bar
{
margin: 0px;
padding:20px;
background-color:white;
opacity:0.6;
color:black;
font-family:'Roboto',sans-serif;
font-style: italic;
border-radius:20px;
font-size:15px;
}
a
{
color:grey;
float:right;
text-decoration:none;
font-style:normal;
padding-right:20px;
}
a:hover{
background-color:black;
color:white;
border-radius:15px;0
font-size:30px;
padding-left:10px;
}
.div1{
    background-color: lightgrey;
    width: 500px;
    border: 10px solid peach;
    padding: 20px;
    margin: 20px;
    height: 500px;
}
```

```

.header { position: relative;
            top:0;
            margin:0px;
            z-index: 1;
            left: 0px;
            right: 0px;
            position: fixed;
            background-color: #8B008B ;
            color: white;
            box-shadow: 0px 8px 4px grey;
            overflow: hidden;
            padding-left:20px;
            font-family: 'Josefin Sans';
            font-size: 2vw;
            width: 100%;
            height:8%;
            text-align: center;
        }
        .topnav {
            overflow: hidden;
            background-color: #FCAD98;
        }

        .topnav-right a {
            float: left;
            color: black;
            text-align: center;
            padding: 14px 16px;
            text-decoration: none;
            font-size: 18px;
        }

        .topnav-right a:hover {
            background-color: #FF69B4;
            color: black;
        }

        .topnav-right a.active {
            background-color: #DA70D6;

```

```

        color: black;
    }

    .topnav-right {
        float: right;
        padding-right: 100px;
    }
</style>
</head>
<body>
<div class="header">
<div style="width: 50%; float: left; font-size: 2vw; text-align: left; color: black; padding-top: 1%; padding-left: 5%;">Nutrition
    <div class="topnav-right" style="padding-top: 0.5%;">

        <a href="{{ url_for('home') }}">Home</a>
        <a class="active" href="{{ url_for('image1') }}">Classify</a>
    </div>
</div>
<br>

</div>
<div class="container">
<center>
<div id="content" style="margin-top: 2em;"></div></center>
</div>
</body>

<footer>
<script src="{{ url_for('static', filename='js/main.js') }}"
type="text/javascript"></script>
</footer>
</html>

```

o.html

```

<html lang="en" dir="ltr">

    <head>
    <style>

    </style>
    <meta charset="utf-8">

```

```
<title>Nutrition Image Analysis</title>
<link rel="shortcut icon" href="{{ url_for('static',
filename='diabetes-favicon.ico') }}">
<link rel="stylesheet" type="text/css" href="{{ url_for('static',
filename='style.css') }}">
<script src="https://kit.fontawesome.com/5f3f547070.js"
crossorigin="anonymous"></script>
<link href="https://fonts.googleapis.com/css2?family=
Pacifico&display=swap" rel="stylesheet">
</head>
```

```
<!-- Result -->
```

```
<div class="results">
```

```
<p style="padding-top: 150px; color:blue;"><h4
style="color:blue;">Food Classified is: <h4><b><h4
style="color:red;"><u>{{showcase1}}<h4><br><h4
style="color:red;"><u>{{showcase}}<h4></p>
```

```
</div></div>
```

```
</body>
```

```
</html>
```

8. TESTING

```
import numpy as np
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
model=load_model('train.h5')
model=load_model('dataset.h5')
model=load_model('nutrition.h5')
img=image.load_img(r"/content/drive/MyDrive
/CNN/Dataset/TEST_SET/PINEAPPLE/125_100.jpg")
img
```



```
img=image.load_img(r"/content/drive/MyDrive
/CNN/Dataset/TEST_SET/PINEAPPLE/125_100.jpg",
target_size=(64,64))
img
```



```
x=image.img_to_array(img)
```

x

```
array([[[[255., 255., 255.],
         [255., 255., 255.],
         [255., 255., 255.],
         ...,
         [255., 255., 255.],
         [255., 255., 255.],
         [255., 255., 255.]],
```

```
[[255., 255., 255.],
 [255., 255., 255.],
 [255., 255., 255.],
```

```
...,
```

```

        [255., 255., 255.],
        [255., 255., 255.],
        [255., 255., 255.]],

        [[255., 255., 255.],
        [255., 255., 255.],
        [255., 255., 255.],
        ...,
        [255., 255., 255.],
        [255., 255., 255.],
        [255., 255., 255.]],
        ...,

        [[255., 255., 255.],
        [255., 255., 255.],
        [255., 255., 255.],
        ...,
        [255., 255., 255.],
        [255., 255., 255.],
        [255., 255., 255.]],

        [[255., 255., 255.],
        [255., 255., 255.],
        [255., 255., 255.],
        ...,
        [255., 255., 255.],
        [255., 255., 255.],
        [255., 255., 255.]], dtype=float32)
x=np.expand_dims(x,axis=0)

```

```

[[255., 255., 255.],
 [255., 255., 255.],
 [255., 255., 255.],
 ...,
 [255., 255., 255.],
 [255., 255., 255.],
 [255., 255., 255.]],

[[255., 255., 255.],
 [255., 255., 255.],
 [255., 255., 255.],
 ...,
 [255., 255., 255.],
 [255., 255., 255.],
 [255., 255., 255.]],

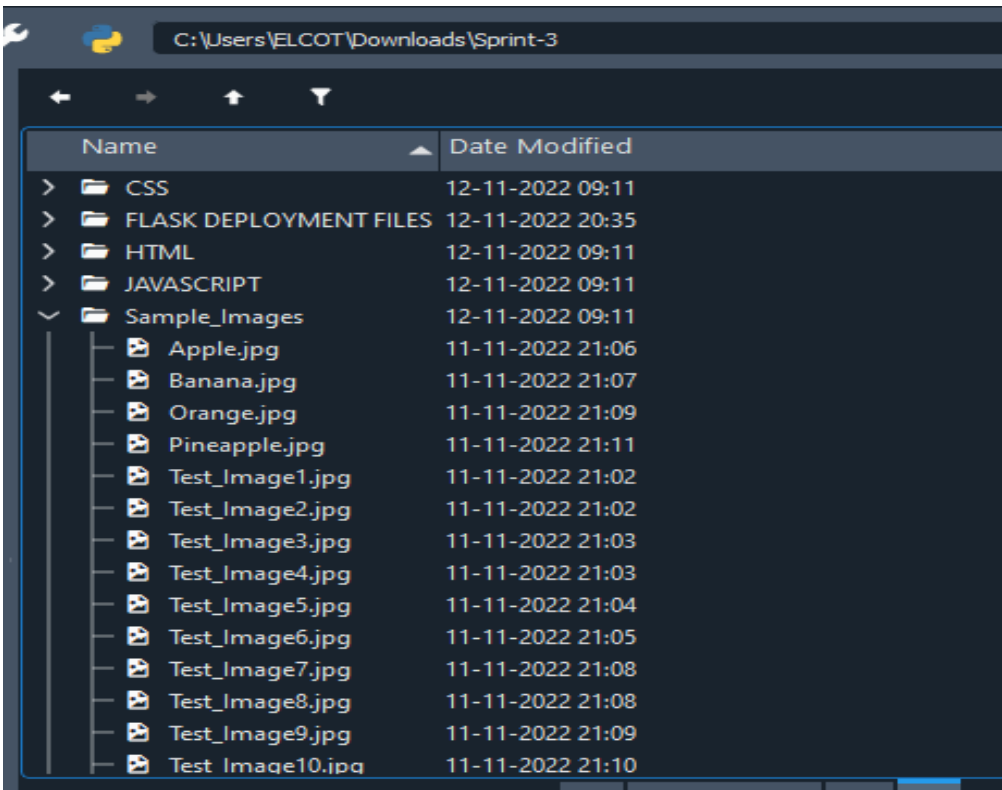
[[255., 255., 255.],
 [255., 255., 255.],
 [255., 255., 255.],
 ...,
 [255., 255., 255.],
 [255., 255., 255.],
 [255., 255., 255.]]], dtype=float32)
pred = model.predict
pred
array
([[0.25227112, 0.17414774, 0.15219809, 0.20493415, 0.21644896],
 [0.26760292, 0.1759095 , 0.15206912, 0.19424875, 0.21016978],
 [0.26474723, 0.165203 , 0.14452063, 0.20434381, 0.2211853 ],
 ...,
 [0.24550524, 0.1721549 , 0.16282505, 0.21065485, 0.20885986],
 [0.25395462, 0.1735253 , 0.16055605, 0.20655352, 0.20541045],
 [0.24495909, 0.15889102, 0.16927534, 0.20705006, 0.21982446]],
 dtype=float32
<bound method Model.predict of <keras.engine.
sequential.Sequential object at 0x7f94abfd7c10>>
predict_x=model.predict(x_test)

classes_x=np.argmax(predict_x,axis=1)
classes_x
array([0, 0, 0, ..., 0, 0, 0])
x_test.class_indices
index=['APPLE','BANANA','ORANGE','WATERMELON','PINEAPPLE']
result=str(index[classes_x[0]])
result

```

'Pineapple'

8.1 TEST CASES



8.2 USER ACCEPTANCE TESTING



APPLE BANANA ORANGE PINEAPPLE WATERMELON TEST_IMAGE1



TEST_IMAGE2 TEST_IMAGE3 TEST_IMAGE4 TEST_IMAGE5 TEST_IMAGE6

PERFORMANCE TESTING:

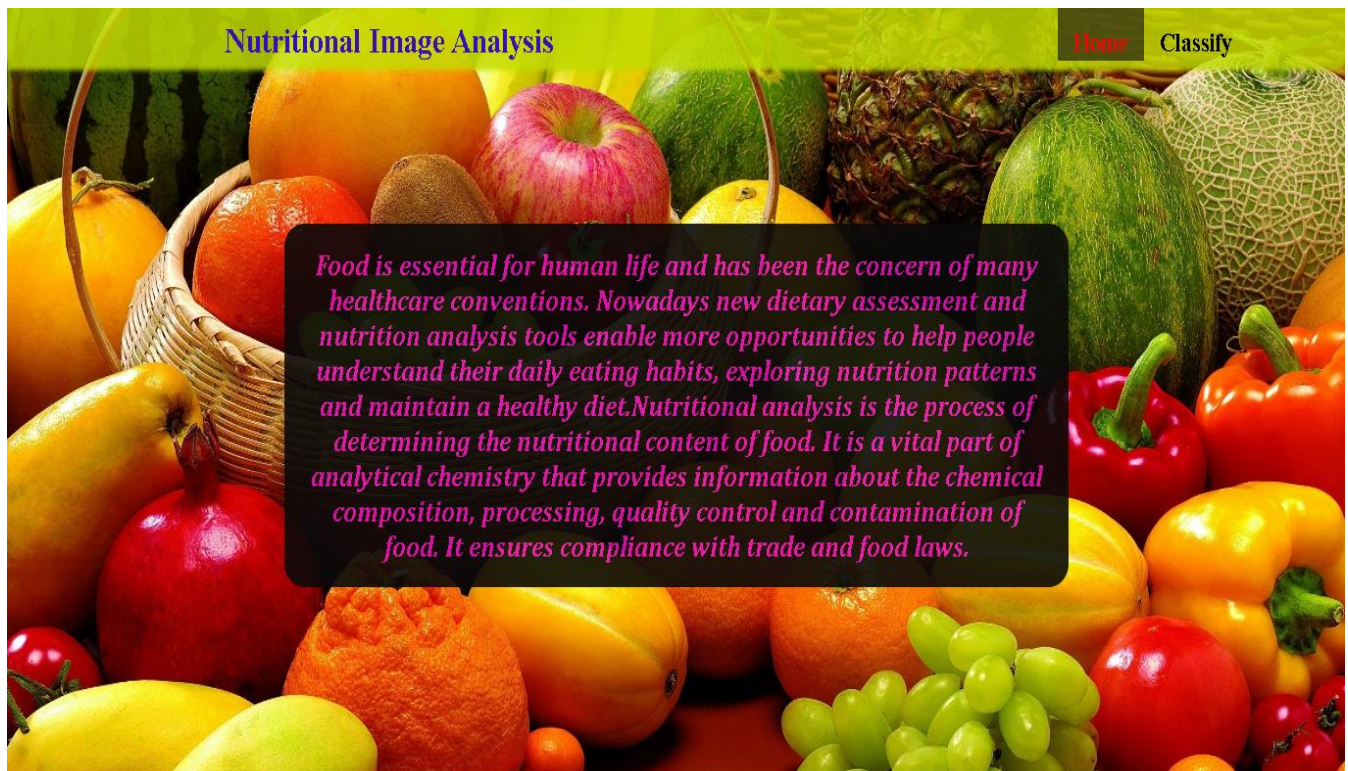
Epoch 1/10
110/110 [=====] - 27s 242ms/step - loss: 0.4205 - accuracy: 0.8861 -
val_loss: 48.9065 - val_accuracy: 0.1488
Epoch 2/10
110/110 [=====] - 27s 245ms/step - loss: 0.0082 - accuracy: 0.9989 -
val_loss: 62.1670 - val_accuracy: 0.1280
Epoch 3/10
110/110 [=====] - 28s 255ms/step - loss: 0.0014 - accuracy: 1.0000 -
val_loss: 66.6759 - val_accuracy: 0.1488
Epoch 4/10
110/110 [=====] - 27s 242ms/step - loss: 3.3364e-04 - accuracy:
1.0000 - val_loss: 70.6794 - val_accuracy: 0.1488
Epoch 5/10
110/110 [=====] - 27s 248ms/step - loss: 1.9990e-04 - accuracy:
1.0000 - val_loss: 74.1865 - val_accuracy: 0.1488
Epoch 6/10
110/110 [=====] - 26s 236ms/step - loss: 4.5090e-04 - accuracy:
1.0000 - val_loss: 75.5190 - val_accuracy: 0.1308
Epoch 7/10
110/110 [=====] - 27s 248ms/step - loss: 1.0600e-04 - accuracy:
1.0000 - val_loss: 78.4789 - val_accuracy: 0.1488
Epoch 8/10
110/110 [=====] - 26s 237ms/step - loss: 7.9529e-05 - accuracy:
1.0000 - val_loss: 80.7918 - val_accuracy: 0.1403
Epoch 9/10
110/110 [=====] - 26s 236ms/step - loss: 9.2201e-05 - accuracy:
1.0000 - val_loss: 80.3610 - val_accuracy: 0.1431

Epoch 10/10
110/110 [=====] - 29s 266ms/step - loss: 9.1324e-05 - accuracy:
1.0000 - val_loss: 83.0943 - val_accuracy: 0.1393
<keras.callbacks.History at 0x7fbc5cb4b10>

9.RESULTS:

9.1 Performance Metrics

Output link : <https://github.com/IBM-EPBL/IBM-Project-2034-1658423887/blob/main/Project%20Development%20Phase/Sprint-3/Output%20Screenshots/Output%20Screenshots.docx>



Nutritional Image Analysis

[Home](#)

[Classify](#)

Upload image to classify

Upload Image



food classified :

Classify



Nutritional Image Analysis

[Home](#)[Classify](#)

Upload image to classify

Upload Image



food classified :

60 calories, No fat or sodium, 3 grams of fiber, 12 grams of sugar, 1 gram of protein, 14 micrograms of vitamin A, 70 milligrams of vitamin C, 6% of your daily recommended amount of calcium

10. ADVANTAGES AND DISADVANTAGES

Advantages:

- Food and food habits are ever-changing and evolving. People and professionals need to quickly adapt to new food products, diets, and changing preferences. The best way to instantly adapt to these changes is to have software that changes and adapts with you.
- Using automated nutrition analysis software will allow you to free up more time to innovate or grow your business. If you find a nutrition analysis software that has all the features you need, you can create much more time to focus on improving your business.
- Features such as a quick preview of nutrients while adding foods to diets, menus, and recipes give you the ability to save time when new recipes and food products are introduced.
- Having quick and easy software to help them plan their meals will save you tons of time.

Disadvantages:

- This methodology is still limited by its dependency on time-consuming and error-prone manual video annotations, with many studies resorting to the use of multiple human annotators.
- Often suffers from reliability issues.
- It is extremely expensive due to semantics analysis model and nutritional analysis model.
- In order to make recommendations, the system needs to collect nutritional needs from users. Most of the information is only provided through continuous interactions with users. However, in reality, recording nutritional intake from users cannot avoid faults because users usually forget or give wrong information about the food they have consumed.
- Moreover deep learning requires expensive GUIs and hundreds of machines. This increases the cost to the users.

11. CONCLUSION

Food is essential for human life and has been the concern of many health care conventions. In this project we have built a nutrition analysis model that classifies the nutritional content of the food through the image uploaded by the user. Such Nutritional analysis helps people understand their daily eating habits, exploring nutrition patterns and maintaining a healthy diet. It is a vital part of analytical chemistry that provides information about the chemical composition, processing, quality control and contamination of food.

The nutritional analysis model is implemented using Convolutional neural network and the web application is built and implemented using Flask framework. As for the future work, the model can be trained and tested on more datasets to provide accurate results and better performance.

12. FUTURE SCOPE

The future scope of this project is very broad. Few of them are:

- The model could be trained using vast database in order to increase the accuracy of results.
- The Backend framework of the web application can be improved so that the uploaded images can be handled appropriately.
- In addition to the nutrition analysis, the application can also be designed to provide recipes that can be prepared using the nutrient-rich foods
- A database can also be implemented for the system so that users can save their data and relook into it later.
- The Web application can be further developed and launched as an Android App so that anyone anywhere with or without internet connection can access it and get benefited from its use cases.

13. APPENDIX

Source Code:

```
from flask import Flask,render_template,request  
# Flask-It is our framework which we are going to use to run/serve our application.  
#request-for accessing file which was uploaded by the user on our application.
```

```

import os
import numpy as np #used for numerical analysis
from tensorflow.keras.models import load_model#to load our trained model
from tensorflow.keras.preprocessing import image
import requests

app = Flask(__name__,template_folder="templates") # initializing a flask app
# Loading the model
model=load_model('nutrition.h5')
print("Loaded model from disk")
@app.route('/')# route to display the home page
def home():
    return render_template('home.html')
@app.route('/image1',methods=['GET','POST'])# routes to the index html
def image1():
    return render_template("image.html")
@app.route('/predict',methods=['GET', 'POST'])# route to show the predictions in a web UI
def launches():
    if request.methods=='POST':
        f=request.files['file'] #requesting the file
        basepath=os.path.dirname('__file__')#storing the file directory
        filepath=os.path.join(basepath,"uploads",f.filename)#storing the file in uploads folder
        f.save(filepath)#saving the file
        img=image.load_img(filepath,target_size=(64,64)) #load and reshaping the image
        x=image.img_to_array(img)#converting image to an array
        x=np.expand_dims(x,axis=0)#changing the dimensions of the image
        pred=np.argmax(model.predict(x), axis=1)
        print("prediction",pred)#printing the prediction
        index=['APPLES','BANANA','ORANGE','PINEAPPLE','WATERMELON']
        result=str(index[pred[0]])
        x=result
        print(x)
        result=nutrition(result)
        print(result)
        return render_template("0.html",showcase=(result))
import http.client
conn = http.client.HTTPSConnection("calorieninjas.p.rapidapi.com")
headers = {
'X-RapidAPI-Key': "e5805fbf62mshf8d7308c0600c2dp197087jsn93407e3cce35",
'X-RapidAPI-Host': "calorieninjas.p.rapidapi.com"

```

```

    }
    conn.request("GET", "/v1/nutrition?query=Pineapple", headers=headers)
    res = conn.getresponse()
    data = res.read()
    print(data.decode("utf-8"))
import requests
url = "https://calorieninjas.p.rapidapi.com/v1/nutrition"
querystring = {"query": "Pineapple"}
headers = {
    "X-RapidAPI-Key": "e5805fbf62mshf8d7308c0600c2dp197087jsn93407e3cce35",
    "X-RapidAPI-Host": "calorieninjas.p.rapidapi.com"
}
response = requests.request("GET", url, headers=headers, params=querystring)
print(response.text)
if __name__ == "__main__":
    # running the app
    app.run(debug=False)

```

GitHub Link : <https://github.com/IBM-EPBL/IBM-Project-21783-1659791467>

Project Demo Link :

https://drive.google.com/file/d/1Y1yUJUSu_iz9z2EGqyFhq1spuV4-tbLp/view?usp=share_link