AI-POWERED NUTRITION ANALYZER FOR FITNESS ENTHUSIASTS

A PROJECT REPORT

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BONAFIDE CERTIFICATE

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Submitted for the Anna University Project Viva Voice held on _____

INTERNAL EXAMINER   **EXTERNAL EXAMINER**

ACKNOWLEDGEMENT

TABLE OF CONTENTS

7. CODING & SOLUTIONING

      7.1. Feature 1

      7.2. Feature

8. TESTING

      8.1. Test Cases

      8.2. User Acceptance Testing

9. RESULTS

      9.1. Performance Metrics

10. ADVANTAGES & DISADVANTAGES

11. CONCLUSION

12. FUTURE SCOPE

13. APPENDIX

Source Code Output GitHub & Project Demo Link

1. INTRODUCTION

1.1. PROJECT OVERVIEW

A nutritional analyzer is a device that is used to analyze the nutrient contents of food. Nutritional analysers can be used to determine the Calorie, Fat, Protein, Carbohydrate, and the Fibre contents of food. Nutritional analyzers can also be used to determine the vitamin and mineral contents of food.

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.

1.2. PURPOSE

The purpose of a nutritional analyzer is to provide users with information about the nutritional content of their food. This information can be used to make informed decisions about what to eat and how to maintain a healthy diet.

The goal of this project is to develop a nutritional analyzer that can be used to quickly and easily assess the nutritional value of foods. The analyzer will be able to identify the nutrient content of foods, as well as the caloric value. Additionally, the analyzer will be able to provide recommendations on how to improve one's diet.

2. LITERATURE SURVEY

2.1. EXISTING PROBLEM

- Progressive Spinal Net architecture for FC layers **-** In this paper the Progressive Spinal Net progressive computational network for FC layers of deep- networks is introduced as an upgraded version of the DNN concept. **-** Praveen Chopra

- Spinal Net: Deep Neural Network with Gradual Input **-** In this research, the Spinal Net DNN model was introduced. The chordate nervous system, which has a special way of connecting a lot of sensing data and making local decisions, is mimicked in the construction of Spinal Net. **-** H M Dipu Kabir

- Classification of Fruits Using Deep Learning Algorithms **-** In this study a deep learning-based system for classifying fruits is suggested. A DCNN model, an Alex Net model, and a MobileNetV2 model were investigated in the proposed framework. Three datasets with different sizes and levels of complexity were used to test the recommended framework. **-** Mirra K B

- A Comprehensive Study on Torch vision Pre- trained Models for Fine-grained Interspecies Classification **-** This study attempts to investigate various pretrained models provided in the PyTorch library's Torch vision package. And look into how well they can classify fine- grained photos. **-** Feras Albardi

- Fruits classification by using machine learning - An experiment using popular approaches on local data **-** In this paper, we examine the methods for classifying images that can be used to categorise fruits. The study's findings can be used to place fruit on the correct shop shelves, spot fruit mismatches there, or check fruit prices without using a barcode scanner. Three well-known classification models—Random Forest, K-Nearest Neighbours (KNN), and Support Vector
Machine—are employed in this study (SVM). **-** Nguyen Vuong Thinh

- Fruit Recognition and Classification with Deep Learning Support on Embedded System (fruit net) **-** This suggested study employs image processing techniques for fruit recognition. Convolutional Neural Networks (ConNN)* deep learning model for classification is created in the study. The Keras platform was used to construct the suggested model. **-** Haci Bayram Unal

- Using Natural Language Processing and Artificial Intelligence to Explore the Nutrition and Sustainability of Recipes and Food **-** According to this paper's point of view, Interdisciplinary approaches should be used to address food and recipe research in order to address health and sustainability issues. These approaches should combine NLP and other AI techniques with historical food research, food science, nutrition, and sustainability expertise. **-** Marieke van Erp

- Fruits Classification using Convolutional Neural Network **-** This study investigates a CNN-based classification of fruits. For five scenarios utilising the fruits-360 dataset, the accuracy and loss curves were created using various combinations of hidden layers. This paper discusses several computer vision-based approaches and algorithms for fruit recognition and classification. **-** Mehenag Khatun

- Fruit classification by HPA-SLFN **-**In this study, we introduced a brand-new fruit classification method called HPASLFN. The findings indicated that HPA classification SLFN's accuracy of 89.5% was superior to those of other classification techniques. **-**Siyuan Lu

- Date fruits classification using texture descriptors and shape-size features **-**In this study a suggested technique breaks down a visual image of a date into its component colours. The local texture descriptor, such as a Weber local descriptor (WLD) histogram or a local binary pattern (LBP), is then applied to each component in order to encode the texture pattern of the date. To characterise the image, the texture patterns fromeach component are combined.**-**Ghulam Muhammad.

2.2. REFERENCES

[1] Muhammad, Ghulam. "Date fruits classification using texture descriptors and shapesize features." Engineering Applications of Artificial Intelligence 37 (2015): 361-367.

[2] Lu, Siyuan, et al. "Fruit classification by HPA-SLFN." 2016 8th International Conference on Wireless Communications & Signal Processing (WCSP). IEEE, 2016.

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[5] Thinh, Nguyen Vuong, et al. "Fruits classification by using machine learning-An experiment using popular approaches on local data." 2021 IEEE International Conference on Machine Learning and Applied Network Technologies (ICMLANT). IEEE, 2021.

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[7] KB, Mirra, and R. Rajakumari. "Classification of Fruits Using Deep Learning Algorithms." Available at SSRN 4068366.

[8] Chopra, Praveen. "Progressivespinalnet architecture for fc layers." arXiv preprint arXiv:2103.11373 (2021).

[9] Kabir, HM Dipu, et al. "Spinalnet: Deep neural network with gradual input." IEEE Transactions on Artificial Intelligence (2022).

[10] Van Erp, Marieke, et al. "Using natural language processing and artificial intelligence to explore the nutrition and sustainability of recipes and food." Frontiers in artificial intelligence 3 (2021): 621577.

2.3. PROBLEM STATEMENT DEFINITION

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.)

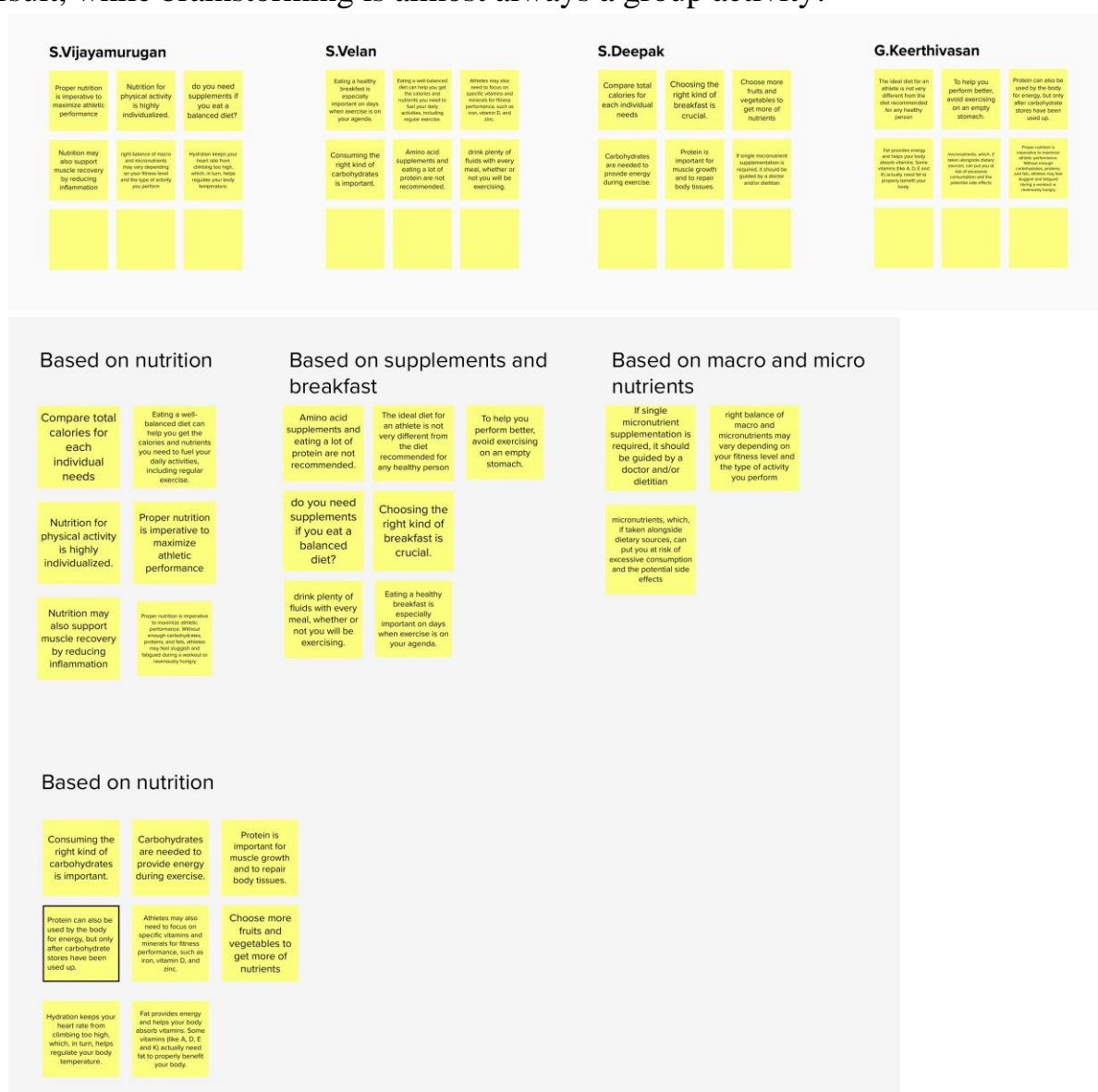## 3. IDEATION & PROPOSED SOLUTION

3.1. EMPATHY MAP CANVAS

An empathy map is a collaborative tool teams can use to gain a deeper insight into their customers. Much like a user persona, an empathy map can represent a group of users, such as a customer segment. The empathy map was originally created by Dave Gray and has gained much popularity within the agile community.
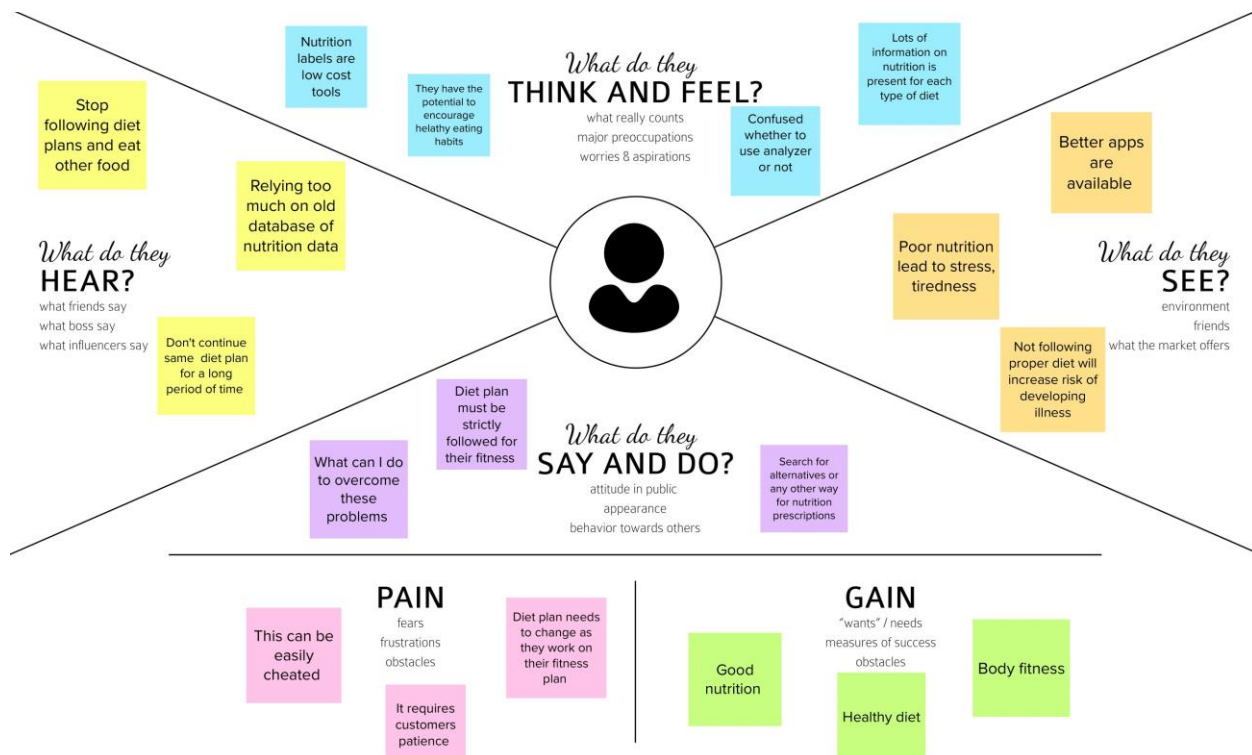
3.2. IDEATION AND BRAINSTORMING

Ideation is the process of forming ideas from conception to implementation, most often in a business setting. Ideation is expressed via graphical, written, or verbal methods, and arises from past or present knowledge, influences, opinions, experiences, and personal convictions.

Ideation is often closely related to the practice of brainstorming, a specific technique that is utilized to generate new ideas. A principal difference between ideation and brainstorming is that ideation is commonly more thought of as being an individual pursuit, while brainstorming is almost always a group activity.

Importance

If each of these tasks could get done without any difficulty or cost, which would have the most positive impact?

Feasibility

Regardless of their importance, which tasks are more feasible than others? (Cost, time, effort, complexity, etc.)

Proper nutrition is imperative to maximize athletic performance

right balance of macro and micronutrients may vary depending on your fitness level and the type of activity you perform

Eating a well-balanced diet can help you get the calories and nutrients you need to fuel your daily activities, including regular exercise.

The ideal diet for an athlete is not very different from the diet recommended for any healthy person

micronutrients, which, if taken alongside dietary sources, can put you at risk of excessive consumption and the potential side effects

Nutrition for physical activity is highly individualized.

Proper nutrition is imperative to maximize athletic performance. Without enough carbohydrates, proteins, and fats, athletes may feel sluggish during a workout or ravenously hungry

Eating a healthy breakfast is especially important on days when exercise is on your agenda.

If single micronutrient supplementation is required, it should be guided by a doctor and/or dietitian

drink plenty of fluids with every meal, whether or not you will be exercising.

Amino acid supplements and eating a lot of protein are not recommended.

Protein is important for muscle growth and to repair body tissues.

Athletes may also need to focus on specific vitamins and minerals for fitness performance, such as iron, vitamin D, and zinc.

Nutrition may also support muscle recovery by reducing inflammation

Fat provides energy and helps your body absorb vitamins. Some vitamins (like A, D, E and K) actually need fat to properly benefit your body.

Carbohydrates are needed to provide energy during exercise.

Consuming the right kind of carbohydrates is important.

Compare total calories for each individual needs

Protein can also be used by the body for energy, but only after carbohydrate stores have been used up.

do you need supplements if you eat a balanced diet?

Choosing the right kind of breakfast is crucial.

To help you perform better, avoid exercising on an empty stomach.

Hydration keeps your heart rate from climbing too high, which, in turn, helps regulate your body temperature.

Choose more fruits and vegetables to get more of nutrients

TIP

Participants can use their cursors to point at where sticky notes should go on the grid. The facilitator can confirm the spot by using the laser pointer holding the **H key** on the keyboard.

12

3.3. PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	- The emergence of technology has made our life more inactive - The App Store and Google Play are already saturated with fitness and sports apps. Thus, users are finding it difficult to make a choice. - I am a fitness enthusiast; I'm trying to maintain fitness but unable to maintain fitness because of improper intake of nutrition which makes me feel the need to intake proper amount of nutrition
2.	Idea / Solution description	- The online artificial dietician is a bot, with artificial intelligence about human diets. - It acts as a diet consultant like a real dietician. - This type of app helps the users have a well-fine-tuned workout experience.

3.	Novelty / Uniqueness	- AI augments the capabilities of differently abled individuals - fitness apps raise the bar when it comes to the user's standard of wellness. - AI operates 24x7 without interruption or breaks and has no downtime.
4.	Social Impact / Customer Satisfaction	The main objective of this study is to know the influence of the use of the fitness application (app) on sports habits, customer satisfaction and maintenance intention of fitness centre users.
5.	Business Model (Revenue Model)	- It can be developed with minimum cost and provide high effective process at less time - Due to the cost of app development technology, the amount of physical work has almost diminished which is the root cause of various problems.
6.	Scalability of the Solution	- In the further advancement, users can post their queries and get more advice from other users - In the further can advancement, users can Integrate this app with fitness trackers

3.4. PROBLEM SOLUTION FIT

The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it solves the customer's problem.

1. CUSTOMER SEGMENT(S) — CS
- Trainers who can provide fitness plans.
- Anyone who wants to maintain their body fitness.
- Patients who want to monitor their caloric intake.

6. CUSTOMER LIMITATIONS EG. BUDGET, DEVICES — CL
- Limited supervision.
- Limited financial constraints.
- Limited information on specified nutrition intakes.

5. AVAILABLE SOLUTIONS PLUSES & MINUSES — AS
- Artificial intelligence monitors customer traffic and engagement and learns from insights to promote self-service and sales systems.

2. PROBLEMS / PAINS • ITS FREQUENCY — PR
- improper diet leads to various health related issues.
- Muscular atrophy can occur due to lack of malnutrition, lack of physical activity
- Hard to maintain body shape after taking in artificial supplements.
- Due to lack of specialist staff for providing nutrition prescriptions

9. PROBLEM ROOT / CAUSE — RC
- Lack of knowledge among people regarding the proper amount of nutrition intake.
- Many suggestions for a single diet make it hard to concentrate on following a particular routine
- People think the only way to get good body shape is to take in artificial supplements
- Lack of guidance can cause wrong amount of intake in nutrition and can cause various health issues

7. BEHAVIOR • ITS INTENSITY — BE
- Asking suggestions from surrounding peoples and implementing the recent technologies
- Searching an alternative solution from an already existing solution.

3. TRIGGERS TO ACT — TR
- Hearing about innovative technologies and effective solutions.
- Seeing others having better results while following this nutrition chart make better option while compared to other solutions

4. EMOTIONS BEFORE / AFTER — EM
- People are unaware of what nutrition to take and the right amount.
- Step by step instructions provided by the nutrition analyser is easy to follow.

10. YOUR SOLUTION — SL
- The AI gets all the required data like height, weight and body size from the user and according to the user and their desired body shape it creates a diet plan that will make them reach goals in an efficient way.
- It can provide diet using all food types like vegetables, meat, egg and including fruits and juices which can be helpful for the adequate intake of nutrients required by the body
- It makes sure the right amount of nutrients are taken in at the right interval of time.

8. CHANNELS of BEHAVIOR — CH
ONLINE
- Using different platforms /social media to describe uses of the nutrition analyser and how it works as a great tool for fitness enthusiasts.

OFFLINE
- Gives awareness among people about the types of nutrition intake and how the application is useful for various people who is interested in maintaining Body fitness

4. REQUIRMENT 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
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Image Acquisition	Capture the Image and Check the Top and Side View of Image
FR-4	Object Detection	Get a series of Bounding Boxes, which means objects are located.
FR-5	Image Segmentation	Get a series of food images stored in matrix with values of background pixels replaced by zeros.
FR-6	Volume Estimation	To estimate the volume, calculate the scale factors on calibration objects.
FR-7	Calorie Estimation	After estimating the volume, the next step is to estimate each food's mass

4.2. NON FUNCTIONAL REQUIREMENTS

FR No.	Non-Functional Requirements	Description
NFR-1	**Usability**	Informs you how nutrient dense your food is.
NFR-2	**Security**	The information is visible to user only and image was secured highly.
NFR-3	**Reliability**	The food packages are important for calculate the calories
NFR-4	**Performance**	It is based on the package of food used for the calorie calculation
NFR-5	**Availability**	It is available for all users to calculate the calorie of the foods
NFR-6	**Scalability**	Increasing the calculation of the calorie in foods

5. PROJECT DESIGN

5.1. DATA FLOW DIAGRAMS

Simplified diagram
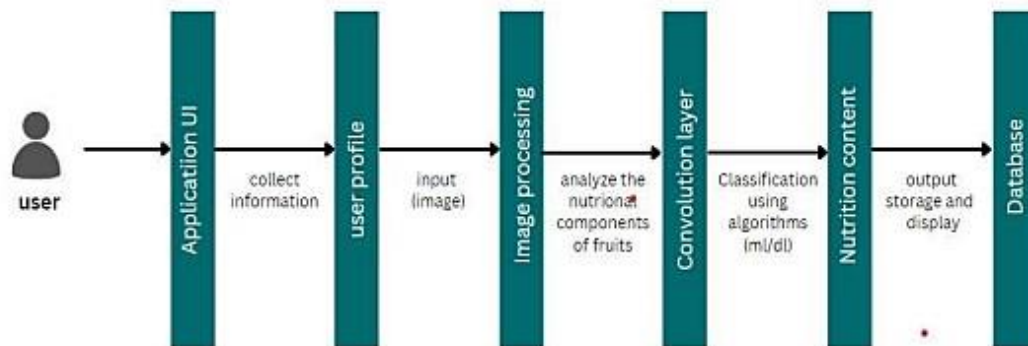
DFD Level 0 (Industry Standard)
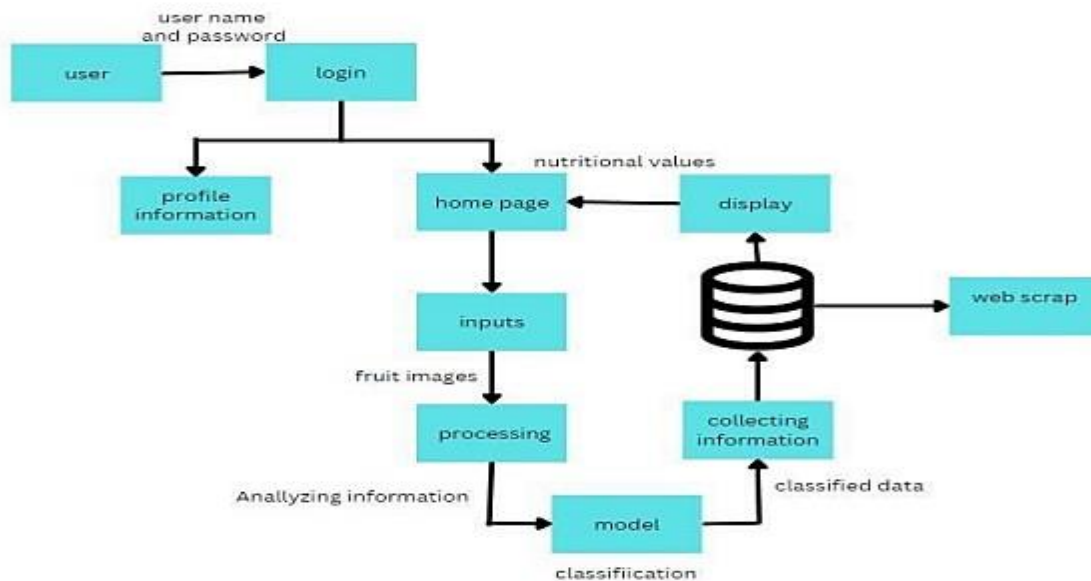
5.2. SOLUTION AND TECHNICAL ARCHITECTURE

Based on the complexity of the deployment, a solution architecture diagram may actually be a set of diagrams documenting various levels of the architecture. The diagram relates the information that you gather on the environment to both physical and logical choices for your architecture in an easily understood manner.
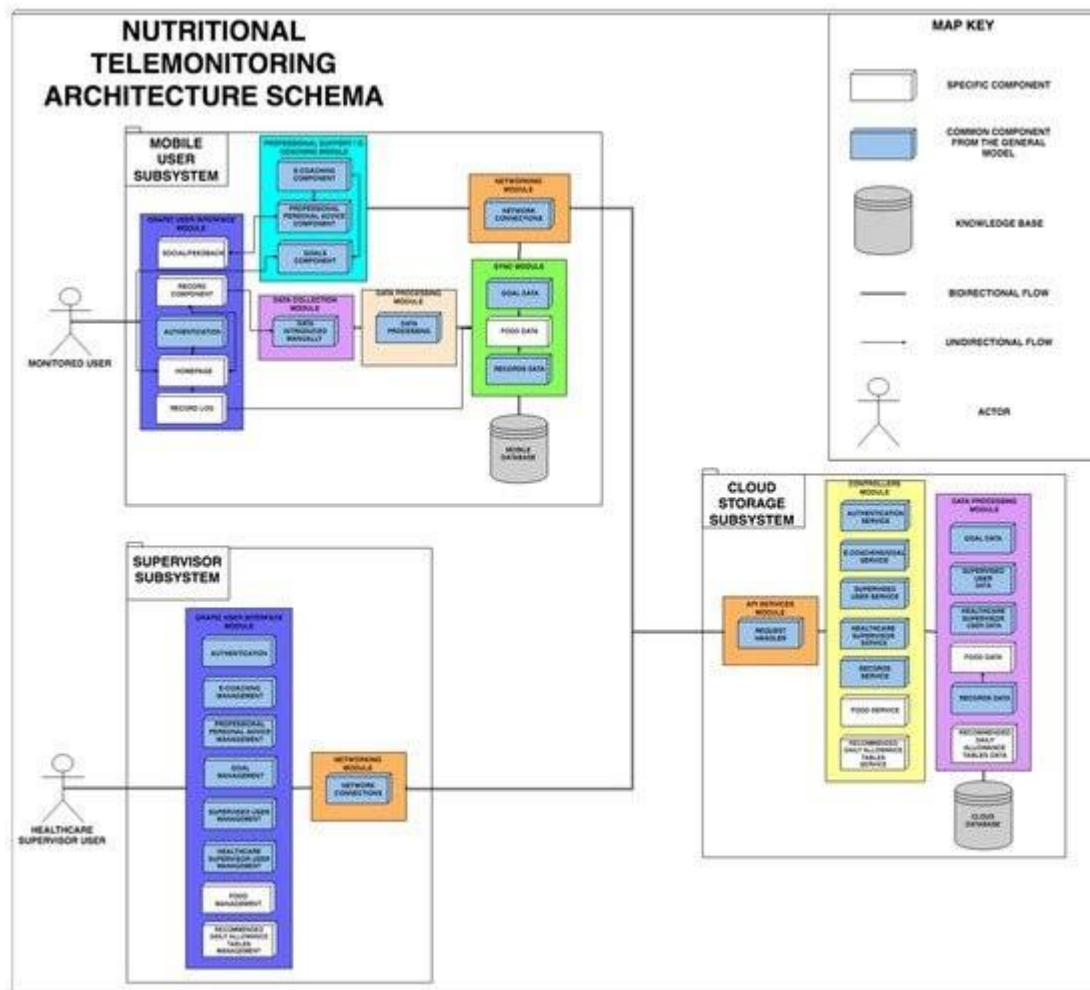
5.3. USER STORIES

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / Dashboard	High	Sprint1
		USN-2	As a user, I will receive confirmation email once have registered for the application	I can receive confirmation email & click confirm	High	Sprint1
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint2

		USN-4	As a user, I can register for the application through Gmail	I can register through already existing mail account.	Medium	Sprint1
	Login	USN-5	As a user, I can log into the application by entering email & password	A user can registration, I can log in via only email & password.	High	Sprint1
	Dashboard	USN-6	Display the nutrition values, line graph / bar graph real me.	I can expect the prediction in various formats.	Low	Sprint3
Customer (Web user)	Login	USN-7	As the user, I can login by using Gmail or Facebook account or LinkedIn or by registering.	Existing users can easily login.	High	Sprint2

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer Care Executive	Support	USN-8	The Customer care service will provide solutions for any FAQ and provide Chat Bot.	I can solve the problems raised.	High	Sprint-3
Administrator	Access Control	USN-9	Admin can control the access of users.	Access permission for Users.	High	Sprint-4
	Database	USN-10	Admin can store the details of users.	Stores User details.	Medium	Sprint-4
	News	USN-11	Admin will give the recent news of food nutrition values	Provide the recent food details.	Medium	Sprint-4
	Notification	USN-12	Admin will notify when the food nutrition values changes.	Notification by Gmail.	High	Sprint-4

6.PROJECT PLANING AND SCHEDULING

6.1. SPRINT PLANNING & ESTIMATION

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Data Collection	USN-1	Download Food Nutrition Dataset	2	Medium	Velan S
Sprint-1	Data Pre-processing	USN-2	Importing the Dataset into Workspace	1	Low	Keerthivasan G
Sprint-1		USN-3	Handling Missing Data	3	Medium	Velan S
Sprint-1		USN-4	Feature Scaling	3	Low	Vijayamurugan S
Sprint-1		USN-5	Data Visualization	3	Medium	Deepak S
Sprint-1		USN-6	Splitting Data into Train and Test	4	High	Velan S
Sprint-1		USN-7	Creating a Dataset with Sliding Windows	4	High	Velan S
Sprint-2	Model Building	USN-8	Importing the Model Building Libraries	1	Medium	Keerthivasan G

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-2		USN-9	Initializing The Model	1	Medium	Vijayamurugan S
Sprint-2		USN-10	Adding LSTM Layers	2	High	Vijayamurugan S
Sprint-2		USN-11	Adding Output Layers	3	Medium	Vijayamurugan S
Sprint-2		USN-12	Configure The Learning Process	4	High	Deepak S
Sprint-2		USN-13	Train the Model	2	Medium	Vijayamurugan S
Sprint-2		USN-14	Model Evaluation	1	Medium	Vijayamurugan S
Sprint-2		USN-15	Save The Model	2	Medium	Velan S
Sprint-2		USN-16	Test The Model	3	High	Deepak S
Sprint-3	Application Building	USN-17	Create a HTML File	4	Medium	Keerthivasan G
Sprint-3		USN-18	Build Python Code	4	High	Vijayamurugan S
Sprint-3		USN-19	Run the App in Local Browser	4	Medium	Deepak S
Sprint-3		USN-20	Showcasing Prediction on UI	4	High	Vijayamurugan S
Sprint-4	Train The Model on IBM	USN-21	Register for IBM Cloud	4	Medium	Deepak S
Sprint-4		USN-23	Integrate Flask with Scoring End Point	8	High	Vijayamurugan S

6.2. SPRINT DELIVERY SCHEDULE

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	03 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	10 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	17 Nov 2022

7. CODING & SOLUTIONING

7.1 FEATURE 1

The aim of pre-processing is an improvement of the image data that suppresses unwilling distortions or enhances some image features important for further processing, although geometric transformations of images (e.g. rotation, scaling, translation) are classified among pre-processing methods here since similar techniques are used.

Code:

```
from google.colab import drive drive.mount('/content/drive')

cd//content/drive/MyDrive/Colab Notebooks/Dataset

import numpy as np
import tensorflow
from tensorflow.keras.models import Sequential
from tensorflow.keras import layers
from tensorflow.keras.layers import Dense,Flatten
from tensorflow.keras.layers import Conv2D,MaxPooling2D,Dropout
from keras.preprocessing.image import ImageDataGenerator

train_datagen =
ImageDataGenerator(rescale=1./255,shear_range=0.2,zoom_range=0.2,horizontal_f
lip =True)
test_datagen=ImageDataGenerator(rescale=1./255)

x_train = train_datagen.flow_from_directory(
r'/content/drive/MyDrive/content/TRAIN_SET',
   target_size=(64, 64),batch_size=5,color_mode='rgb',class_mode='sparse') x_test =
test_datagen.flow_from_directory(
   r'/content/drive/MyDrive/content/TEST_SET',
```

target_size=(64, 64),batch_size=5,color_mode='rgb',class_mode='sparse')

print(x_train**.**class_indices)*#checking the number of classes*

print(x_test**.**class_indices)*#checking the number of classes*

from collections **import** Counter **as** c
c(x_train **.**labels)

7.2. FEATURE 2

MODEL TRAINING ON IBM WATSON STUDIO

! pip install watson-machine-learning-client

```
from ibm_watson_machine_learning import APIClient
wml_credentials = {
    "url": "https://us-south.ml.cloud.ibm.com",
"apikey":"o49g8_rjLtMfFOxWPrBuja8eQPmNZtIKuGy3_MzoZp"}
client = APIClient(wml_credentials)

client = APIClient(wml_credentials)
 def giud_from_space_name(client,space_name):
  space = client.spaces.get_details ()
   return (next (item for item in space['resources'] if
item['entity']['name'] == space_name)['metadata']['id'])
space_uid = giud_from_space_name(client,'Nutrition Analyzer') print("Space
UID = "+ space_uid)
client.set.default_space(space_uid)

client.repository.download('4e26aed0-bb0c-4b3d-8476-9630f3617dc2', 'my_model.tar.gz')
```

8. TESTING

8.1. TEST CASES

A test case is a set of actions performed on a system to determine if it satisfies software requirements and functions correctly. A test case is a document, which has a set of test data, preconditions, expected results and postconditions, developed for a particular test scenario.

8.2. USER ACCEPTANCE TESTING

User acceptance testing (UAT), also called application testing or end-user testing, is a phase of software development in which the software is tested in the real world by its intended audience. UAT is often the last phase of the software testing process and is performed before the tested software is released to its intended market. The goal of UAT is to ensure software can handle real-world tasks and perform up to development specifications. In UAT, users are given the opportunity to interact with the software before its official release to see if any features have been overlooked or if it contains any bugs. UAT can be done in-house with volunteers, by paid test subjects using the software or by making the test version available for download as a free trial. The results from the early testers are forwarded to the developers, who make final changes before releasing the software commercially. UAT is effective for ensuring quality in terms of time and software cost, while also increasing transparency with users.

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
No background image	6	3	2	3	20
Image not uploaded	2	0	3	0	4
Output not visible	3	2	0	1	6
Fixed	9	4	4	20	37
No preview of uploaded image	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	0	5	2	1	8
Totals	20	14	13	26	77

Section	Total Cases	Not Tested	Fail	Pass
Homepage	2	0	0	2
Contents of homepage	5	0	0	51
Background image in homepage	4	0	0	2
Moving to classify page	6	0	0	3
Choose image	4	0	0	9
Uploaded image preview	4	0	0	4
Contents of the output	3	0	0	2
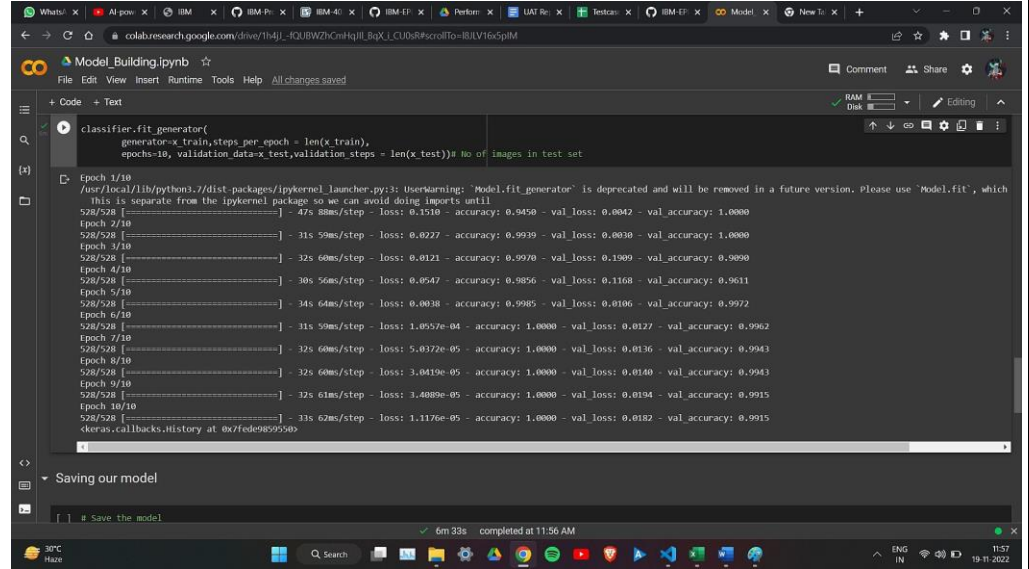
9. RESULTS

9.1. PERFORMANCE METRICS

S.No.	Parameter	Values	Screenshot
1.	Model Summary	**Total params:** 813,733 **Trainable params:** 813,733 **Non-trainable params:** 0	

2.	Accuracy	**Training Accuracy** - 99.2% **Valida on Accuracy** – 98.3%	

10. ADVANTAGES & DISADVANTAGES

ADVANTAGES

There are many advantages to using an AI-powered nutrition analyzer for fitness enthusiasts. Some of these advantages include:

1. The software is powerful and can be used for a long time

The software is easy to operate, powerful, and can be used for a long time. Provide customers with free software upgrades for life.

2. Automated analysis of nutrient content

The instrument is equipped with a spectrum of nutrient analysis software for automatic analysis of nutrient content.

3. It is suitable for food research and development, clinical nutrition, dietitian and other departments

It is suitable for food research and development, clinical nutrition, dietitian and other departments. According to the analysis results, the nutrition of the human body is improved, and the weight loss effect is obvious.

4. To solve the problem of food nutrition labeling

The instrument can quickly and accurately analyze the nutrient content of food, and is an indispensable instrument for solving food nutrition labeling.

5. The instrument is easy to operate, accurate and reliable

The instrument is easy to operate, accurate and reliable. It is an ideal instrument for food analysis, quality control and food research.

DISADVANTAGES

Some of the potential disadvantages of an AI-powered nutrition analyzer for fitness enthusiasts include:

1. They can be expensive.

2. They require you to have a specific food item in order to get accurate results.

3. They can be time-consuming to use.

4. The results can be difficult to interpret.

5. They are not always accurate.

6. They can be frustrating to use.

7. You may not get the results you want.

8. You may not be able to find the right food item.

9. You may not be able to use the results.

10. You may not be able to find the right nutritional analyzer.

11. CONCLUSION

Overall, we believe that the AI-powered nutrition analyzer is a great tool for fitness enthusiasts. It can help them track their diet and ensure that they are getting the nutrients they need. Additionally, it can help them identify areas where they may need to make changes in their diet

12. FUTURE SCOPE

Further enhancement can be made in the future advancement, to develop personalized nutrition plans. The plans could be based on an individual's age, weight, height, gender, activity level, and other factors. The plans could also be customized for specific medical conditions. There is a lot of potential for the Nutritional Analyzer to be used in a variety of settings. For example, it could be used in restaurants to help customers make healthier choices. It could also be used in schools to help students learn about nutrition. Additionally, the Nutritional Analyzer could be used in hospitals and other healthcare settings to help patients make better choices about their diet.

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')#rendering the home page

@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
launch():
    if request.method=='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
```
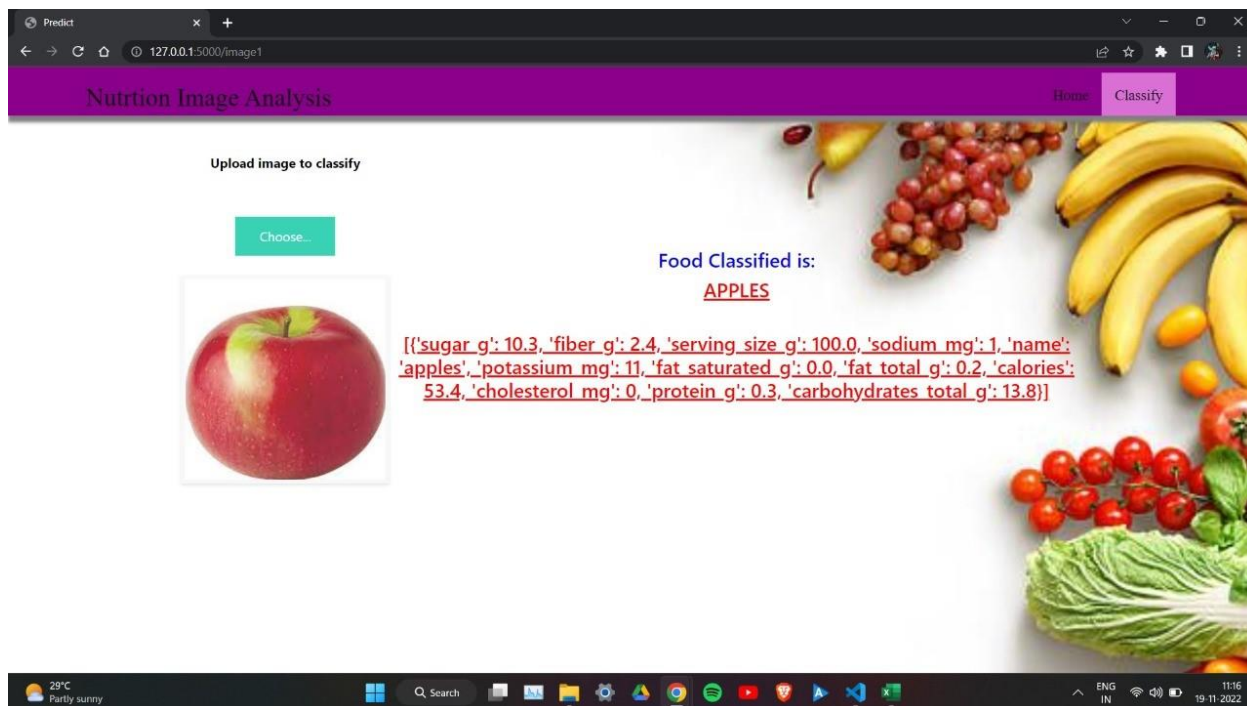
```python
    f.save(filepath)#saving the file
    img=image.load_img(filepath,target_size=(64,64)) #load and reshaping the
image
    x=image.img_to_array(img)#converting image to an array
    x=np.expand_dims(x,axis=0)#changing the dimensions of the image
    pred=np.argmax(model.predict(x), axis=1)
    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),showcase1=(x))
def nutrition(index):
    url = "https://calorieninjas.p.rapidapi.com/v1/nutrition"
    querystring = {"query":index}
    headers = {
        'x-rapidapi-key': "5d797ab107mshe668f26bd044e64p1ffd34jsnf47bfa9a8ee4",
'x-rapidapi-host': "calorieninjas.p.rapidapi.com"
        }
    response = requests.request("GET", url, headers=headers, params=querystring)

    print(response.text)
return response.json()['items'] if
__name__ == "__main__":    #
running the app
    app.run(debug=False)
```
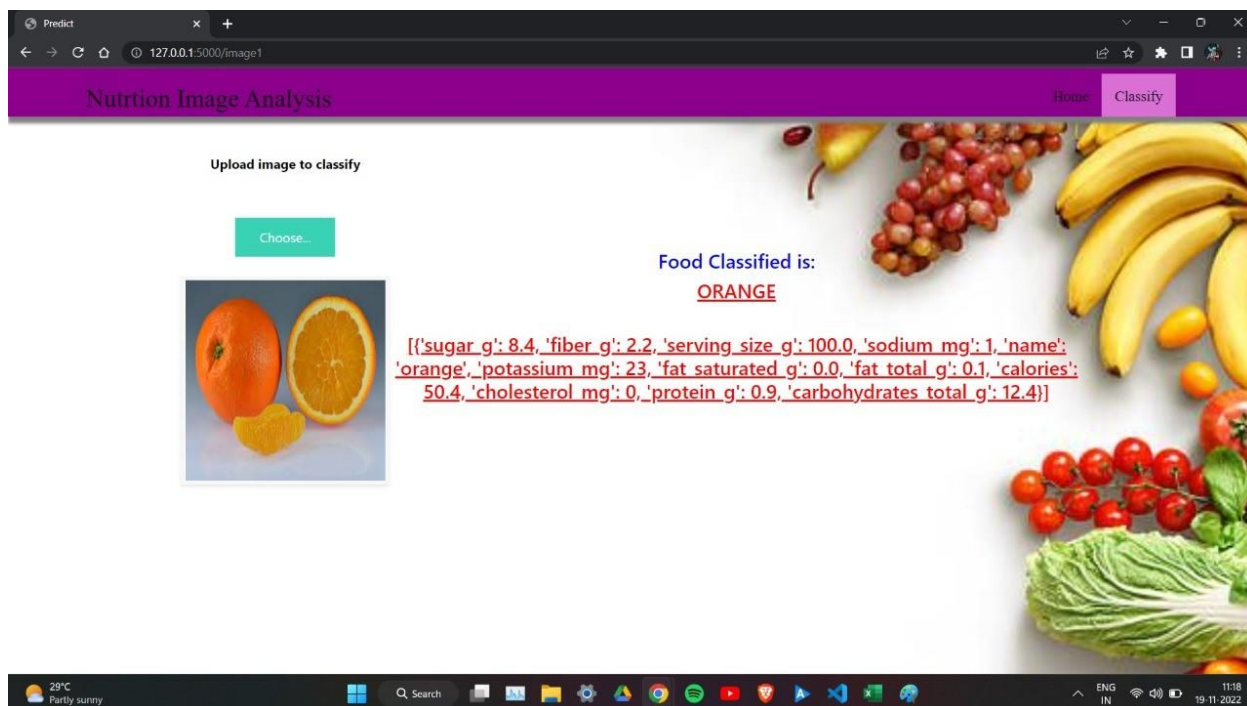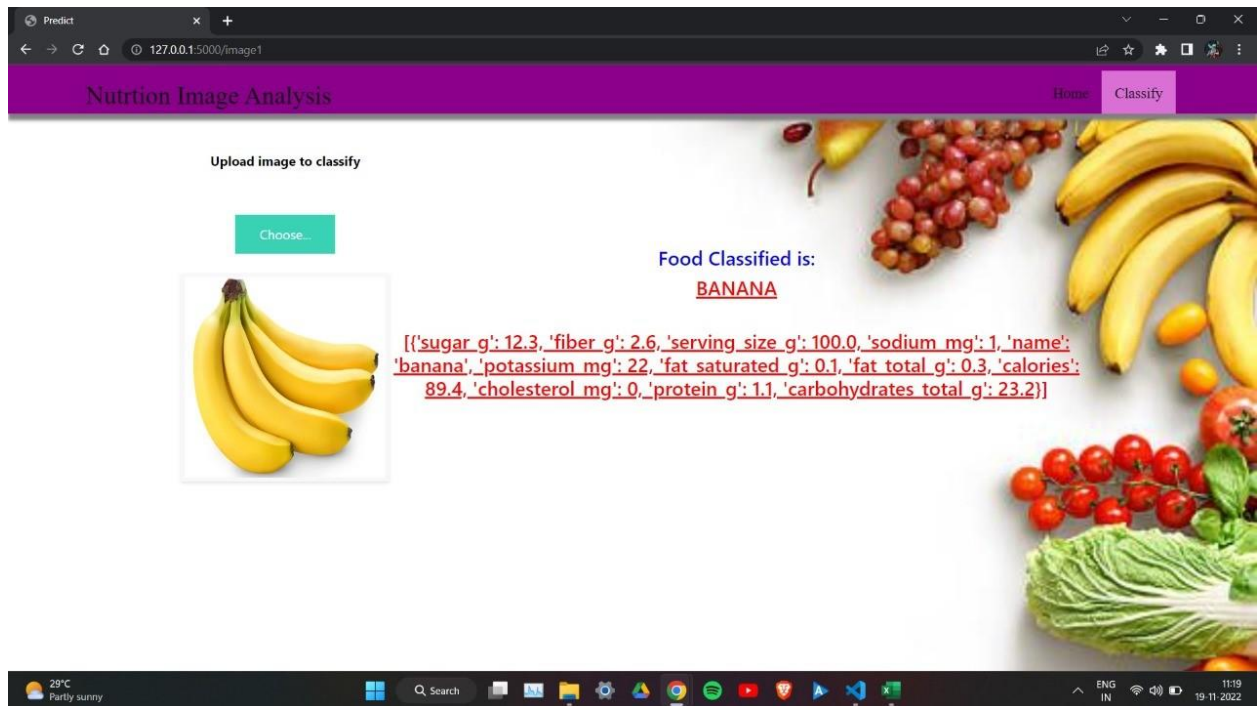
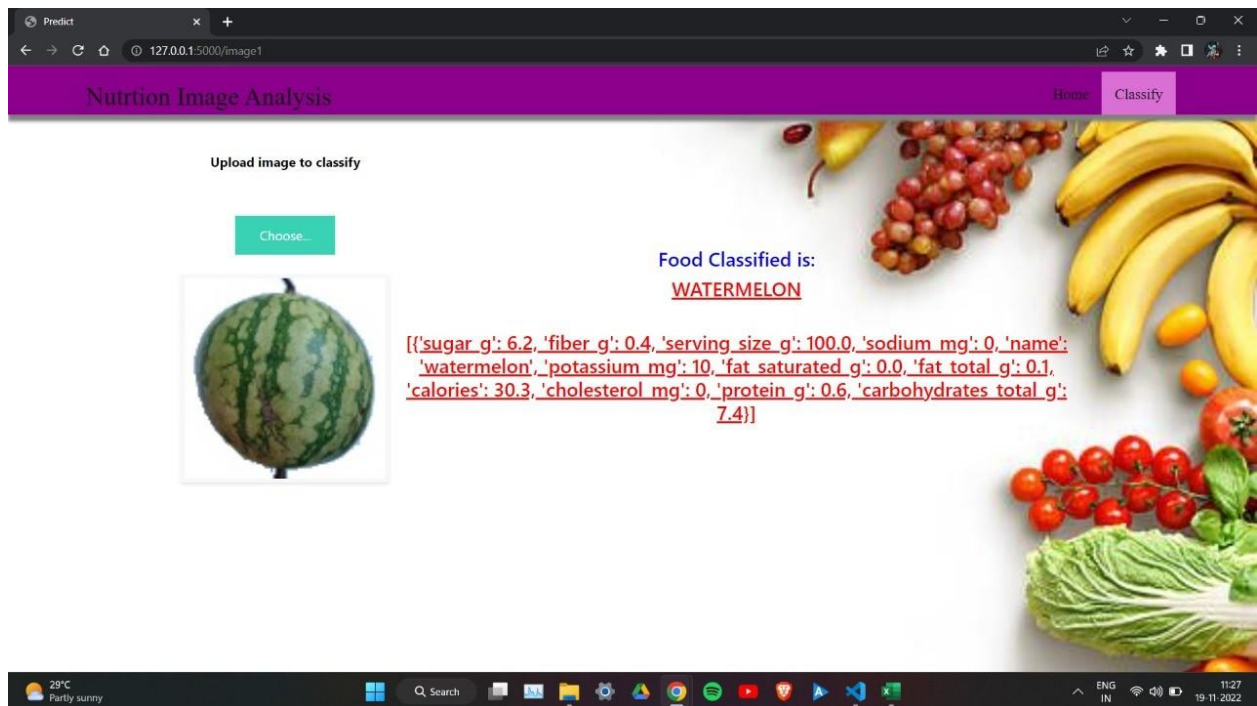## OUTPUT:

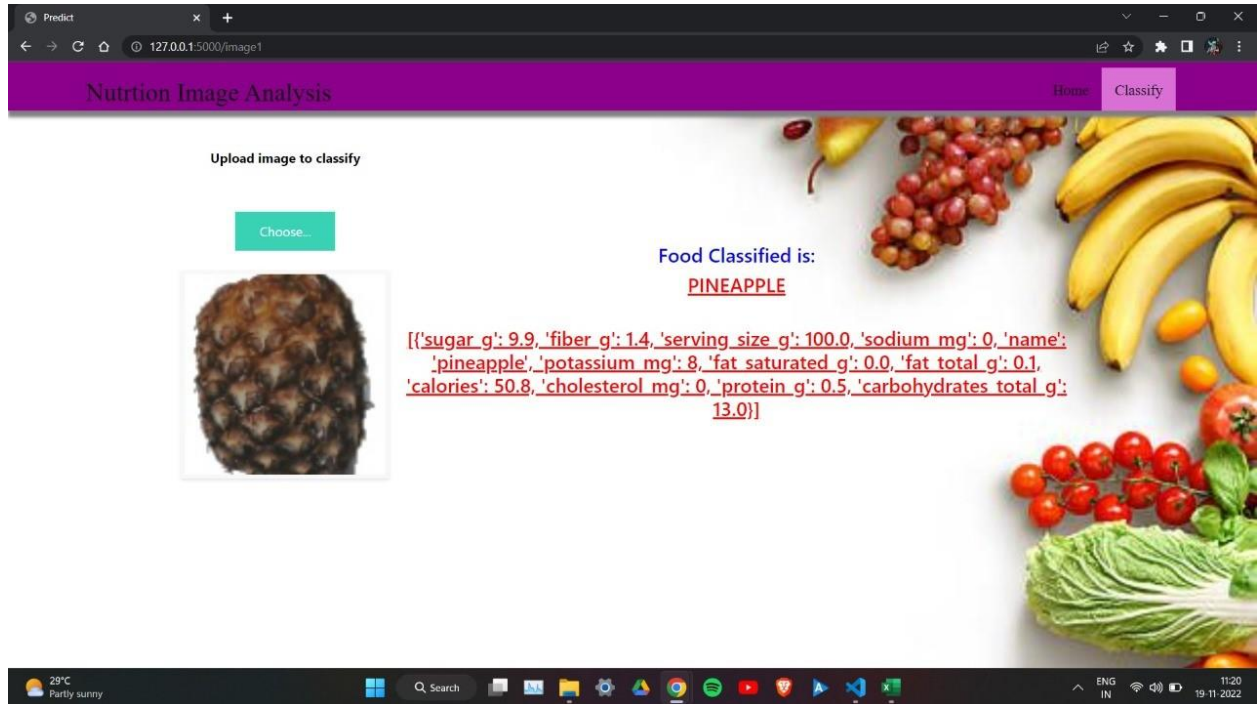### SAMPLE 1:

SAMPLE 2:

SAMPLE 3:

SAMPLE 4:

SAMPLE 5:

GITHUB LINK: https://github.com/IBM-EPBL/IBM-Project-40391-1660628900

PROJECT DEMO LINK: https://youtu.be/F8WHFTWDHj4