

AI -POWERED NUTRITION ANALYZER FOR FITNESS ENTHUSIASTS

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**COLLEGE NAME : CMS COLLEGE OF
ENGINEERING & TECHNOLOGY**

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INTRODUCTION:

1.1 PROJECT OVERVIEW

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.

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 building a model which is used for classifying the fruit depends on the different characteristics like color, 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, Fiber, Protein, Calories, etc.).

1.2 PURPOSE

This Project allows the users to keep track of their diet and exercise regime, take expert advice and connect to other fitness enthusiasts thus equipping them to maintain a healthy lifestyle. The system plans offer its customer and fitness enthusiasts many beauty tips options that can help them reach their goals. This project vision is to build the world's largest online health and fitness service. It wants to help millions of consumers achieve their goals by Engaging with nutritionists and other health experts empowered with artificial intelligence. Developed for android the app takes a holistic lifestyle tracking approach to keep users engaged and motivated. Health- tech took an initiative to help people lead a healthy and fit lifestyle. This introduced a free immunity assessment test on the app and also offering a free consultation to those who score low on immunity and make its users stand strong in their home workouts; daily live Workouts with coaches and trackers for sleep, smoking, walking, running and drinking water. Users can access all these services under the Immunity Tab of the Healthy app.

LITERATURE SURVEY:

In both experimental and clinical medicine, artificial intelligence (AI), a subfield of computer science, is increasingly used to simulate thought processes, learning capacities, and knowledge management. There has been growth in recent decades. In the biomedical sciences applications of AI. The potential applications of artificial intelligence in the fields of medical diagnosis, risk assessment, and treatment technique support are expanding quickly. These studies were classified into three categories: AI in nutritional epidemiology (13 studies), AI in clinical nutrients research (22 studies), and AI in biomedical nutrients research (20 studies). The artificial neural network (ANN) technology was discovered to be prevalent in the collection of studies on the generation of nutrients and food composition. However, research on the impact of nutrition on how the human body functions in health and sickness as well as research on the gut microbiota heavily utilised machine learning techniques. In-depth learning . In a series of studies on clinical nutritional consumption, algorithms predominated. The evolution of AI-powered nutritional systems could result in the development of a global network that can to actively assist and keep an eye on the individualised nutrient supply.

2.1 Existing Problem

The categorization of images has been the subject of numerous research. The earliest effort to create a produce recognition system for use in supermarkets was called Veggie Vision. The system was able to gather more information since it could evaluate texture, colour, and density. denser than determined by dividing the fruit's weight by its surface area. The claimed accuracy was around 95% when texture and colour features were added. Fariaetal provided a classifier framework. Fusion for automatic produce recognition in supermarkets. To increase the recognition rate, they merged low-cost classifiers that had been trained on particular classes of interest. Using statistical texture traits and colour histograms, Chowdhury et al. identified 10

different vegetables. They used a neural network as a classifier and achieved a classification accuracy of up to 96.55%. For the purpose of identifying and categorising the 15 various sorts of images produced, Dubey presented a framework. In this method, the region of interest is extracted from an image via segmentation, and the calculated a multi-stage learning algorithm is utilised to train and classify the segmented region using attributes from that segmented region by a machine of the support vector type. They also suggested an enhanced sum and difference histogram (ISADH) texturing feature for this particular type of issue. The robot's ability to harvest well is heavily impacted by fruit detection because the environment is unstructured and the lighting is always changing. Bulanonet al. used a red chromaticity coefficient to enhance the area of fruit in images and used a circle detection technique to categorise specific fruits. Jimenez et al. created a technique that can recognise spherical fruits in environments that are challenging to identify, such as occlusions, shadows, bright areas, and overlapping fruits. Data on range and attenuation a laser range-finder sensor detects, and the fruit's 3-D position with radius and after completing the recognition processes, reflectance is achieved.

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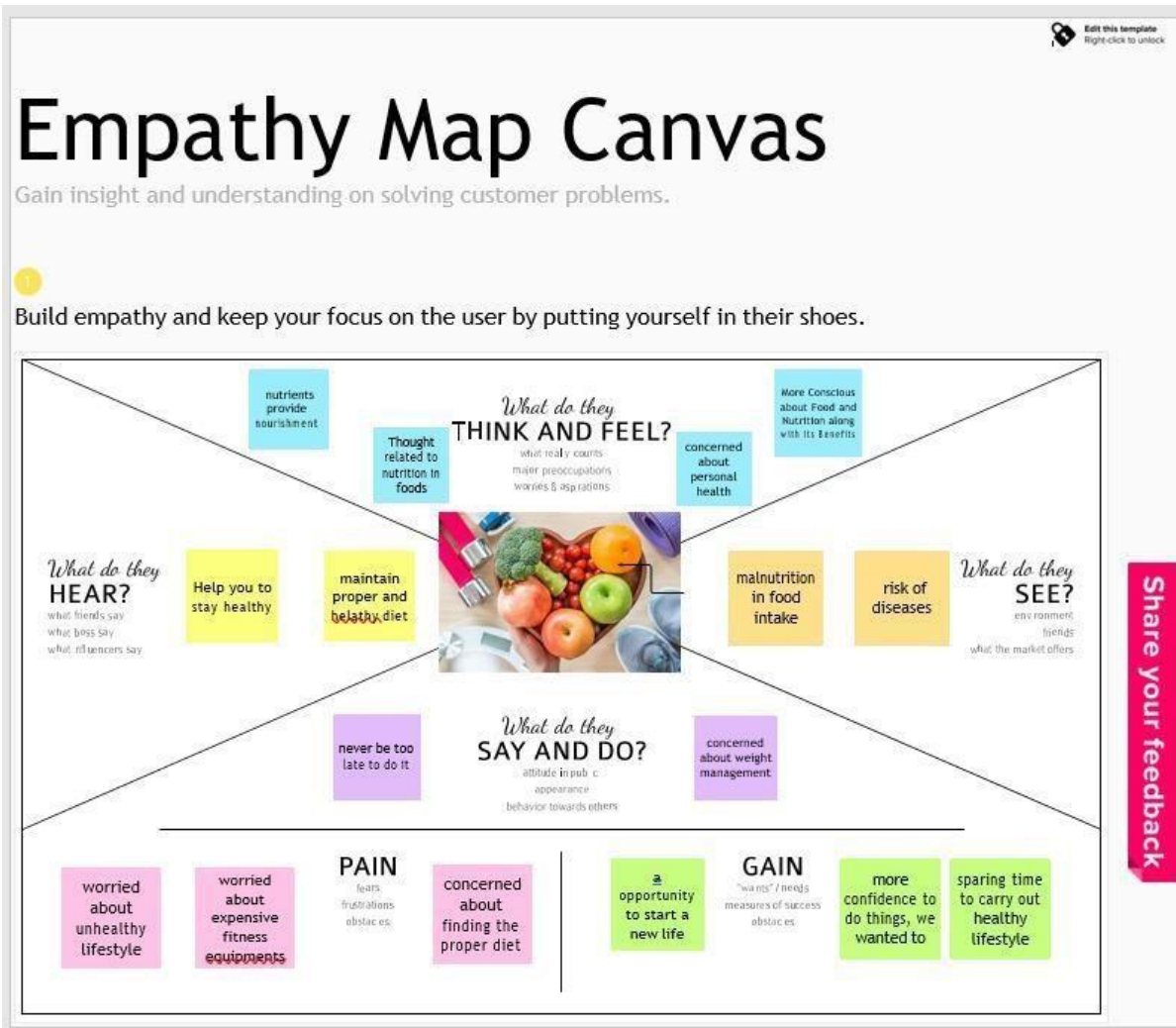
2.3 Problem Statement Definition

Due to change in food habits people do not get aware of food items. Our

project is to get details about food nutritions, carbohydrate, protein and fat. Nutritional awareness is also related to knowledge of the interrelationships between nutritional matters and human life, which may have an effect on a person's life. The World Health Organisation (WHO) data reveals that more than 60% of world's population is not physically active enough to induce health benefits.

3. IDEATION & PROPOSED SOLUTION:

3.1 Empathy Map



3.2 Ideation & Brainstorming

Template

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

- Team gathering**
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.
- Set the goal**
Think about the problem you'll be focusing on solving in the brainstorming session.
- 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 a smooth and productive session

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

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 button to start drawing!

NIVYA AVANTHIKA

BHAYNA

RITHIKA

SANTHOSH

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

NUTRITIONAL

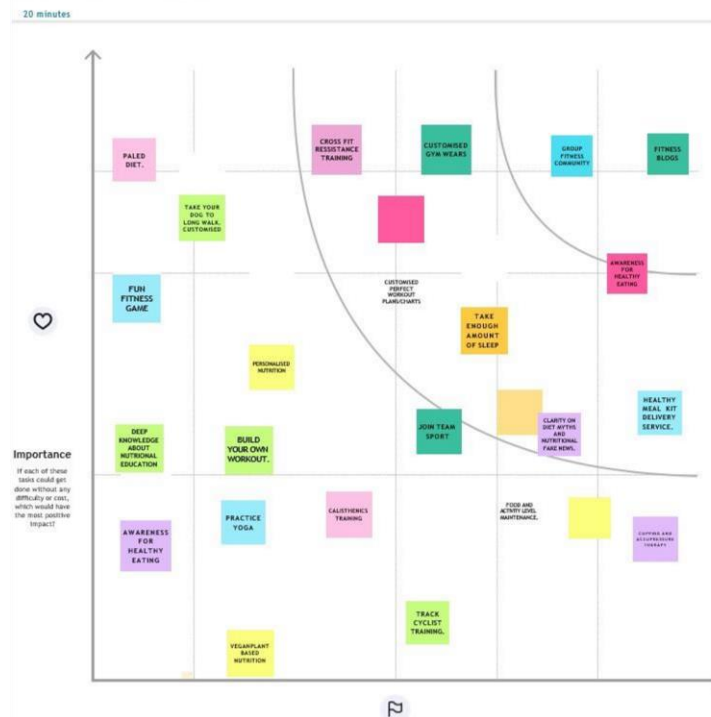
WORKOUT

PROGRAMS

Share template feedback

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.



After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

Quick add-ons

- Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.
- Export the mural
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.



Keep moving forward

- Strategy blueprint
Define the components of a new idea or strategy.
Open the template →
- Customer experience journey map
Understand customer needs, motivations, and obstacles for an experience.
Open the template →
- Strengths, weaknesses, opportunities & threats
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.
Open the template →

3.3 PROPOSED SOLUTION

In this era, smart devices are playing an increasingly important role in daily life, and the use of smart devices for the treatment of various diseases is not uncommon. To accomplish this goal, we propose a system or application to assist normal people as well as obese people in balancing their diet by measuring daily intake food attributes and ingredients through their ease. The proposed application will enable the user to figure out the content of the food item by providing the photograph of food to the system. The application will detect the food items within the photograph and recognize them using Convolution Neural Network. The system will also be able to estimate the food attributes by crawling data from the Internet. The proposed system will allow not only the obese person but also the healthy person so that people can plan well for their daily intake calories. We will contribute to this thesis in the following ways.

- We propose a transfer learning based novel system that automatically performs the exact classification of the food image and estimates the food attributes.
- We present the dataset for evaluating current system and other deep learning-based recognition systems that will be developed in the future.
- There is no data set that contains subcontinental dishes available to the public, we created a new set of data that includes both subcontinental and other common cuisines

REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS

1. USER REGISTRATION:

Interacting the user through web interface and automated voice to answer the user queries and to guide them in a proper way to maintain their fitness. In the web interface, there will be separate and special features for the registered user to get personalized and well-defined advice and good practice lectures to maintain their fitness. All the registered users will be verified with either email or mobile number based on their interest in giving their information, but the verification is a must one. For non-registered users, the user can visit the website free of cost and can check the nutrient value in the fruits and vegetables, and also can view the common practices for fitness.

2. USER MANAGEMENT:

Creating a group of people, who are willing to be fit in their health and making them organized in a sample place, through which they can collaborate and also can achieve their goals with others, by encouraging each other. The application

gives the ability to ask questions about a problem in the fitness groups, through which they can work effectively.

3. USER SATISFYING:

The satisfaction of each user is a must, so UI/UX should be more than enough to engage the user in the platform and the performance of the application should be optimized in order to keep every user for a long time. On an periodic interval (like once in month), we need to interact one to one with each and every user to solve the queries.

4. USER ENGAGEMENT

The user should be engaged in the application at least Once a day to get notified about the latest and good practice on fitness which is recommended by the backend model.

4.2 NON-FUNCTIONAL REQUIREMENTS

1. 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.

2. SECURITY:

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 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. With the proper guide and proper information in which we can get a nutrition properly and we can have got a proper fitness plan.

3. RELIABILITY:

It should also provide the information on nutrition and health which it should prevent from health information on diseases, health risks and prevention guidelines. It should also provide 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 contain the calorie information, balanced diet plans, what type food can be consumed at what time etc. So, by this way it can be reliable.

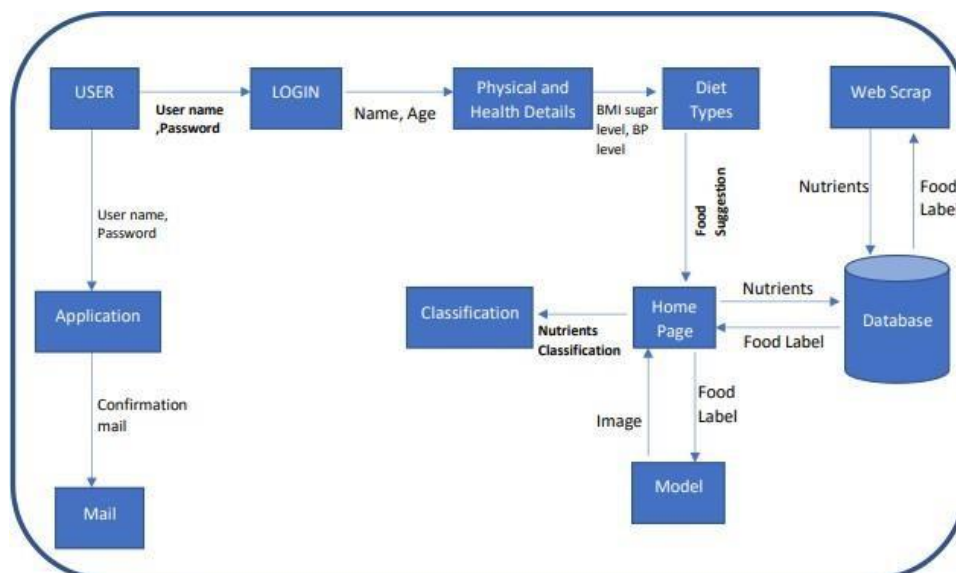
4. PERFORMANCE:

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

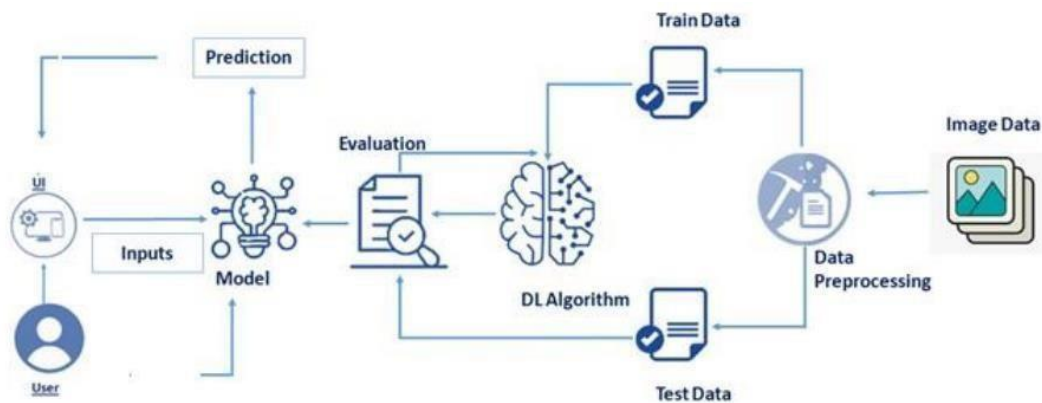
. While consuming the page it should provide the response as much as possible without any delay or time traffic. The connection should e properly maintained so that it can use while travelling or in remote places.

PROJECT DESIGN

5.1 Data Flow Diagrams



5.2 Solution & Technical Architecture



5.3 User Stories



PROJECT PLANNING & SCHEDULING

6.1 SPRINT PLANNING & ESTIMATION

Sprint	Functional Requirement (Epic)	User Story Number	User Story/ Task	Story Points	Priority	Team Member
--------	-------------------------------	-------------------	------------------	--------------	----------	-------------

Sprint-1		USN-0	As a developer I have to collect different type of data supporting the model	5	High	Nivya Avanthika .S
Sprint-1		USN-1	As a user, I can register for the application by entering my email, password, and confirming my password	5	High	Bhavna .N
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	5	High	Rithika .A.B
Sprint-2		USN-3	As a user, I will receive confirmation email once I have registered for the application	3	Low	Santhosh .N
Sprint-1		USN-4	As a user, I can register for the	3	Medium	
			application through Gmail			Nivya Avanthika .S
Sprint-1	Login	USN-5	As a user, I can log into the application by entering email & password	5	High	Bhavna .N

Sprint-2	Model building	USN-6	As a user, I can log into the application by entering email & password	5	High	Rithika .A.B
Sprint-2	Main Interface	USN-7	As a user I can view my calorie intake by clicking photo of the food I eat	5	High	Santhosh .N
Sprint-2	Package, Dashboard	USN-8	As a user I can choose variety of packages based on my requirement	4	Medium	Nivya Avanthika .S
Sprint-3	Diet plan for free users	USN-9	As a dietitian I provide daily plans for the betterment of the user	5	High	Bhavna .N
Sprint-3	Personalized food habit based diet plan for premium users	USN-10	As a Premium User, I can choose to follow diet plan based on my food habits or the generalized one	3	Medium	Rithika .A.B
Sprint-2	User image analysis	USN-11	As a user I can track my calorie	5	High	Santhosh .N
			intake, and know about my food in detail			

Sprint-3	Improve efficiency of AI model	-	As a developer I have to give a better model that will analyse food precisely and provide accurate results	3	Medium	Nivya Avanthika .S
Sprint-2	User Analysis record	USN-12	As a user, I can check the previous records and I can analyse my food habits	4	Medium	Bhavna .N
Sprint-4	Fitness tips and basic exercises	USN-13	As a user I can follow some fitness tips and I can maintain weight as required	5	Medium	Rithika .A.B
Sprint-4	Home remedies	USN-14	As a user I can follow some natural home remedies for common diseases like (cold, cough, fever) and treat myself	5	High	Santhosh .N
Sprint-4	Optimize the user experience with the app	-	As a developer I have to provide clean and smooth interface to my user	5	High	Nivya Avanthika .S
Sprint-1	Payment Gateway for	-	As a developer I	3	Medium	Bhavna .N

	purchasing package		have to create a environment which makes user feel ease to complete his/her Payments with various Payment options			
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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 ADD	6 days	21-Oct 2022	29-Oct 2022	23	28-Oct 2022
Sprint-2	20	6 days	31-Oct 2022	05-Nov 2022	26	04-Nov 2022
Sprint-3	20	6 days	07-Nov 2022	12-Nov 2022	11	11-Nov 2022
Sprint-4	20	6 days	14-Nov 2022	19 - Nov 2022	18	17-Nov 2022

COADING & SOLUTIONING

7.1 Feature-1

```
App.py 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
```

```

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)

```

```

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 for numerical
import numpy as np # used analysis to load our
from tensorflow.keras.models import load_model # trained model
from tensorflow.keras.preprocessing import image 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 filepath = 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), 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"
    }

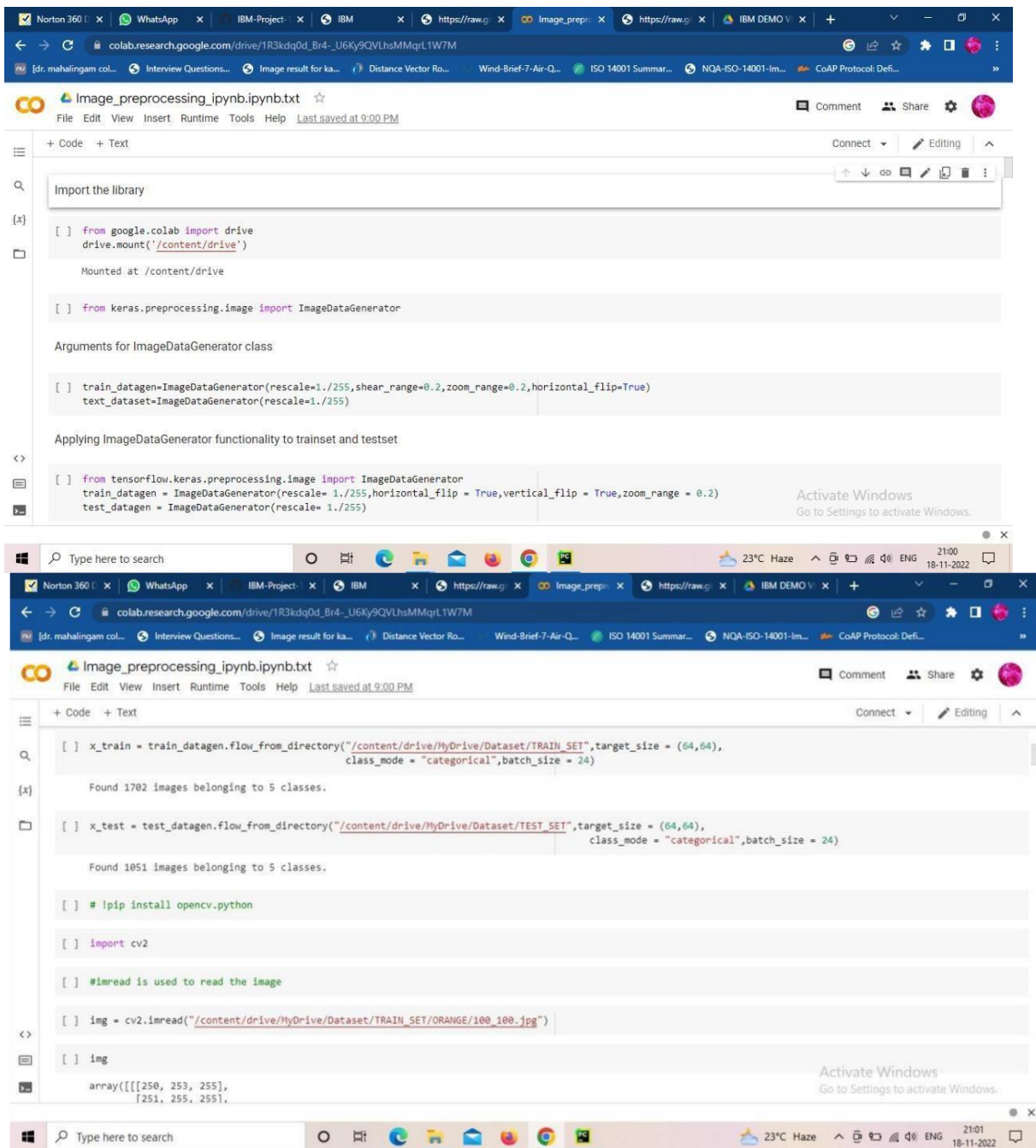
    response = requests.request("GET", url, headers=headers, params=querystring)

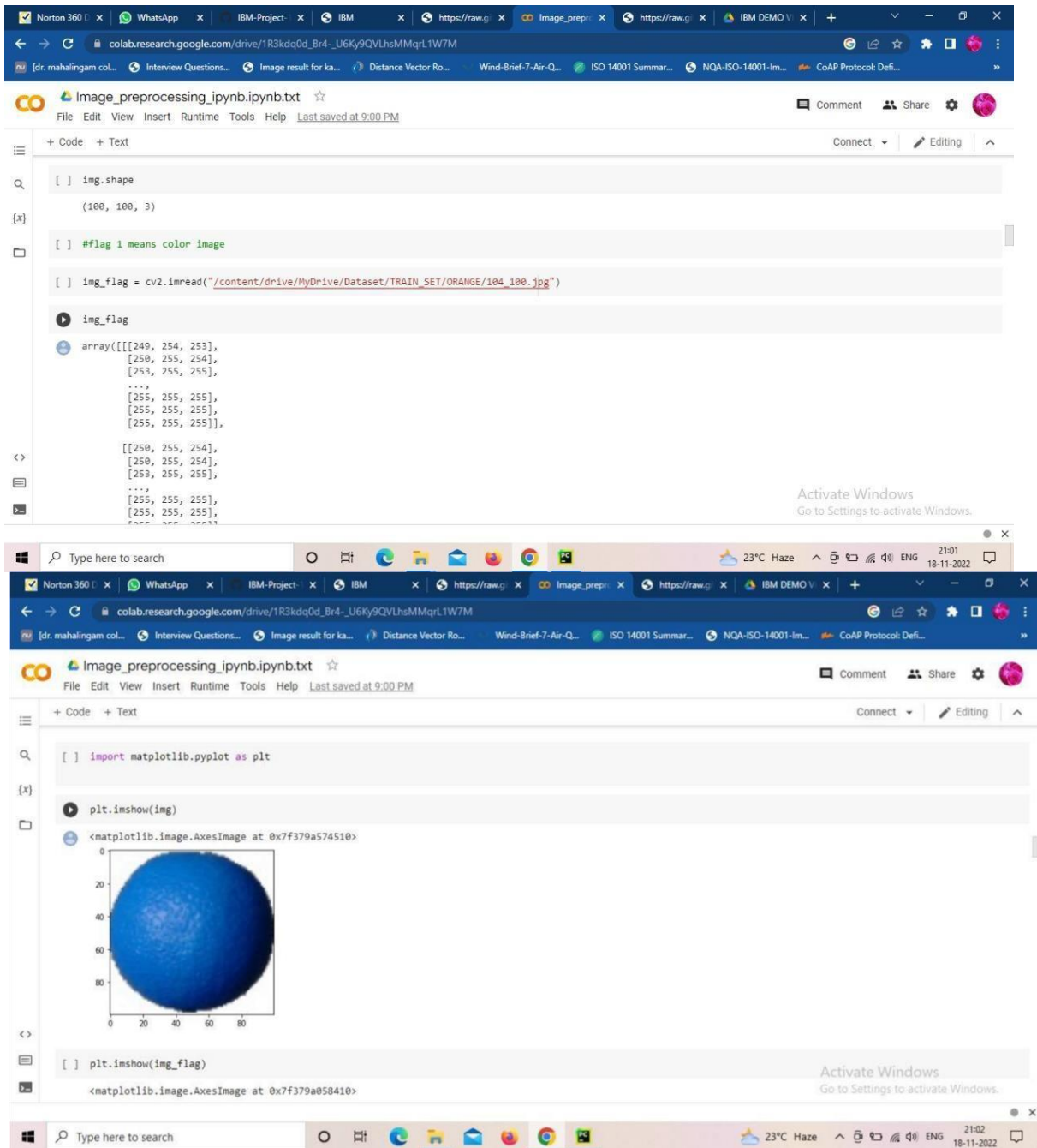
    print(response.text)
    return response.json()['items']

if __name__ == '__main__':
    # running the app
    app.run(debug=False)

```

7.2 Feature-2



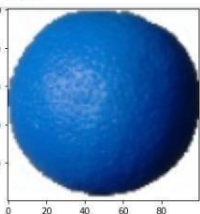


colab.research.google.com/drive/1R3kdq0d_Br4_U6Ky9QVLhsMMqrl1W7M

Image_preprocessing.ipynb.txt

Code

```
[ ] #resize the image
[ ] resized_img = cv2.resize(img,(100,100))
[ ] resized_img.shape
(100, 100, 3)
[ ] plt.imshow(resized_img)
```



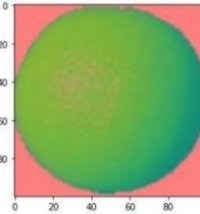
Activate Windows
Go to Settings to activate Windows.

colab.research.google.com/drive/1R3kdq0d_Br4_U6Ky9QVLhsMMqrl1W7M


Image_preprocessing.ipynb.txt

Code

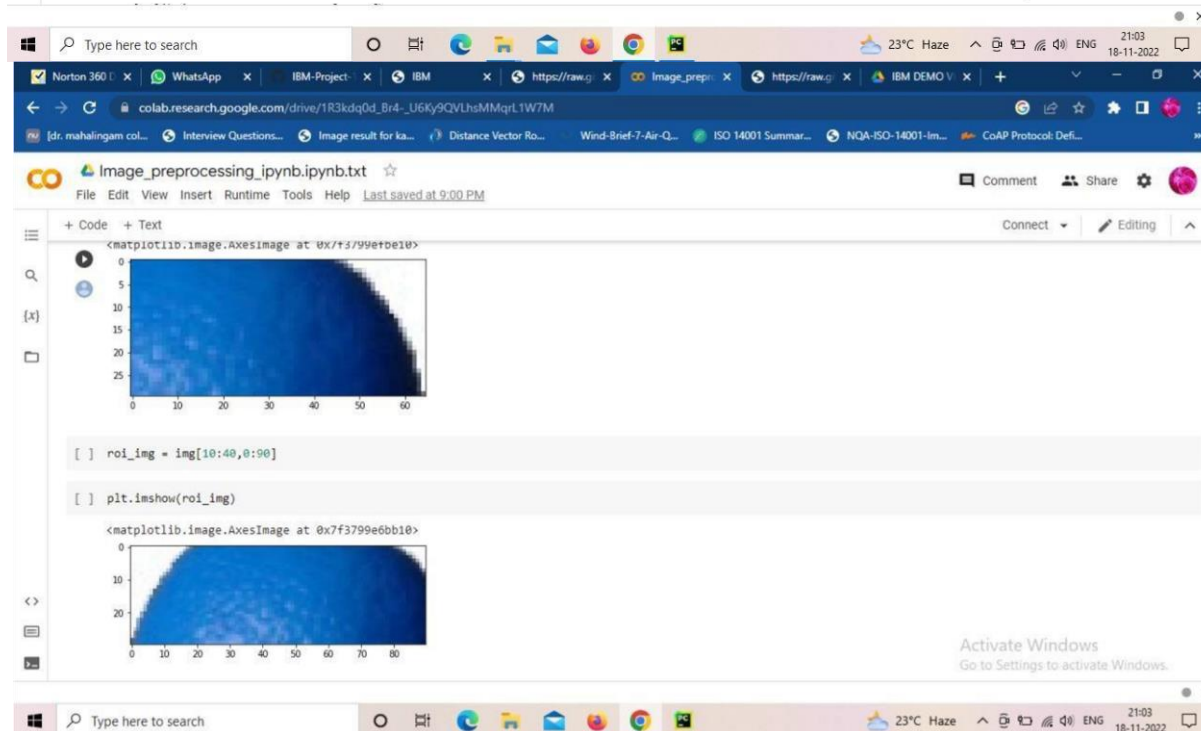
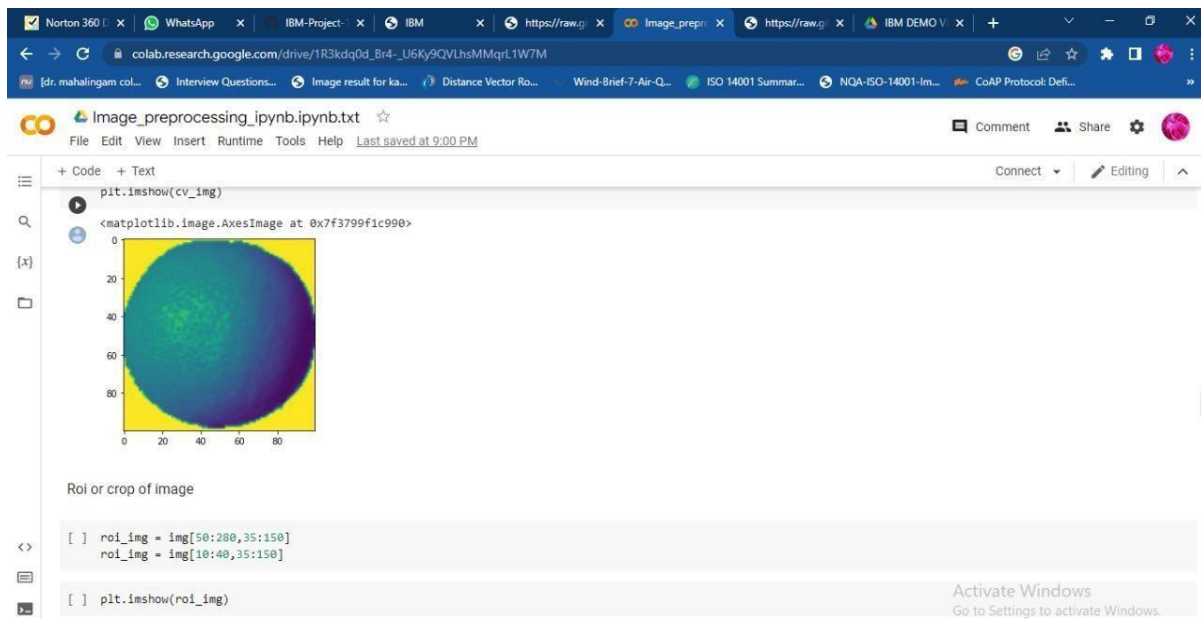
```
plt.imshow(cv_img)
<matplotlib.image.AxesImage at 0x7f3799fa8b50>
```

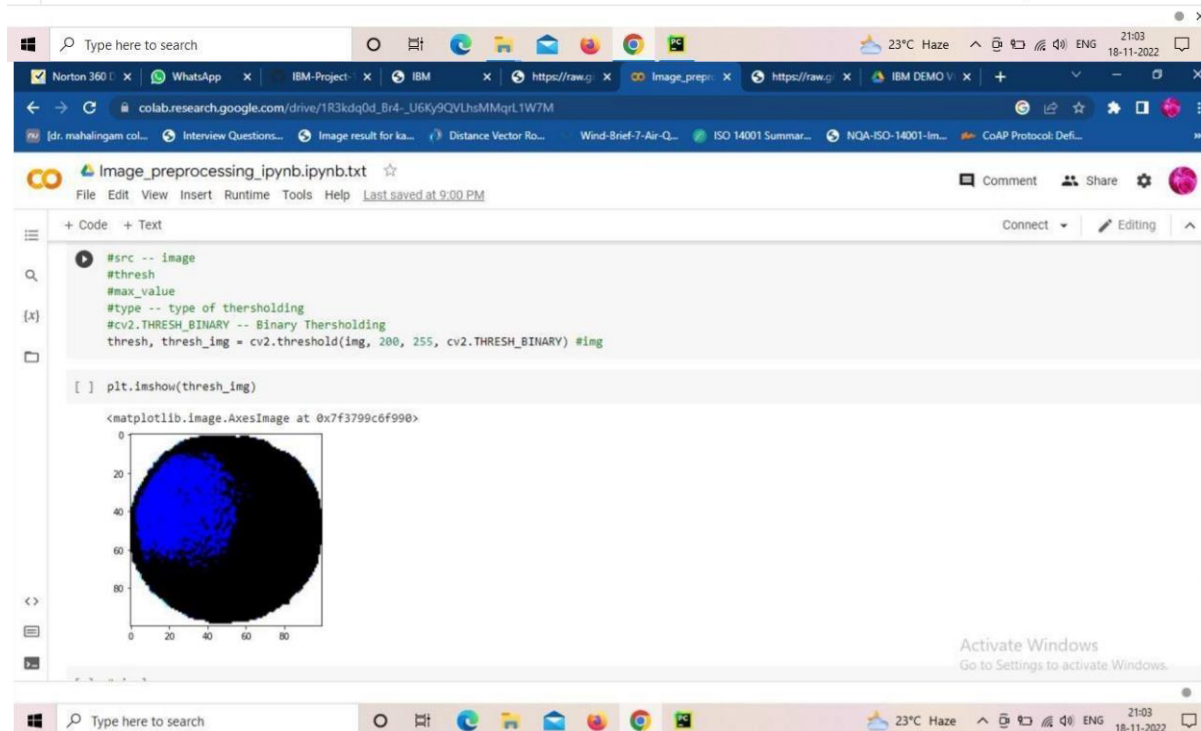
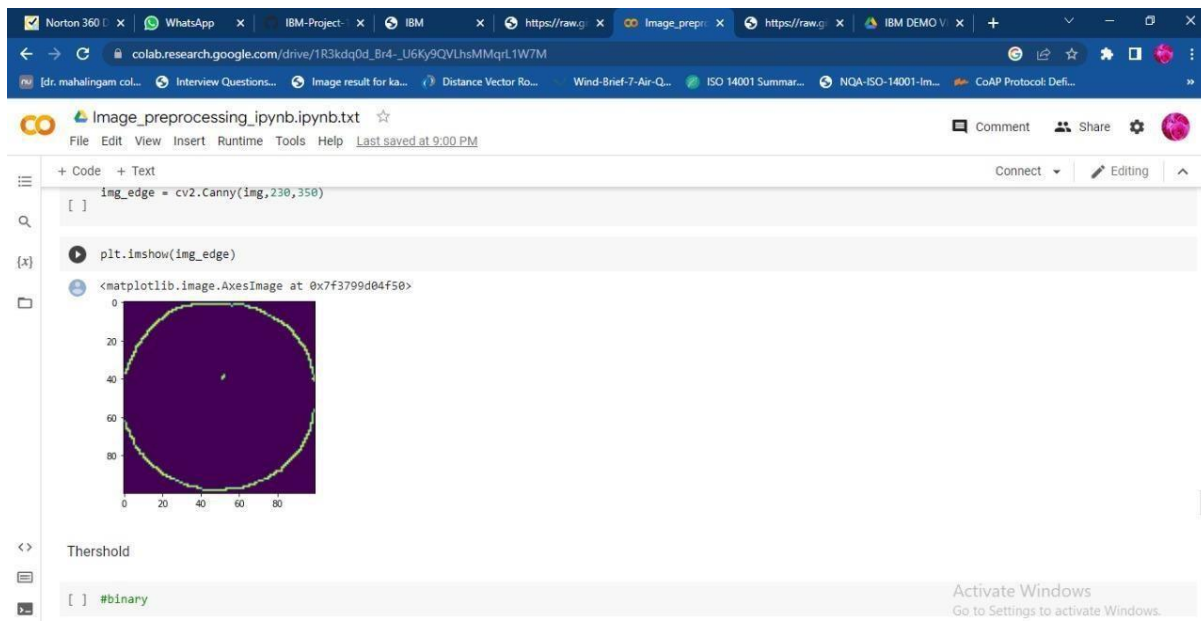


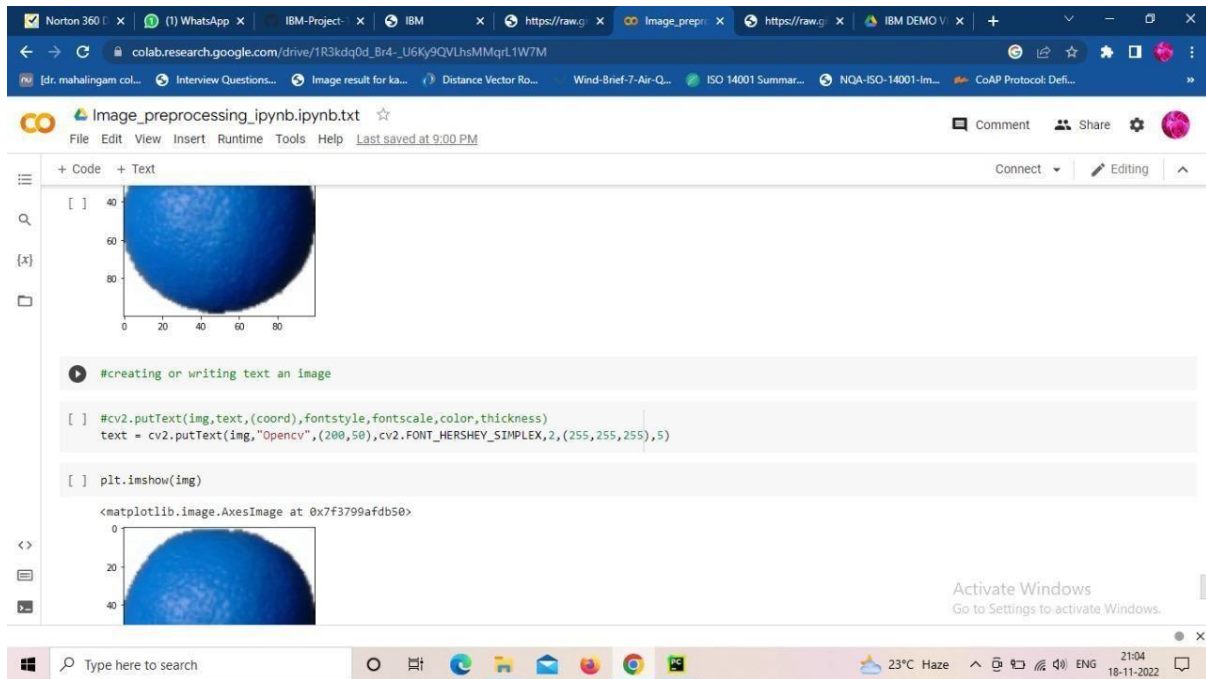
```
[ ] cv_img = cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)
[ ] plt.imshow(cv_img)
<matplotlib.image.AxesImage at 0x7f3799f1c990>
```



Activate Windows
Go to Settings to activate Windows.

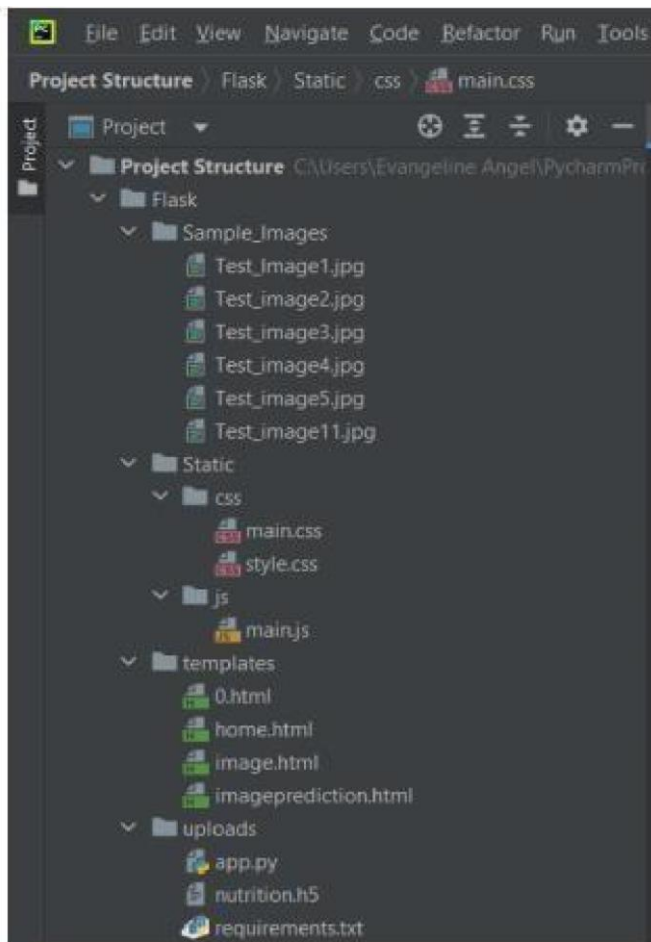






TESTING

8.1 TEST CASES:





8.2 USER ACCEPTANCE TESTING:

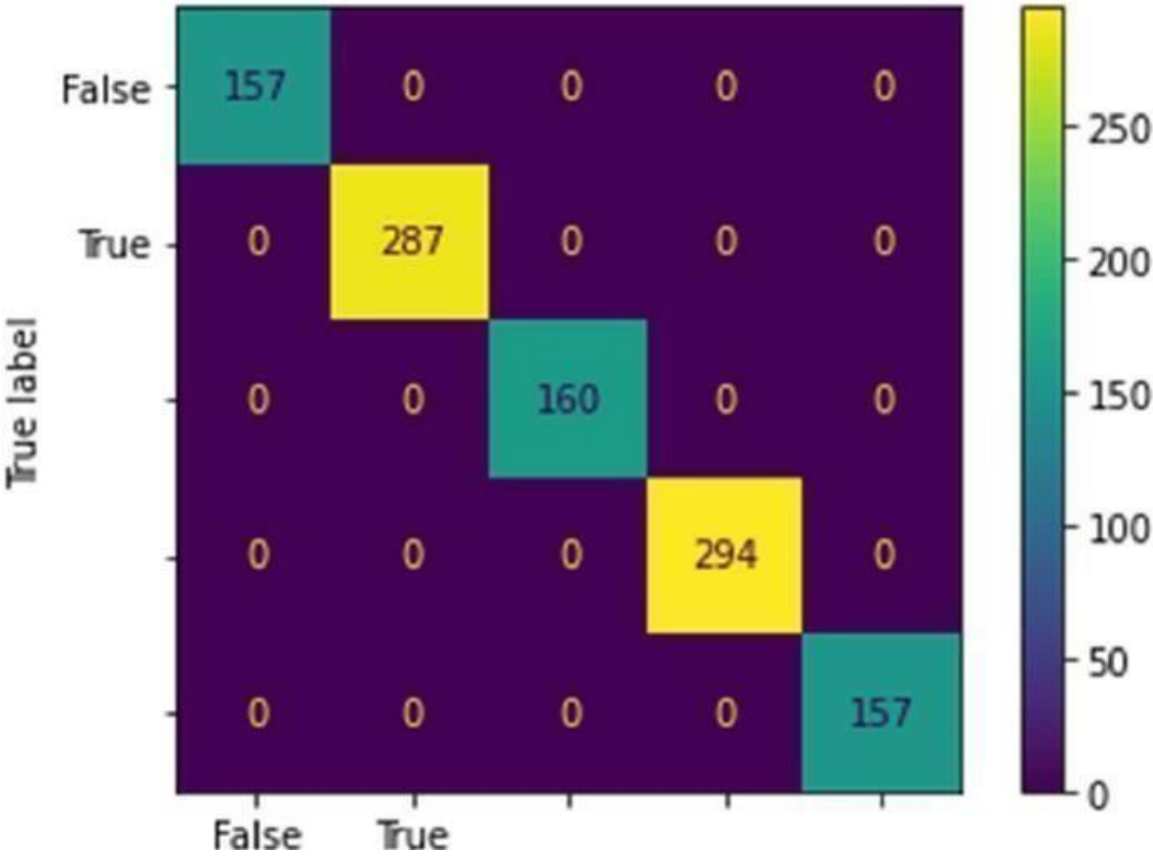


9. RESULTS:

9.1 PERFORMANCE METRICS

3. Precision – 100 %

1. Confusion Matrix



```
print(metrics.classification_report(test_data['label'].values, test_data['model_preds'].values))
```

	precision	recall	f1-score	support
0	1.00	1.00	1.00	157
1	1.00	1.00	1.00	287
2	1.00	1.00	1.00	160
3	1.00	1.00	1.00	294
4	1.00	1.00	1.00	157
accuracy			1.00	1055
macro avg	1.00	1.00	1.00	1055
weighted avg	1.00	1.00	1.00	1055

2. Accuracy – 100 %

```
[8] print(f"the accuracy is {metrics.accuracy_score(test_data['label'].values, test_data['model_preds'].values)}")  
the accuracy is 1.0
```

```
[11] print(f"the precision is {metrics.precision_score(test_data['label'].values, test_data['model_preds'].values, average = 'weighted')}")  
the precision is 1.0
```

4. Recall – 100 %

```
✓ [12] print(f"the recall is {metrics.recall_score(test_data['label'].values, test_data['model_preds'].values, average = 'weighted')}")  
the recall is 1.0
```

5. Specificity – 100 %

specificity 100 %

```
▶ print(f"the specificity is {metrics.recall_score(test_data['label'].values, test_data['model_preds'].values, pos_label=0, average = 'weighted')}")  
the specificity is 1.0  
1.0 - 100 %
```

6. F1-Score – 100 %

```
✓ [13] print(f"the f1 score is {metrics.f1_score(test_data['label'].values, test_data['model_preds'].values, average = 'weighted')}")  
the f1 score is 1.0
```

```
Console 1/A x
Python 3.9.12 (main, Apr 4 2022, 05:22:27) [MSC v.1916 64 bit (AMD64)]
Type "copyright", "credits" or "license" for more information.

IPython 8.2.0 -- An enhanced Interactive Python.

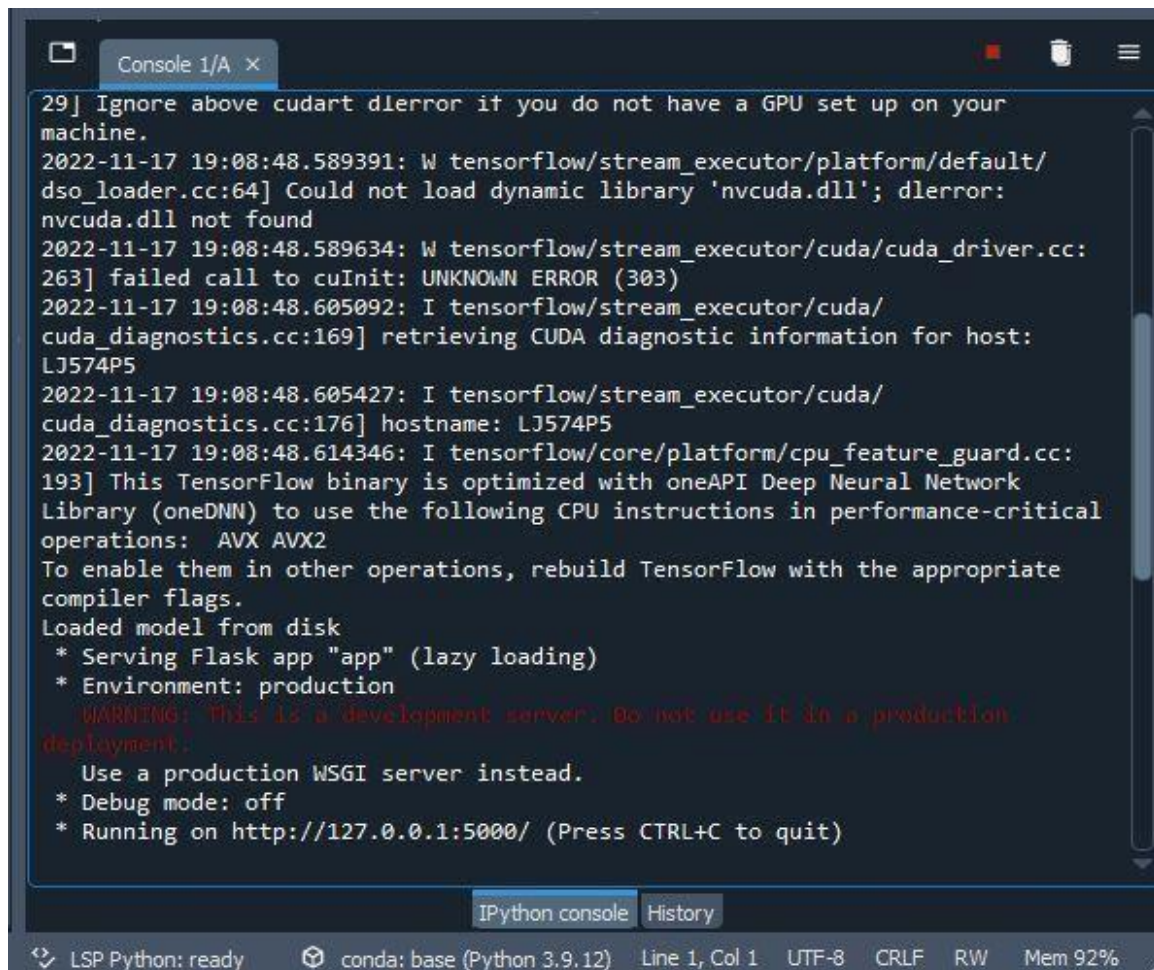
In [1]: runfile('D:/Flask/app.py', wdir='D:/Flask')

2022-11-17 19:08:34.338872: W tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could not load dynamic library 'cudart64_110.dll'; dLError: cudart64_110.dll not found
2022-11-17 19:08:34.340229: I tensorflow/stream_executor/cuda/cudart_stub.cc:29] Ignore above cudart dlerror if you do not have a GPU set up on your machine.

2022-11-17 19:08:34.338872: W tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could not load dynamic library 'cudart64_110.dll'; dLError: cudart64_110.dll not found
2022-11-17 19:08:34.340229: I tensorflow/stream_executor/cuda/cudart_stub.cc:29] Ignore above cudart dlerror if you do not have a GPU set up on your machine.

2022-11-17 19:08:48.589391: W tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could not load dynamic library 'nvcuda.dll'; dLError: nvcuda.dll not found
2022-11-17 19:08:48.589634: W tensorflow/stream_executor/cuda/cuda_driver.cc:263] failed call to cuInit: UNKNOWN ERROR (303)
2022-11-17 19:08:48.605092: I tensorflow/stream_executor/cuda/cuda_diagnostics.cc:169] retrieving CUDA diagnostic information for host:

IPython console History
LSP Python: ready conda: base (Python 3.9.12) Line 1, Col 1 UTF-8 CRLF RW Mem 90%
```



The screenshot shows a terminal window titled "Console 1/A x". The output consists of several lines of logs from TensorFlow and Flask. It starts with a warning about a missing GPU, followed by a warning about a failed call to cuInit. Then, it shows information about retrieving CUDA diagnostic information for the host "LJ574P5". Next, it displays information about the CPU instructions (AVX, AVX2) used by TensorFlow. Finally, it shows the Flask server output, including the loaded model from disk, the serving Flask app "app" (lazy loading), the environment (production), a warning about using a development server, and the running URL (http://127.0.0.1:5000/).

```
29] Ignore above cudart dlerror if you do not have a GPU set up on your machine.
2022-11-17 19:08:48.589391: W tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could not load dynamic library 'nvcuda.dll'; dlerror: nvcuda.dll not found
2022-11-17 19:08:48.589634: W tensorflow/stream_executor/cuda/cuda_driver.cc:263] failed call to cuInit: UNKNOWN ERROR (303)
2022-11-17 19:08:48.605092: I tensorflow/stream_executor/cuda/cuda_diagnostics.cc:169] retrieving CUDA diagnostic information for host: LJ574P5
2022-11-17 19:08:48.605427: I tensorflow/stream_executor/cuda/cuda_diagnostics.cc:176] hostname: LJ574P5
2022-11-17 19:08:48.614346: I tensorflow/core/platform/cpu_feature_guard.cc:193] This TensorFlow binary is optimized with oneAPI Deep Neural Network Library (oneDNN) to use the following CPU instructions in performance-critical operations: AVX AVX2
To enable them in other operations, rebuild TensorFlow with the appropriate compiler flags.
Loaded model from disk
* Serving Flask app "app" (lazy loading)
* Environment: production
  WARNING: This is a development server. Do not use it in a production deployment.
  Use a production WSGI server instead.
* Debug mode: off
* Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
```

At the bottom of the terminal, there are tabs for "Python console" and "History". The status bar at the very bottom shows "LSP Python: ready", "conda: base (Python 3.9.12)", "Line 1, Col 1", "UTF-8", "CRLF", "RW", and "Mem 92%".

9.2 OUTPUTS

9.2.1 home.ht

Image choosing:

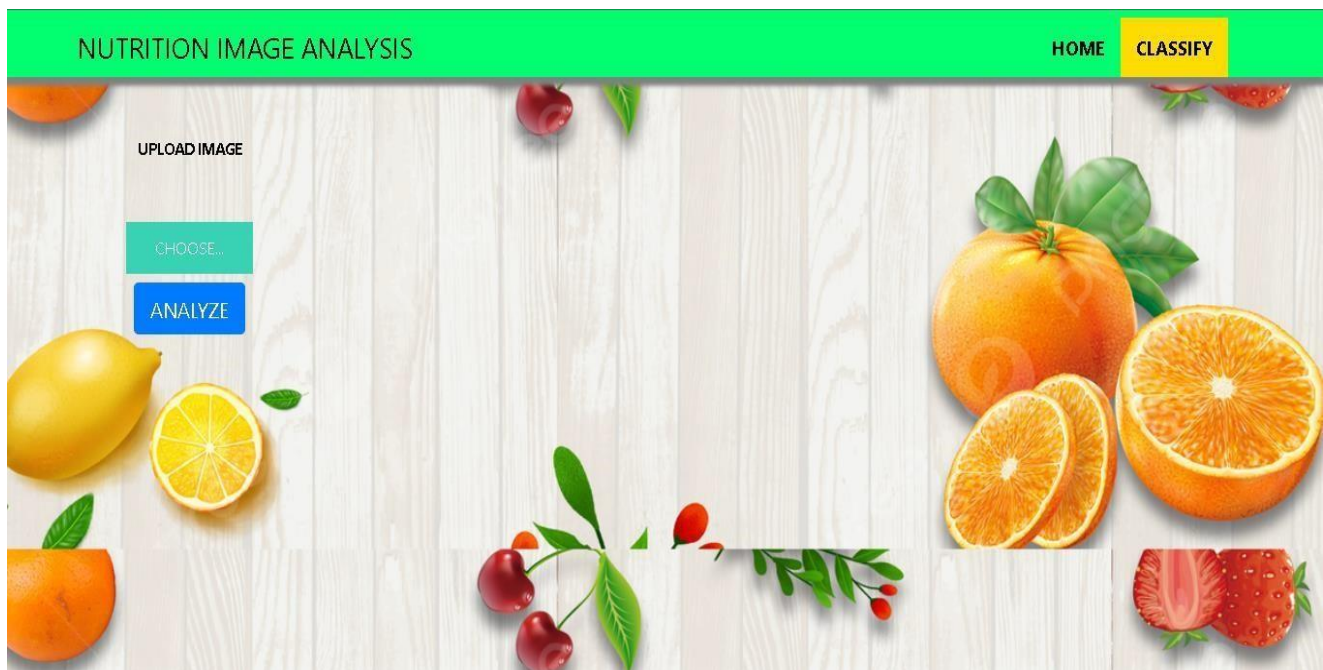


Image Prediction:



10 ADVANTAGES AND DISADVANTAGES

ADVANTAGES:

Yet people consume foods, not nutrients, so it is helpful to view food or a meal as more than just a set of nutrients that impact our health. Some weight-loss diets have assigned a negative connotation to certain nutrients, such as low-fat or low-carbohydrate diets. This can create a view that a specific nutrient is bad, regardless of the role it plays when foods containing that nutrient are consumed as part of a healthy, balanced diet. This model helps in analyzing a nutrition in the food.

DISADVANTAGES:

Like anything, there are always drawbacks. In some cases, the predicting algorithm may give the wrong output.

11. CONCLUSION:

The good nutrition is fundamental for children's current and future health, as well as their development and learning. The benefits of developing healthy dietary and lifestyle patterns from an early age onwards can positively impact on people's nutrition and health throughout their adult lives, and enhance the productivity of individuals and nations. Nutrition education is an important element in an overall strategy aimed at improving food security and preventing all forms of malnutrition.

Most countries in the region implement school health and nutrition programmes, including school feeding, deworming, vitamin and mineral supplementation, etc. Innovative, creative and effective school nutrition education programmes exist in some countries in the region. However, these are often small-scale and implemented as pilot projects, focus on children with special needs and prioritize the transfer of knowledge over the promotion of active learning and the creation of appropriate attitudes, life skills and behaviors.

12. FUTURE SCOPE:

The food photographs in this research study are categorised into the appropriate groups using a deep learning approach. In terms of future improvement, the classification task may be made better by reducing noise from the dataset. The same research may be done with a larger dataset, more classes, and more photos in each class since a larger dataset increases accuracy by teaching the algorithm additional features and lowers the loss rate. The model's weights may be saved and utilised to create a web or mobile application that classifies images and also extracts the calories from the food that has been identified.

13. APPENDIX:

Source Code

APP.PY

```
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
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)
```

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://www.livingproofnyc.com/wp-  
content/themes/livingproof/assets/img/hero-background.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:25px;

} h3 { margin: 0px;
padding:20px; background-
color:#9ACD32; width:
800px; opacity:0.6;
color:#000000; font-
family:'Roboto',sans-serif;
font-style: italic; border-
radius:20px; font-
size:25px; } 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;

}

```

```



```

```

text-align:
center;
padding: 14px
16px;    text-
decoration:
none; font-size:
22px;

}

.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%;">

Home

Classify </div>

</div>

</div>

<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

{ % extends "imageprediction.html" % } { % block content % }

<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 }}</p> </span>

            </h3>

        </div>
    </div>
    { % endblock % }

```

IMAGE PREDICTION.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/be211ad5043a8d05757a3538bdd8f
450.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:25px;
```

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x;

}
.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%;">Nutrtion Image Analysis</div>
```

```
<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">{% block content %}{% endblock
%}</div></center>

    </div>

</body>

<footer>

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

</footer>

</html>

```

MAIN.CSS

```

.img-preview { width: 256px; height: 256px;
    position: relative; border: 5px solid #F8F8F8;
    box-shadow: 0px 2px 4px 0px rgba(0, 0, 0, 0.1);
    margin-top: 1em; margin-bottom: 1em;
}

```

```

.img-preview>div { width: 100%;
    height: 100%; background-size:
    256px 256px; background-

```

```

    repeat: no-repeat; background-
    position: center;
}

input[type="file"] {
    display: none;
}

.upload-label{    display:
    inline-block; padding:
    12px          30px;
    background: #39D2B4;

    color: #fff; font-
    size:        1em;
    transition: all .4s;
    cursor: pointer;
}

.upload-label:hover{
    background: #34495E; color:
    #39D2B4;
}

.loader { border: 8px solid #f3f3f3; /* Light
    grey */ border-top: 8px solid #3498db; /*
    Blue */ border-radius: 50%; width: 50px;

```

```
height: 50px; animation: spin 1s linear
infinite;

}

@keyframes spin {
  0% { transform: rotate(0deg); }
  100% { transform: rotate(360deg); }
}
```

STYLE.CSS

```
body{

    background-image:url(bg.jpg);
    background-size: 400% auto;
    background-repeat: no-repeat;
    background-position:center;
    color:#555;
    font-family:Arial, Helvetica, sans-serif;
    font-size:16px; line-height:1.6em;
    margin:0;

}
```

```
.container{ width:80%;
    margin:auto;
    overflow:hidden;
```

```
}
```

```
.justify{ text-align:justify; text-justify: auto; }
```

```
.parallax {  
  /* The image used */ background-image: url("doc.jpg");  
  
  /* Set a specific height */ min-height: 750px;  
  
  /* Create the parallax scrolling effect */  
  background-attachment: fixed;  
  background-position: center;  
  background-repeat: no-repeat;  
  background-size: cover;  
}
```

```
html {  
  scroll-behavior: smooth;  
}  
#section2 { height: 500px;  
background: ; } div.background {
```

```
background: url("static/bgg2.jpg");
min-height: 5px;

background-attachment: fixed;
background-position: center;
background-repeat: no-repeat;
background-size: cover;

}
```

```
#navbar{ background-
    color:#fff; color:#333;

}
```

```
#navbar ul{
    padding:0;    list-
    style: none;

}
```

```
#navbar    li{
    display:inline;

}
```

```
#navbar a{ color:#fff; text-
    decoration:    none;
    font-size:18px;
    padding-right:15px;
```

```
}
```

```
#showcase{ min-  
    height:300px; margin-  
    bottom:30px;  
}
```

```
#showcase h1{ width:  
    100%;    color:#333;  
    font-size:40px; text-  
    align: center; line-  
    height: 1em; padding-  
    top:10px;  
}
```

```
#showcase h2{ width:  
    100%;  
  
    color:#333; font-  
    size:30px; text-  
    align: center; line-  
    height: 1.6em;  
    padding-top:10px;  
}
```

```
#main{  
    float:left;    color:#fff;  
    width:65%; padding:0
```

```

        30px;        box-sizing:
        border-box;

    }

#sidebar{
    float:right;

    width:35%; background-
    color: #ffcccc; color:#000;
    padding-left:10px; padding-
    right:10px; padding-top:1px;
    box-sizing: border-box;

}

```

```

.img-preview { width: 10px; height: 10px; position:
    relative; border: 5px solid #F8F8F8; box-
    shadow: 0px 2px 4px 0px rgba(0, 0, 0, 0.1);
    margin-top: 1em; margin-bottom: 1em;

}

```

```

.img-preview>div { width: 10%;
    height: 10%; background-size:
    100px 10px; background-
    repeat: no-repeat; background-
    position: center;
}

```

```
}
```

```
input[type="file"] {  
    display: none;  
}
```

```
.upload-label{  
    display: inline-block;  
    padding: 12px 30px;  
    background: #39D2B4;  
  
    color: #fff; font-  
    size: 1em;  
    transition: all .4s;  
    cursor: pointer;  
}
```

```
.upload-label:hover{  
    background: #34495E;  
    color: #39D2B4;  
}
```

```
.myButton { border: none;  
    text-align: center; cursor:  
    pointer; text-transform:  
    uppercase; outline: none;  
    overflow: hidden; position:  
    relative; color: #fff; font-
```



```
weight: 700; font-size:
12px; background-color:
#ff0000; padding: 10px
15px;
margin: 0 auto; box-shadow: 0 5px 15px
rgba(0,0,0,0.20);
}
```

```
.myButton span {
position: relative;
z-index: 1;
}
```

```
.myButton:after {
content: ""; position:
absolute; left: 0; top:
0; height: 310%;
width: 150%;
background: #f2f2f2;

-webkit-transition: all .5s ease-in-out; transition:
all .5s ease-in-out;

-webkit-transform: translateX(-98%) translateY(-25%) rotate(45deg);
transform: translateX(-98%) translateY(-25%) rotate(45deg);
}
```

```
.myButton:hover:after {
```

```
-webkit-transform: translateX(-9%) translateY(-25%) rotate(45deg); transform:
translateX(-9%) translateY(-25%) rotate(45deg);
```

```
}
.loader { border: 8px solid #f3f3f3; /* Light
    grey */ border-top: 8px solid #ff0000; /*
    Red */ border-radius: 50%; width: 50px;
    height: 50px; animation: spin 1s linear
    infinite;

}
```

```
@keyframes spin {
    0% { transform: rotate(0deg); }
    100% { transform: rotate(360deg); }
}
```

```
#main-footer{
    background: #333;
    color:#fff; text-
    align: center;
    padding:1px;
    margin-top:0px;

}
```

```
@media(max-width:600px){
    #main{
        width:100%;
        float:none;
```

```

    }

    #sidebar{
        width:100%;
        float:none;
    }
}

```

MAIN.JS

```

$(document).ready(function () {
    // Init
    $('.image-section').hide();
    $('.loader').hide();
    $('#result').hide();

    // Upload    Preview
    function  readURL(input)  {  if
        (input.files  &&  input.files[0])  {
            var  reader  =  new  FileReader();
            reader.onload = function (e) {

                $('#imagePreview').css('background-image', 'url(' + e.target.result +
            '));

                $('#imagePreview').hide();
                $('#imagePreview').fadeIn(650);
            }
            reader.readAsDataURL(input.files[0]);

```

```

    }
}

$("#imageUpload").change(function () {
    $('.image-section').show();
    $('#btn-predict').show();
    $('#result').text("");
    $('#result').hide();
    readURL(this);

});

// Predict
$('#btn-predict').click(function () { var form_data = new
    FormData($('#upload-file')[0]);

    // Show loading animation
    $(this).hide();
    $('.loader').show();

    // Make prediction by calling api /predict
    $.ajax({ type: 'POST', url:
        '/predict',          data:
        form_data, contentType:
        false,  cache:      false,
        processData: false, async:
        true,  success:  function
        (data) {
        // Get and display the result

```

```
$('.loader').hide();  
$('#result').fadeIn(600);  
$('#result').html(data);    console.log('Success!');  
    },  
});  
});  
});
```

GITHUB

<https://github.com/IBM-EPBL/IBM-Project-30416-1660146270.git>