PROJECT REPORT

AI-POWERED NUTRITION ANALYZER
FOR FITNESS ENTHUSIASTS

Submitted by

PNT2022TMID41467

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TABLE OF CONTENTS

CHAPTER-1

INTRODUCTION

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.

1.2 PURPOSE

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.).

CHAPTER-2

LITERATURE SURVEY

2.1 EXISTING PROBLEM

Neutrino delivers nutrition-based data services and analytics to its users and wants to turn into a leading source of the nutrition-related platform. The platform employs NLP and mathematical models from the optimization theory as well as predictive analysis to enable individualized data compilation.

The application relies on Artificial Intelligence to produce custom data related to smart calorie counter powered by AI. Their artificial intelligence learns an individual's tastes, preferences, and body type. All of this is packaged in a comprehensive nutrition and activity tracker.

2.2 REFERENCES

https://www.nutrinohealth.com/

2.3 PROBLEM STATEMENT DEFINITION

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.).

CHAPTER-3

IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS
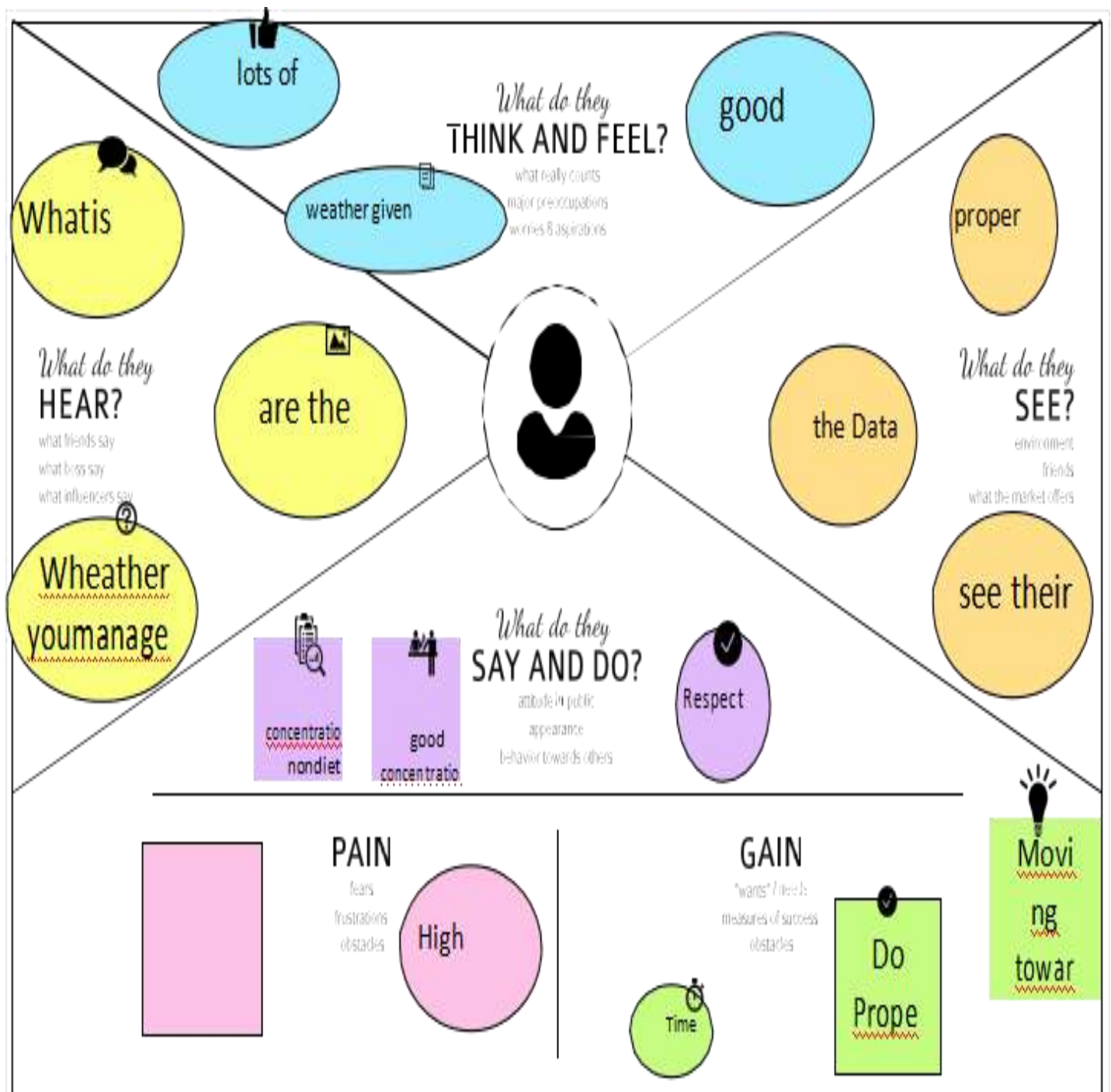
3.2 IDEATION & BRAINSTORMING

M.SURESH KUMAR

Recognize text	Identification of language in the given text	Acquisition of input from the user
Create GUI to predict the digit	Identification of Stroke classification	Training of models

A.ILAYARAJA

Pixel Detection	Time Interval	Pixel Size
Classification of digit	Text Classification	Symbol Classification

M.VASANTHI

Identation	Capital letters identification	Color identification
Number of lines to be counted	Space detection	Paragraph Spacing

S.SAVITHA

Grabbing character to a grid	Predict/ sense the image	Acquisition
Learning Modules	Pixel Detection	ReSampling

IDENTIFICATION

Recognize Text

Space detection

Classification

Capital letters identification

Classification of digit

Acquisition of input from the user

create GUI to predict the digit

Learning Modules

Training of models

ReSampling

TIP
Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mural.
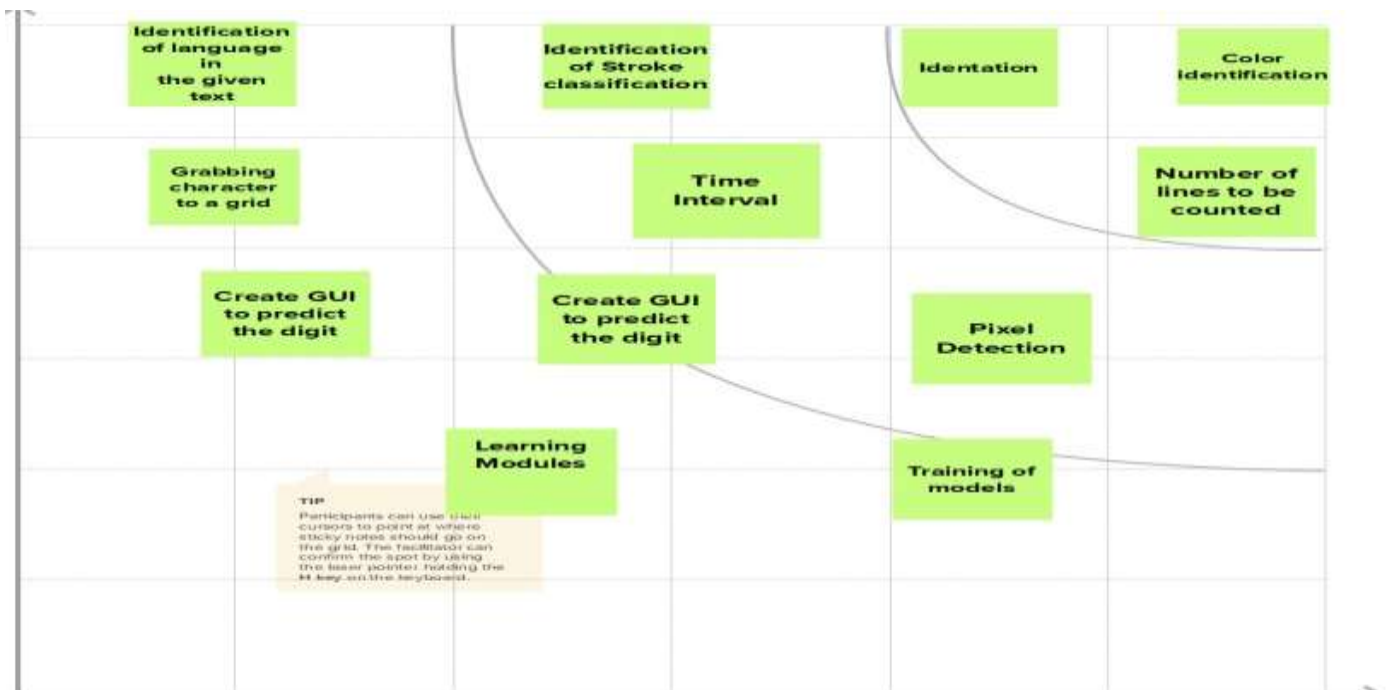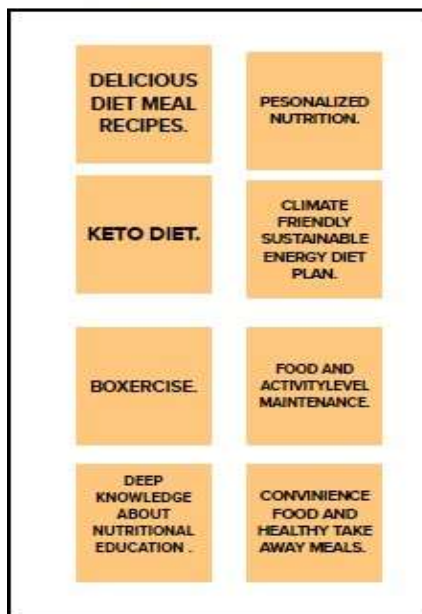
Identification of language in the given text

Identification of Stroke classification

Identation

Color identification

Grabbing character to a grid

Time Interval

Number of lines to be counted

Create GUI to predict the digit

Create GUI to predict the digit

Pixel Detection

Learning Modules

Training of models

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.

NUTRITIONAL

DELICIOUS DIET MEAL RECIPES.	PESONALIZED NUTRITION.
KETO DIET.	CLIMATE FRIENDLY SUSTAINABLE ENERGY DIET PLAN.
BOXERCISE.	FOOD AND ACTIVITYLEVEL MAINTENANCE.
DEEP KNOWLEDGE ABOUT NUTRITIONAL EDUCATION .	CONVINIENCE FOOD AND HEALTHY TAKE AWAY MEALS.

WORKOUT

CALISTHENICS TRAINING.	POWER LIFTING TRAINING.
AEROBICS TRAININGS.	CROSS FIT RESISTANCE TRAINING.
TRACK CYCLIST TRAINING.	FUN FITNESS GAME.
TAKE YOUR DOG TO LONG WALK.	PRACTICE YOGA.

PROGRAMS

AWARENESS FOR HEALTHY EATING.	HEALTHY MEAL KIT DELIVERY SERVICE.
CLARITY ON DIET MYTHS AND NUTRITIONAL FAKE NEWS .	ONLINE NUTRITION COUNSELING.
STRENGTH WARS. (CHALLENGES)	FITNESS BLOGS.
DEEP KNOWLEDGE ABOUT NUTRITIONAL EDUCATION .	CUSTOMISED GYM WEARS.

3.3 PROPOSED SOLUTION

S.NO	PARAMETERS	SOLUTIONS
1.	Problem Statement	• Main objective is to detect the nutrition in a fruit from camera captured image. • The identification of nutrition and calories from a image is quite an interesting field. • Since nutrition monitoring plays an important role in leading healthy lifestyle, this product has the potential to become an essential in our day to day life.
2.	Idea / Solution description	• The solution is to develop AI-powered nutrition analyzer application. • By giving the image of the fruit as the input to the application, it will display the nutrition content in it. • By training the model with various inputs, image processing can be improved as well as the accuracy of the result.
3.	Novelty / Uniqueness	• Personalized nutrition for individuals. • Providing science based guidance for healthy living. • Balanced food diet and measured intake. • 24/7 support. • Serving size.
4.	Social Impact / Customer Satisfaction	• Economically stable product. • Change one's view towards health and fitness. • Quality of service. • High fiber food. • Accurate amount of nutrition.
5.	Business Model (Revenue Model)	• User friendly interface which improves the constant use of the product. • Hence, Economical growth improves. • Product will be delivered in pocket size which results in consuming low memory. • Nutrition and fitness related ads to earn profit
6.	Scalability of the Solution	• Offers ingredients substance detail in food • Suggest best health solution and meal plans for different criteria proposed by different individuals. • Virtualization of your long term plan to provide motivation to the customer.

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 actually solves the customer's problem. It helps entrepreneurs, marketers and corporate innovators identify behavioral patterns

Purpose:
- Solve complex problems in a way that fits the state of your customers.
- Succeed faster and increase your solution adoption by tapping into existing mediums and channels of behavior.
- Sharpen your communication and marketing strategy with the right triggers and messaging.
- Increase touch-points with your company by finding the right problem-behavior fit and building trust by solving frequent annoyances, or urgent or costly problems.

CHAPTER-4

REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

- It will generate the diet plan as well as monitor the user's health to classify the category of the disease and to create the diet plan. It will also reduce the cost of consulting the person nutritionist.
- The task of food detection/classification is not easy as it seems. All possible options related to the given Image.
- Image classification, object detection, segmentation, face recognition.
- Classification of crystal structure using a convolutional neural network
- Nutrition is vital to the growth of the human body. Nutritional analysis guarantees that the meal meets the appropriate vitamin and mineral requirements, and the examination of nutrition in food aids in understanding the fat proportion, carbohydrate dilution, proteins, fiber, sugar, and so on. Another thing to keep in mind is not to exceed our daily calorie requirements
- Computer-Assisted Nutritional Recognize Food Images – In order to solve this issue, a brand-new Convolutional Neural Network (CNN)- based food picture identification system was created, as described in this study. We utilized our suggested strategy on two sets of actual food picture data.
- Here the user can capture the images of different fruits and then the image will be sent to the trained model. The model analyzes the image and detects the nutrition based on the fruits like (Sugar, Fiber, Protein, Calories, etc.)

- The Ultimate Workout at Home Solution This fitness AI software is designed with personalized training regimens for each individual. It began as "gym only software," but has now improved its system to satisfy "at home fitness" expectations.
- You take a picture, dial in data such as whether you are eating breakfast or lunch and add a quick text label, and the app estimates the calorie content.
- This software collaborated with IBM's natural language capability to provide 24-hour assistance and dietary recommendations.

For Example:
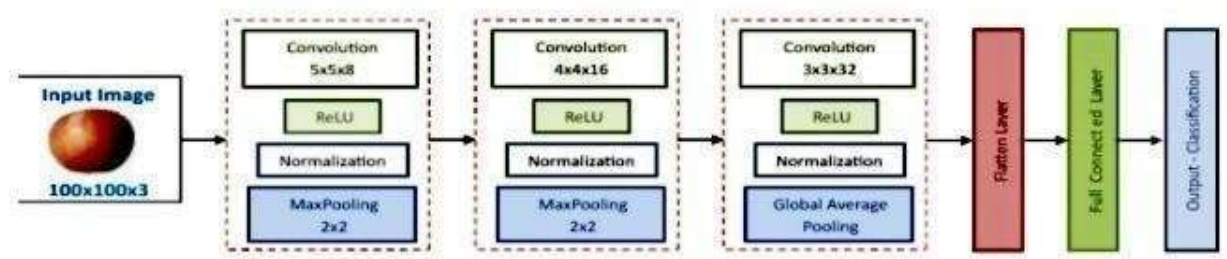
- The comparison of the proposed model with the conventional models shows that the results of this model are exceptionally good and promising to use in real-world applications.
- This sort of higher accuracy and precision will work to boost the machine's general efficiency in fruit recognition more appropriately.
- A generic model for the dietary protein requirement (as with any nutrient) defines the requirement in terms of the needs of the organism,
- i.e. metabolic demands, and the dietary amount which will satisfy those needs, i.e. efficiency of utilization, thus: dietary requirement = metabolic demand/efficiency of utilization.

| FR No	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Users can create an account to use the application. This can be done by creating a persona on the application with a username and password or by making use of an existing email ID.
FR-2	User Confirmation	Once a user registers onto the application, they receive a confirmation to their email id which they provide for registration. OTP authentication is integrated to ensure identity theft does not occur.
FR-3	Calorie Calendar Creation	On creation of a user profile, a calendar is generated in association with the account. This calendar is private to the user and keeps track of the calories consumed in a day and related statistics.
FR-4	Image Capturing and Processing	The application allows users to capture images of the ingredients they consume. These are given to the model for predicting their labels, i.e. identify the fruits. Further, the quantity of the fruits should be discerned. The application should be able to work with images of low quality and low resolution as well.
FR-5	Calorie Value Computation	Once the labels of the ingredients and their quantity have been found, the net calorie value of the meal is calculated by summing up the calories of each ingredient in their respective amounts. The calorie values are fetched from the internet while that of frequently used items are fetched from a database.
FR-6	Storage of Data	Data about the user and their log in details are stored in a backend database. Apart from these, calorific information of frequently consumed ingredients are also stored to minimize overhead and complexity.
FR-7	Calorie Over-Consumption Notification	When a user exceeds their permissible calorie consumption amount for the day, the application issues a notification for the same. The application then suggests low- calorie diets to ensure minimum over-consumption.

4.2 NON-FUNCTIONAL REQUIREMENTS

| FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The users should be able to use the application without any difficulties. The interface should be easy to use and understand. The image capture process should be smooth and not tedious.
NFR-2	**Security**	Details of the users and their personal calories calendar should not be disclosed or shared to other users. Privacy of data should be ensured.
NFR-3	**Reliability**	The application should correctly identify the fruits from the captured image and fetch its nutritional value. The count and calculation of the calories should be done accurately.
NFR-4	**Performance**	The application should be built on a highly efficient prediction model such that the results are accurate. It should keep in mind time and space complexity.
NFR-5	**Availability**	The application should be available to its users at all times and should work efficiently. It should not suffer from issues such as application crashes.
NFR-6	**Scalability**	The application should be able to support updates in terms of features and functionality. The system should be built such that it can upgrade using the existing underlying architecture.

CHAPTER-5

PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS
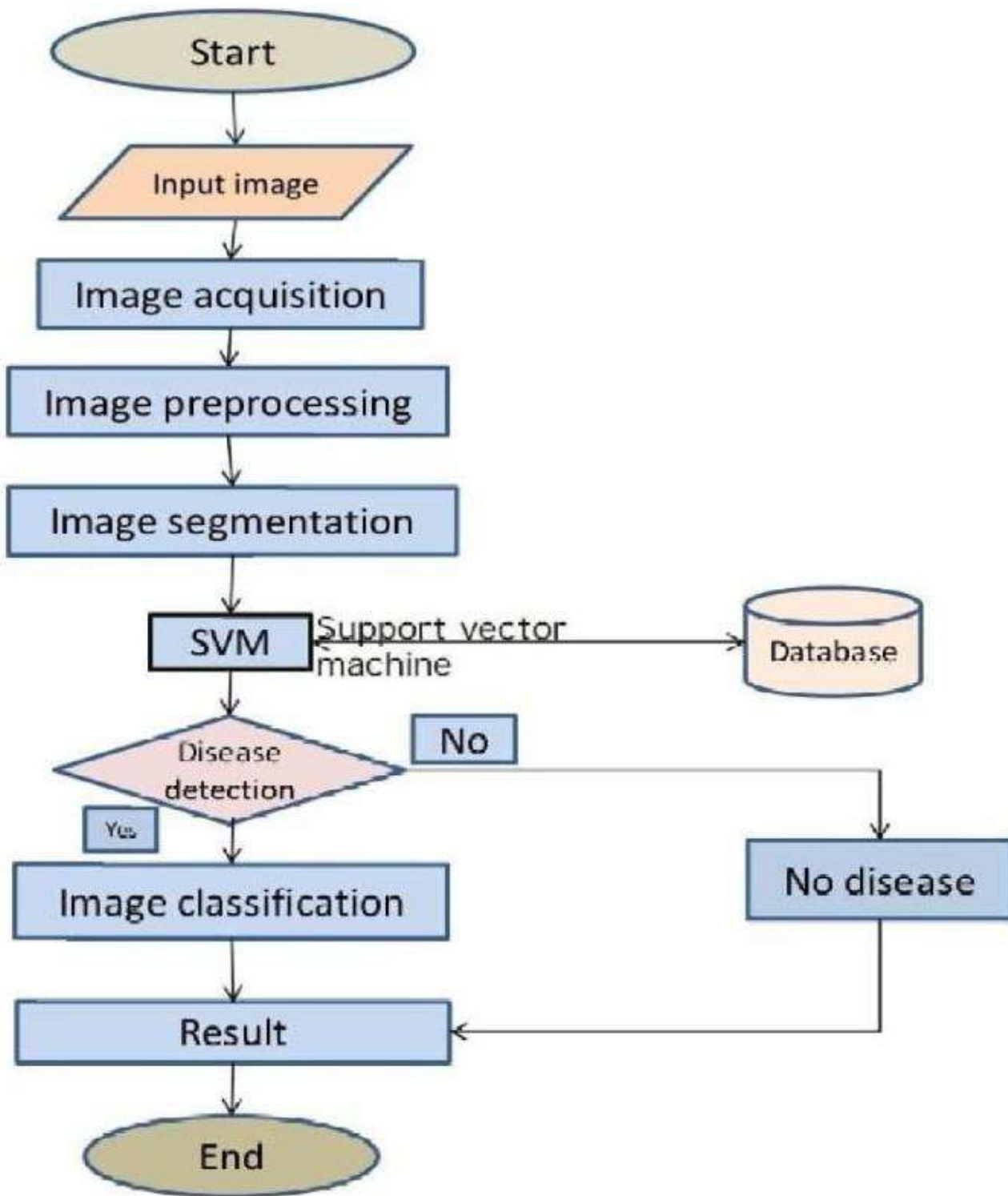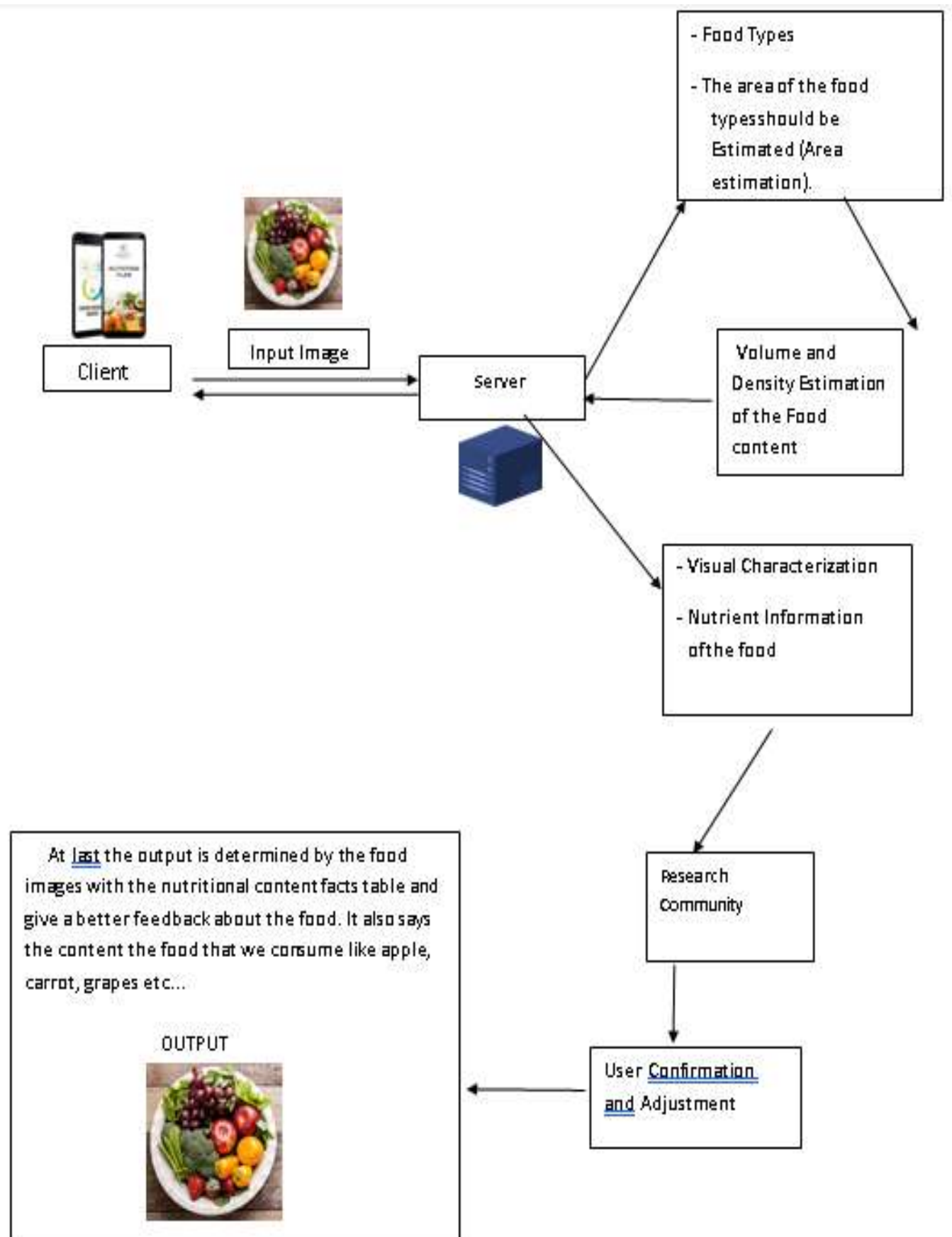
5.2 SOLUTION & TECHNICAL ARCHITECTURE
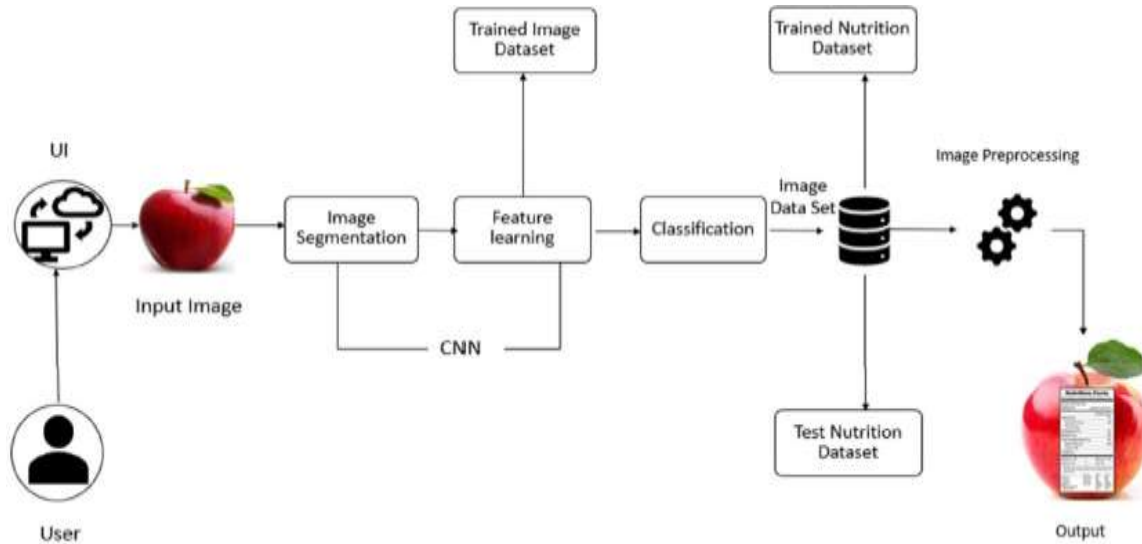
S.No	Component	Description	Technology
1.	App	User interacts with application for the prediction of Nutrition	Python, Java, HTML, SQLite, Android studio
2.	Database	Data Type, Configurations and data will be stored	MySQL, JS
3.	Cloud Database	Database Service on Cloud	IBM DB2, IBM Cloudant etc.
4.	File Storage	File storage requirements	Cloud -- > drive
5.	Machine Learning Model	Purpose of Machine Learning Model	ANN, CNN, RNN
6.	Notification	Notification will be sent from the server	Send Grid

Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Open-source frameworks used	SendGrid, Python, JQuery
2.	Security Implementations	Request authentication using encryption	Encryptions, SSL certs
3.	Scalable Architecture	The scalability of architecture consists of 3 tiers	Web Server – HTML, CSS ,Javascript Application Server – Python Flask Database Server – IBM Cloud
4.	Availability	Availability is increased by loads balancers in cloud VPS	IBM Cloud hosting
5.	Performance	The application is expected to handle up to 4000 predications per second	IBM Load Balance

Client

Input Image

Server

- Food Types

- The area of the food types should be Estimated (Area estimation).

Volume and Density Estimation of the Food content

- Visual Characterization

- Nutrient Information of the food

Research Community

User Confirmation and Adjustment

At last the output is determined by the food images with the nutritional content facts table and give a better feedback about the food. It also says the content the food that we consume like apple, carrot, grapes etc...

OUTPUT

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 confirmingmy password.	I can access my account /dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation emailonce I have registered for the application	I can receive confirmationemail & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the applicationthrough Facebook	I can register & access thedashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the applicationthrough Gmail		Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application byentering email & password		High	Sprint-1
	Dashboard	USN-5	As a user, I can Access my Dashboard		Medium	Sprint - 1
Customer (Webuser)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirmingmy password.	I can access my account /dashboard	High	Sprint -1
Customer Care Executive	Solution	USN-5	Responding to each email you receive canmake a lasting impression on customers.	Offer a solution for owyour company can improve the customer experience	High	Sprint-1
Administrator	Manage	USN-5	Do-it yourself service for delivery Everything	Set of predefined requirements that must bemet to mark a user story complete	High	Sprint-1|

CHAPTER-6

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	Sureshkumar.M
Sprint-1		USN-2	Image data augmentation - Increasing the amount of data by generating new data points from existing data	5	medium	Ilayaraja.A
Sprint-1	Image Preprocessing	USN-3	Image Data Generator Class - Used for getting the input of the original data	5	medium	Vasanthi.M
Sprint-1		USN-4	Applying image data generator functionality to train set and test set	5	Medium	Savitha.S
Sprint-2	Modeling Phase	USN-5	Defining the model architecture - Building the model using deep learning approach and adding CNN layers	4	High	Sureshkumar.M
Sprint-2		USN -6	Training , saving, testing and predicting the model	4	High	Ilayaraja.A

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

| 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 accessibilty	4	medium	Vasanthi.M
		USN-20	Non Functional testing – Checking scalability and performance of the application	4	medium	Savitha.S

6.2 SPRINT DELIVERY SCHEDULE

Project Tracker, Velocity & Burn down Chart: (4 Marks)

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	30 Nov 2022	20	30 Nov 2022
Sprint-2	20	6 Days	31 Oct 2022	06 Nov 2022	20	06 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	13 Nov 2022	20	13 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Velocity:

Average Velocity= 12/6 = 3.33

6.3 REPORTS FROM JIRA
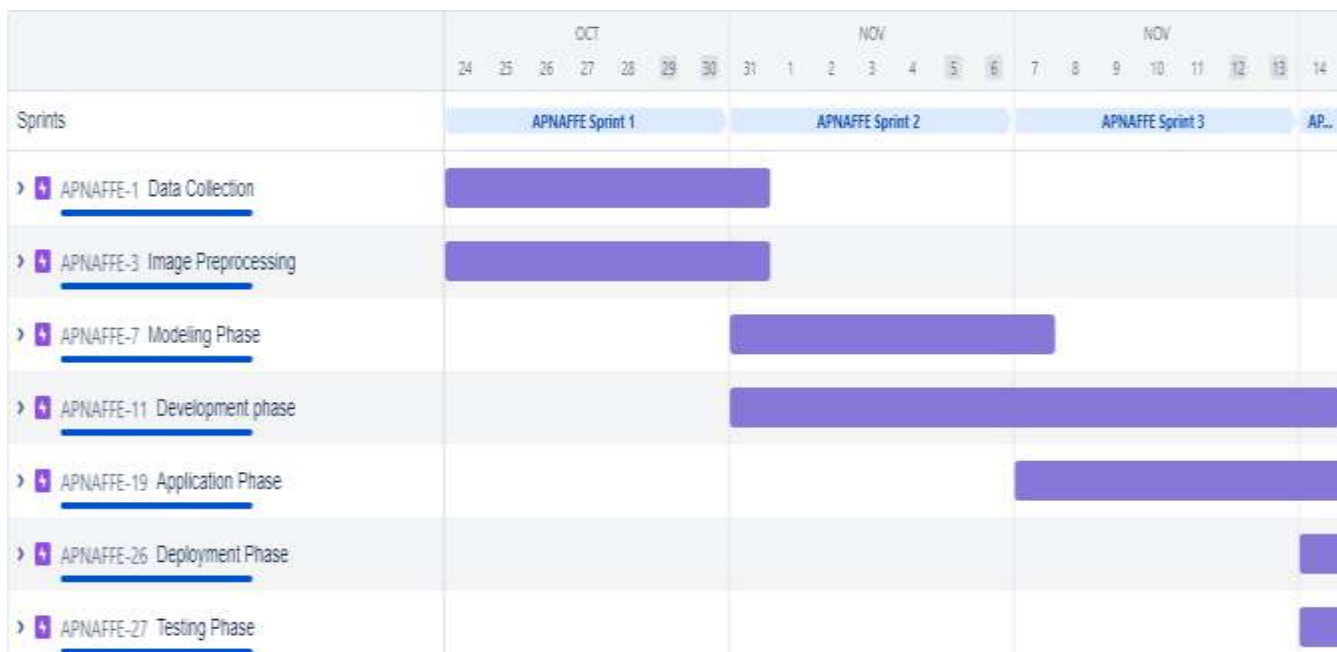
CHAPTER-7

CODING & SOLUTIONING (Explain the features added in the project along with code)

7.1 FEATURE 1

Data Collection

Download the dataset here

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

    Mounted at /content/drive

[ ]    cd/content/drive/MyDrive/Colab Notebooks

    /content/drive/MyDrive/Colab Notebooks

[ ]    # Unzipping the dataset
       !unzip 'Dataset.zip'
```

Image Preprocessing

```
[ ]    from keras.preprocessing.image import ImageDataGenerator
```

Image Data Augmentation

```
[ ]    train_datagen = ImageDataGenerator(rescale=1./255,shear_range=0.2,zoom_range=0.2,horizontal_flip=True)
       test_datagen=ImageDataGenerator(rescale=1./255)
```

Applying Image DataGenerator Functionality To Trainset And Testset

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

Model Building

1. Importing The Model Building Libraries

```python
import numpy as np
import tensorflow as tf
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
```

2. Initializing The Model

```python
classifier = Sequential()
```

3. Adding CNN Layers

```
[ ]    classifier = Sequential()
       classifier.add(Conv2D(32, (3, 3), input_shape=(64, 64, 3), activation='relu'))
       classifier.add(MaxPooling2D(pool_size=(2, 2)))
       classifier.add(Conv2D(32, (3, 3), activation='relu'))
       classifier.add(MaxPooling2D(pool_size=(2, 2)))
       classifier.add(Flatten())
```

4. Adding Dense Layers

```
[ ]    classifier.add(Dense(units=128, activation='relu'))
       classifier.add(Dense(units=5, activation='softmax'))
```

```
⊙      classifier.summary()
```

```
Model: "sequential_1"
_____
Layer (type)               Output Shape              Param #
=================================================================
conv2d (Conv2D)            (None, 62, 62, 32)        896
```

5. Configure The Learning Process

```
[ ]    classifier.compile(optimizer='adam', loss='sparse_categorical_crossentropy', metrics=['accuracy'])
```

6. Train The Model

```
[ ]    classifier.fit_generator(generator=x_train,steps_per_epoch = len(x_train),epochs=20, validation_data=x_test,validation_steps = len(x_test))
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:2: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future version. Pl

Epoch 1/20
494/824 [================>.............] - ETA: 6:52 - loss: 0.7194 - accuracy: 0.7174
◄                                                                                                          ►
```
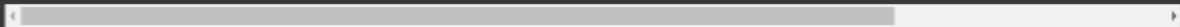
7. Saving The Model

```
[ ]    classifier.save("nutrition.h5")
```
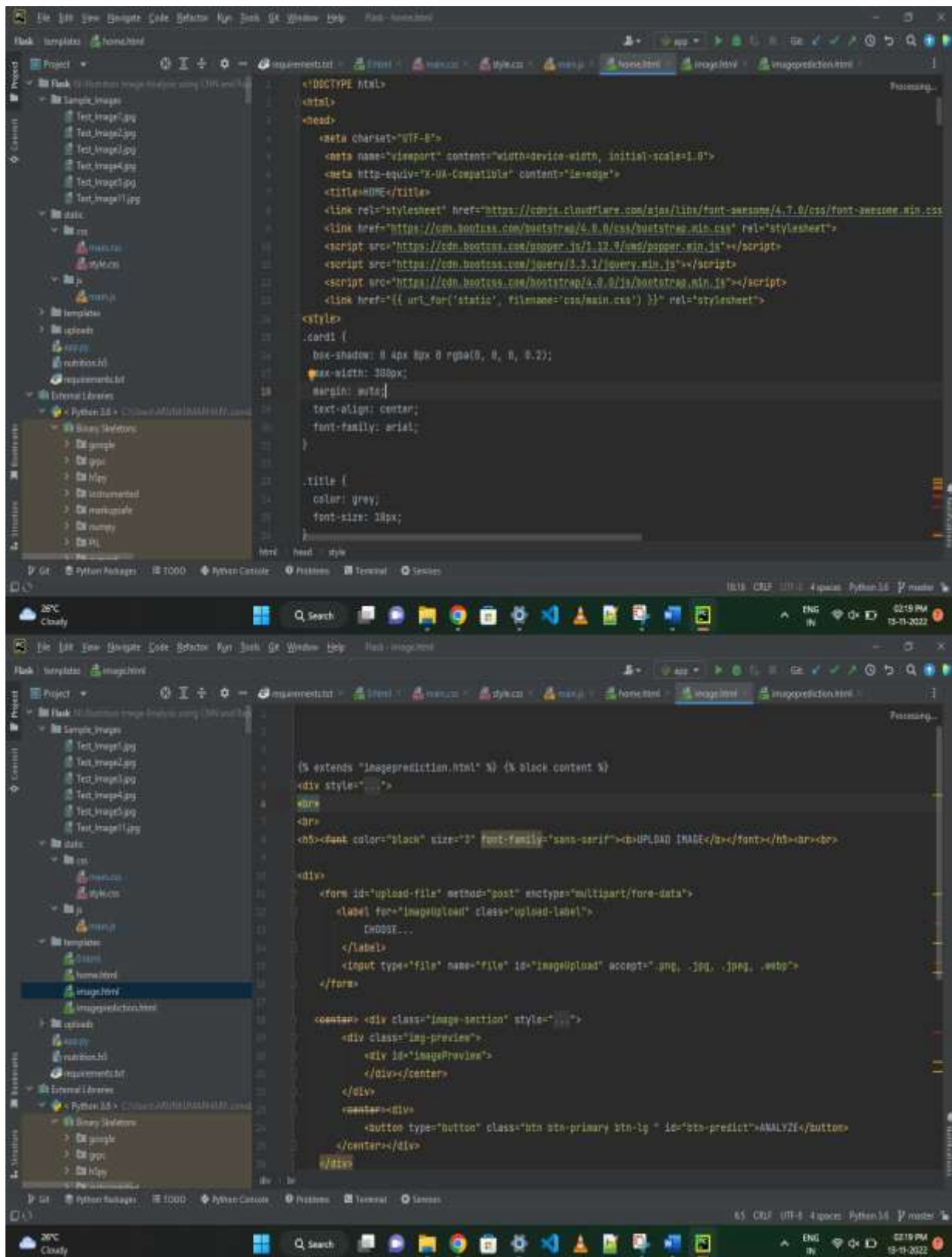
8. Testing The Model

```
from tensorflow.keras.models import load_model
from keras.preprocessing import image
model = load_model("nutrition.h5")
```
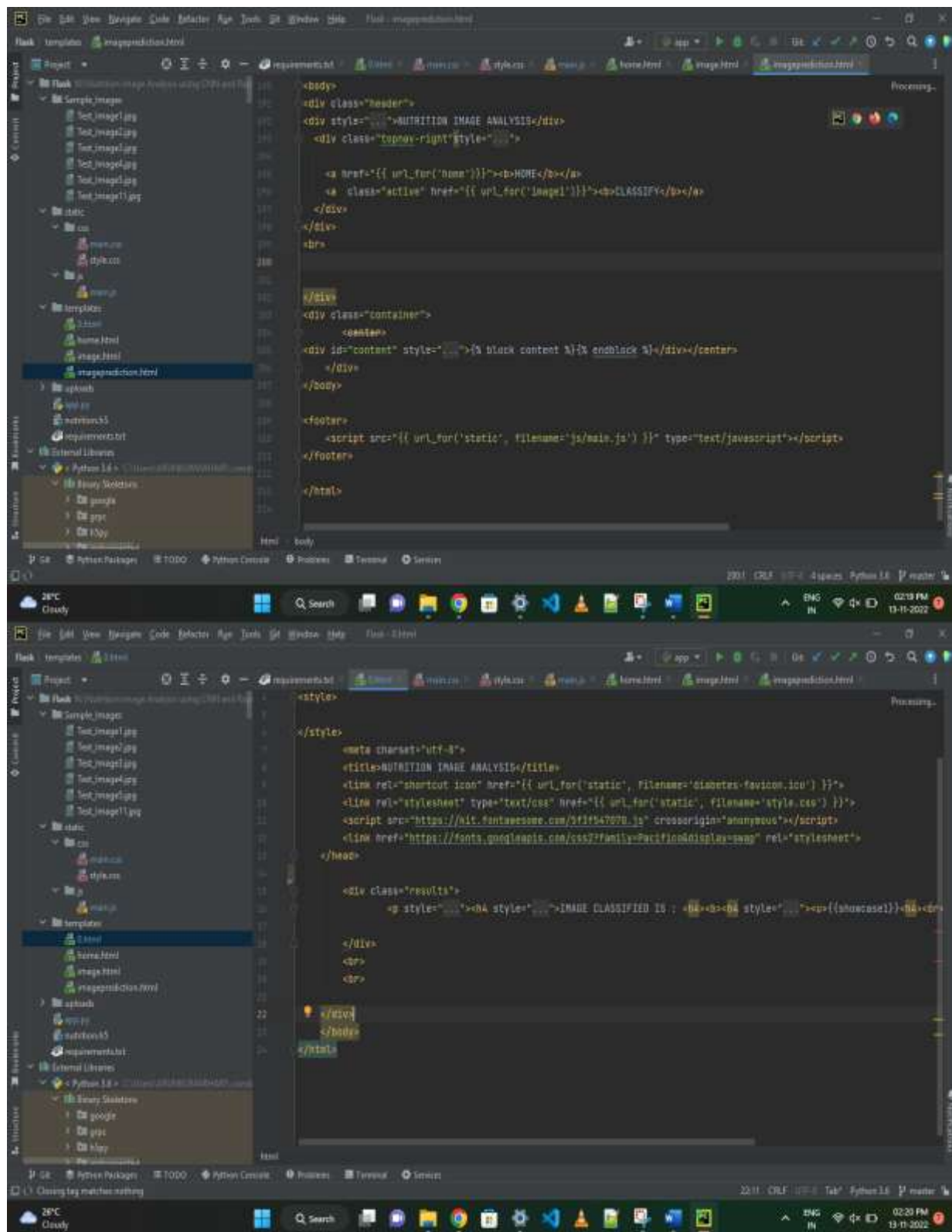
```
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
model = load_model("nutrition.h5")
img = image.load_img(r'/content/drive/MyDrive/Colab Notebooks/Sample_Images/Test_Image1.jpg',grayscale=False,target_size= (64,64))
x = img_to_array(img)
x = np.expand_dims(x,axis = 0)
predict_x=model.predict(x)
classes_x=np.argmax(predict_x,axis=-1)
classes_x
```

```
1/1 [==============================] - 0s 62ms/step
array([0])
```
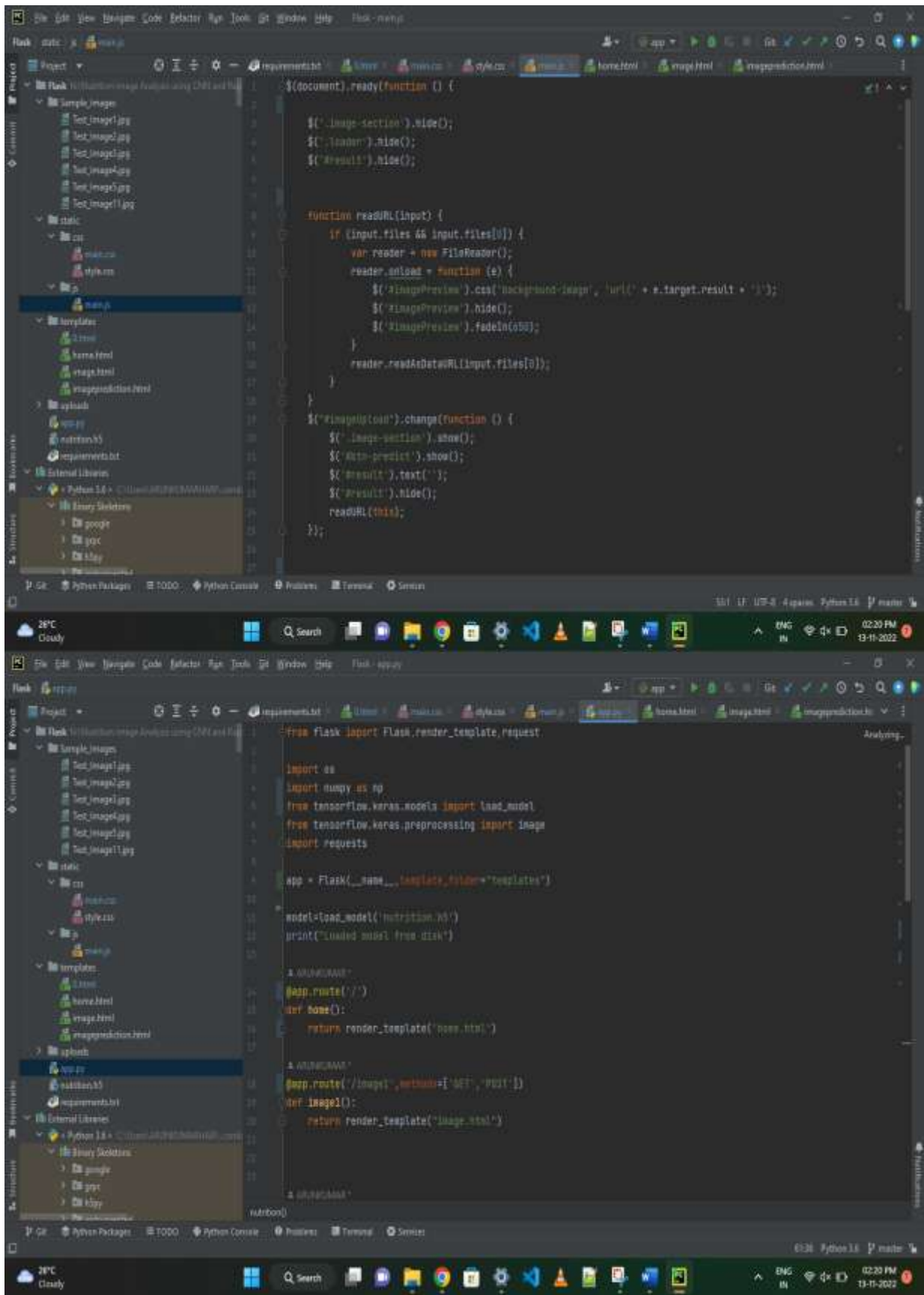
```
index=['APPLES', 'BANANA', 'ORANGE','PINEAPPLE','WATERMELON']
result=str(index[classes_x[0]])
result
```
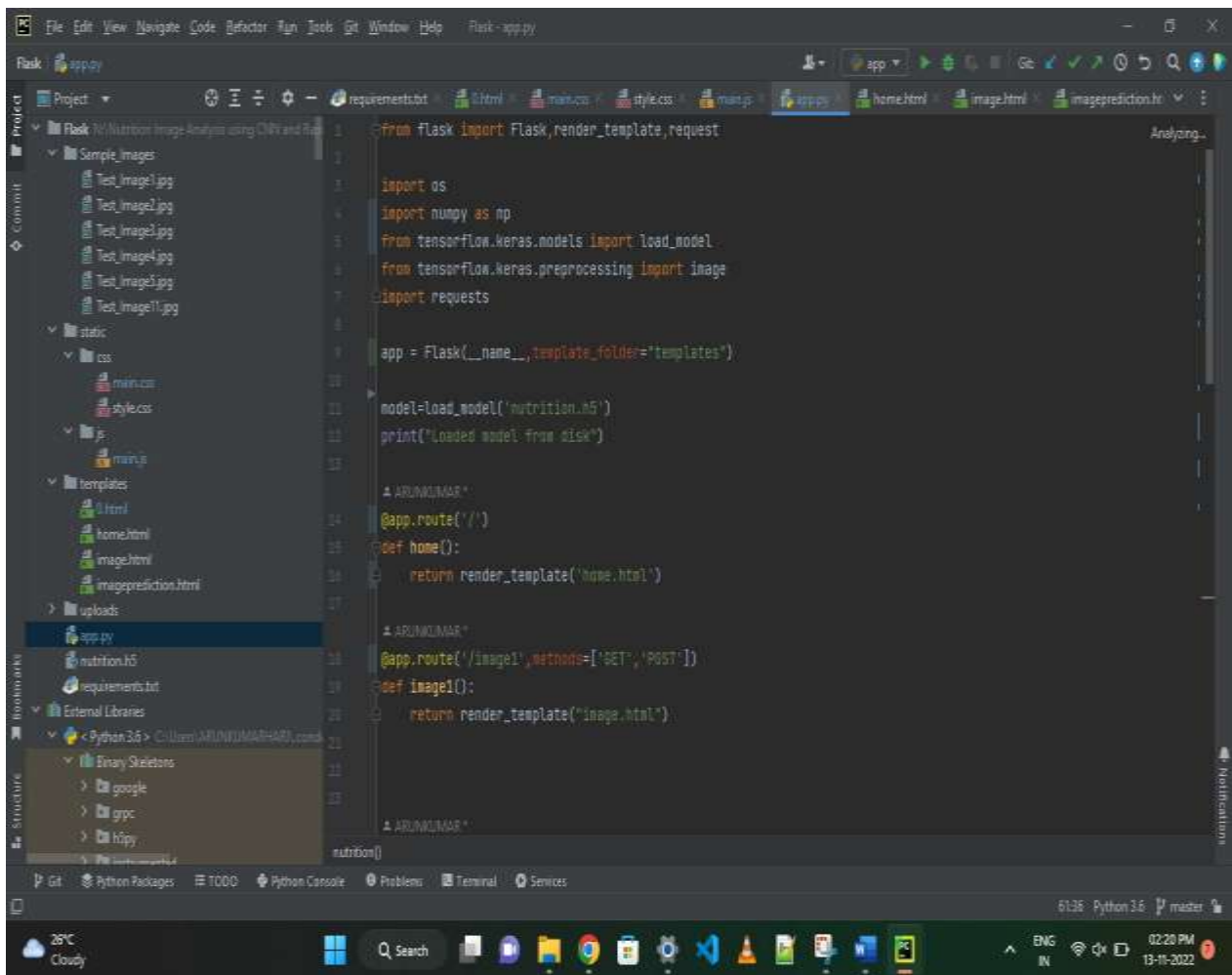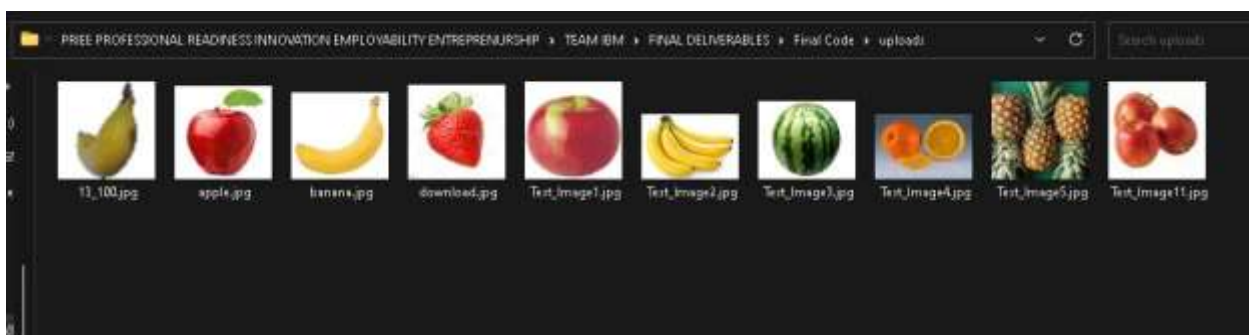
7.2 FEATURE 2

```html
<body>
<div class="header">
<div style="...">NUTRITION IMAGE ANALYSIS</div>
  <div class="topnav-right" style="...">

    <a href="{{ url_for('home')}}"><b>HOME</b></a>
    <a class="active" href="{{ url_for('image1')}}"><b>CLASSIFY</b></a>
  </div>
</div>
<br>


</div>
<div class="container">
      <center>
<div id="content" style="...">{% block content %}{% endblock %}</div></center>
  </div>
</body>


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


</html>
```
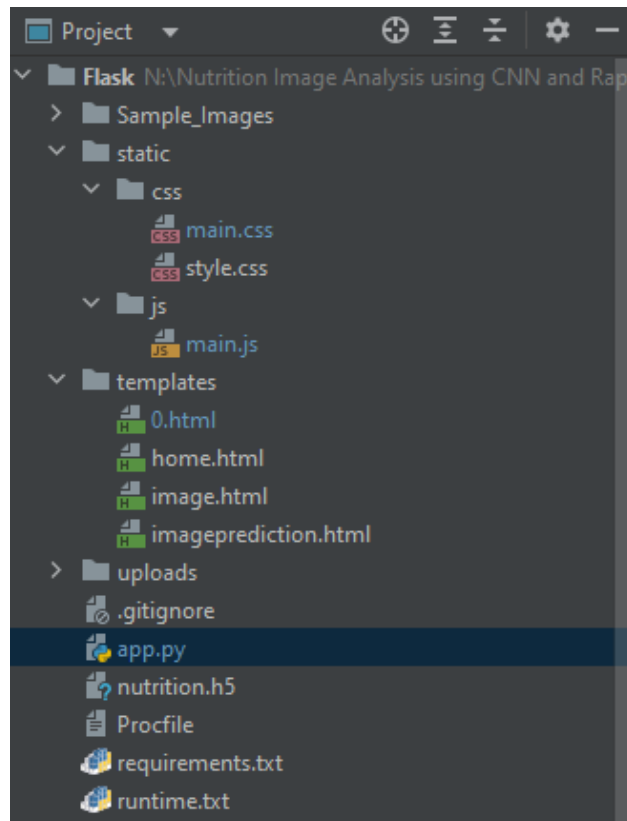


```html
<style>

</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/5f1f547078.js" crossorigin="anonymous"></script>
    <link href="https://fonts.googleapis.com/css2?family=PacificoDisplay=swap" rel="stylesheet">
  </head>

    <div class="results">
      <p style="..."><h4 style="...">IMAGE CLASSIFIED IS : </h4><b><h4 style="..."><p>{{showcase1}}</h4><br
    </div>
    <br>
    <br>

  </div>
  </body>
</html>
```

24

```css
.img-preview {
    width: 250px;
    height: 250px;
    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: 250px 250px;
    background-repeat: no-repeat;
    background-position: center;
}

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

.upload-label{
    display: inline-block;
    padding: 12px 30px;
    background: #39B2B4;
    color: #fff;
```



```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");
```

```javascript
$(document).ready(function () {

    $('.image-section').hide();
    $('.loader').hide();
    $('#result').hide();


    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);
    });
```

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

import os
import numpy as np
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
import requests

app = Flask(__name__,template_folder="templates")

model=load_model('nutrition.h5')
print("Loaded model from disk")


@app.route('/')
def home():
    return render_template('home.html')


@app.route('/image1',methods=['GET','POST'])
def image1():
    return render_template('image.html')
```

CHAPTER-8

TESTING

8.1 TEST CASES

8.2 USER ACCEPTANCE TESTING

CHAPTER-9

RESULTS

9.1 Performance Metrics

OBJECTIVE OF THE PROJECT

- 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.


AIM OF THE PROJECT

- 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.).
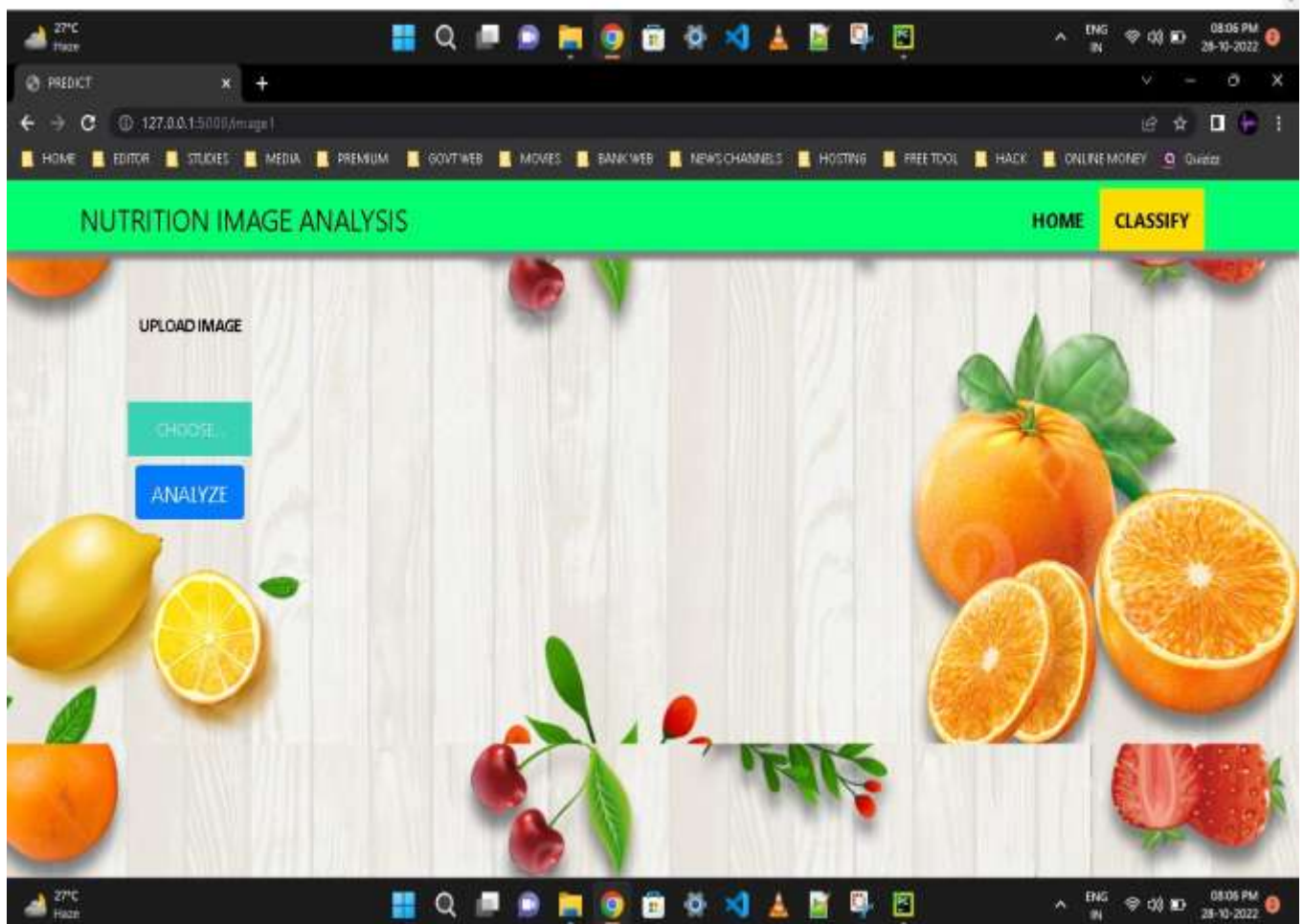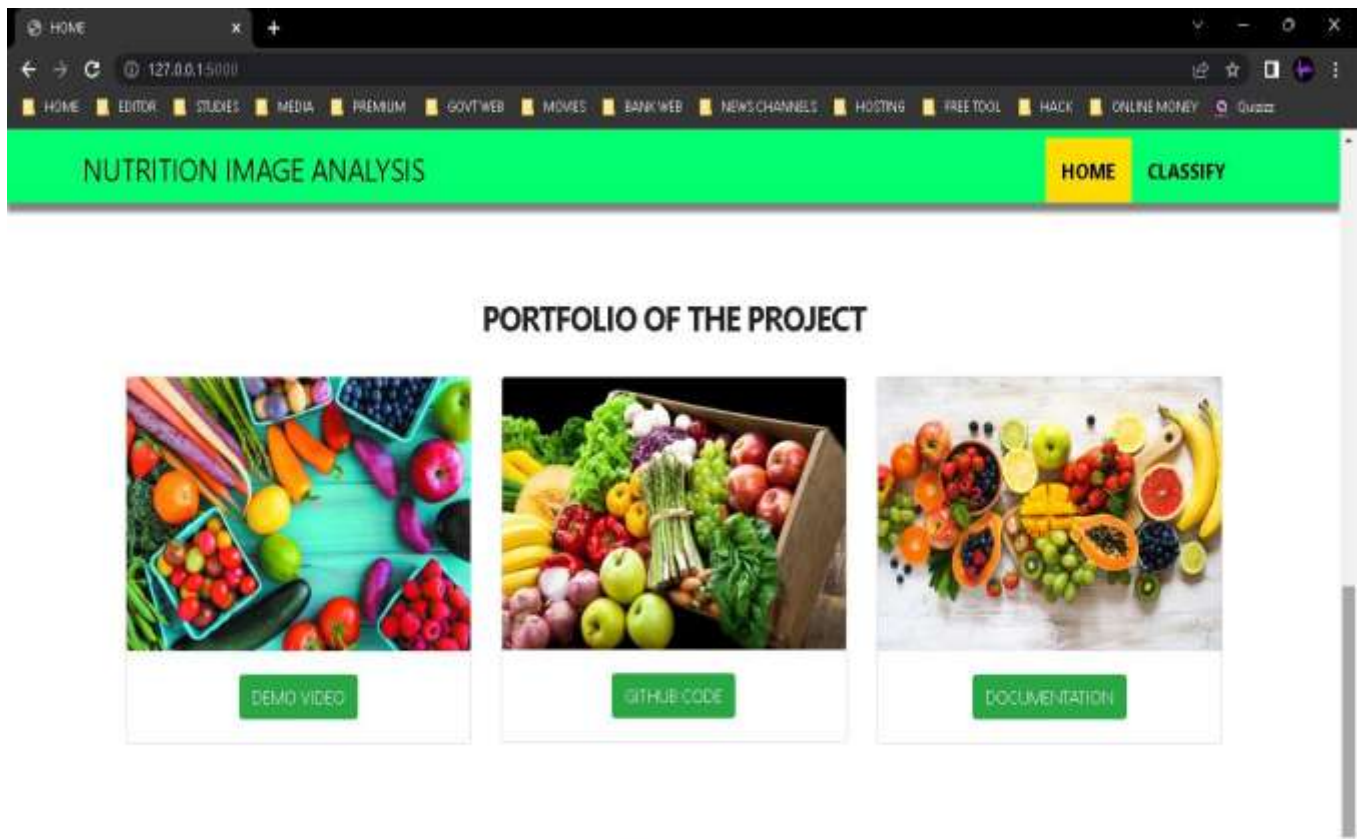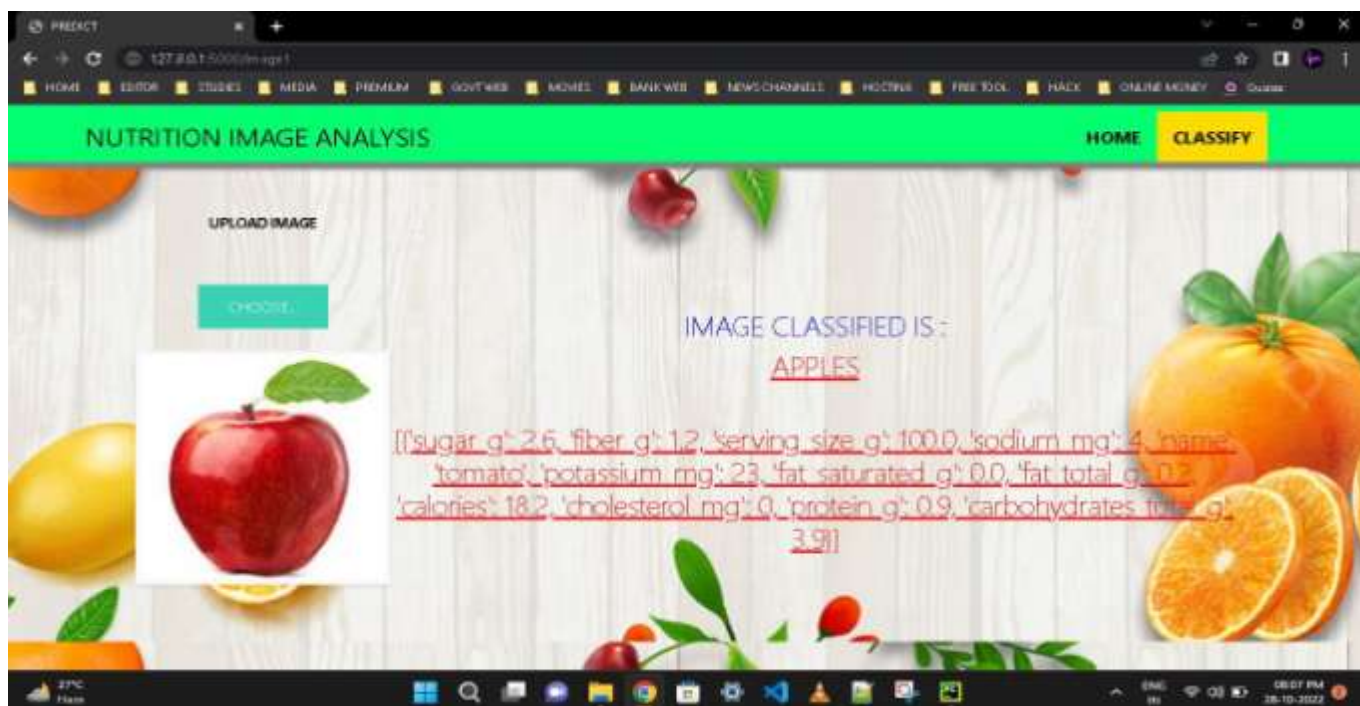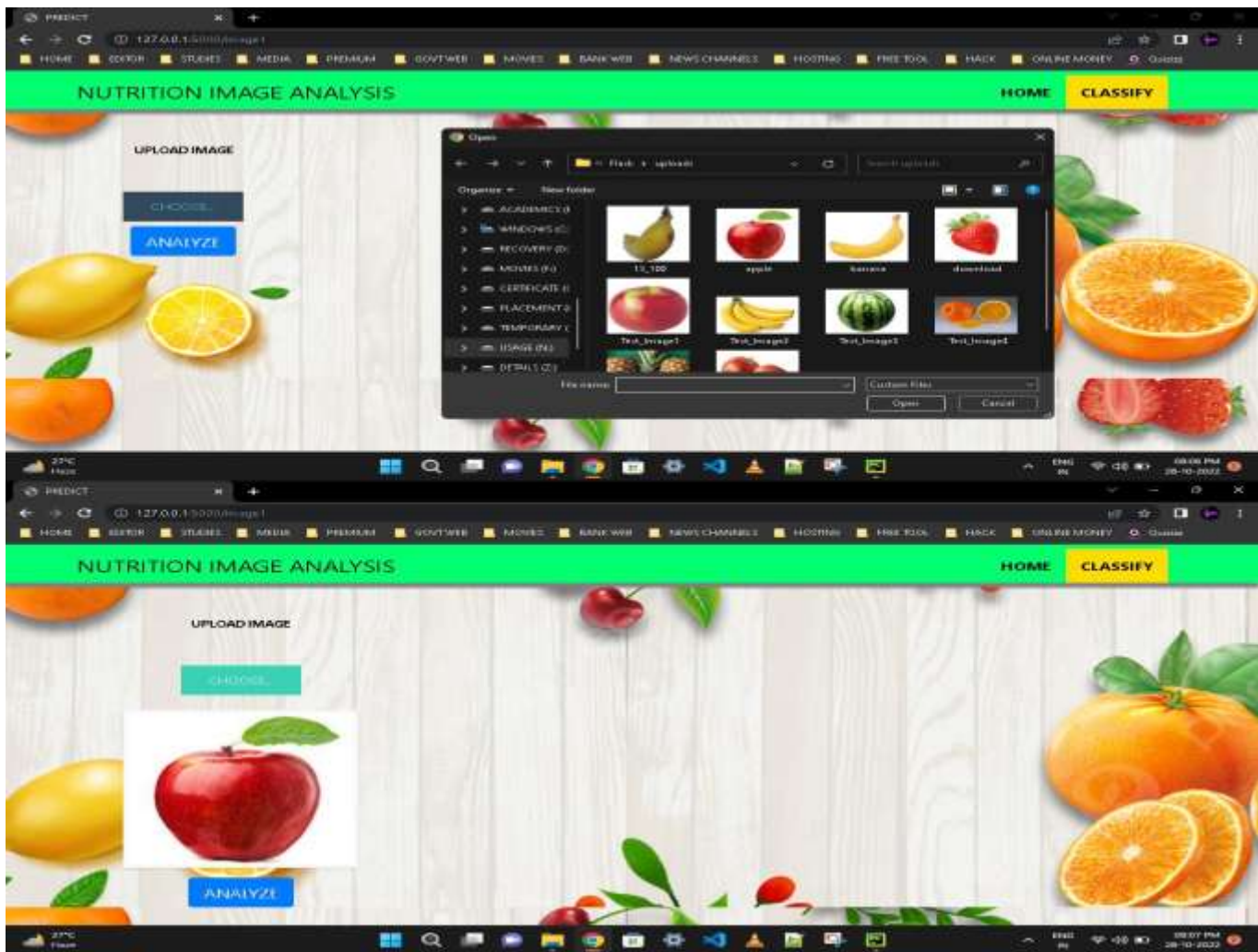
CHAPTER-10

ADVANTAGES & DISADVANTAGES

ADVANTAGES

- The new dietary assessment and nutrition analysis tools enable more opportunities to helppeople understand their daily eating habits
- It help in exploring the nutrition patterns in their daily routines and this is very useful forpeople to maintain a healthy diet balances.
- The nutritional analysis is used to determine the nutritional content of food.
- This application eliminates the travelling cost in visiting a dietician.
- The usage of this application greatly reduces the time required to get the best diet plan

DISADVANTAGES

- The android mobile user will not be able to insert or view details if the server goes down. Thus there is disadvantage of single point failure.

CHAPTER-11

CONCLUSION

By the end of this project we will

- know fundamental concepts and techniques of Convolutional Neural Network.

- gain a broad understanding of image data

- know how to build a web application using the Flask framework.

- know how to pre-process data and

- know how to clean the data using different data preprocessing techniques.

CHAPTER-12

FUTURE SCOPE

- AI is revolutionizing the health industry.

- It is majorly used in improving marketing and sales decisions, AI is now also being used to reshape individual habits.

- In future we don't want to go to gym and do any diets. By using this nutrition fitness analyzer we can maintain our diet plans without any help from others and we can lead a happy and healthy life with good wealth.

- AI can easily track health behaviors and repetitive exercise patterns and use the data to guide you towards your fitness journey and diet plans .

CHAPTER-13

APPENDIX

Source Code - https://drive.google.com/drive/folders/1NvXv_n1aNOCT0mnB7Mxtc2VJR4jSvskf?usp=share_link

GitHub - https://github.com/IBM-EPBL/IBM-Project-35710-1660287765

Demo Link:
https://drive.google.com/file/d/1q9JBKnQVVSilECuSsAHD_9OxEK1sW7GQ/view?usp=sharing