TEAM ID : PNT2022TMID47211

PROJECT NAME : AI-Powered Nutrition Analyzer For Fitness Enthusiasts

Project Report

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.).

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

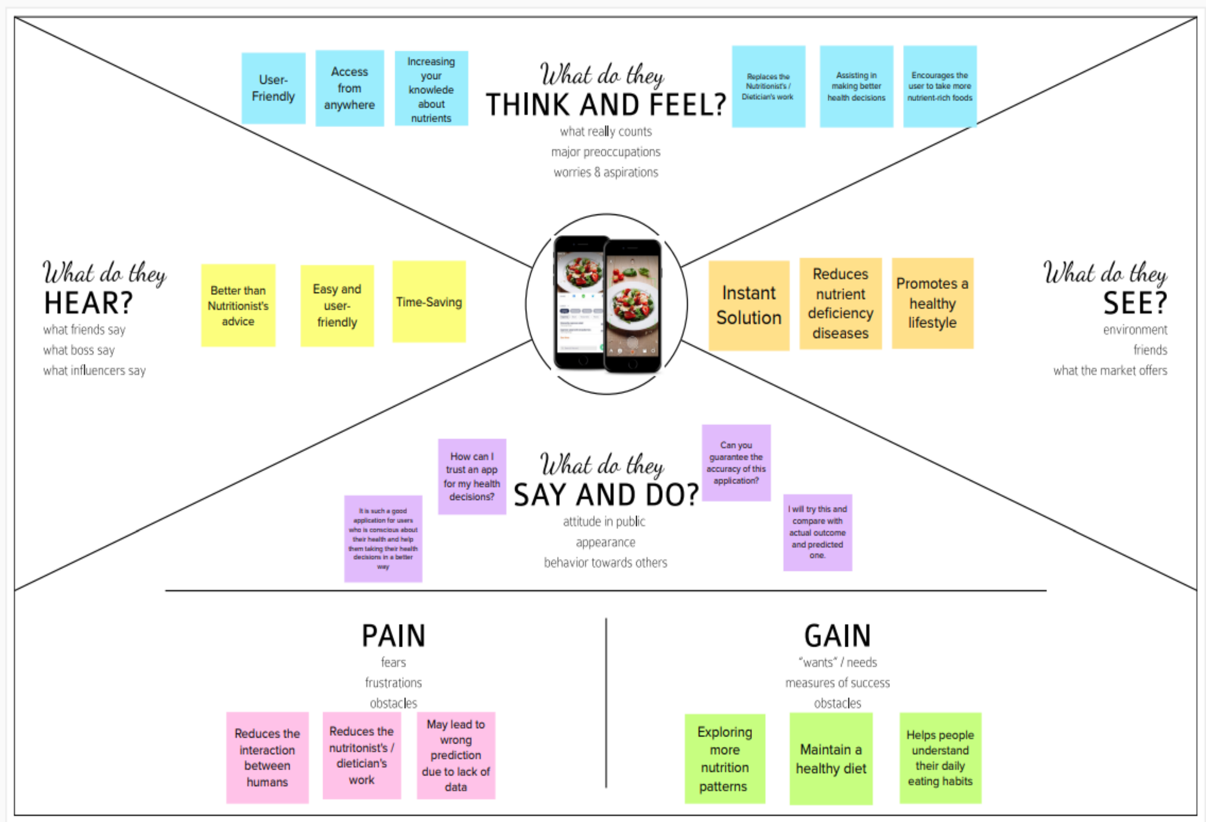
https://www.nutrinohealth.com/

2.3 Problem Statement Definition

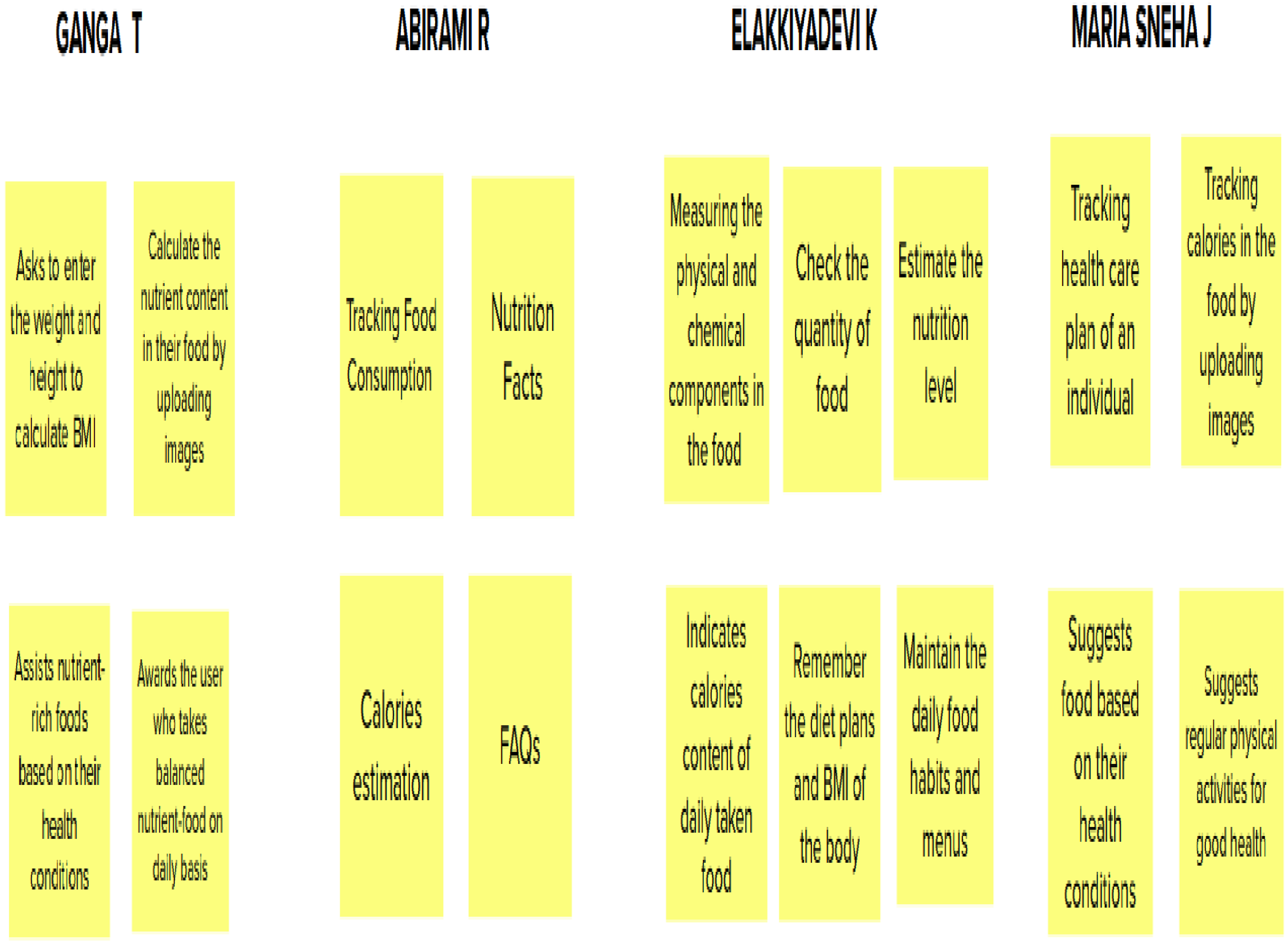
The main aim of the project is to building a model which is used for classifying the fruit depends onthe different characteristics like colour, shape, texture etc. Here the user can capture the images ofdifferent fruits and then the image will be sent the trained model. The model analyses the image and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

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas


User-Friendly
Access from anywhere
Increasing your knowlede about nutrients
What do they THINK AND FEEL?
what really counts
major preoccupations
worries & aspirations
Replaces the Nutritionist's / Dietician's work
Assisting in making better health decisions
Encourages the user to take more nutrient-rich foods
What do they HEAR?
what friends say
what boss say
what influencers say
Better than Nutritionist's advice
Easy and user-friendly
Time-Saving
Instant Solution
Reduces nutrient deficiency diseases
Promotes a healthy lifestyle
What do they SEE?
environment
friends
what the market offers
It is such a good application for users who is conscious about their health and help them taking their health decisions in a better way
How can I trust an app for my health decisions?
What do they SAY AND DO?
attitude in public
appearance
behavior towards others
Can you guarantee the accuracy of this application?
I will try this and compare with actual outcome and predicted one.
PAIN
fears
frustrations
obstacles
Reduces the interaction between humans
Reduces the nutritonist's / dietician's work
May lead to wrong prediction due to lack of data
GAIN
"wants" / needs
measures of success
obstacles
Exploring more nutrition patterns
Maintain a healthy diet
Helps people understand their daily eating habits

3.2 Ideation & Brainstorm



GANGA T

Asks to enter the weight and height to calculate BMI

Calculate the nutrient content in their food by uploading images

Assists nutrient-rich foods based on their health conditions

Awards the user who takes balanced nutrient-food on daily basis

ABIRAMI R

Tracking Food Consumption

Nutrition Facts

Calories estimation

FAQs

ELAKKIYADEVI K

Measuring the physical and chemical components in the food

Check the quantity of food

Estimate the nutrition level

Indicates calories content of daily taken food

Remember the diet plans and BMI of the body

Maintain the daily food habits and menus

MARIA SNEHA J

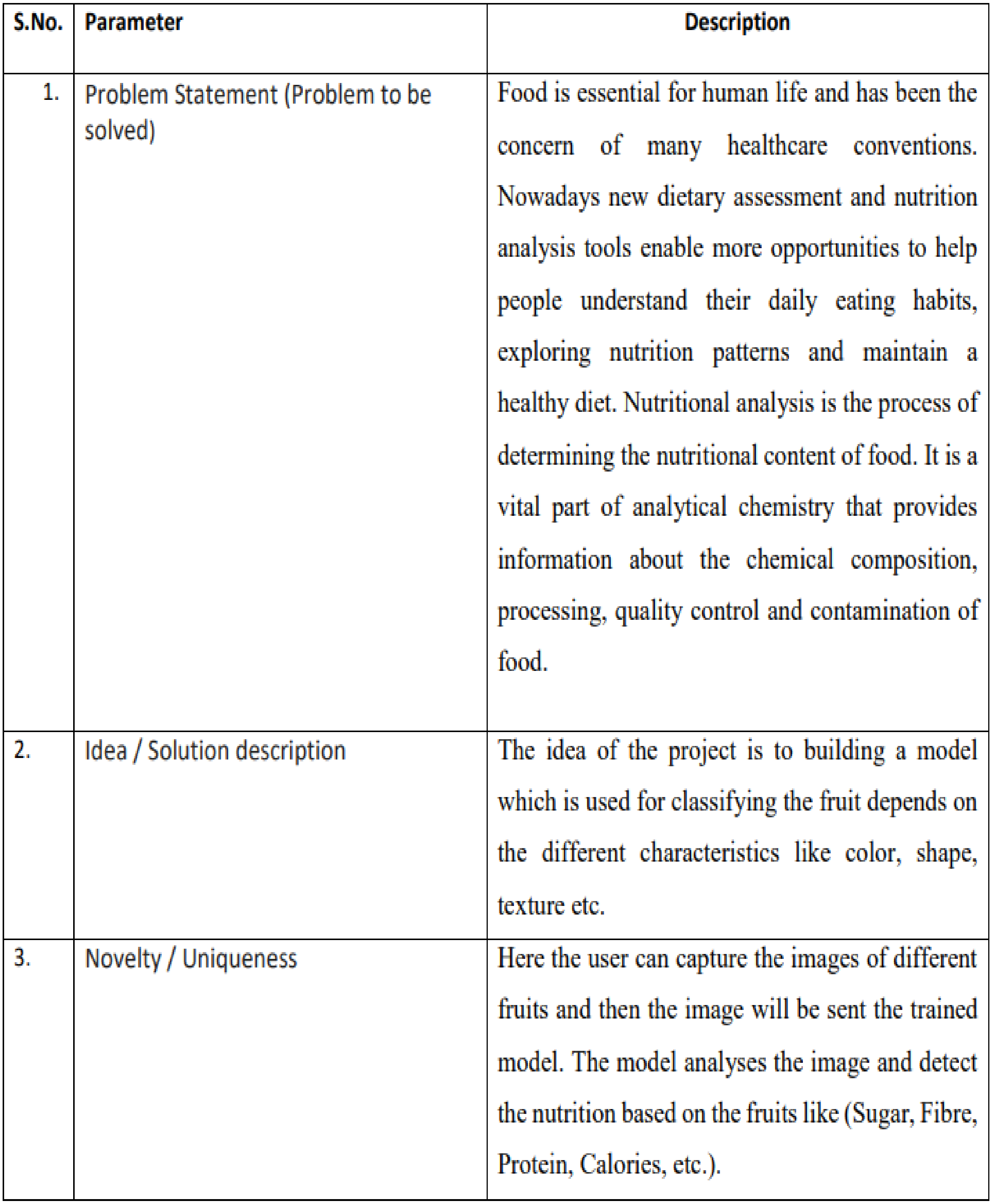
Tracking health care plan of an individual

Tracking calories in the food by uploading images

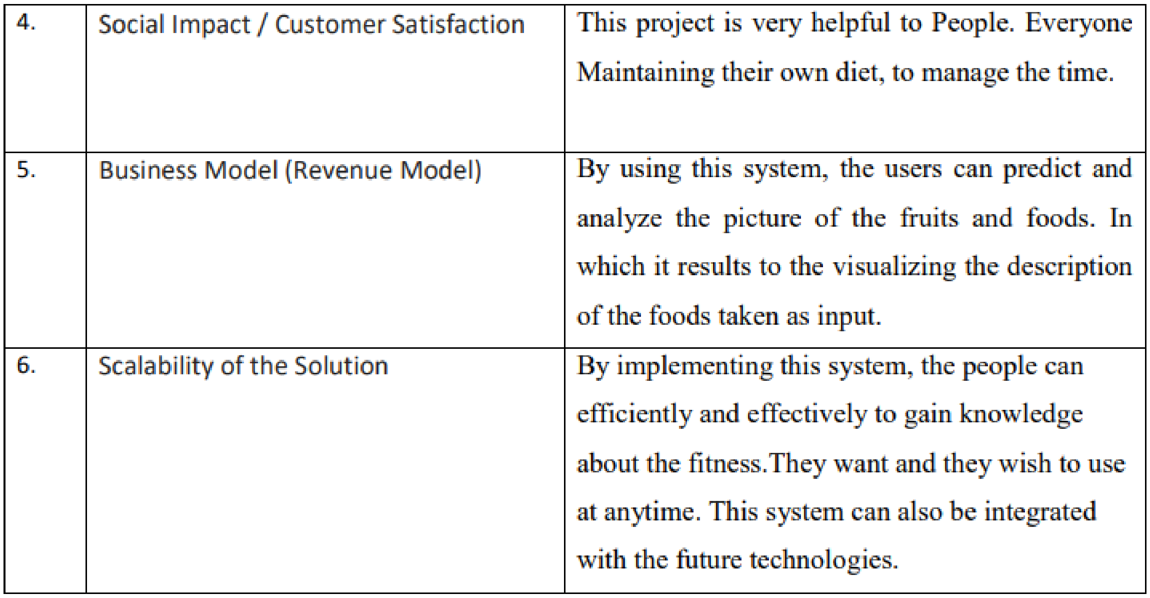
Suggests food based on their health conditions

Suggests regular physical activities for good health

3.3 Proposed Solution



S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	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.
2.	Idea / Solution description	The idea 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.
3.	Novelty / Uniqueness	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.).



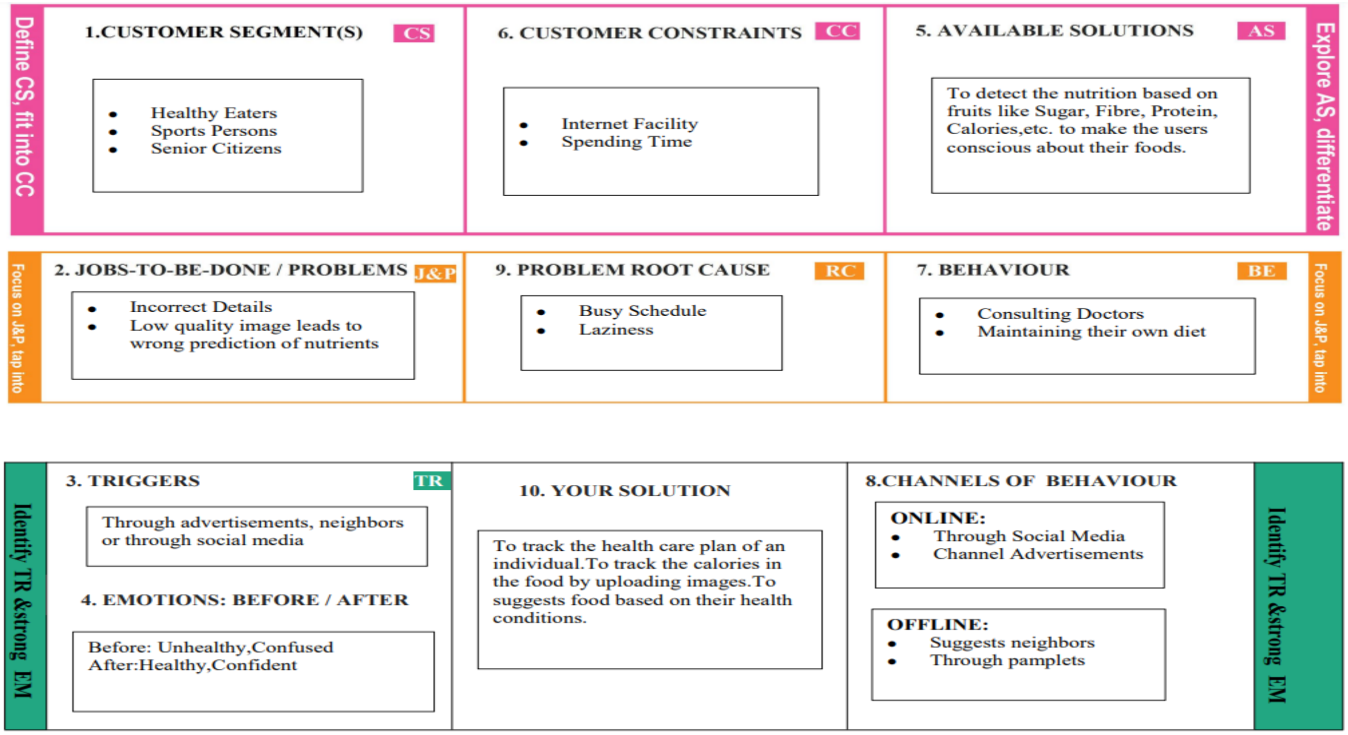
4.	Social Impact / Customer Satisfaction	This project is very helpful to People. Everyone Maintaining their own diet, to manage the time.
5.	Business Model (Revenue Model)	By using this system, the users can predict and analyze the picture of the fruits and foods. In which it results to the visualizing the description of the foods taken as input.
6.	Scalability of the Solution	By implementing this system, the people can efficiently and effectively to gain knowledge about the fitness.They want and they wish to use at anytime. This system can also be integrated with the future technologies.

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.



1.CUSTOMER SEGMENT(S) CS

- Healthy Eaters
- Sports Persons
- Senior Citizens

6. CUSTOMER CONSTRAINTS CC

- Internet Facility
- Spending Time

5. AVAILABLE SOLUTIONS AS

To detect the nutrition based on fruits like Sugar, Fibre, Protein, Calories,etc. to make the users conscious about their foods.

2. JOBS-TO-BE-DONE / PROBLEMS J&P

- Incorrect Details
- Low quality image leads to wrong prediction of nutrients

9. PROBLEM ROOT CAUSE RC

- Busy Schedule
- Laziness

7. BEHAVIOUR BE

- Consulting Doctors
- Maintaining their own diet

3. TRIGGERS TR

Through advertisements, neighbors or through social media

4. EMOTIONS: BEFORE / AFTER

Before: Unhealthy,Confused
After:Healthy,Confident

10. YOUR SOLUTION

To track the health care plan of an individual.To track the calories in the food by uploading images.To suggests food based on their health conditions.

8.CHANNELS OF BEHAVIOUR

ONLINE:
- Through Social Media
- Channel Advertisements

OFFLINE:
- Suggests neighbors
- Through pamplets

4. REQUIREMENT ANALYSIS

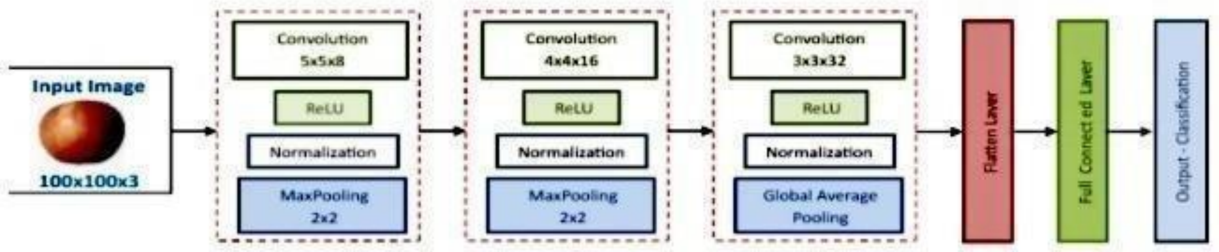
4.1 Functional requirement

- 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 personnutritionist.
- The task of food detection/classification is not easy as it seems. All possible options relatedto 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 themeal 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 resultsof 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-ConsumptionNotification	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.

FR-8	Diet Plan Specification	Users can select the kind of diet plan they want to follow with a target in mind such as weight loss, muscle building, etc. The application sources diet plans and food items that supplement their goals from the internet to help them achieve their goal.

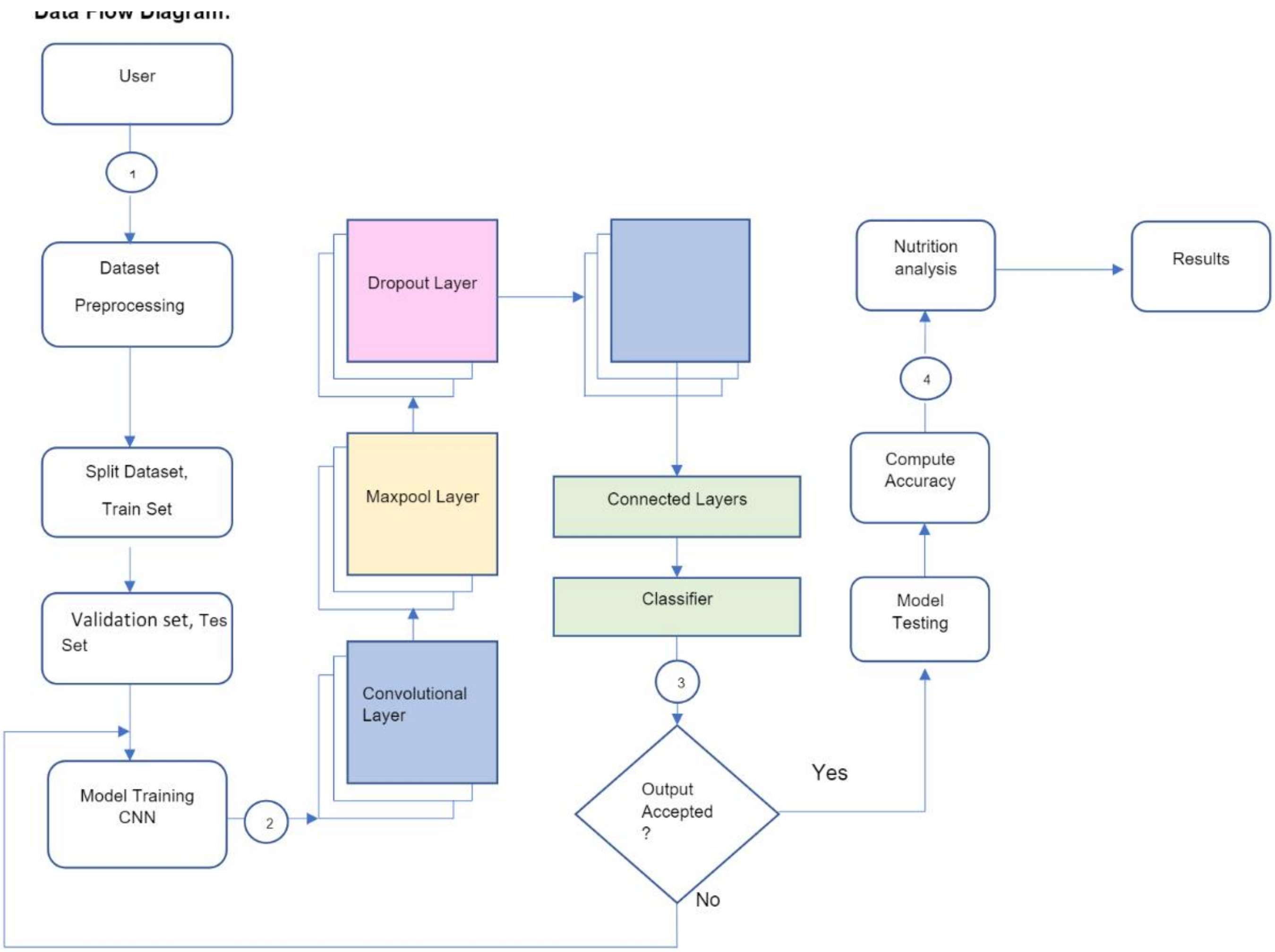
4.2 Non-Functional requirements

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

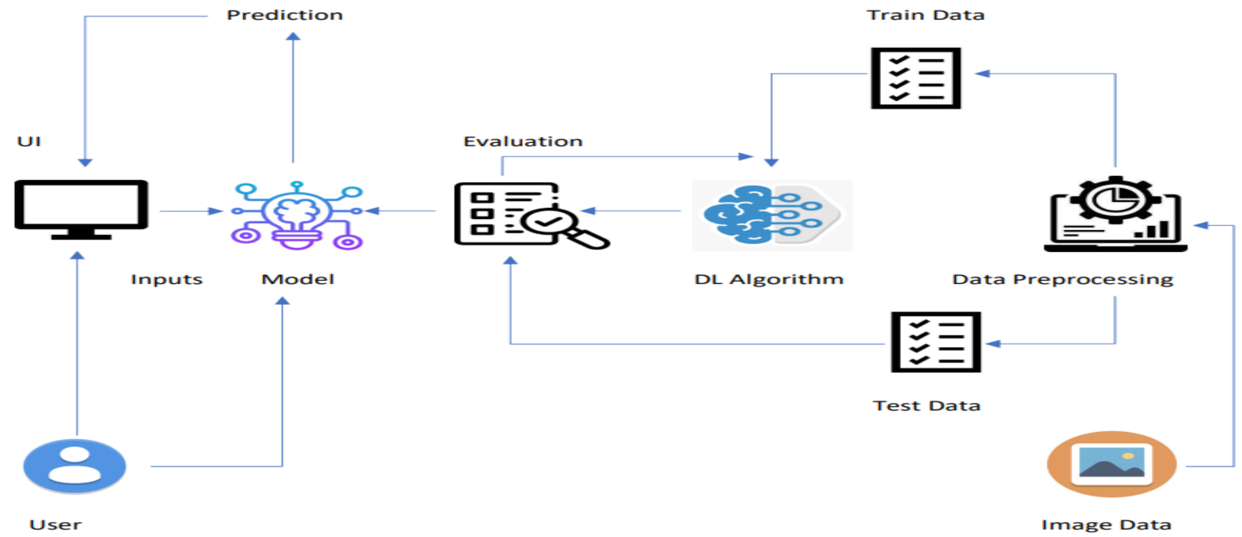
		calories should be done accurately.
NFR-4	**Performance**	The application should be built on a highly efficient prediction model such that the results are accurate. It should keep in mind time and space complexity.
NFR-5	**Availability**	The application should be available to its users at all times and 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.

5. PROJECT DESIGN

5.1 Data Flow Diagrams



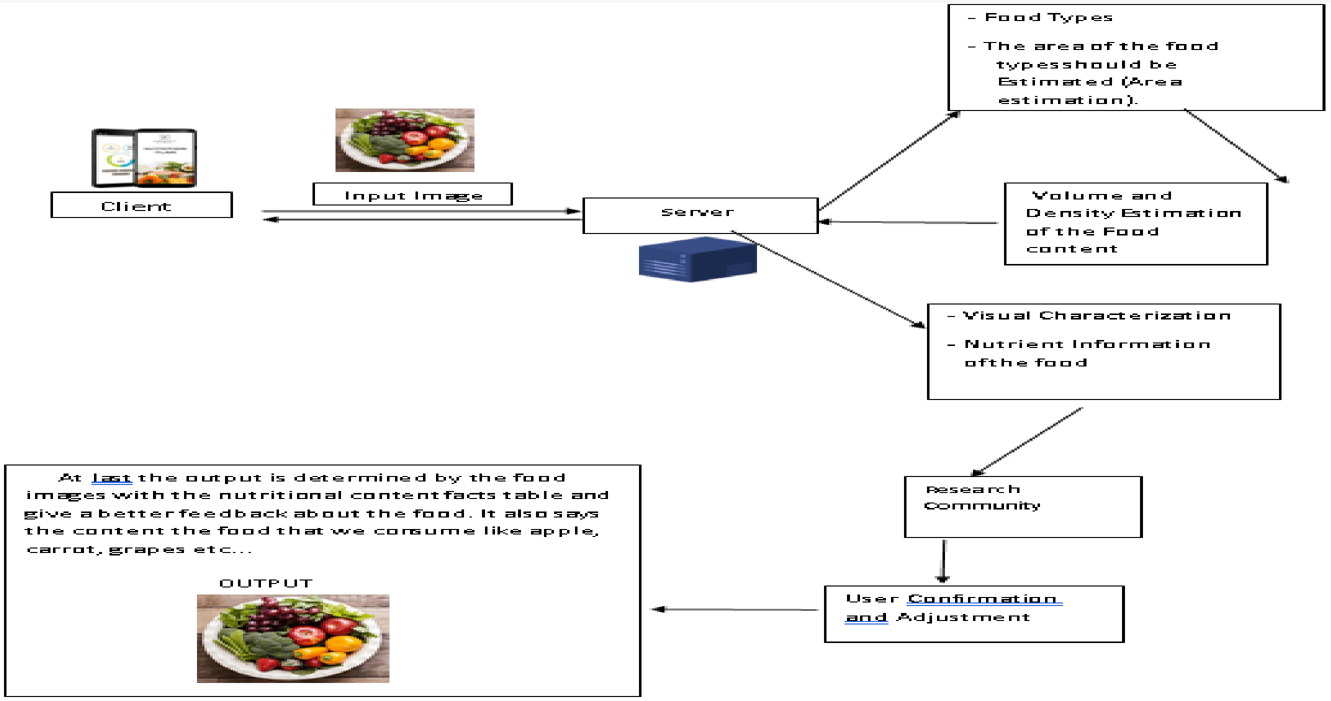
5.2 Solution & Technical Architecture



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	SendGrid

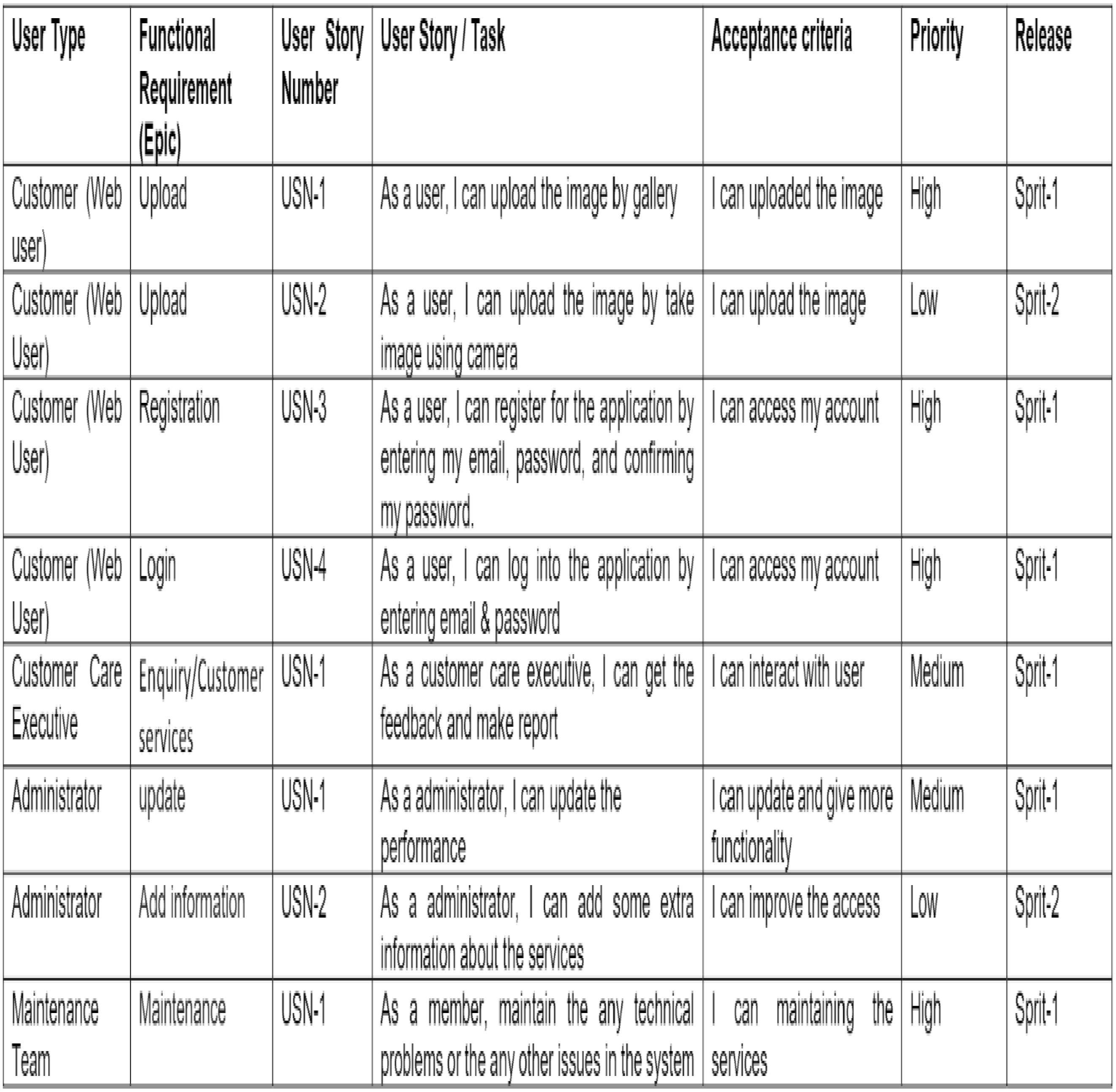
Application Characteristics:

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 typesshould be Estimated (Area estimation).
Volume and Density Estimation of the Food content
- Visual Characterization
- Nutrient Information ofthe food
Research Community
User Confirmation and Adjustment
OUTPUT

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...

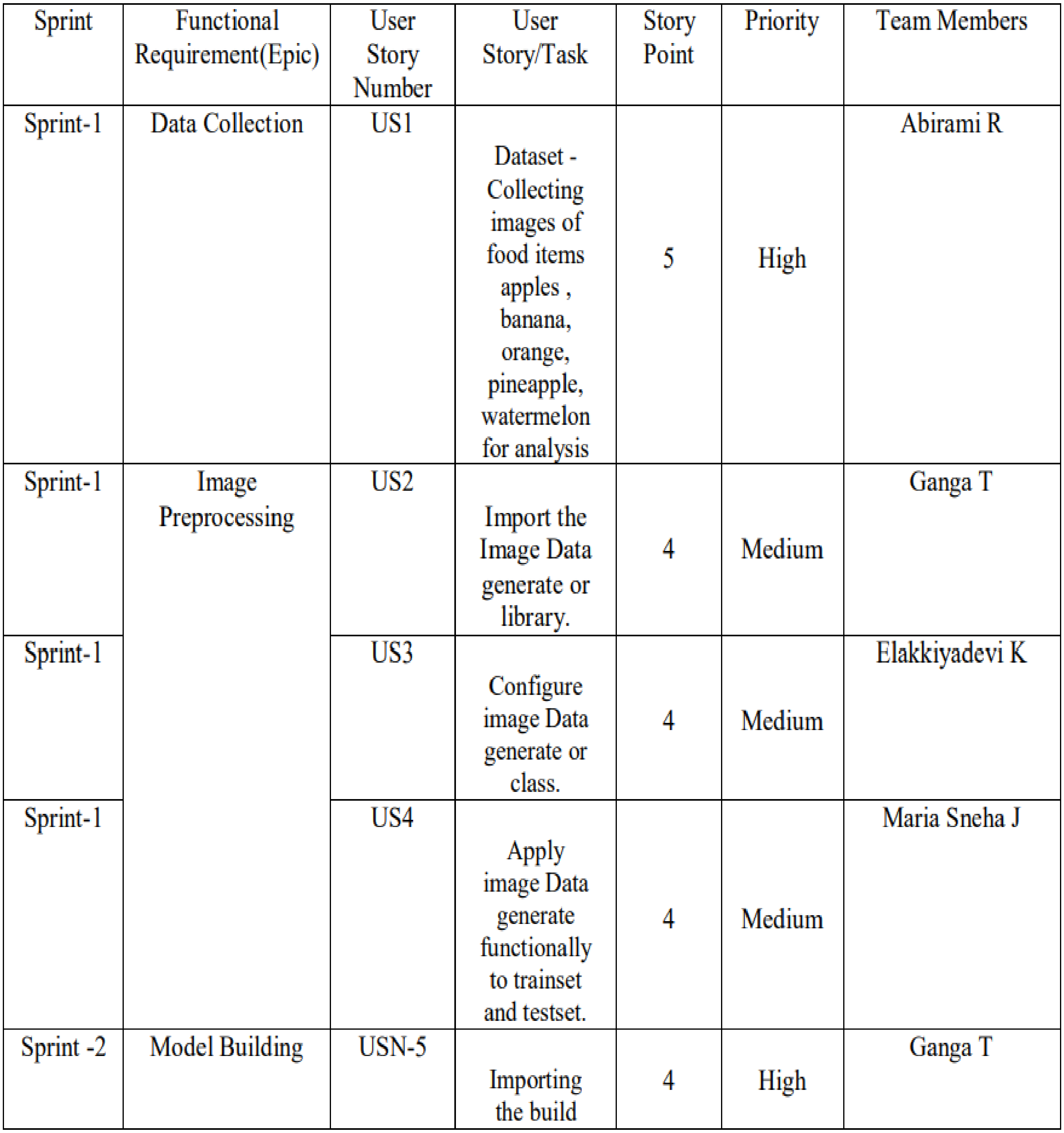
5.3 User Stories



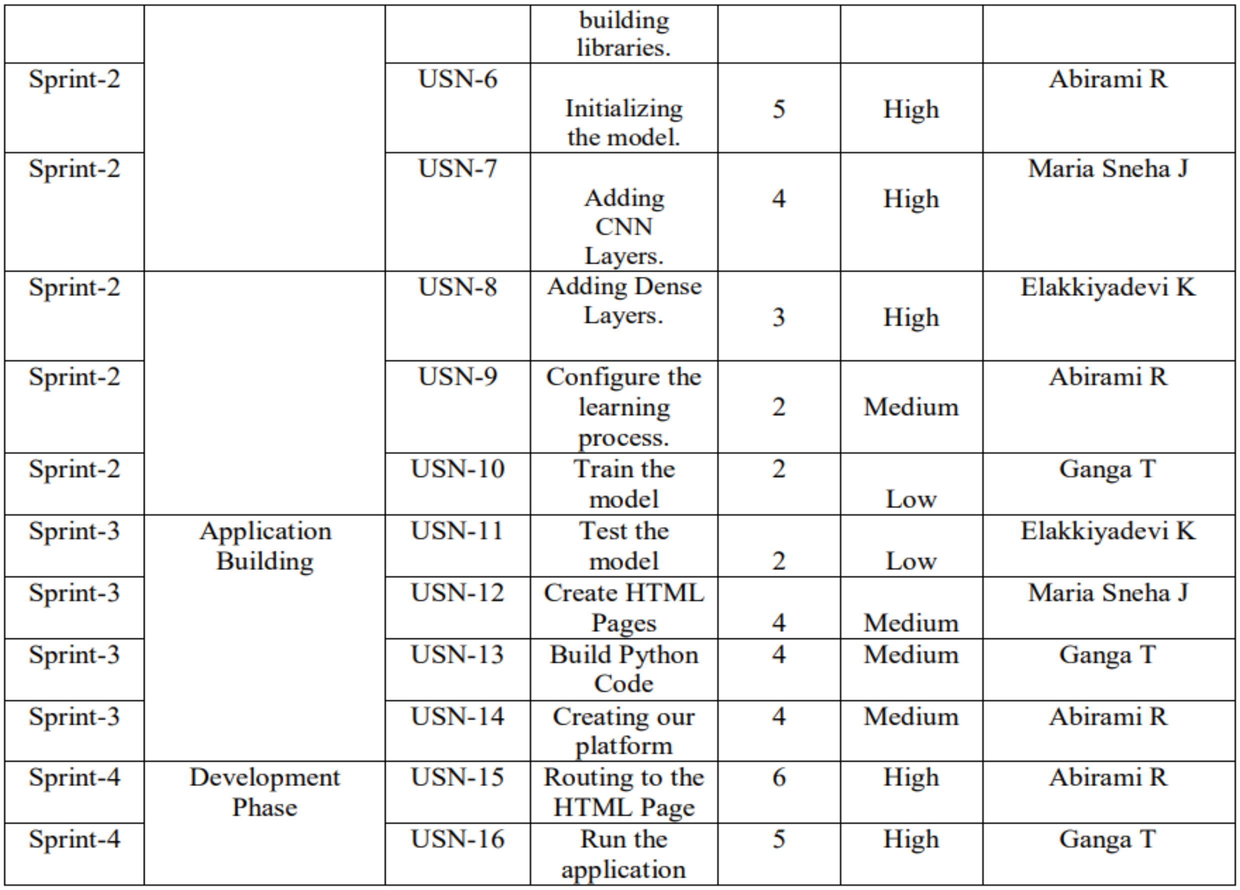
User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Web user)	Upload	USN-1	As a user, I can upload the image by gallery	I can uploaded the image	High	Sprit-1
Customer (Web User)	Upload	USN-2	As a user, I can upload the image by take image using camera	I can upload the image	Low	Sprit-2
Customer (Web User)	Registration	USN-3	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account	High	Sprit-1
Customer (Web User)	Login	USN-4	As a user, I can log into the application by entering email & password	I can access my account	High	Sprit-1
Customer Care Executive	Enquiry/Customer services	USN-1	As a customer care executive, I can get the feedback and make report	I can interact with user	Medium	Sprit-1
Administrator	update	USN-1	As a administrator, I can update the performance	I can update and give more functionality	Medium	Sprit-1
Administrator	Add information	USN-2	As a administrator, I can add some extra information about the services	I can improve the access	Low	Sprit-2
Maintenance Team	Maintenance	USN-1	As a member, maintain the any technical problems or the any other issues in the system	I can maintaining the services	High	Sprit-1

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

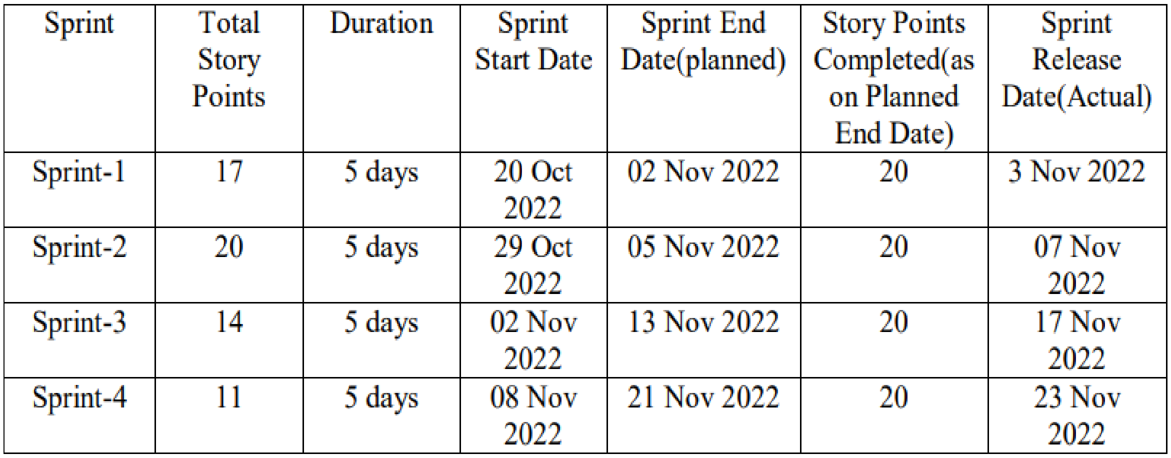


Sprint	Functional Requirement(Epic)	User Story Number	User Story/Task	Story Point	Priority	Team Members
Sprint-1	Data Collection	US1	Dataset - Collecting images of food items apples , banana, orange, pineapple, watermelon for analysis	5	High	Abirami R
Sprint-1	Image Preprocessing	US2	Import the Image Data generate or library.	4	Medium	Ganga T
Sprint-1		US3	Configure image Data generate or class.	4	Medium	Elakkiyadevi K
Sprint-1		US4	Apply image Data generate functionally to trainset and testset.	4	Medium	Maria Sneha J
Sprint -2	Model Building	USN-5	Importing the build	4	High	Ganga T



			building libraries.			
Sprint-2		USN-6	Initializing the model.	5	High	Abirami R
Sprint-2		USN-7	Adding CNN Layers.	4	High	Maria Sneha J
Sprint-2		USN-8	Adding Dense Layers.	3	High	Elakkiyadevi K
Sprint-2		USN-9	Configure the learning process.	2	Medium	Abirami R
Sprint-2		USN-10	Train the model	2	Low	Ganga T
Sprint-3	Application Building	USN-11	Test the model	2	Low	Elakkiyadevi K
Sprint-3		USN-12	Create HTML Pages	4	Medium	Maria Sneha J
Sprint-3		USN-13	Build Python Code	4	Medium	Ganga T
Sprint-3		USN-14	Creating our platform	4	Medium	Abirami R
Sprint-4	Development Phase	USN-15	Routing to the HTML Page	6	High	Abirami R
Sprint-4		USN-16	Run the application	5	High	Ganga T

6.2 Sprint Delivery Schedule



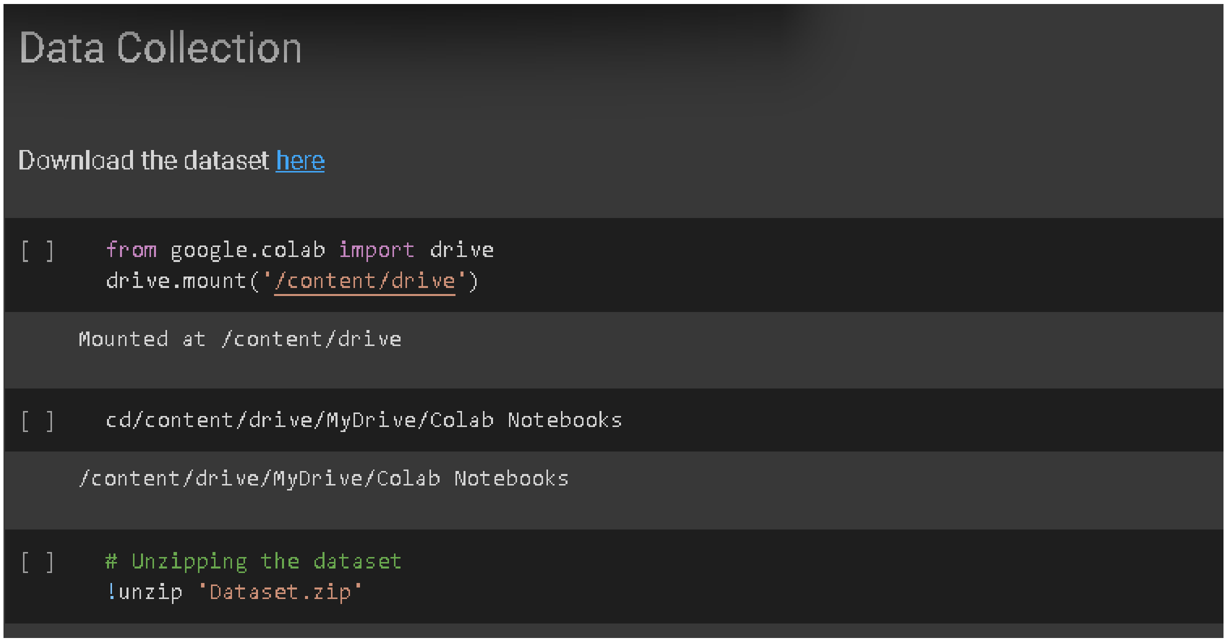
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date(planned)	Story Points Completed(as on Planned End Date)	Sprint Release Date(Actual)
Sprint-1	17	5 days	20 Oct 2022	02 Nov 2022	20	3 Nov 2022
Sprint-2	20	5 days	29 Oct 2022	05 Nov 2022	20	07 Nov 2022
Sprint-3	14	5 days	02 Nov 2022	13 Nov 2022	20	17 Nov 2022
Sprint-4	11	5 days	08 Nov 2022	21 Nov 2022	20	23 Nov 2022

Velocity:

Average Velocity=12/4=3

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

3.1 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'
```

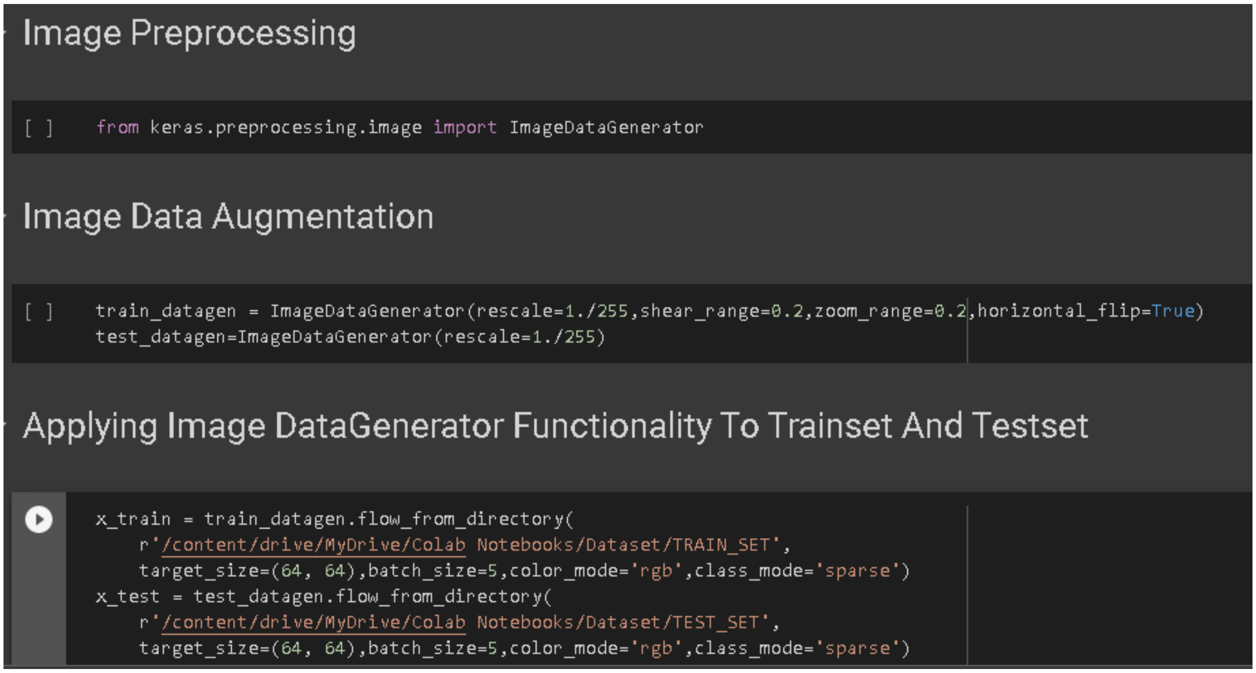


Image Preprocessing

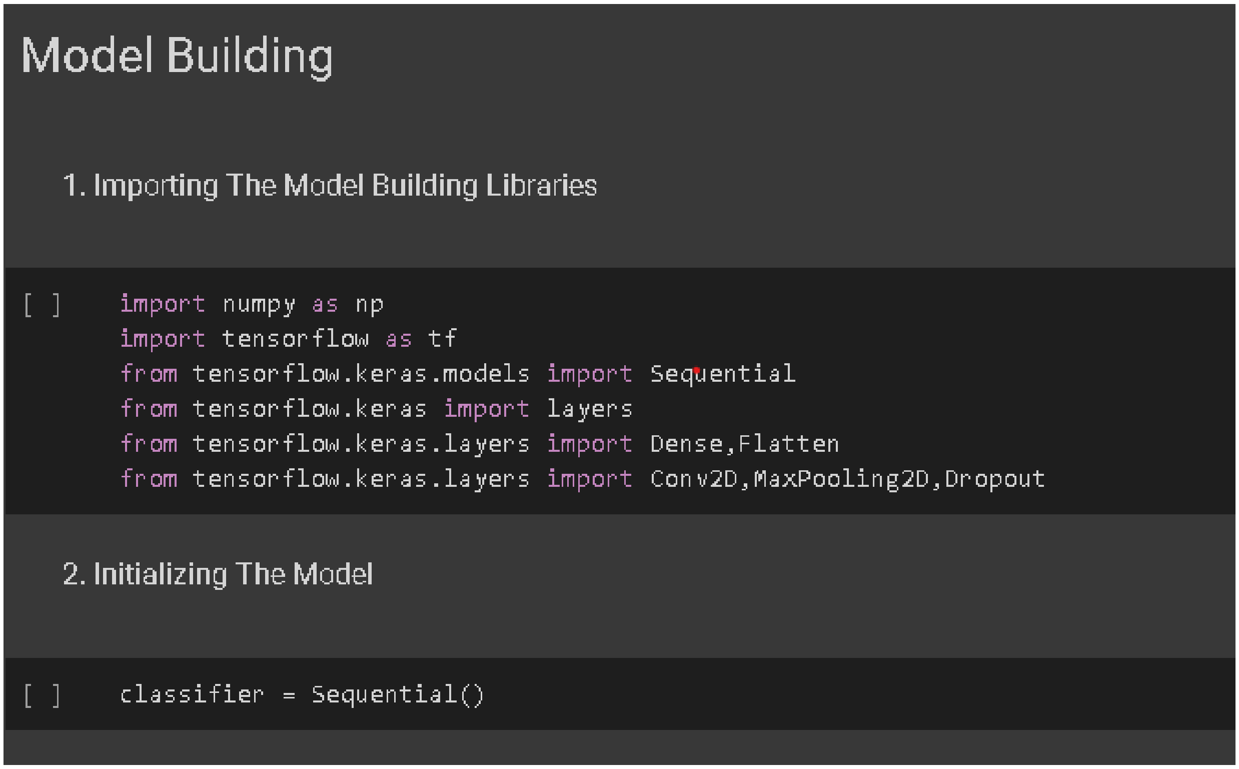
```
[ ]  from keras.preprocessing.image import ImageDataGenerator
```

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')
```



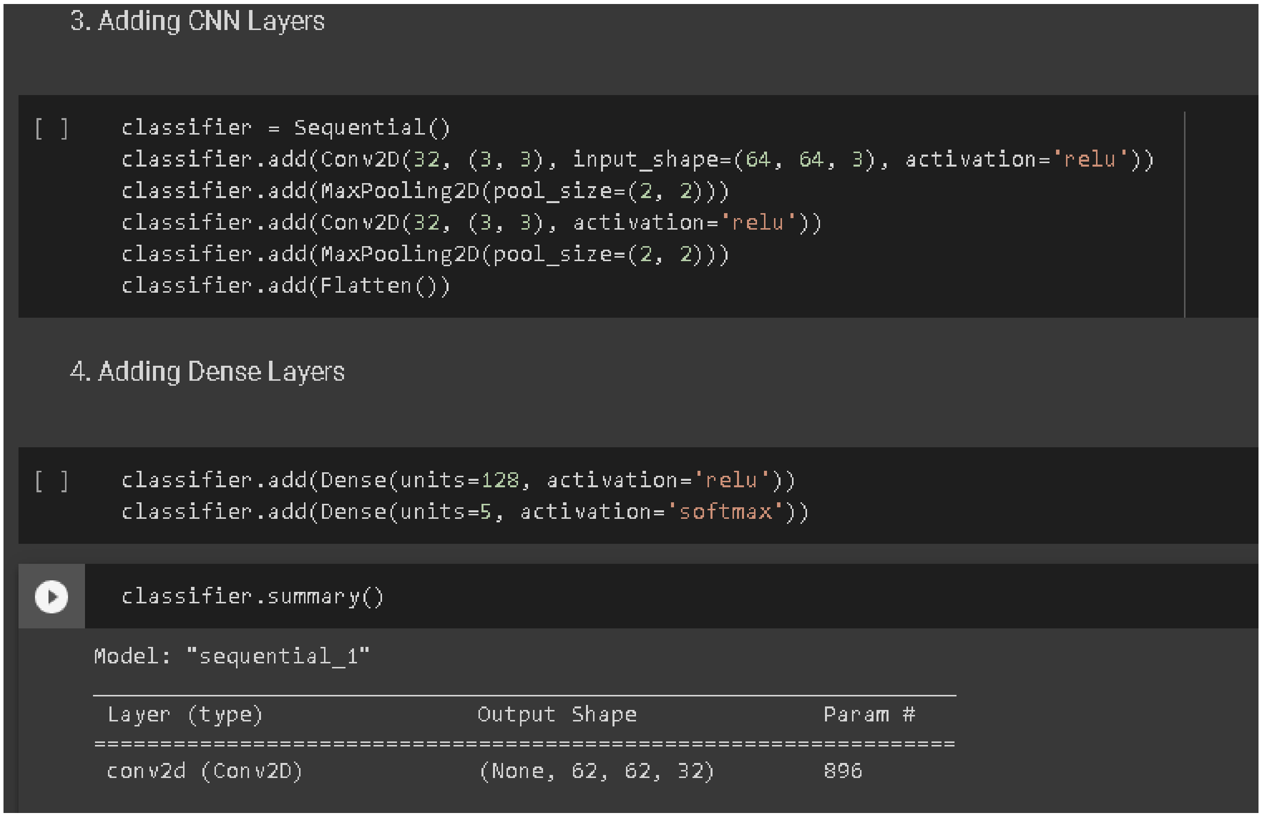
Model Building

1. Importing The Model Building Libraries

```
[ ]  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

```
[ ]  classifier = Sequential()
```



3. Adding CNN Layers

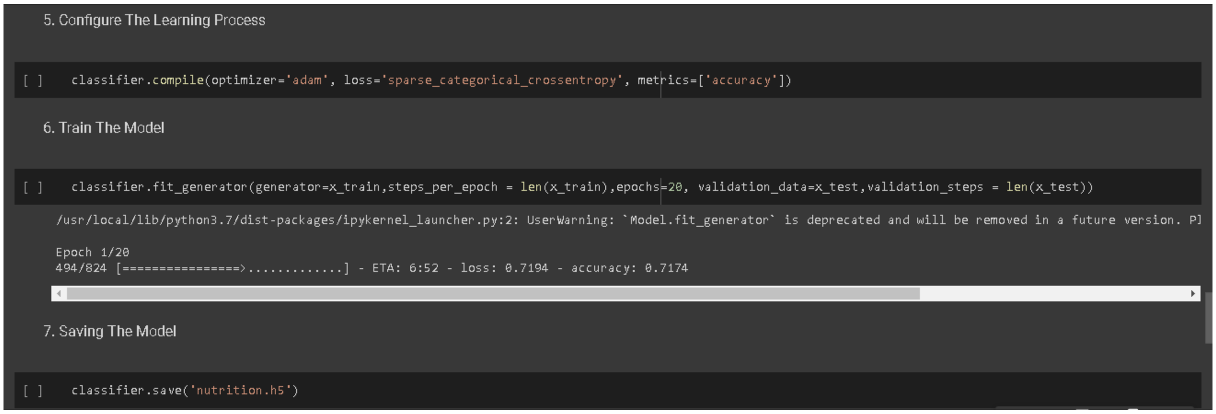
```
[ ]  classifier = Sequential()
     classifier.add(Conv2D(32, (3, 3), input_shape=(64, 64, 3), activation='relu'))
     classifier.add(MaxPooling2D(pool_size=(2, 2)))
     classifier.add(Conv2D(32, (3, 3), activation='relu'))
     classifier.add(MaxPooling2D(pool_size=(2, 2)))
     classifier.add(Flatten())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

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

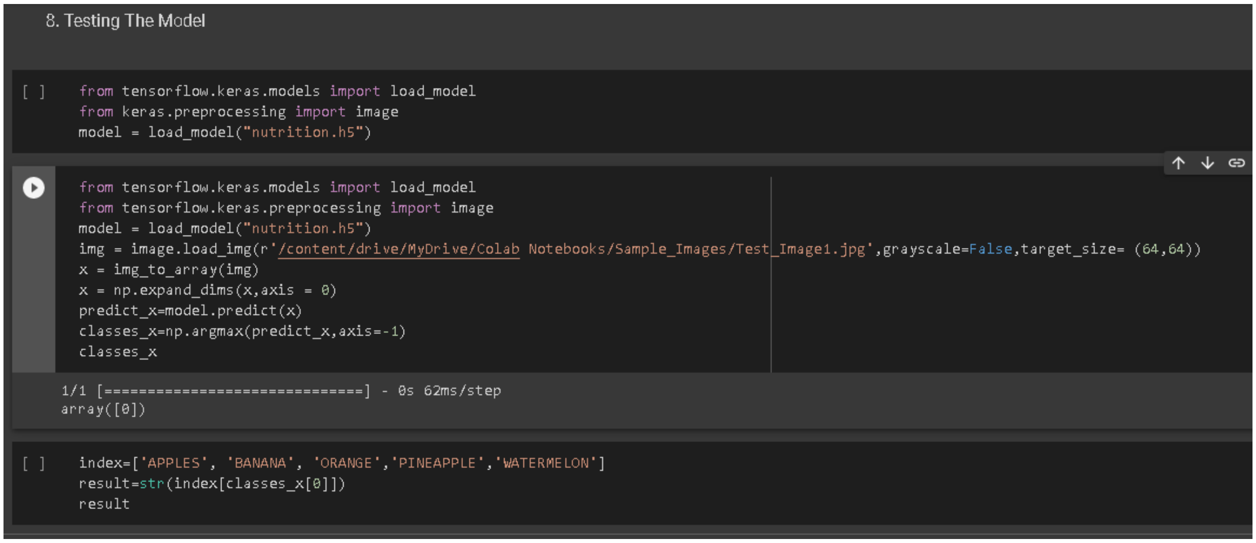
```
[ ]  classifier.compile(optimizer='adam', loss='sparse_categorical_crossentropy', metrics=['accuracy'])
```

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")
```

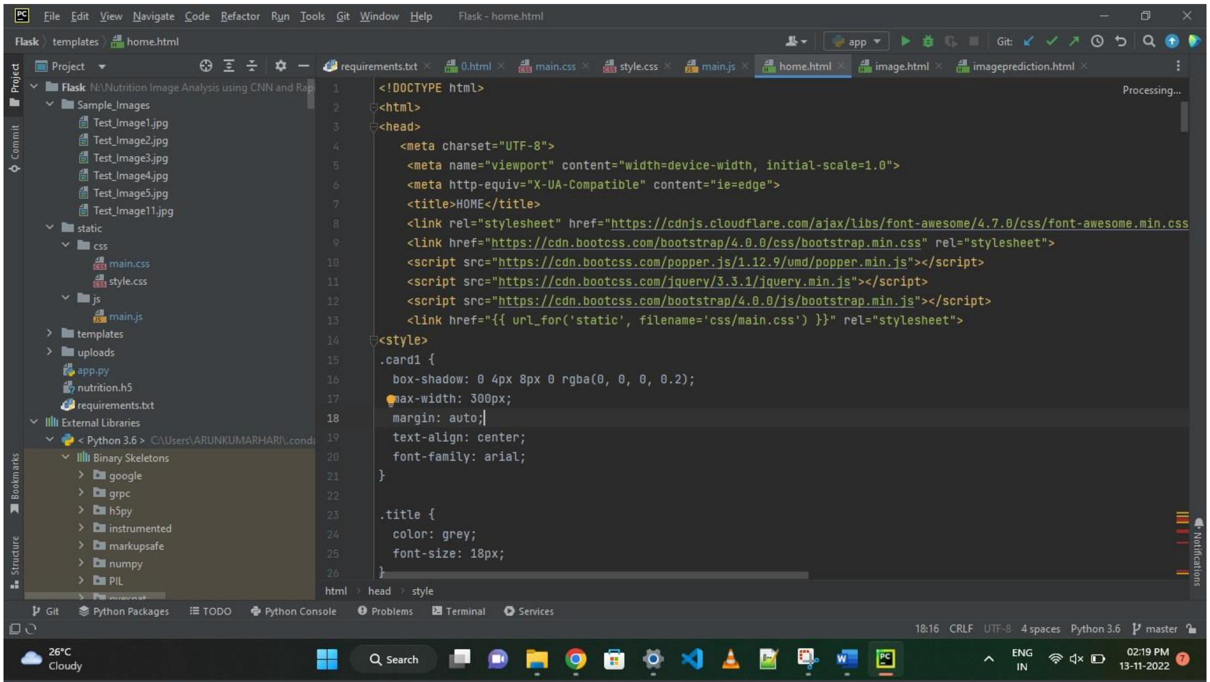
```
      from tensorflow.keras.models import load_model
      from tensorflow.keras.preprocessing import image
      model = load_model("nutrition.h5")
      img = image.load_img(r'/content/drive/MyDrive/Colab Notebooks/Sample_Images/Test_Image1.jpg',grayscale=False,target_size= (64,64))
      x = img_to_array(img)
      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])
```

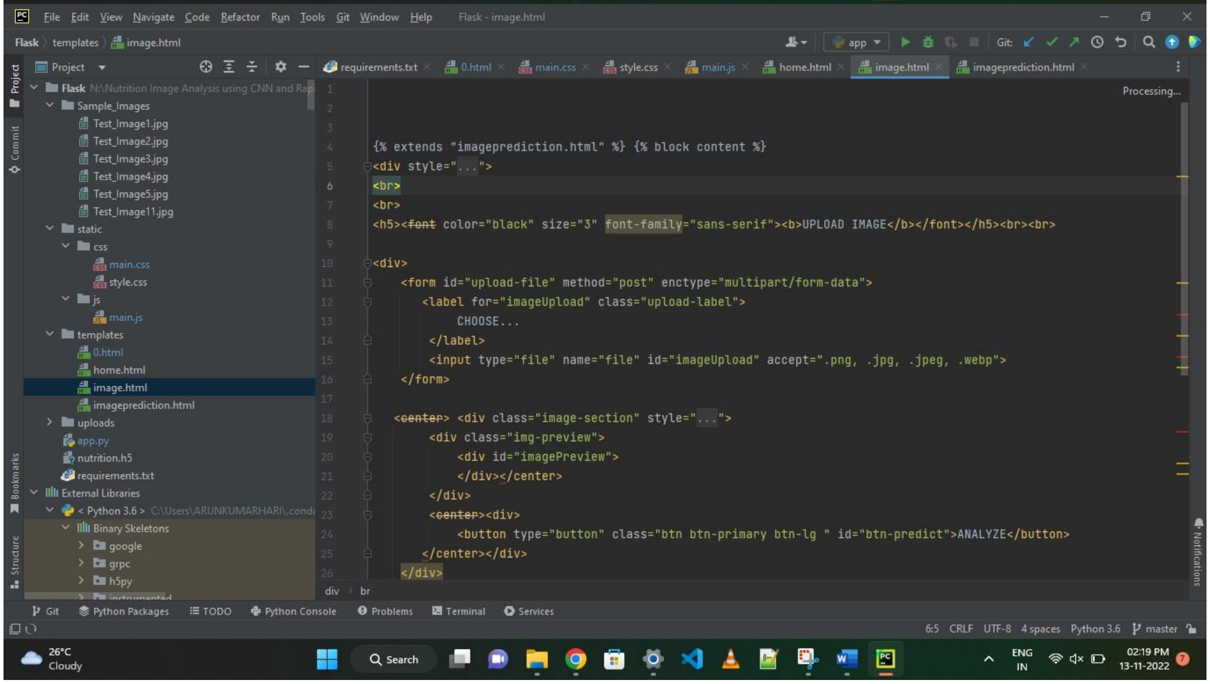
```
[ ]   index=['APPLES', 'BANANA', 'ORANGE','PINEAPPLE','WATERMELON']
      result=str(index[classes_x[0]])
      result
```

SOURCE CODE :
https://colab.research.google.com/drive/1Imkyvkf1NO2FqW3_EvLSNUeL_o5zBJBN?usp=share_link

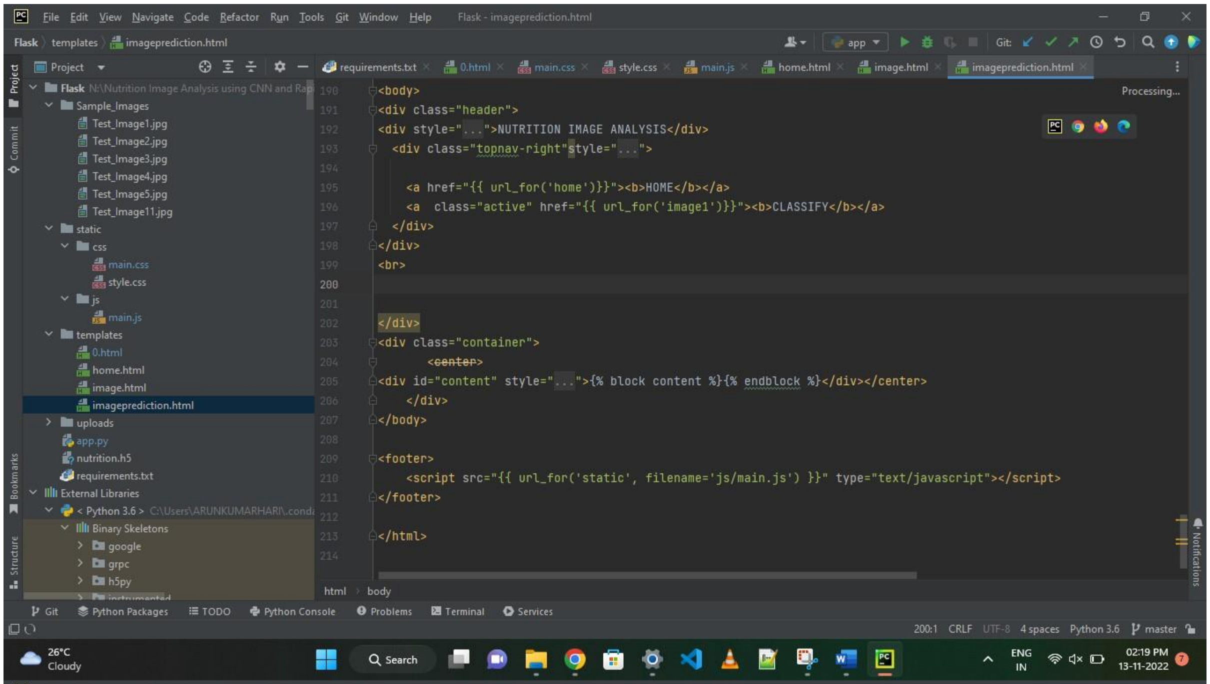
Feature 2



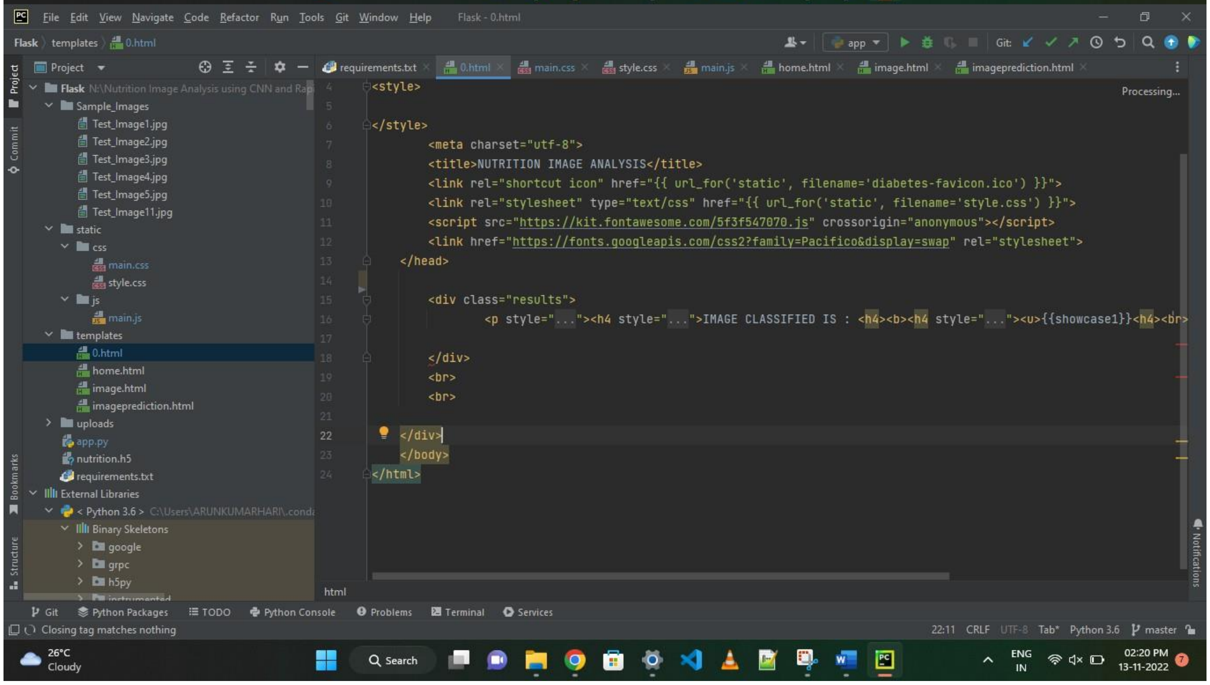
```
<!DOCTYPE html>
<html>
<head>
   <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <meta http-equiv="X-UA-Compatible" content="ie=edge">
    <title>HOME</title>
    <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/4.7.0/css/font-awesome.min.css
    <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>
.card1 {
  box-shadow: 0 4px 8px 0 rgba(0, 0, 0, 0.2);
  max-width: 300px;
  margin: auto;
  text-align: center;
  font-family: arial;
}

.title {
  color: grey;
  font-size: 18px;
}
```



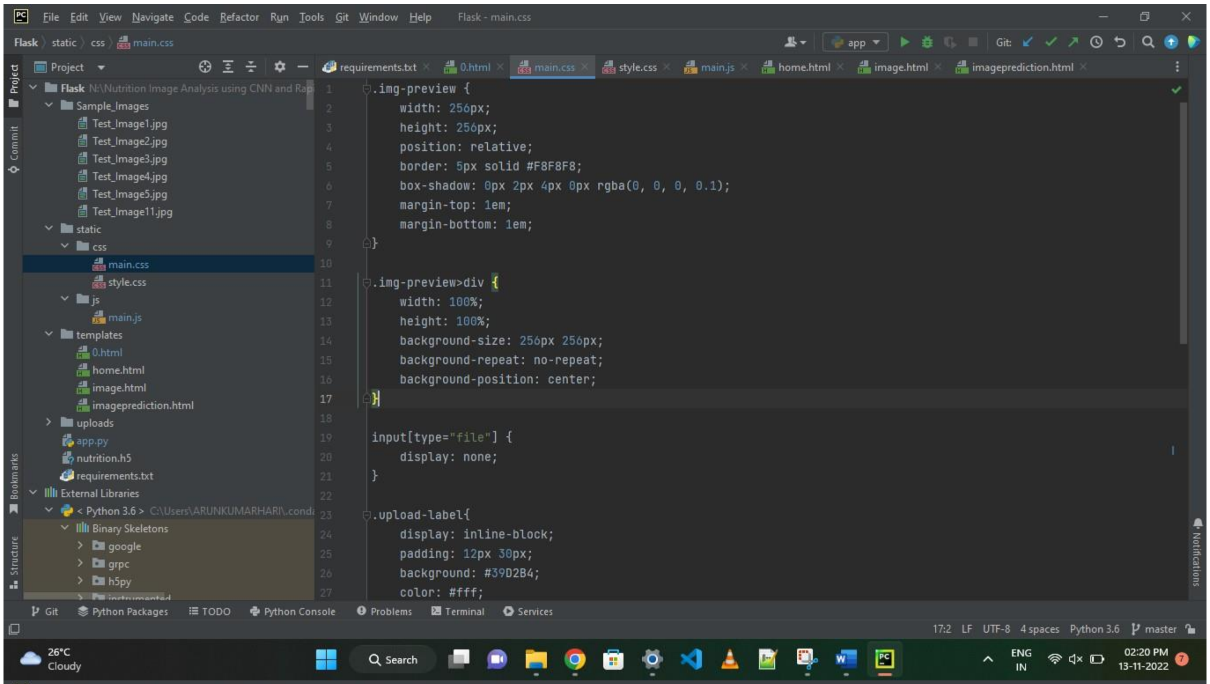
```



{% extends "imageprediction.html" %} {% block content %}
<div style="...">
<br>
<br>
<h5><font color="black" size="3" font-family="sans-serif"><b>UPLOAD IMAGE</b></font></h5><br><br>

<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, .webp">
    </form>

   <center> <div class="image-section" style="...">
        <div class="img-preview">
            <div id="imagePreview">
            </div></center>
        </div>
        <center><div>
            <button type="button" class="btn btn-primary btn-lg " id="btn-predict">ANALYZE</button>
       </center></div>
    </div>
```



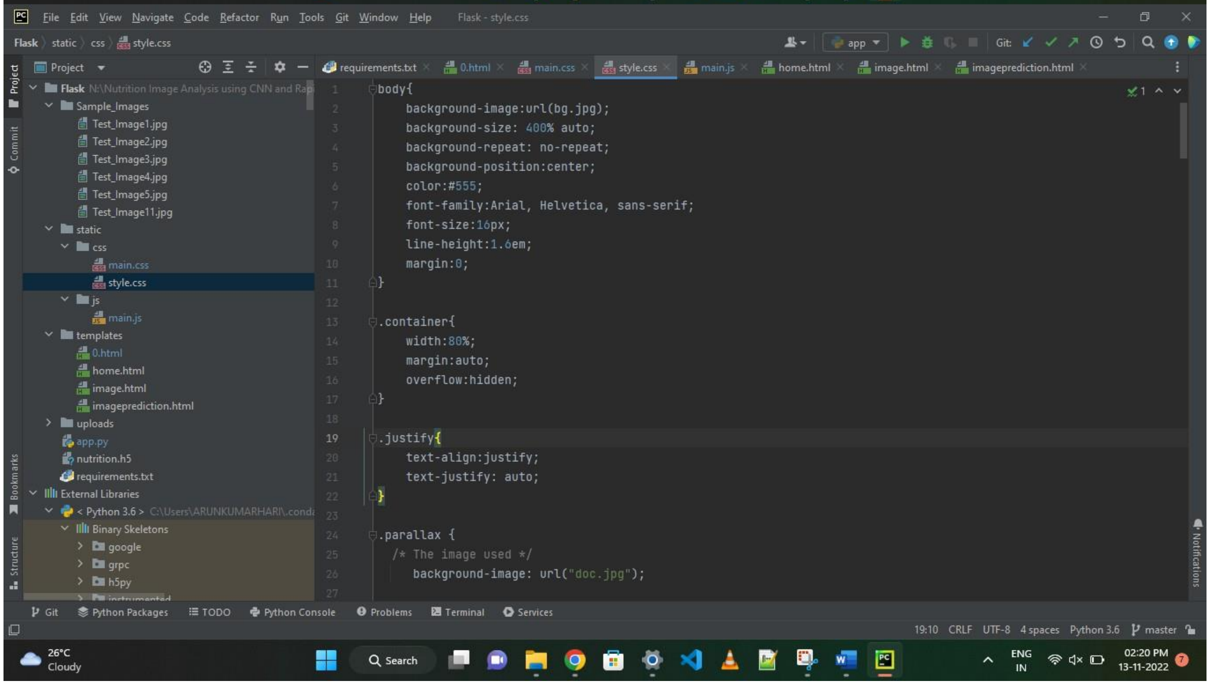
```
<body>
<div class="header">
<div style="...">NUTRITION IMAGE ANALYSIS</div>
  <div class="topnav-right"style="...">

    <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>
```



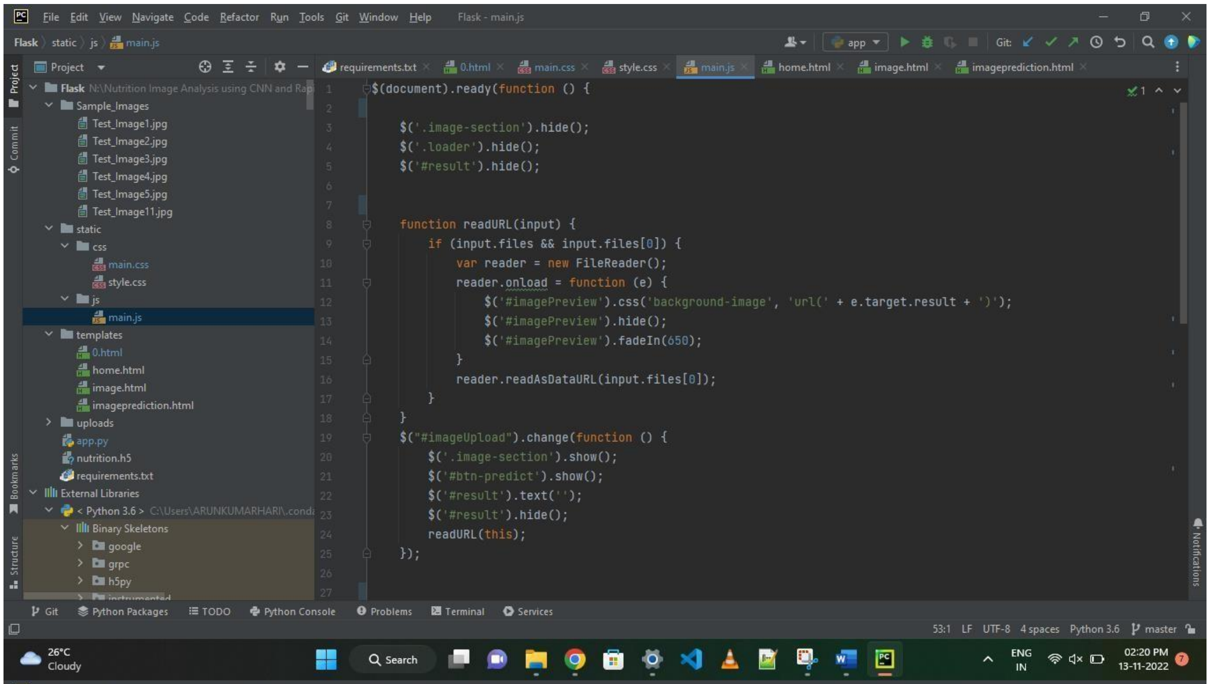
```
<style>

</style>
        <meta charset="utf-8">
        <title>NUTRITION IMAGE ANALYSIS</title>
        <link rel="shortcut icon" href="{{ url_for('static', filename='diabetes-favicon.ico') }}">
        <link rel="stylesheet" type="text/css" href="{{ url_for('static', filename='style.css') }}">
        <script src="https://kit.fontawesome.com/5f3f547070.js" crossorigin="anonymous"></script>
        <link href="https://fonts.googleapis.com/css2?family=Pacifico&display=swap" rel="stylesheet">
    </head>

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

        </div>
        <br>
        <br>

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



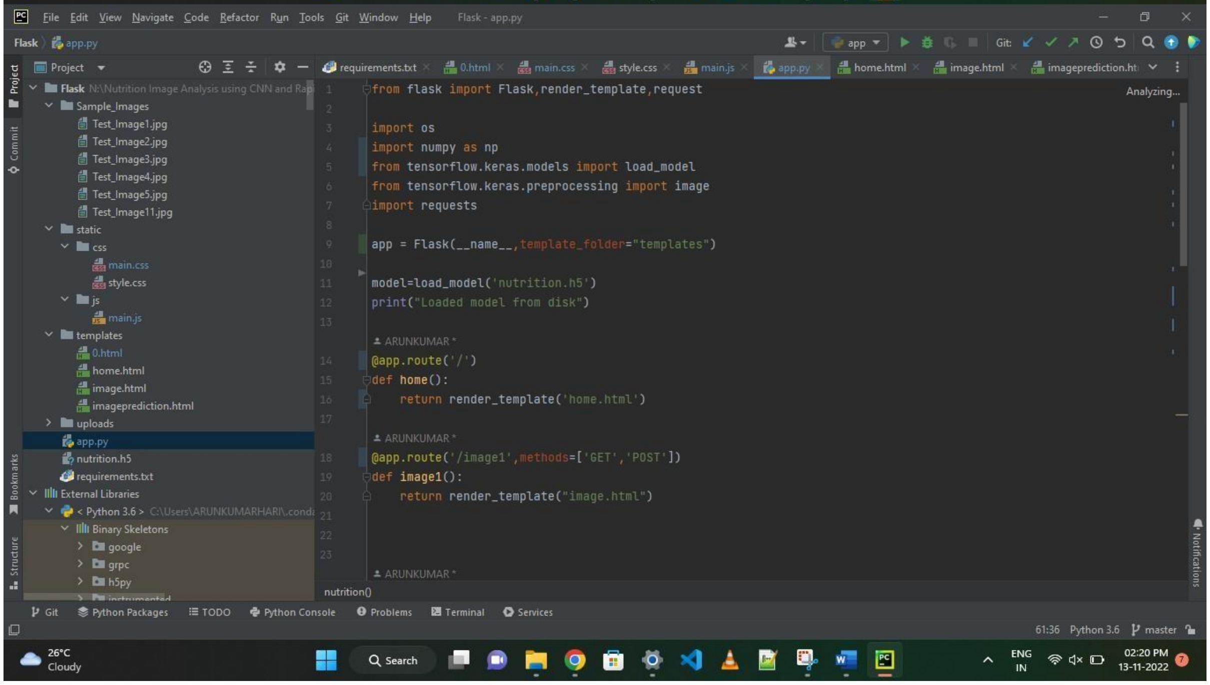
```
.img-preview {
    width: 256px;
    height: 256px;
    position: relative;
    border: 5px solid #F8F8F8;
    box-shadow: 0px 2px 4px 0px rgba(0, 0, 0, 0.1);
    margin-top: 1em;
    margin-bottom: 1em;
}

.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;
```



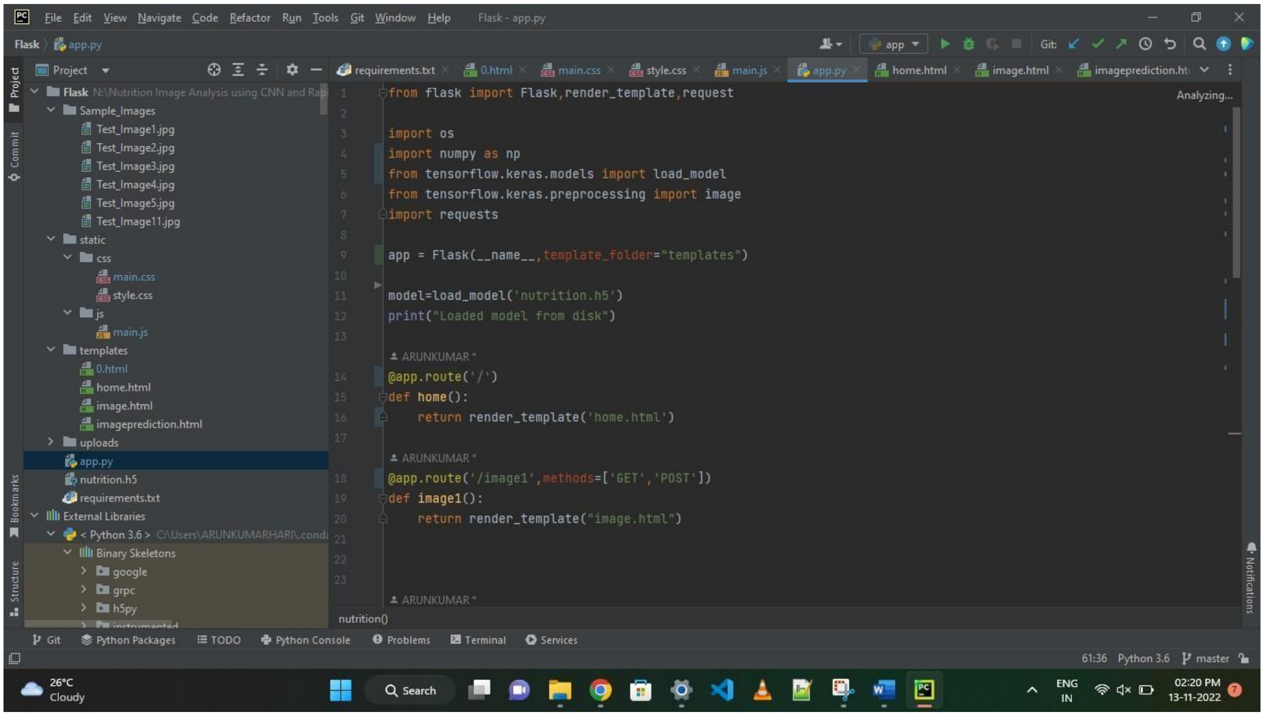
```
body{
    background-image:url(bg.jpg);
    background-size: 400% auto;
    background-repeat: no-repeat;
    background-position:center;
    color:#555;
    font-family:Arial, Helvetica, sans-serif;
    font-size:16px;
    line-height:1.6em;
    margin:0;
}

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

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

.parallax {
  /* The image used */
    background-image: url("doc.jpg");
```


File Edit View Navigate Code Refactor Run Tools Git Window Help Flask - main.js
Flask static js main.js
requirements.txt 0.html main.css style.css main.js home.html image.html imageprediction.html
Project
Flask N:\Nutrition Image Analysis using CNN and Rap
Sample_Images
Test_Image1.jpg
Test_Image2.jpg
Test_Image3.jpg
Test_Image4.jpg
Test_Image5.jpg
Test_Image11.jpg
static
css
main.css
style.css
js
main.js
templates
0.html
home.html
image.html
imageprediction.html
uploads
app.py
nutrition.h5
requirements.txt
External Libraries
< Python 3.6 > C:\Users\ARUNKUMARHARI\.cond
Binary Skeletons
google
grpc
h5py
Git Python Packages TODO Python Console Problems Terminal Services
53:1 LF UTF-8 4 spaces Python 3.6 master
26°C Cloudy
Search
ENG IN
02:20 PM 13-11-2022

```
$(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);
    });
```



```
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")

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

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



ARUNKUMAR *
```

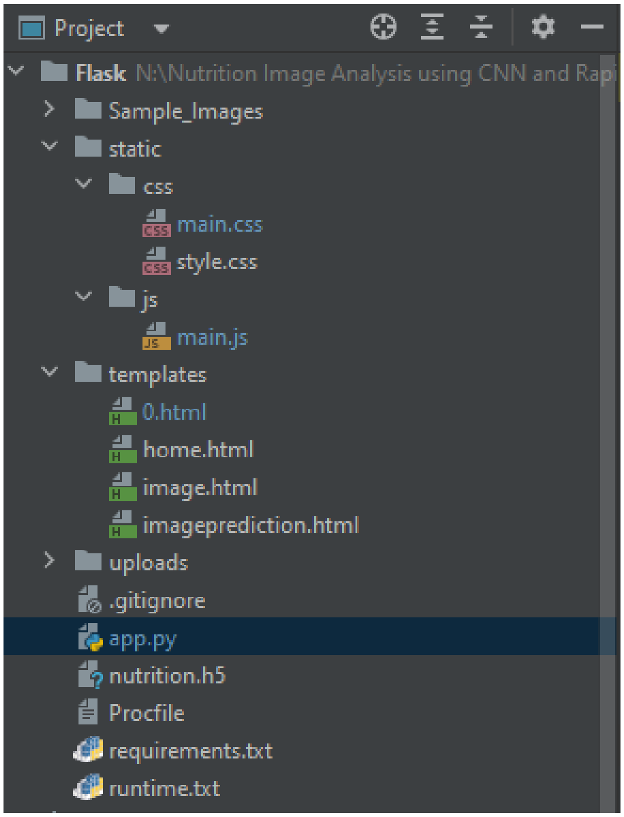


```
Flask N:\Nutrition Image Analysis using CNN and Rap
  Sample_Images
    Test_Image1.jpg
    Test_Image2.jpg
    Test_Image3.jpg
    Test_Image4.jpg
    Test_Image5.jpg
    Test_Image11.jpg
  static
    css
      main.css
      style.css
    js
      main.js
  templates
    0.html
    home.html
    image.html
    imageprediction.html
  uploads
  app.py
  nutrition.h5
  requirements.txt
External Libraries
  < Python 3.6 > C:\Users\ARUNKUMARHARI\.cond
    Binary Skeletons
      google
      grpc
      h5py
```

```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")

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

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


ARUNKUMAR *
nutrition()
```

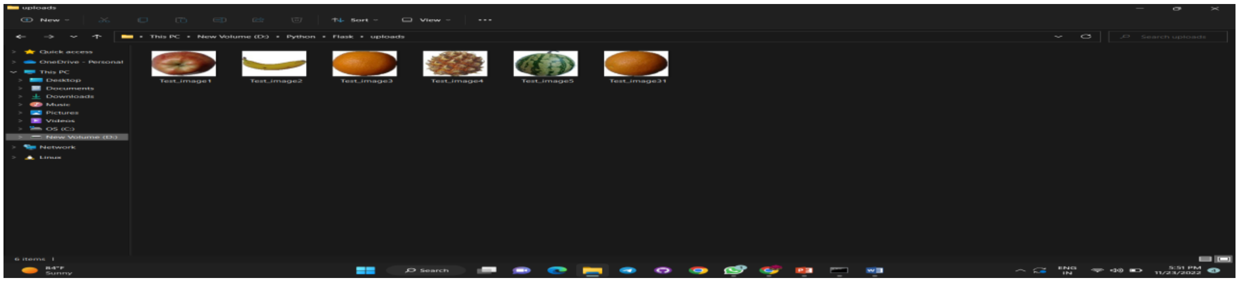
4. TESTING

4.1 Test Case



```
Project
Flask N:\Nutrition Image Analysis using CNN and Rapi
  Sample_Images
  static
    css
      main.css
      style.css
    js
      main.js
  templates
    0.html
    home.html
    image.html
    imageprediction.html
  uploads
  .gitignore
  app.py
  nutrition.h5
  Procfile
  requirements.txt
  runtime.txt
```

4.2 User Acceptance Testing



Purpose of User Acceptance Testing

The purpose of this document is to briefly explain the test coverage and open issues of the [ProductName] project at the time of the release to User Acceptance Testing (UAT).

Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Severity 5	Subtotal
By Design	2	2	1	1	1	7
Duplicate	1	0	1	0	0	2
External	2	0	0	2	0	4

Fixed	3	2	1	1	0	7
Not Reproduced	0	0	1	1	0	2
Skipped	0	0	0	0	0	0
Won't Fix	0	0	0	0	0	0
Totals	8	4	4	5	1	22

Test Case Analysis

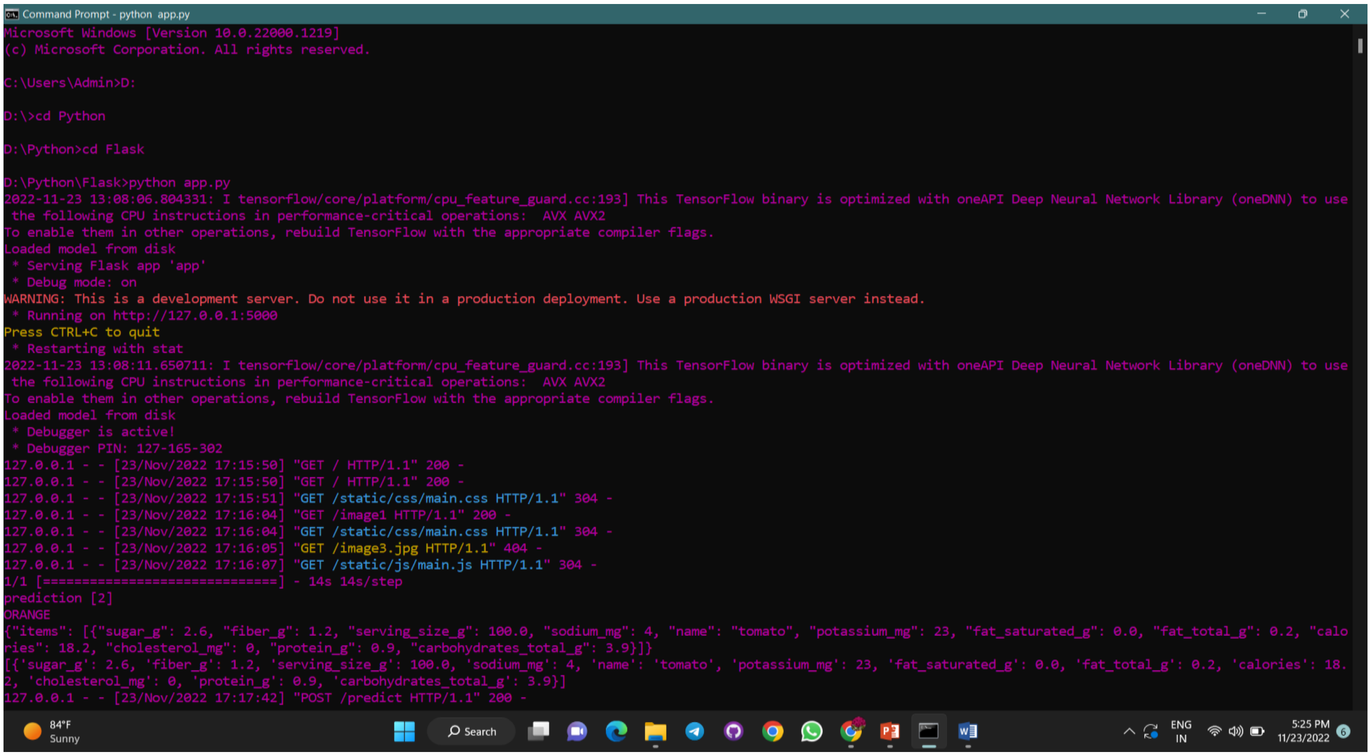
Shows the number of test cases that have passed, failed, and untested

Section	Total cases	Not Tested	Fail	Pass
Home page	6	0	0	6
Image Page	5	0	0	5

Prediction Page	3	0	0	3
Report Page	3	0	0	3

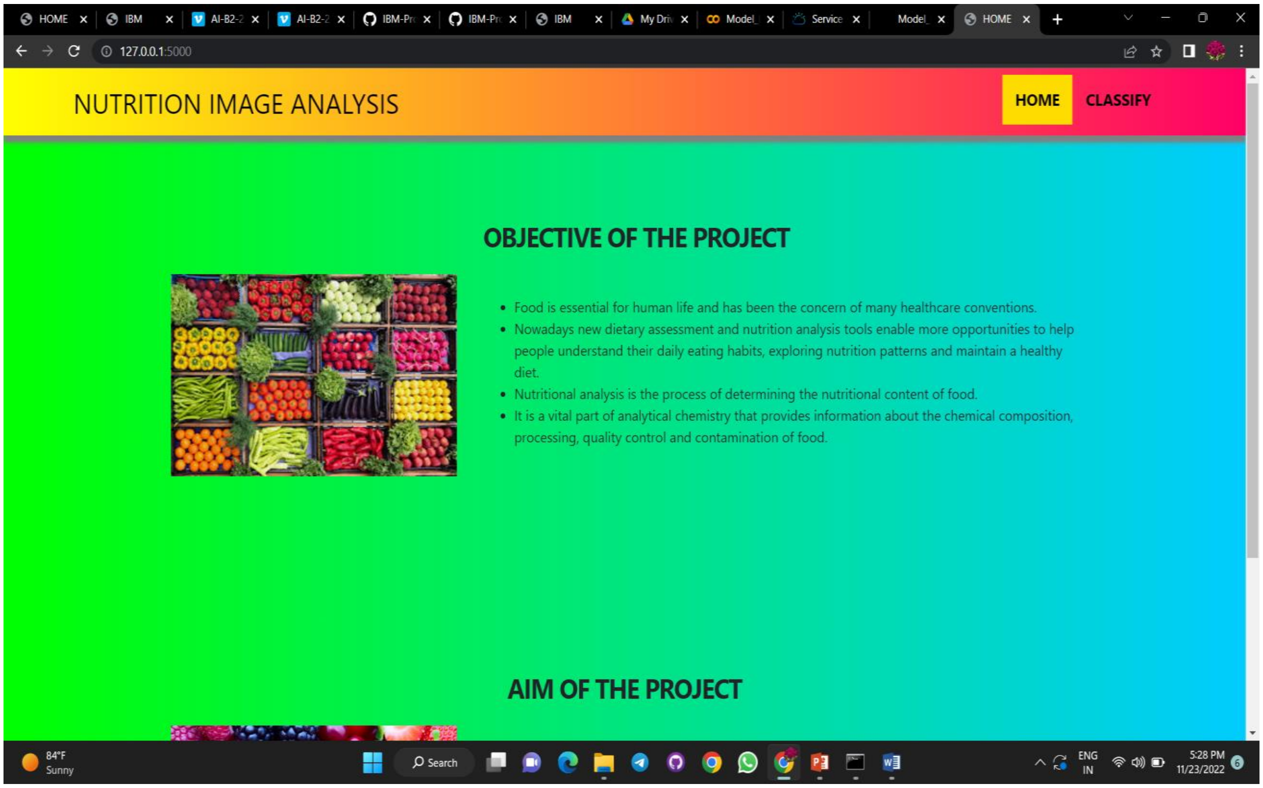
5. RESULTS

5.1 Performance Metrics



```
Microsoft Windows [Version 10.0.22000.1219]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Admin>D:

D:\>cd Python

D:\Python>cd Flask

D:\Python\Flask>python app.py
2022-11-23 13:08:06.804331: 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'
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Running on http://127.0.0.1:5000
Press CTRL+C to quit
 * Restarting with stat
2022-11-23 13:08:11.650711: 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
 * Debugger is active!
 * Debugger PIN: 127-165-302
127.0.0.1 - - [23/Nov/2022 17:15:50] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [23/Nov/2022 17:15:50] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [23/Nov/2022 17:15:51] "GET /static/css/main.css HTTP/1.1" 304 -
127.0.0.1 - - [23/Nov/2022 17:16:04] "GET /image1 HTTP/1.1" 200 -
127.0.0.1 - - [23/Nov/2022 17:16:04] "GET /static/css/main.css HTTP/1.1" 304 -
127.0.0.1 - - [23/Nov/2022 17:16:05] "GET /image3.jpg HTTP/1.1" 404 -
127.0.0.1 - - [23/Nov/2022 17:16:07] "GET /static/js/main.js HTTP/1.1" 304 -
1/1 [==============================] - 14s 14s/step
prediction [2]
ORANGE
{"items": [{"sugar_g": 2.6, "fiber_g": 1.2, "serving_size_g": 100.0, "sodium_mg": 4, "name": "tomato", "potassium_mg": 23, "fat_saturated_g": 0.0, "fat_total_g": 0.2, "calo
ries": 18.2, "cholesterol_mg": 0, "protein_g": 0.9, "carbohydrates_total_g": 3.9}]}
[{'sugar_g': 2.6, 'fiber_g': 1.2, 'serving_size_g': 100.0, 'sodium_mg': 4, 'name': 'tomato', 'potassium_mg': 23, 'fat_saturated_g': 0.0, 'fat_total_g': 0.2, 'calories': 18.
2, 'cholesterol_mg': 0, 'protein_g': 0.9, 'carbohydrates_total_g': 3.9}]
127.0.0.1 - - [23/Nov/2022 17:17:42] "POST /predict HTTP/1.1" 200 -
```

5.2 Output

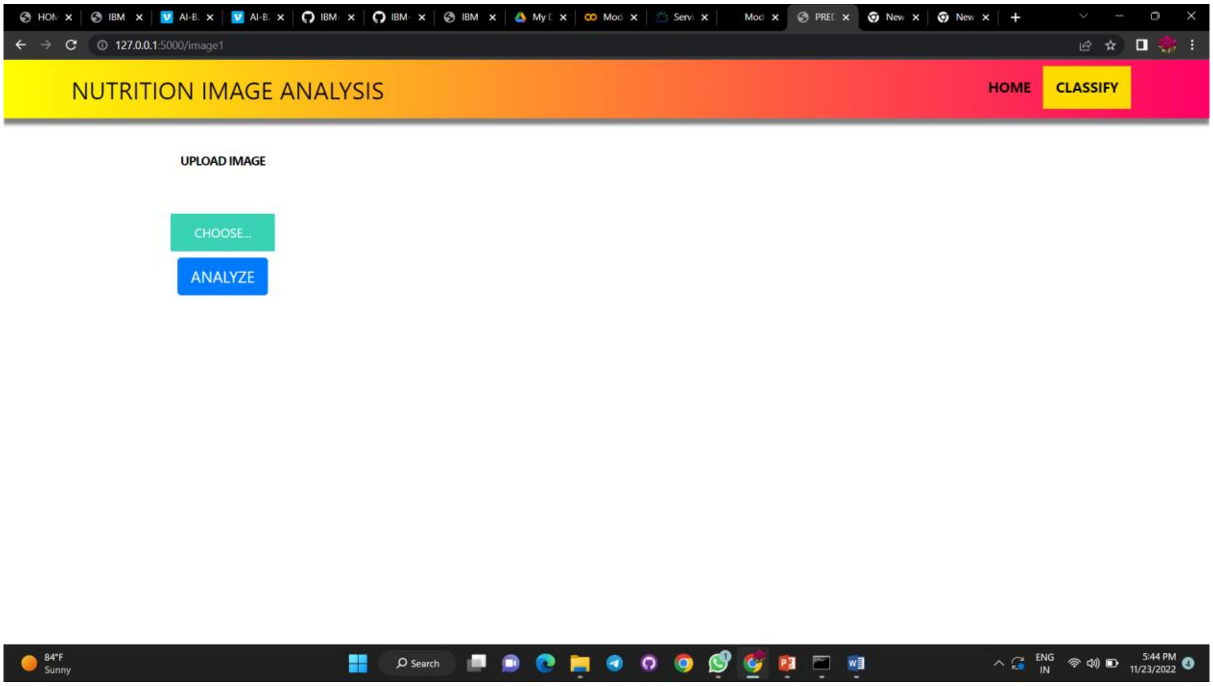


NUTRITION IMAGE ANALYSIS

OBJECTIVE OF THE PROJECT

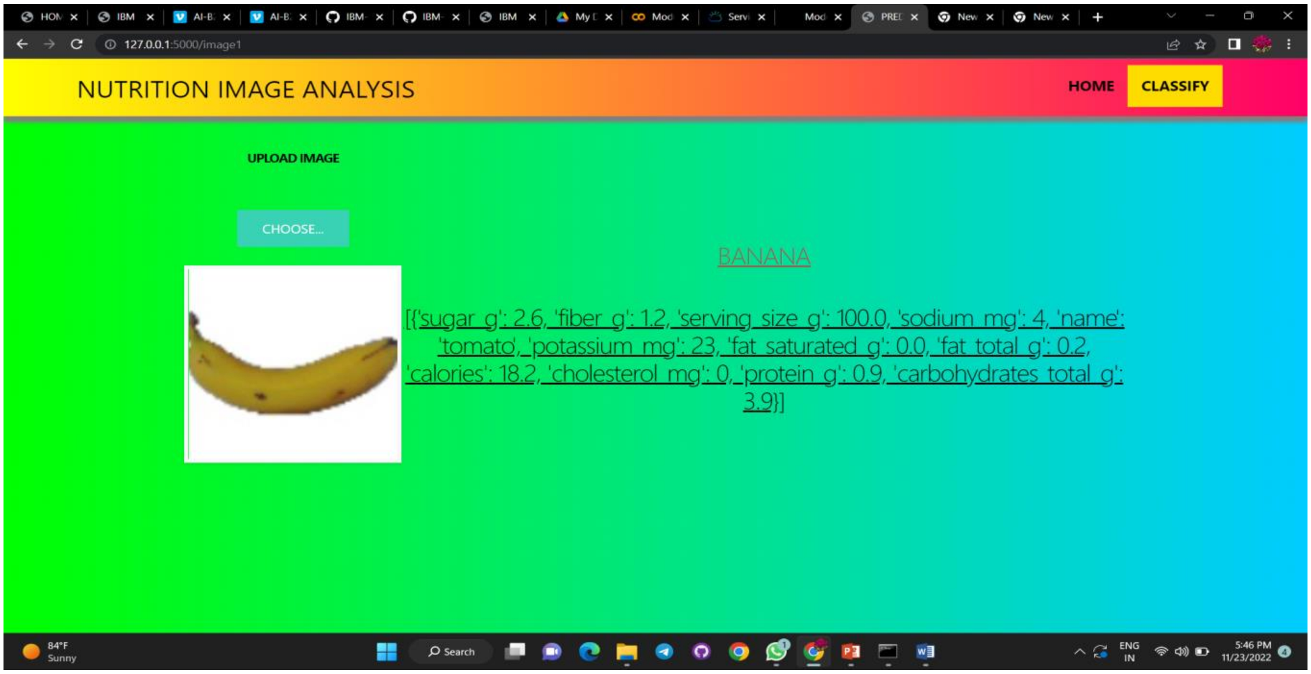
- Food is essential for human life and has been the concern of many healthcare conventions.
- Nowadays new dietary assessment and nutrition analysis tools enable more opportunities to help people understand their daily eating habits, exploring nutrition patterns and maintain a healthy diet.
- Nutritional 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



NUTRITION IMAGE ANALYSIS

UPLOAD IMAGE



BANANA

```
[{'sugar_g': 2.6, 'fiber_g': 1.2, 'serving_size_g': 100.0, 'sodium_mg': 4, 'name':
'tomato', 'potassium_mg': 23, 'fat_saturated_g': 0.0, 'fat_total_g': 0.2,
'calories': 18.2, 'cholesterol_mg': 0, 'protein_g': 0.9, 'carbohydrates_total_g':
3.9}]
```

6. ADVANTAGES & DISADVANTAGES

ADVANTAGES

- The new dietary assessment and nutrition analysis tools enable more opportunities to help people understand their daily eating habits
- It help in exploring the nutrition patterns in their daily routines and this is very useful for people 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.

7. 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.

8. 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.

9. APPENDIX

Source Code - https://drive.google.com/drive/folders/1iwG36Xsq02xwL1tyVNlCgNc1Ov21KKYZ?usp=share_link

GitHub - https://github.com/IBM-EPBL/IBM-Project-50752-1660923418