AI-Powered Nutrition Analyzer For Fitness Enthusiasts

TEAM ID: PNT2022TMID06002

TERM MEMBERS:

NETHRASREE L

NITHYASHREE S B

RAJA SURUDHI D

PREETHI S (TEAM LEADER)

Project Report Format

1. INTRODUCTION

1.1 Project Overview

1.2 Purpose

2. LITERATURE SURVEY

2.1 Existing problem

2.2 References

2.3 Problem Statement Definition

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

3.2 Ideation & Brainstorming

3.3 Proposed Solution

3.4 Problem Solution fit

4. REQUIREMENT ANALYSIS

4.1 Functional requirement

4.2 Non-Functional requirements

5. PROJECT DESIGN

5.1 Data Flow Diagrams

5.2 Solution & Technical Architecture

5.3 User Stories

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

6.2 Sprint Delivery Schedule

6.3 Reports from JIRA

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

Project Report Format

1. INTRODUCTION

1.1 Project Overview

Artificial intelligence (AI) is a rapidly evolving area that offers unparalleled opportunities of progress and applications in many healthcare fields. In this review, we provide an overview of the main and latest applications of AI in nutrition research and identify gaps to address to potentiality this emerging field. AI algorithms may help better understand and predict the complex and non-linear interactions between nutrition-related data and health outcomes, particularly when large amounts of data need to be structured and integrated, such as in metabolism. AI-based approaches, including image recognition, may also improve dietary assessment by maximizing efficiency and addressing systematic and random errors associated with self-reported measurements of dietary intakes.

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. LITERATURESURVEY

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 intelligen celearns an individual's tastes, preferences, and body type. All of this is packaged in a comprehensive nutrition and activity tracker.

1. Artificial intelligence in food science and nutrition Information Technologies Institute(ITI) Kosmas Dimitropou los April 2019 Published by Oxford University Press on behalf of the International Life Sciences Institute.

Advantage:

Tells exactly what to eat according to the body type. All of this is packaged in a comprehensive nutrition and activity tracker Disadvantage:

The AI system may not always make the right decisions, but it will eventually learn from the errors and adjust its decision making processes
to improve over time.

2. Artificial Intelligence in Nutrients Science BALAKRISH NA .Y JUNE 2022 Advantage:

Creation of a global network that will be able to both actively support and monitor the personalized supply of nutrients.

Disadvantage:

The AI System May Be Buggy At First it can take time to work correctly This is normal

3. AI-Based Dietician Professor, Department of Computer Science, Dayananda Sagar Academy of

Technology April 2022 Advantage:

Helps the user to interact better with the system, Provide information to the system as input and take the recommended diet plan as output Disadvantage:

Doesn't have acknowledgeable dietician Don't value customer time Worst service

4. Virtual Nutritionist using AI International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249-8958, Volume-8 Issue-5 June 2019 Blue Eyes Intelligence Engineering and science publication

Advantage:

A user can track his/her progress towards his/her goal from the day he'd started using the application. Reminders for every meal. Inbuilt personalized customization of meals depending upon one's preferred foods

Disadvantage:

High Costs. No creativity. AI is that it cannot learn to think outside the box. Unemployment Make Humans Lazy. No Ethics. Emotionless. No Improvement

2.2 References

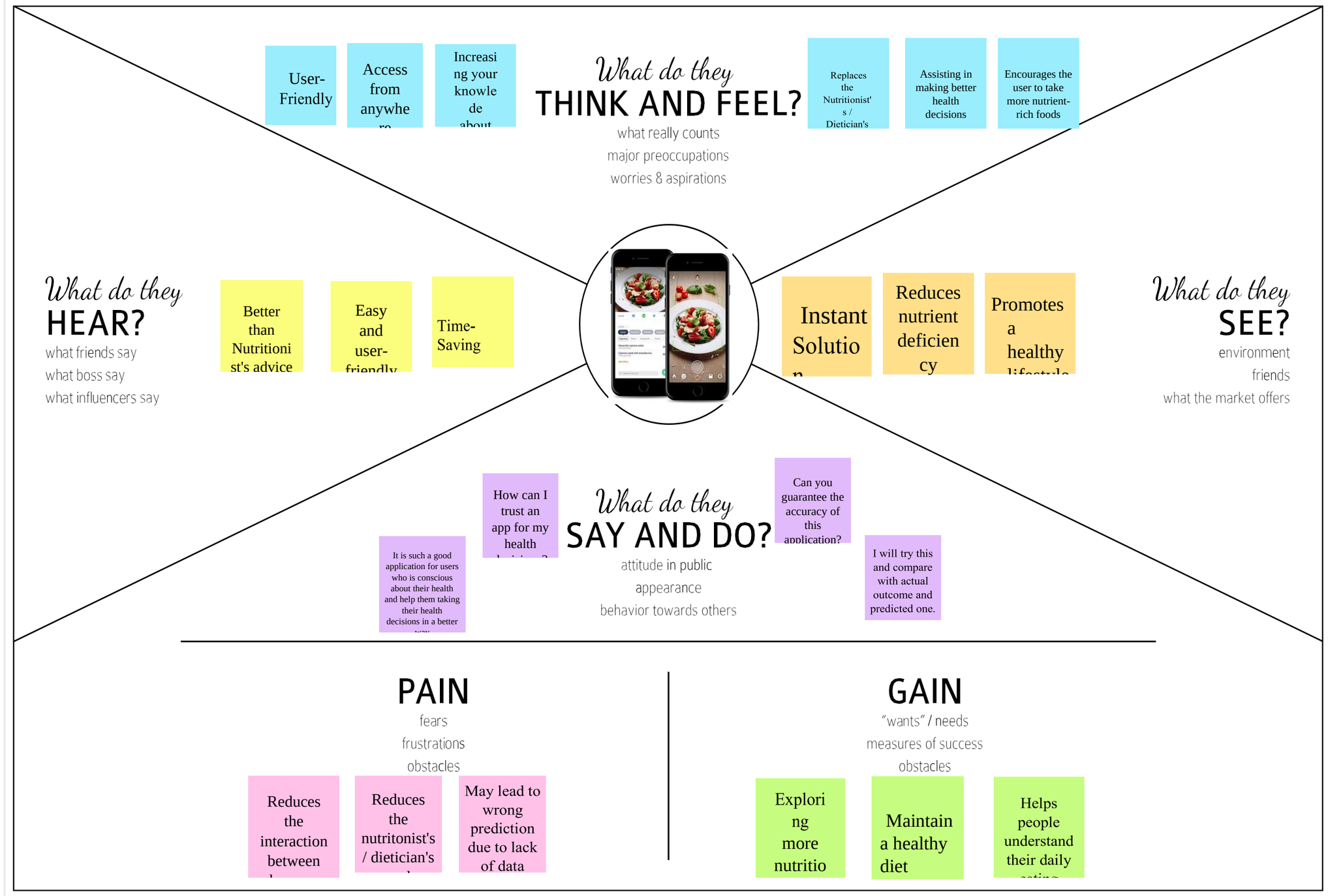
1. Published on April 8, 2019 From Gynaecology to Data Science : The journey of Dr Nitin Paranjape. Analyticsindiamag.com, Akshaya Asokan.
2. Melina cote and Benoit Lamarche , Applied Physiology , Nutrition and Metabolism 15
3. Deloitte(2017) the hospital of the future URL www.deloitte.com/us/globalhospital-of-the future (accessed August 9,2019)
4. INQA (Ed.)(2015) intelligente technik in der beruflichen pfege.von den chance und Risiken einer Pflege 4.0.
5. McCarthy, J., Minsky, M. L., Rochester, N., & Shannon, C. E. (2006). A Proposal for Dartmouth Summer Research Project on Artificial Intelligence. AI Magazine, 27(4), 12-14. https://www.aaai.org/ojs/index.php/aimagazine/article/view/1904/1802.
6. Lalwani, P.(2019). The ethics of AI in HR : what does it take to build an ai ethics framework? https://www.hrtechnoologist.com/articles/digitaltransformation/the-ethics-of-ai-in-hr/
7. Kozan, K.(2017), 3 simple step for improving your candidate engagement, https://ideal.com/candidate-engagement.
8. Johnson K.W., Torres Soto J., Glicksberg B.S., Shameer K., Miotto R., Ali M., Ashley E., Dudley J.T. Artificial intelligence in cardiology. J. Am. Coll. Cardiol. 2018;71:2668–2679. doi: 10.1016/j.jacc.2018.03.521. [PubMed] [CrossRef] [Google Scholar]
9. Hessler G., Baringhaus K.-H. Artificial intelligence in drug design. Molecules. 2018;23:2520. doi: 10.3390/molecules23102520. [PMC free article] [PubMed] [CrossRef] [Google Scholar] 10. Heydarian H., Adam M.T.P., Burrows T., Collins C.E., Rollo M.E. Assessing eating behaviour using upper limb mounted motion sensors: A systematic review. Nutrients. 2019;11:1168. doi: 10.3390/nu11051168. [PMC free article] [PubMed] [CrossRef] [Google Scholar] 11. Demirci F., Akan P., Kume T., Sisman A.R., Erbayraktar Z., Sevinc S. Artificial neural network approach in laboratory test reporting: Learning algorithms. Am. J. Clin. Pathol. 2016;146:227–237. doi: 10.1093/ajcp/aqw104. [PubMed] [CrossRef] [Google Scholar

2.3 Problem Statement Definition

The main purpose of the project is to build a model which is used for classifying the fruit depends on the different characteristics like colour, shape, texture etc. Here the user can capture the images of different fruits and then the image will be sent the trained model. The model analyses the image and detect the nutrition based on the fruits like (Sugar, Fibre, Protein, Calories, etc.).It classify an object with higher degree of accuracy by fine tuning the parameters of the network. The main motto is to reduce the training time and compute complexity of the network by adding a sub layer after each convolution layer.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



3.4 Proposed Solution

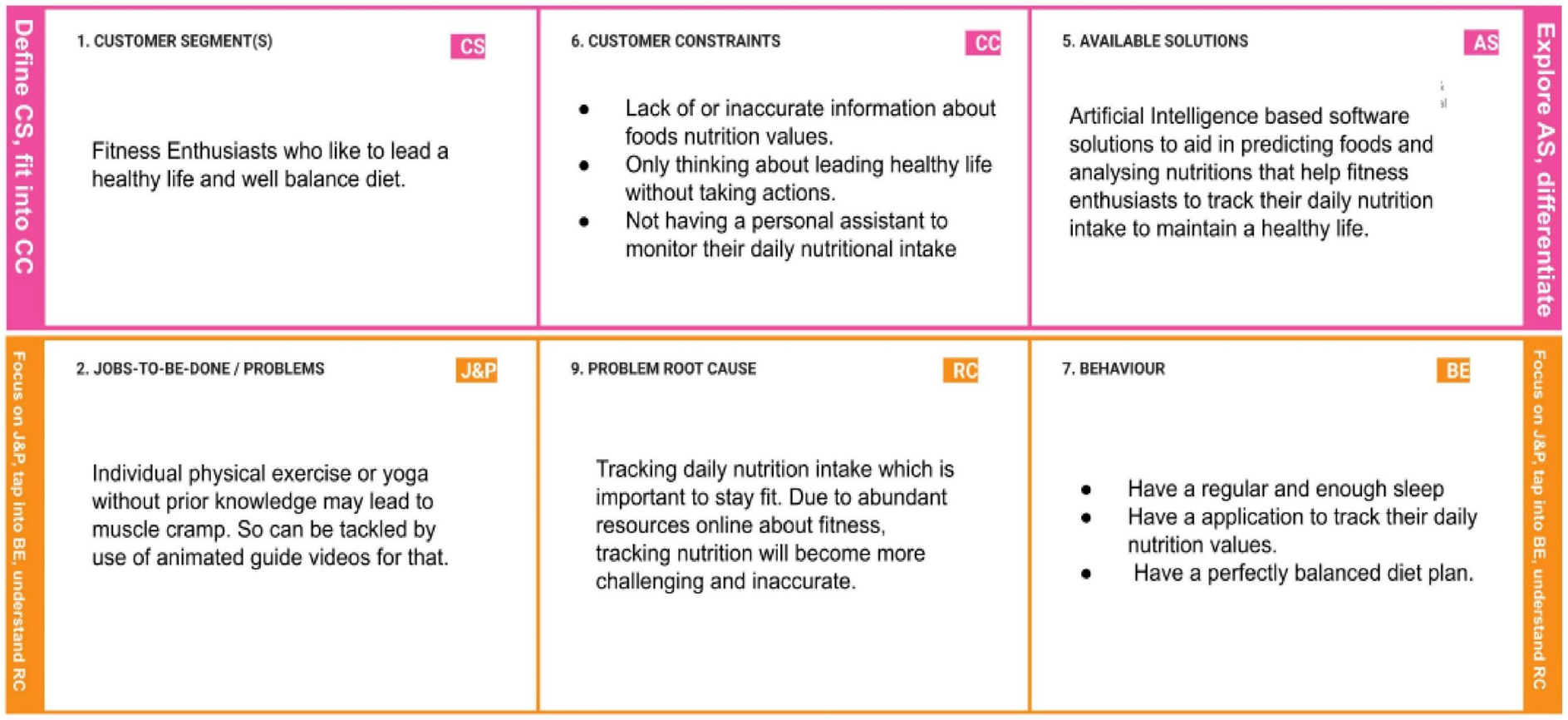
S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	The main goal of the project is to building a model which is used for explaining the fruit depends on the different methods characteristics like colour, shape, texture etc.
2.	Idea/Solution description	Brand-new fruit implementing method called HPA-SLFN can be implemented for classification as it gives good results when compared to that techniques.
3.	Novelty/Uniqueness	The type performance and accuracy for the analyses of image and detection rate of the nutrition based on the fruits is higher.
4.	Social Impact/ Customer Satisfaction	Here the user can capture the images of different fruits and then the pictures 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.) .
5.	Business Model(Revenue Model)	• Data analytics • Statistics methods Future analysis
6.	Scalability of the Solution	The model is scalable from the architecture and data set training perspective. We can train massive amounts of image data by converting them into .npy / .npz file format which would facilitate easy storing, retrieving, and processing.

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.

4.REQUIREMENTANALYSIS

4.1 Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Interaction	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.
FR-2	User Management	Creating a group of people, who are willing to be fit in their health and making them organized in a sampe 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.

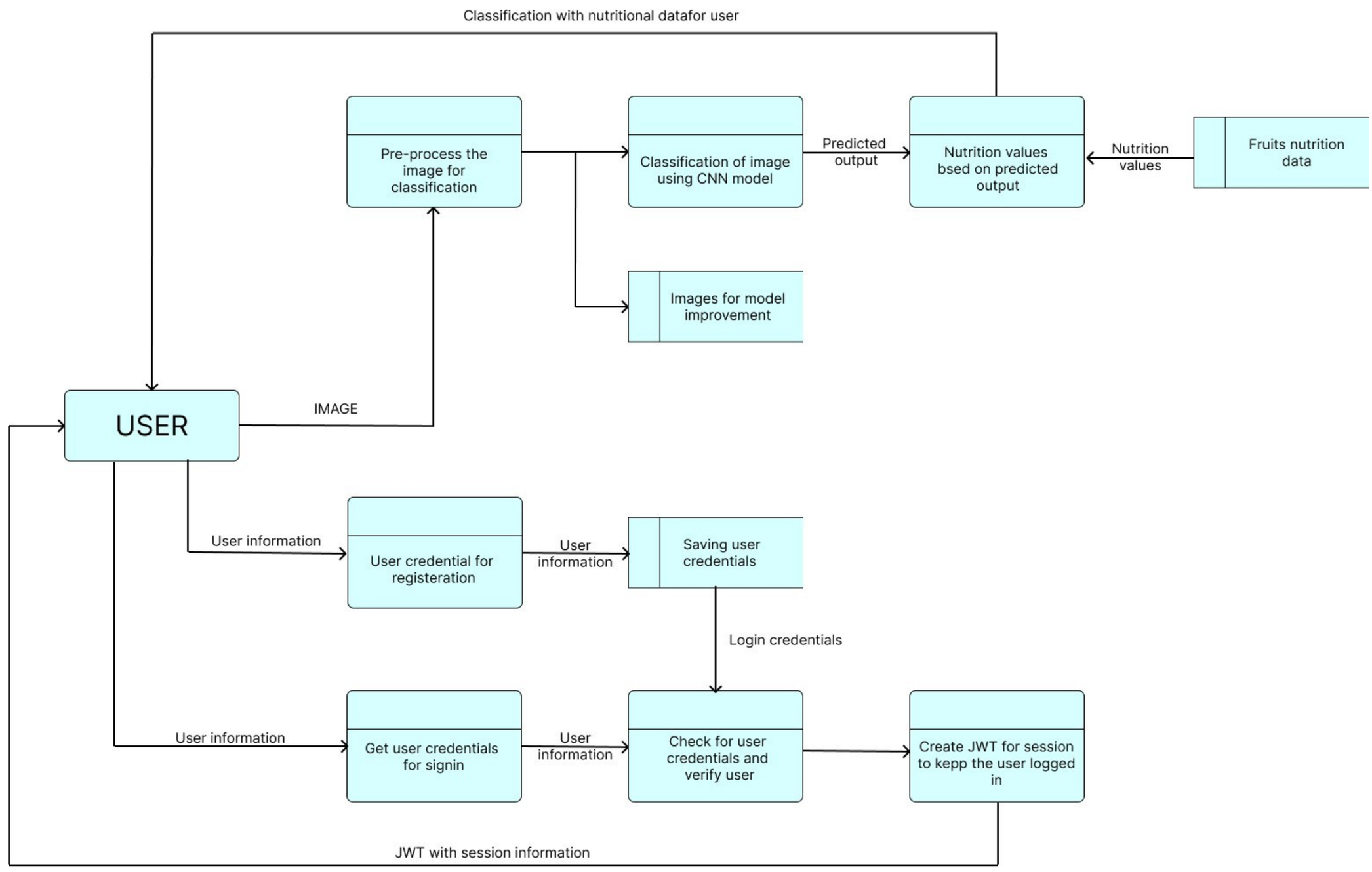
Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

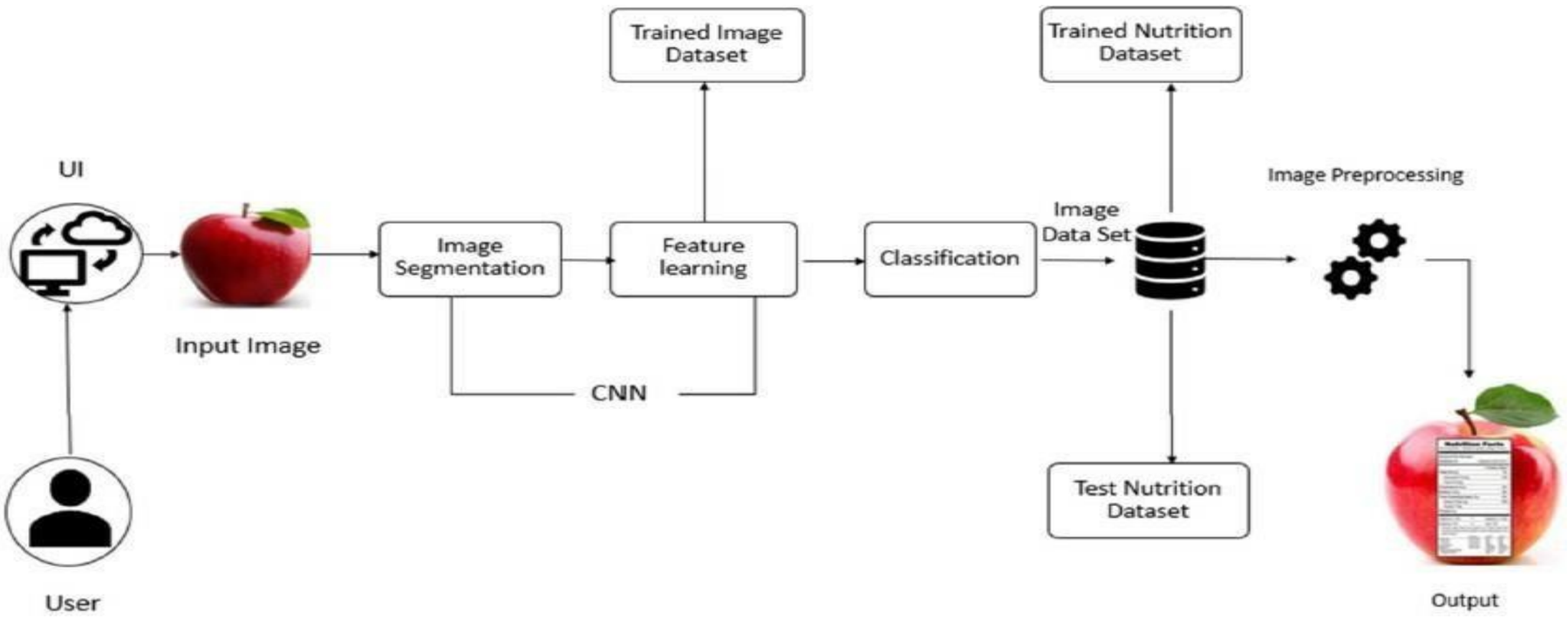
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	60% of the internet users are mobile users, and most of them are only using some common application for communicating based on the features they offer. So the application should be easily accessible by users and also it should have the ability to report an issue by the user to solve it as soon as possible.
NFR-2	**Security**	While logging the application , the data is encrypted and highly secured which can avoid data plagiarism . Authentication and authorization are to be done properly through the application .
NFR-3	**Reliability**	Application can offer you to stay focused on your diet plan . It offers to maintain your calories in your desired food. It shows quite accurately calories for the user that makes to sustain in healthy lifestyle
NFR-4	**Performance**	Performance of the application should be high enough to maintain the user in the application and also to get new users. Performance can be increased by using optimized code and also reducing the redirects and also can by DSA (DataStructures and Algorithms)

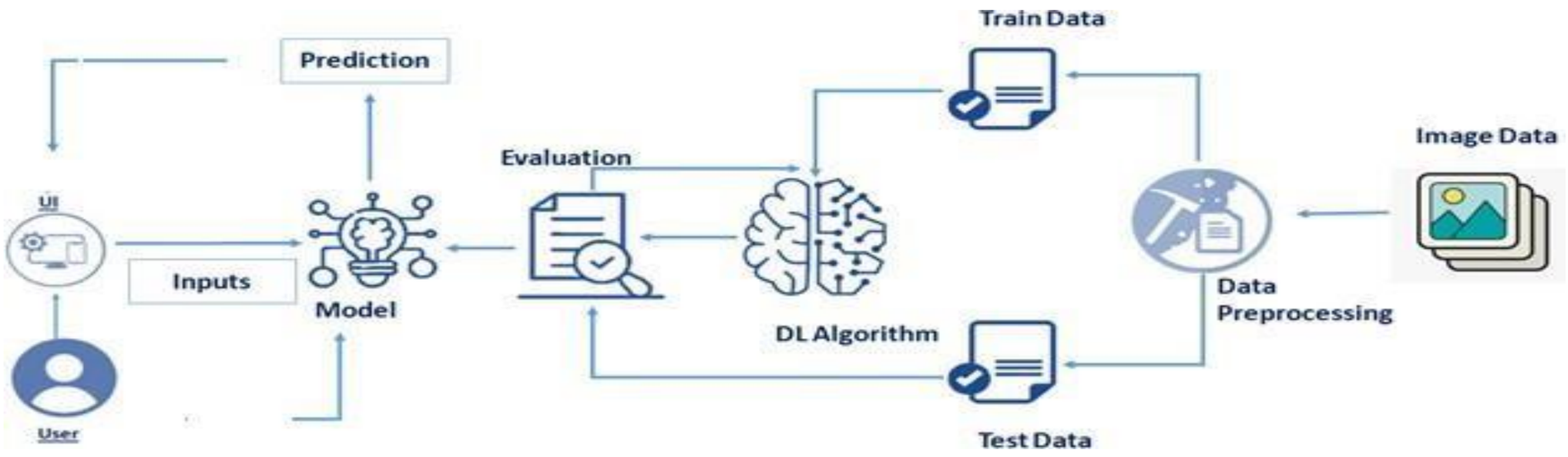
2. PROJECTDESIGN

2.1 Data Flow Diagrams



2.2 Solution & Technical Architecture



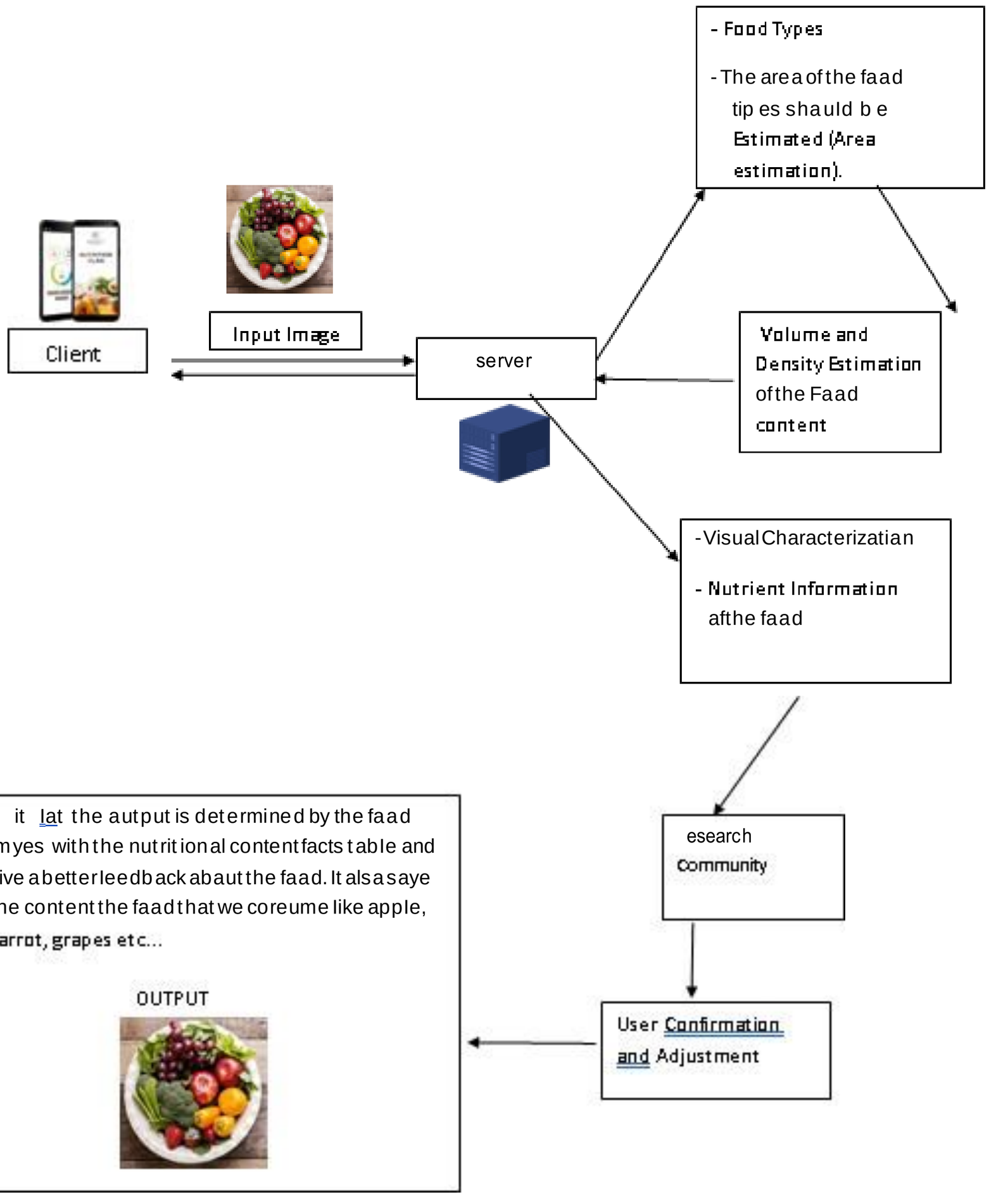


2.3 Solution & Technical Architecture

S.No	Component	Description	Technology
1.	App	User interacts with application for the prediction of Nutrition	Python, Java, HTML, SQLite, Android studio MySQL, JS
2.	Database	Data Type, Configuration sand data will be stored	
3.	Cloud Database	Database Service on Cloud	IBM DB2, IBM Cloud ant 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 frame works used	SendGrid, Python, JQuery
2.	Security Implementations	Request authentication using encryption Thescalabilityof	Encryptions, SSL certs
3.	Scalable Architecture	Architecture consists of 3tiers	Web Server–HTML,CSS ,Java script Application Server –Python Flask Database Server – IBM Cloud
4.	Availability	Availability is increased by loads balancers incloud VPS	IBM Cloud hosting IBM Load Balance
5.	Performance handle up to	The application isexpected to 4000 predications per second	


- Food Types
- The area of the faad tip es shauld b e Estimated (Area estimation).
Client
Input Image
server
Volume and Density Estimation of the Faad content
-Visual Characterizatian
- Nutrient Information afthe faad
esearch Community
User Confirmation and Adjustment
it lat the autput is determined by the faad imyes with the nutritional content facts table and give a better leedback abaut the faad. It alsa saye the content the faad that we coreume like apple, carrot, grapes etc...
OUTPUT

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

6.1 Feature 1

+ Code + Text Reconnect Editing

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

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

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

```
Drive already mounted at /content/gdrive; to attempt to forcibly remount, call drive.mount("/content/gdrive", force_remount=True).
```

```
[ ] ls
```

```
gdrive/  nutrition.h5  sample_data/
```

```
#performing data agumentation to train data
x_train = train_datagen.flow_from_directory(
    r'/content/gdrive/MyDrive/train/TRAIN_SET',
target_size=(64, 64),batch_size=5,color_mode='rgb',class_mode='sparse')
#performing data agumentation to test data
x_test = test_datagen.flow_from_directory(
r'/content/gdrive/MyDrive/train/TEST_SET',
target_size=(64, 64), batch_size=5,color_mode='rgb',class_mode='sparse')
```

```
Found 2626 images belonging to 1 classes.
```

```
[ ] print(x_train.class_indices) #checking the number of classes
```

```
{'TRAIN_SET': 0}
```

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

```
{'APPLES': 0, 'BANANA': 1, 'ORANGE': 2, 'PINEAPPLE': 3, 'WATERMELON': 4}
```

```
[ ] from collections import Counter as c
    c(x_train .labels)
```

```
Counter({0: 2626})
```

```
[ ] import numpy as np#used for numerical analysis
    import tensorflow #open source used for both ML and DL for computation
    from tensorflow.keras.models import Sequential #it is a plain stack of layers
    from tensorflow.keras import layers #A layer consists of a tensor-in tensor-out computation function
    #Dense layer is the regular deeply connected neural network layer
    from tensorflow.keras.layers import Dense,Flatten
    #Faltten-used fot flattening the input or change the dimension
    from tensorflow.keras.layers import Conv2D,MaxPooling2D,Dropout #Convolutional layer
    #MaxPooling2D-for downsampling the image
    from keras.preprocessing.image import ImageDataGenerator
```

```
[ ] model=Sequential()
```

```
# Initializing the CNN
classifier = Sequential()

# First convolution layer and pooling
classifier.add(Conv2D(32, (3, 3), input_shape=(64, 64, 3), activation='relu'))
classifier.add(MaxPooling2D(pool_size=(2, 2)))

# Second convolution layer and pooling
classifier.add(Conv2D(32, (3, 3), activation='relu'))

# input_shape is going to be the pooled feature maps from the previous convolution layer
classifier.add(MaxPooling2D(pool_size=(2, 2)))

# Flattening the layers
classifier.add(Flatten())

# Adding a fully connected layer
classifier.add(Dense(units=128, activation='relu'))
classifier.add(Dense(units=5, activation='softmax')) # softmax for more than 2
```

```
[ ] classifier.summary()#summary of our model
```

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

```
[ ]  conv2d_1 (Conv2D)           (None, 29, 29, 32)        9248

     max_pooling2d_1 (MaxPooling  (None, 14, 14, 32)       0
     2D)

     flatten (Flatten)           (None, 6272)              0

     dense (Dense)               (None, 128)               802944

     dense_1 (Dense)             (None, 5)                 645

     =================================================================
     Total params: 813,733
     Trainable params: 813,733
     Non-trainable params: 0
     _________________________________________________________________
```

```
[ ]  # Compiling the CNN
     # categorical_crossentropy for more than 2
     classifier.compile(optimizer='adam', loss='sparse_categorical_crossentropy', metrics=['accuracy'])
```

```
[ ]  classifier.fit_generator(
            generator=x_train,steps_per_epoch = len(x_train),
            epochs=10, validation_data=x_test,validation_steps = len(x_test))
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:3: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future version. Please use `Model.fit`, which
  This is separate from the ipykernel package so we can avoid doing imports until
Epoch 1/10
526/526 [==============================] - 487s 919ms/step - loss: 0.0029 - accuracy: 1.0000 - val_loss: 70.1925 - val_accuracy: 0.0000e+00
Epoch 2/10
526/526 [==============================] - 26s 50ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 70.1925 - val_accuracy: 0.0000e+00
```

```
[ ] /usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:3: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future version. Please use `Model.fit`, which
      This is separate from the ipykernel package so we can avoid doing imports until
    Epoch 1/10
    526/526 [==============================] - 487s 919ms/step - loss: 0.0029 - accuracy: 1.0000 - val_loss: 70.1925 - val_accuracy: 0.0000e+00
    Epoch 2/10
    526/526 [==============================] - 26s 50ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 70.1925 - val_accuracy: 0.0000e+00
    Epoch 3/10
    526/526 [==============================] - 26s 50ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 70.1925 - val_accuracy: 0.0000e+00
    Epoch 4/10
    526/526 [==============================] - 28s 53ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 70.1925 - val_accuracy: 0.0000e+00
    Epoch 5/10
    526/526 [==============================] - 26s 50ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 70.1925 - val_accuracy: 0.0000e+00
    Epoch 6/10
    526/526 [==============================] - 26s 49ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 70.1925 - val_accuracy: 0.0000e+00
    Epoch 7/10
    526/526 [==============================] - 29s 55ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 70.1925 - val_accuracy: 0.0000e+00
    Epoch 8/10
    526/526 [==============================] - 26s 50ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 70.1925 - val_accuracy: 0.0000e+00
    Epoch 9/10
    526/526 [==============================] - 28s 53ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 70.1925 - val_accuracy: 0.0000e+00
    Epoch 10/10
    526/526 [==============================] - 28s 53ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 70.1925 - val_accuracy: 0.0000e+00
    <keras.callbacks.History at 0x7fb64da59110>
```

```
[ ] classifier.save('nutrition.h5')
```

```
[ ] from tensorflow.keras.models import load_model
    from tensorflow.keras.preprocessing import image
    import numpy as np
```

```
[ ] img = image.load_img("/content/gdrive/MyDrive/train/TEST_SET/WATERMELON/125_100.jpg",target_size= (64,64))#loading of the image
    img
```

```
[ ] x=image.img_to_array(img)#conversion image into array
```

```
[ ] x
```

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

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

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

0s completed at 5:17 PM

```
[ ] x.ndim
```

```
3
```

```
[ ] x=np.expand_dims(x,axis=0) #expand the dimension
```

```
[ ] x.ndim
```

```
4
```

```
[ ] pred = classifier.predict(x)
```

```
1/1 [==============================] - 0s 171ms/step
```

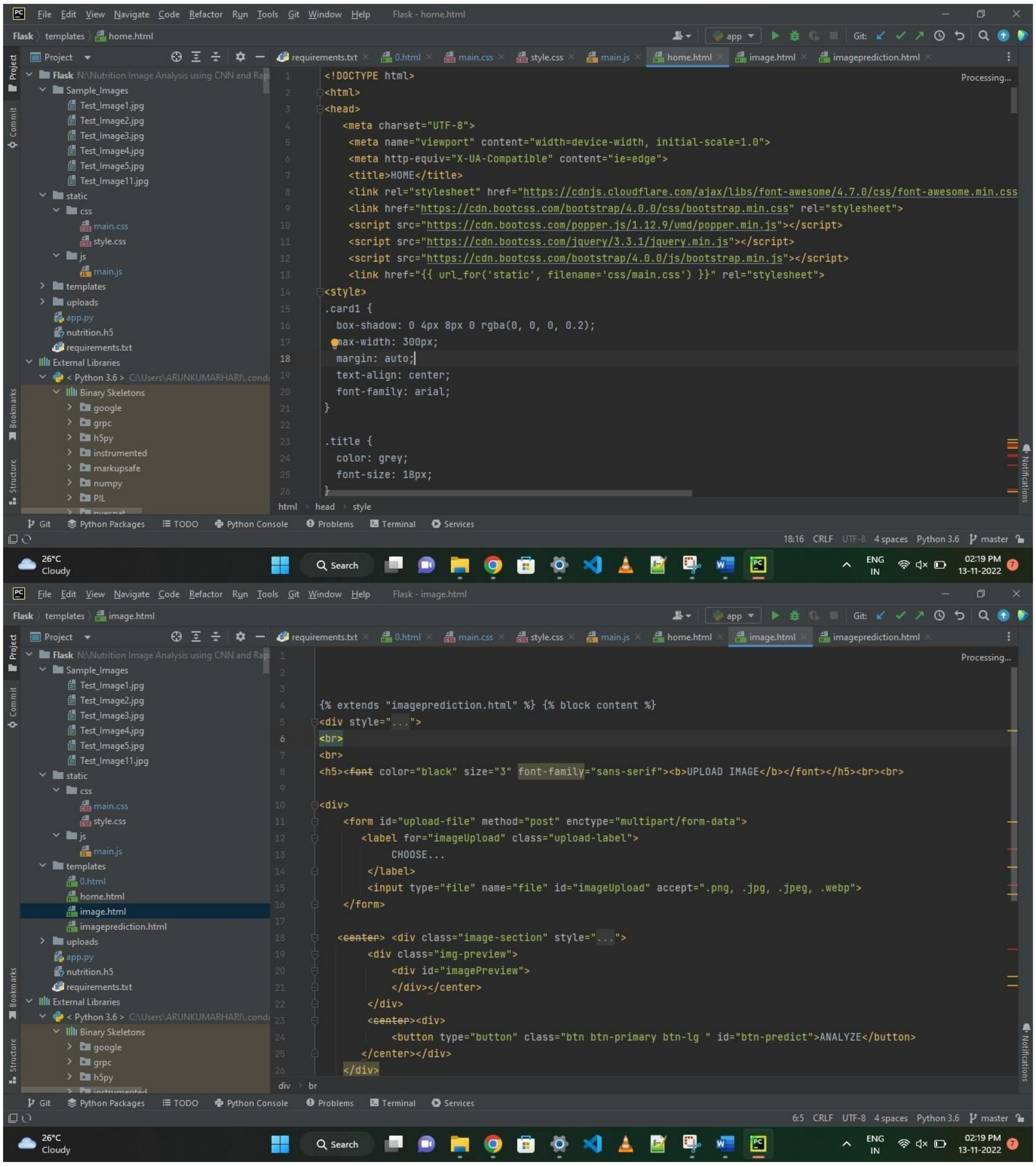
```
[ ] pred
```

```
array([[9.9929476e-01, 1.2502549e-14, 7.0520455e-04, 1.7371690e-17,
        2.1401336e-30]], dtype=float32)
```

```
[ ] labels=['APPLES', 'BANANA', 'ORANGE','PINEAPPLE','WATERMELON']
    labels[np.argmax(pred)]
```

```
'APPLES'
```

6.2 Feature 2


File Edit View Navigate Code Refactor Run Tools Git Window Help
Flask - home.html
Flask templates home.html
app
Git:
Project
requirements.txt
0.html
main.css
style.css
main.js
home.html
image.html
imageprediction.html
Processing...
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
uploads
app.py
nutrition.h5
requirements.txt
External Libraries
< Python 3.6 > C:\Users\ARUNKUMARHARI\.conda
Binary Skeletons
google
grpc
h5py
instrumented
markupsafe
numpy
PIL
<!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;
}
html head style
Git Python Packages TODO Python Console Problems Terminal Services
18:16 CRLF UTF-8 4 spaces Python 3.6 master
26°C Cloudy
Search
ENG IN
02:19 PM 13-11-2022
Flask - image.html
Flask templates image.html
{% extends "imageprediction.html" %} {% block content %}

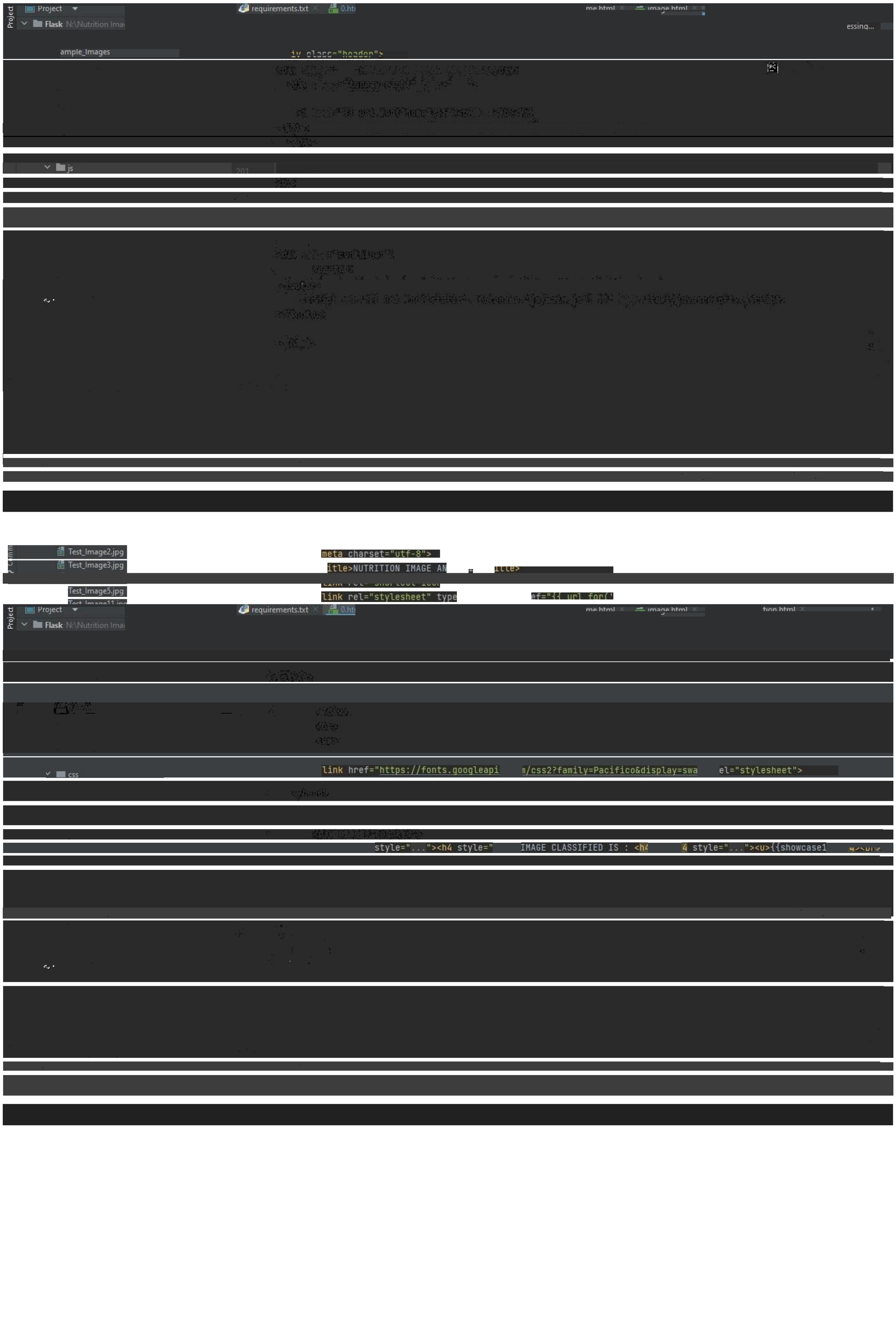
<h5>UPLOAD IMAGE</h5>

<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>

<button type="button" class="btn btn-primary btn-lg " id="btn-predict">ANALYZE</button>

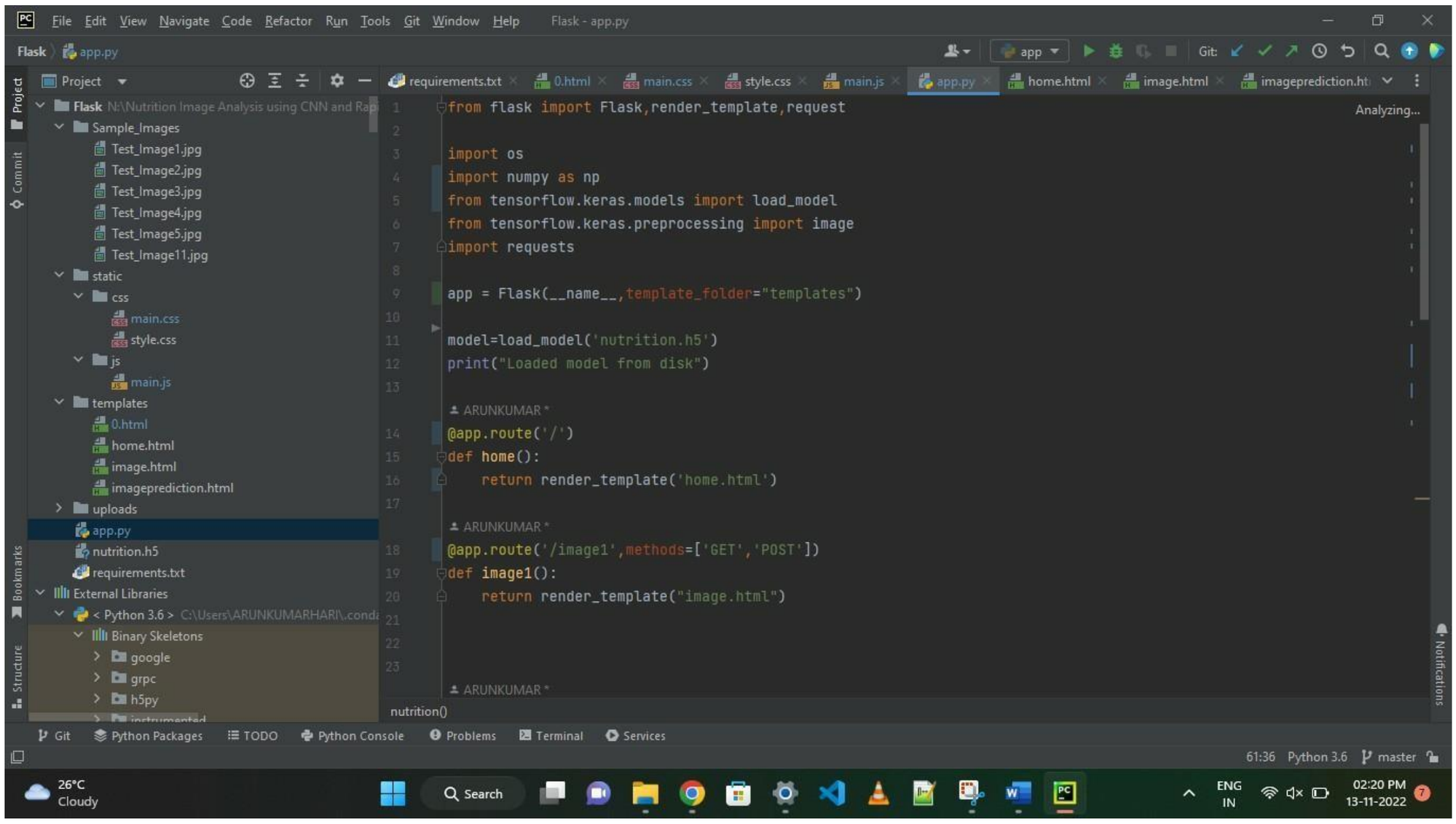
div br
6:5 CRLF UTF-8 4 spaces Python 3.6 master

1 1


Project
requirements.txt
0.htl
me.html
image.html
Flask N:\Nutrition Ima
essing...
ample_Images
iv class="header">
js
201

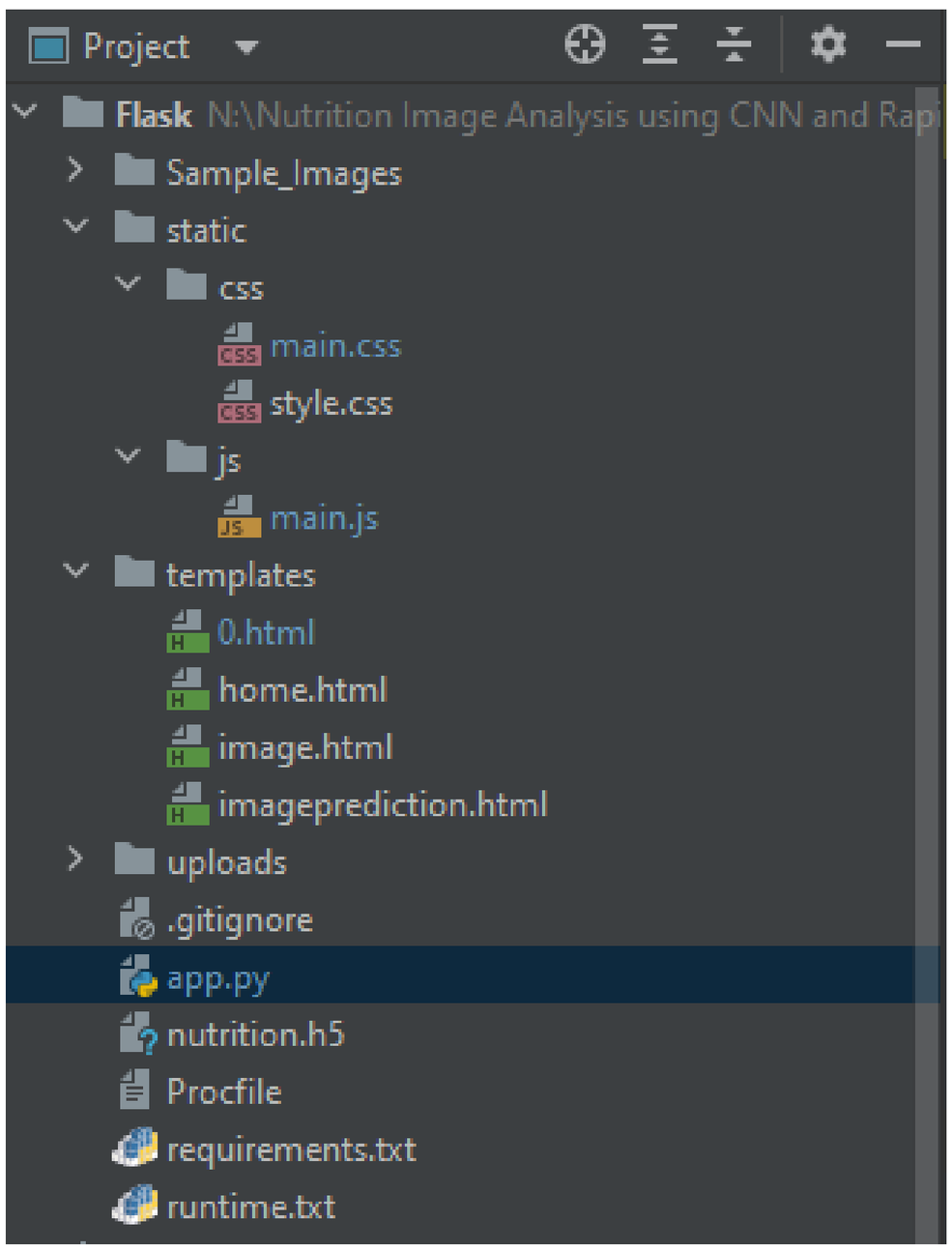
Test_Image2.jpg
Test_Image3.jpg
Test_Image5.jpg
meta charset="utf-8">
itle>NUTRITION IMAGE AN
itle>
link rel="stylesheet" type
ef="{{ url_for('
Project
requirements.txt
0.ht
me.html
image.html
tion.html
Flask N:\Nutrition Ima
link href="https://fonts.googleapi
n/css2?family=Pacifico&display=swa
el="stylesheet">
css

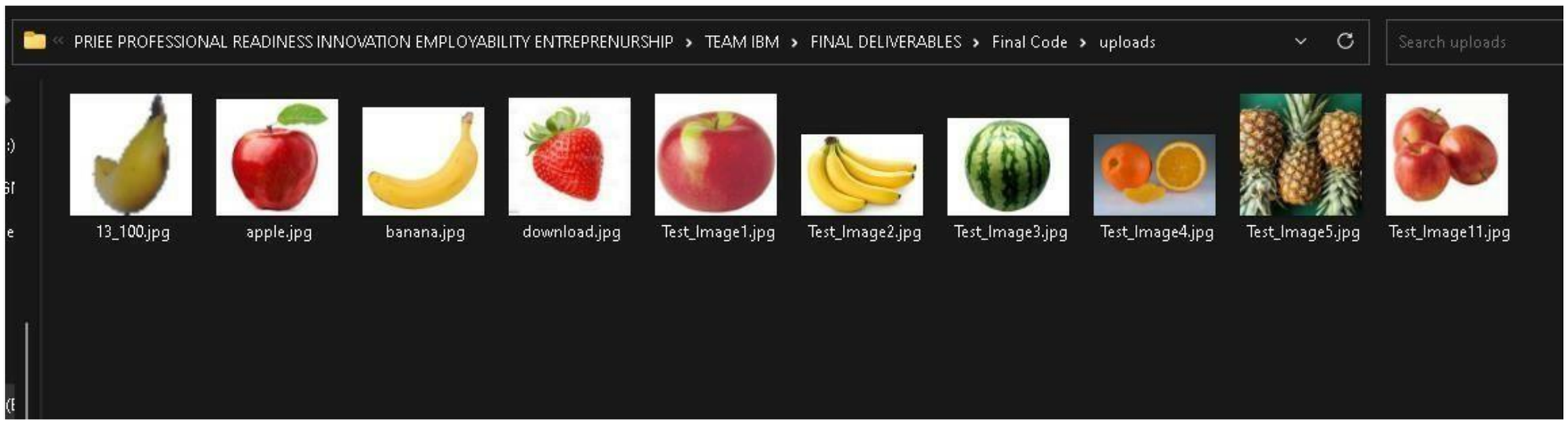
style="..."><h4 style="
IMAGE CLASSIFIED IS : <h
4 style="..."><u>{{showcase1



7. TESTING

7.1 TestCases

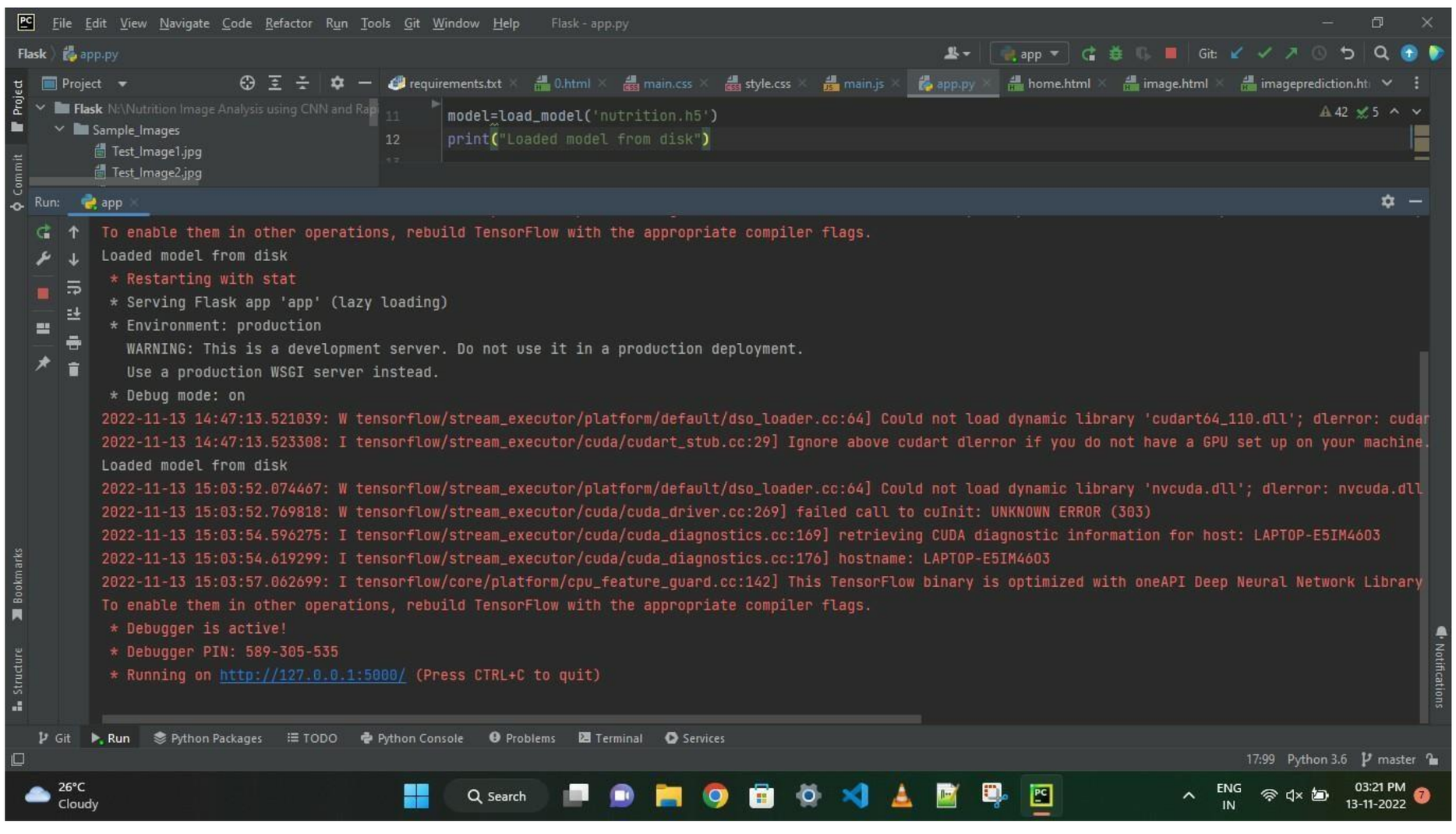




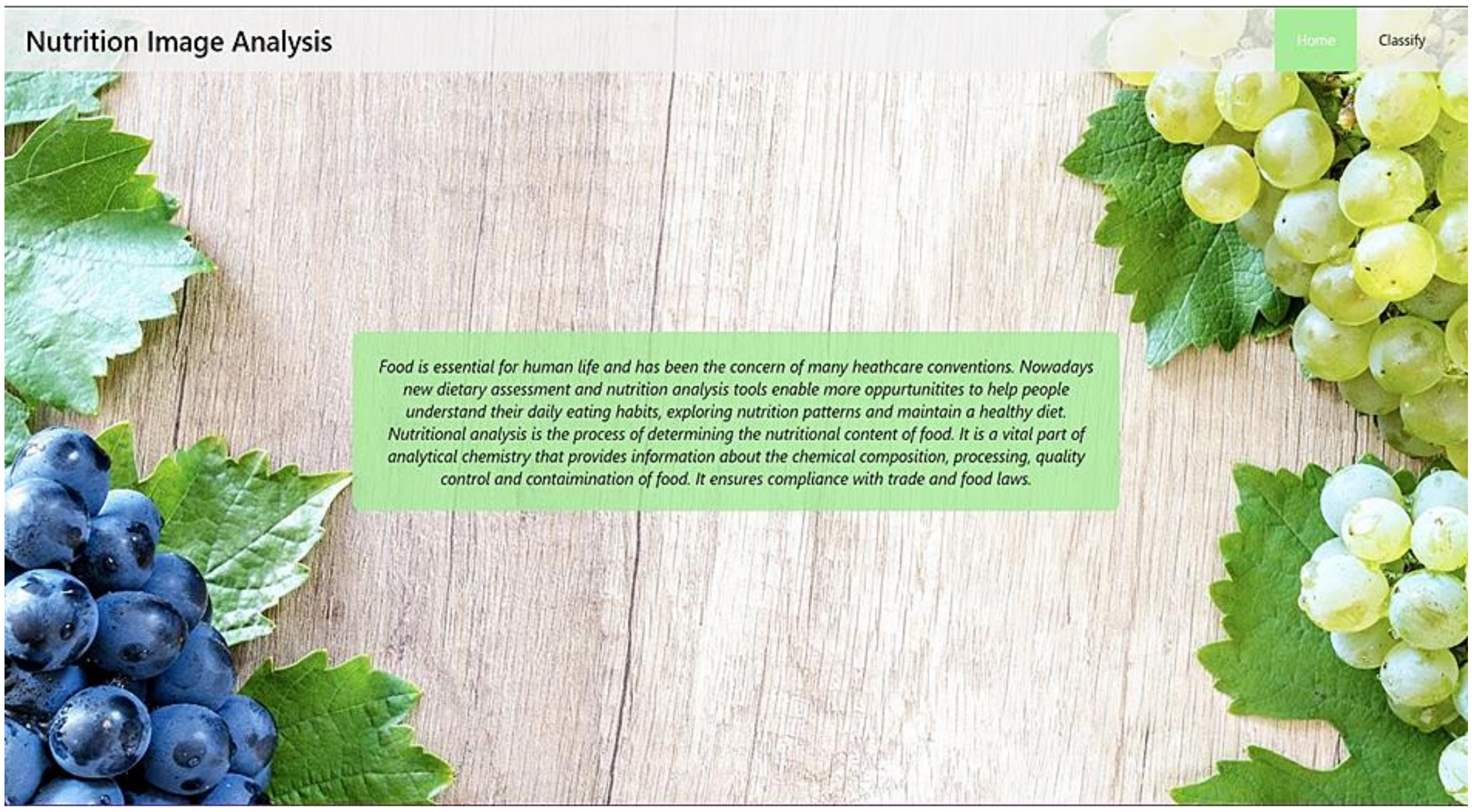
7.2 User AcceptanceTesting

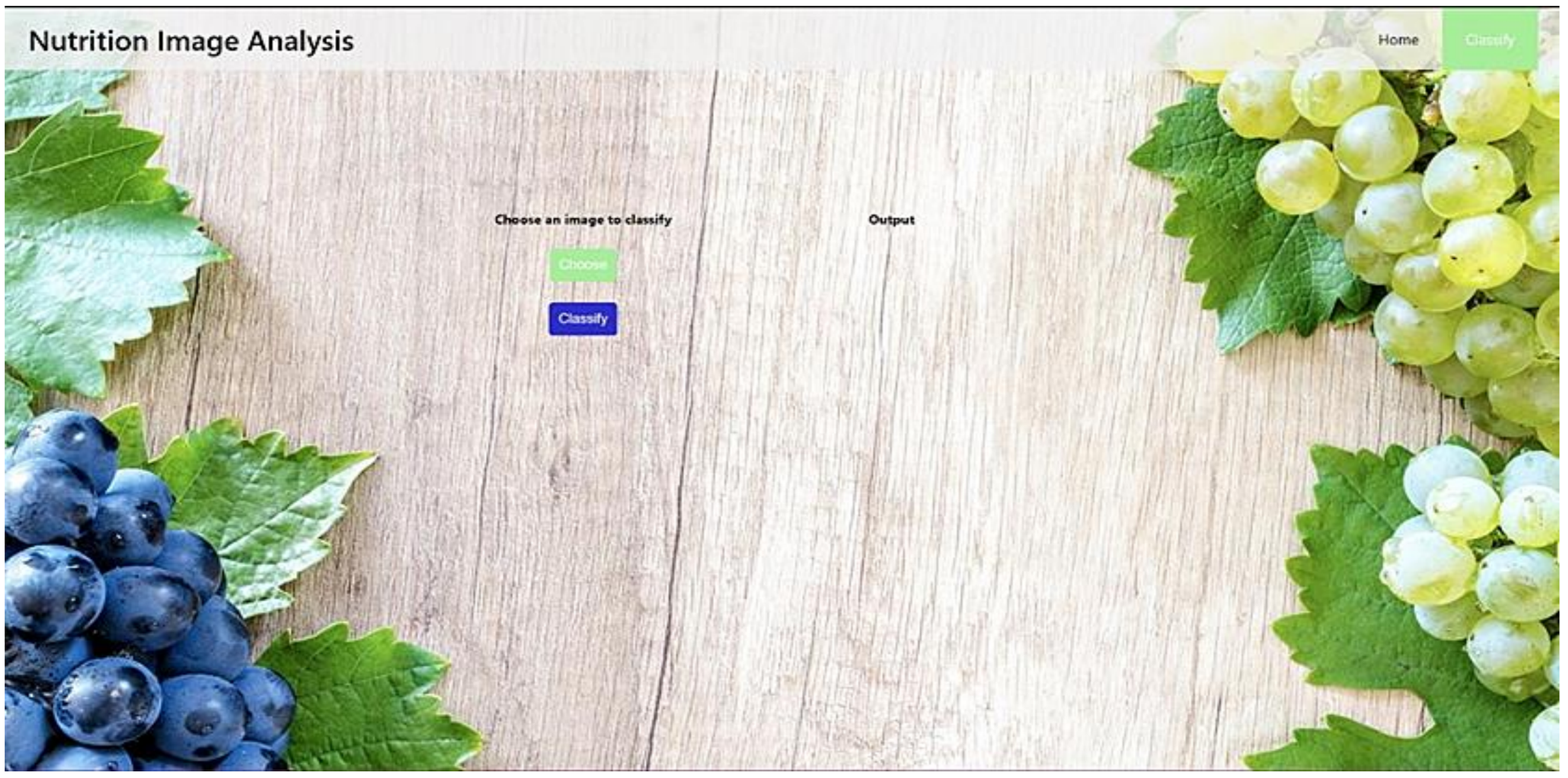
8. RESULTS

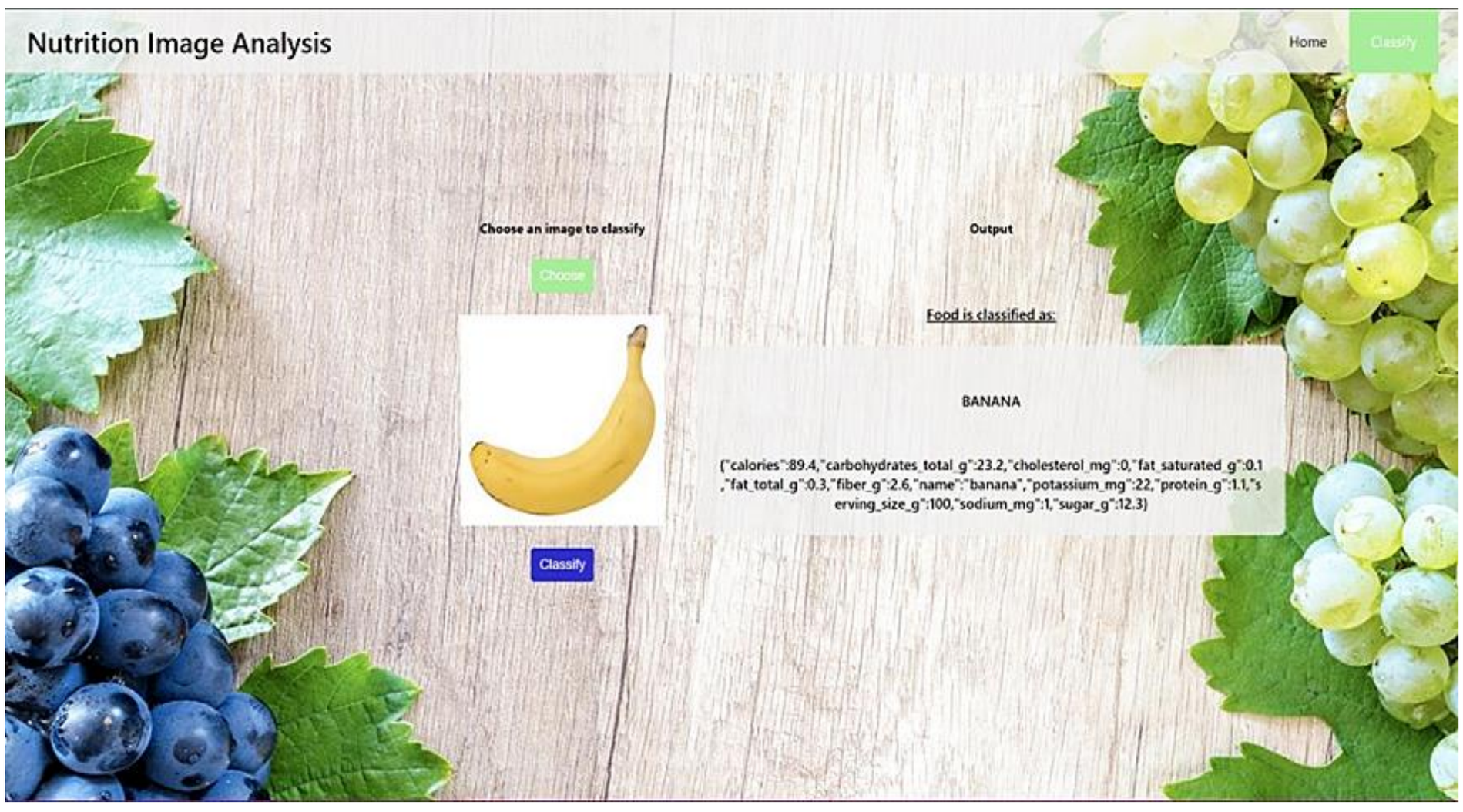
8.1 PerformanceMetrics



8.2 Output


Nutrition Image Analysis
Home
Classify
Food is essential for human life and has been the concern of many heathcare conventions. Nowadays new dietary assessment and nutrition analysis tools enable more oppurtunitites 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 contaimination of food. It ensures compliance with trade and food laws.


Nutrition Image Analysis
Home
Classify
Choose an image to classify
Choose
Classify
Output


Nutrition Image Analysis
Home
Classify
Choose an image to classify
Choose
Classify
Output
Food is classified as:
BANANA
{"calories":89.4,"carbohydrates_total_g":23.2,"cholesterol_mg":0,"fat_saturated_g":0.1
,"fat_total_g":0.3,"fiber_g":2.6,"name":"banana","potassium_mg":22,"protein_g":1.1,"s
erving_size_g":100,"sodium_mg":1,"sugar_g":12.3}

CONCLUSION:

During this project, we had the option to investigate some portion of the profound learning algorithms and find qualities and shortcomings. We picked up information on deep learning, and we got a productthat can perceivefruits from pictures.A new methodfor classifying fruitsusing convolutional neural network algorithm is proposed. The above listed results were obtained using 7 test samples taken out from the actual number of 2626 and 1050 images used for training and testing.

The above algorithm was coded and tested using anaconda software. Different fruits varieties that had different backgrounds were taken for training and testing. The proposed algorithm gave 98% accuracy rate. This project explores a fruits classification based on CNN algorithm. The accuracy and loss curves were generated by using various combinations of hidden layers for five cases using fruits. CNN gave better performance to attain better fruit classification.

We trust that the outcomes and strategies introduced in this projectcan be additionally extended to a greater task. From our perspective, one of the principal goals is to improve the precision of the neural system. This includes further exploring different avenues regarding the structure of the system.

FUTURE SCOPE:

Hopefully, in the future, this project can be extended with a larger dataset having more categories of fruits & vegetables. We will also have the plan to implement some other CNN based models to compare the accuracy on the same dataset, can also work on some more features for grading and classification, which can identify types of disease and/or texture structure of fruits. All these are future direction.

13.2GitHub Link:

Github link:

https://github.com/IBM-EPBL/IBM-Project-22724-1659857199