PROJECT DOCUMENTATION

AI-Powered Nutrition Analyzer for Fitness Enthusiasts

TEAM ID:PNT2022TMID39800

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INTRODUCTION

1.1 ProjectOverview

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 peopleunderstand 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. LITERATURESURVEY

2.1 Existingproblem

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.

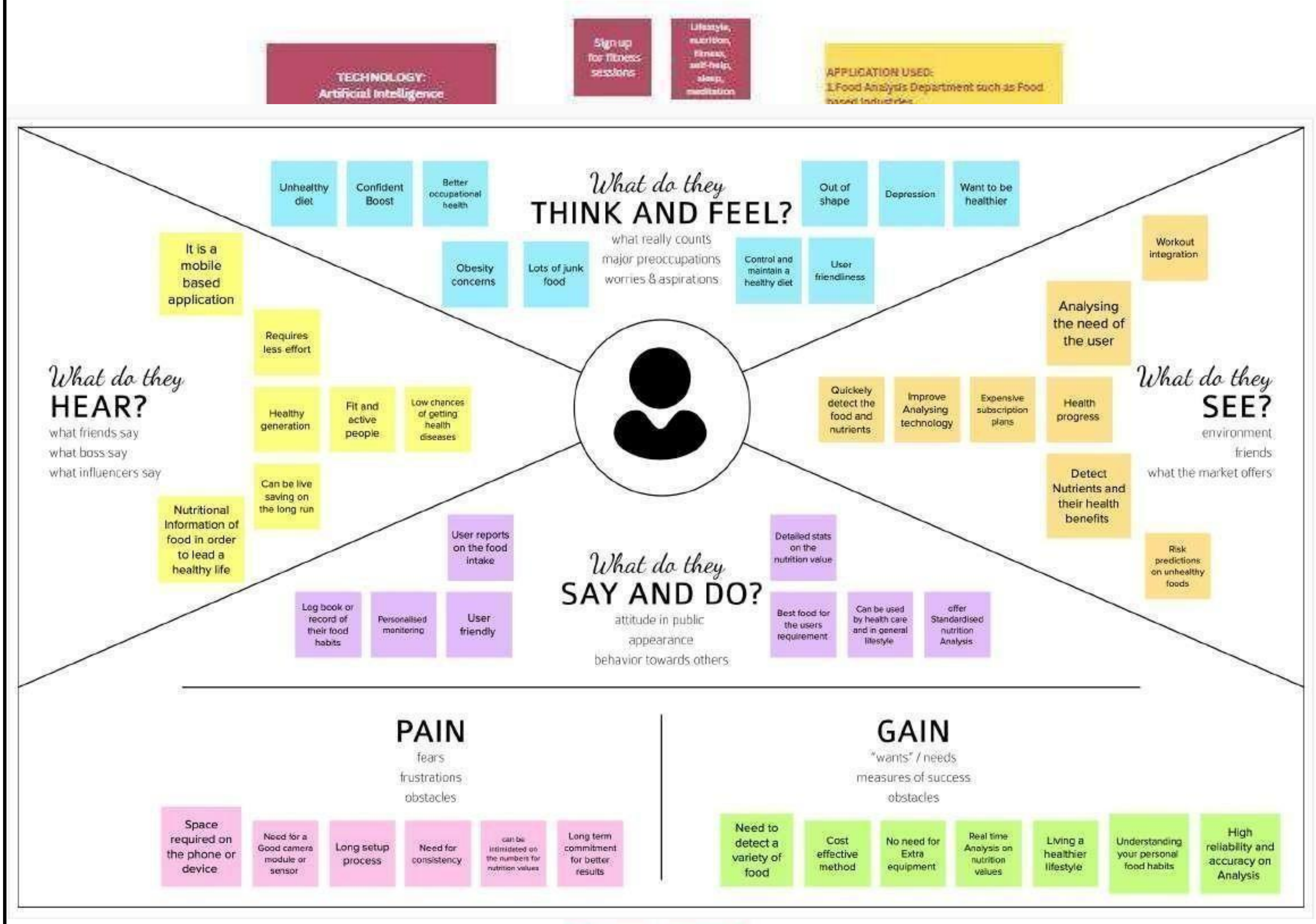
The application relies on Artificial Intelligence to produce custom data related to smart calorie counterpowered by AI. Their artificial intelligence learns an individual's tastes, preferences, and body type. All of this is packaged in a comprehensive nutrition and activity tracker.

2.2 Problem Statement Definition

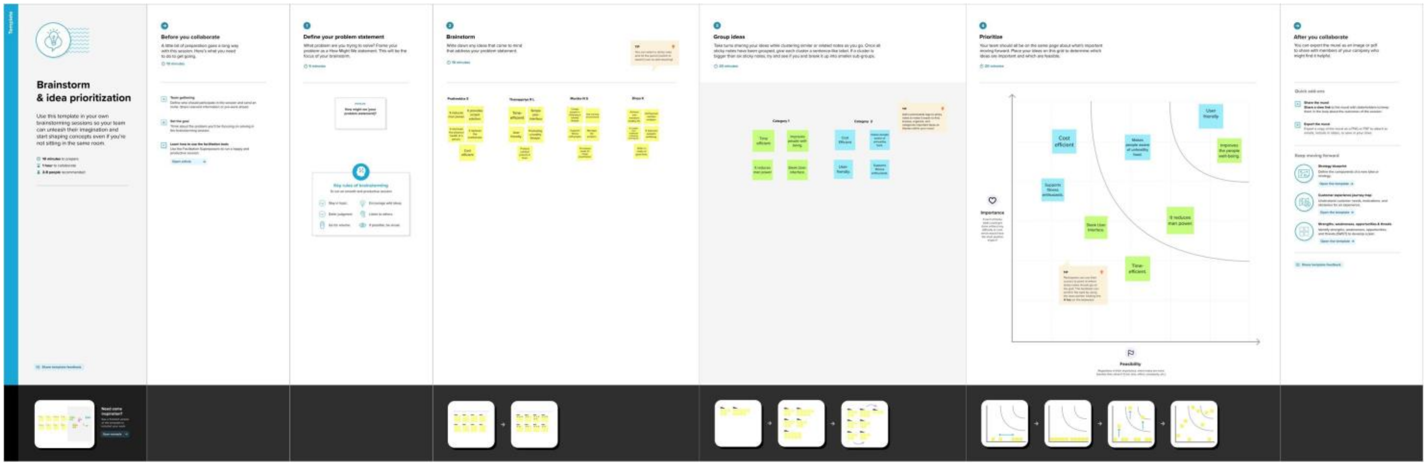
The main aim of the project is to building a model which is used for classifying the fruit depends on the different characteristics like colour, shape, texture etc. Here the user can capture the images of different fruits and then the image will be sent the trained model. The model analyses the image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

3. IDEATION & PROPOSED SOLUTION

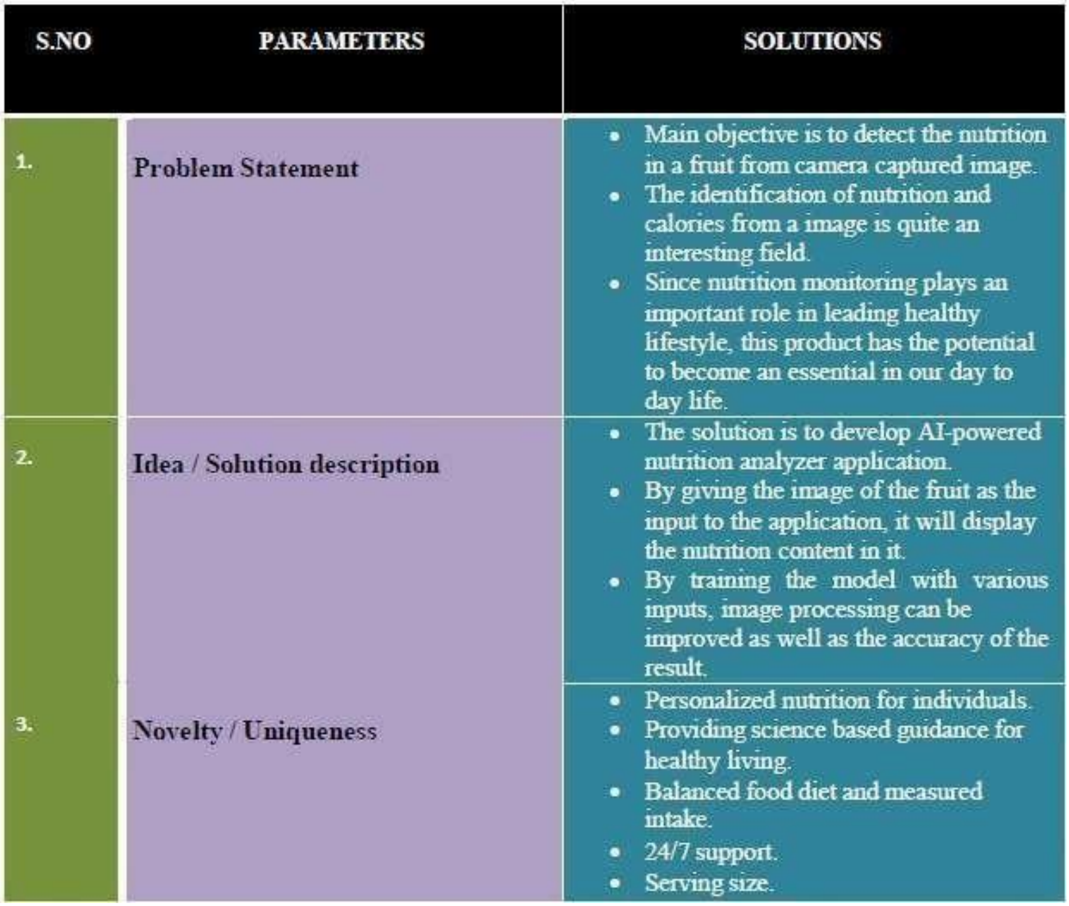
3.1 Empathy Map Canvas


TECHNOLOGY:
Artificial Intelligence
Sign up for fitness sessions
Lifestyle, nutrition, fitness, self-help, sleep, meditation
APPLICATION USED:
1.Food Analysis Department such as Food based industries
What do they THINK AND FEEL?
what really counts
major preoccupations
worries & aspirations
Unhealthy diet
Confident Boost
Better occupational health
Obesity concerns
Lots of junk food
Out of shape
Depression
Want to be healthier
Control and maintain a healthy diet
User friendliness
What do they HEAR?
what friends say
what boss say
what influencers say
It is a mobile based application
Requires less effort
Healthy generation
Fit and active people
Low chances of getting health diseases
Can be live saving on the long run
Nutritional Information of food in order to lead a healthy life
What do they SEE?
environment
friends
what the market offers
Workout integration
Analysing the need of the user
Quickely detect the food and nutrients
Improve Analysing technology
Expensive subscription plans
Health progress
Detect Nutrients and their health benefits
Risk predictions on unhealthy foods
What do they SAY AND DO?
attitude in public
appearance
behavior towards others
User reports on the food intake
Log book or record of their food habits
Personalised monitoring
User friendly
Detailed stats on the nutrition value
Best food for the users requirement
Can be used by health care and in general lifestyle
offer Standardised nutrition Analysis
PAIN
fears
frustrations
obstacles
Space required on the phone or device
Need for a Good camera module or sensor
Long setup process
Need for consistency
can be intimideted on the numbers for nutrition values
Long term commitment for better results
GAIN
"wants" / needs
measures of success
obstacles
Need to detect a variety of food
Cost effective method
No need for Extra equipment
Real time Analysis on nutrition values
Living a healthier lifestyle
Understanding your personal food habits
High reliability and accuracy on Analysis

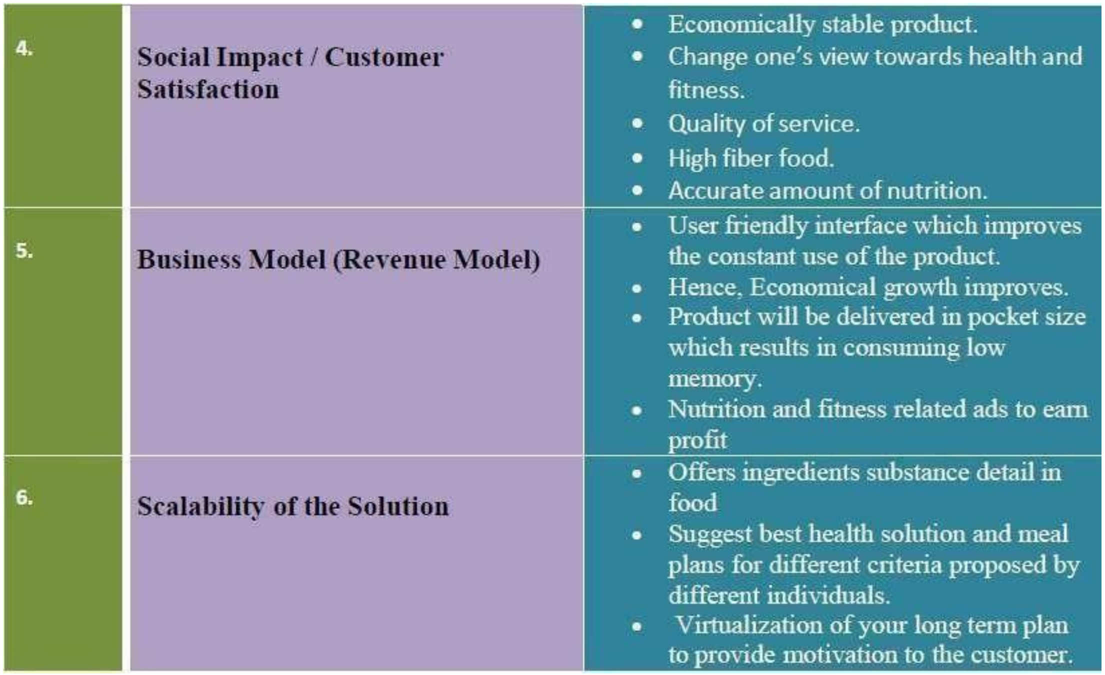
3.2 BrainStorm


Template
Brainstorm
& idea prioritization
Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.
Before you collaborate
Define your problem statement
Brainstorm
Group ideas
Prioritize
After you collaborate
Cost efficient
Makes people aware of unhealthy food
User friendly
Improves the people well-being
Supports fitness enthusiasts
Sleek User Interface
It reduces man power
Time-efficient
Importance
Feasibility

3.3ProposedSolution



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.



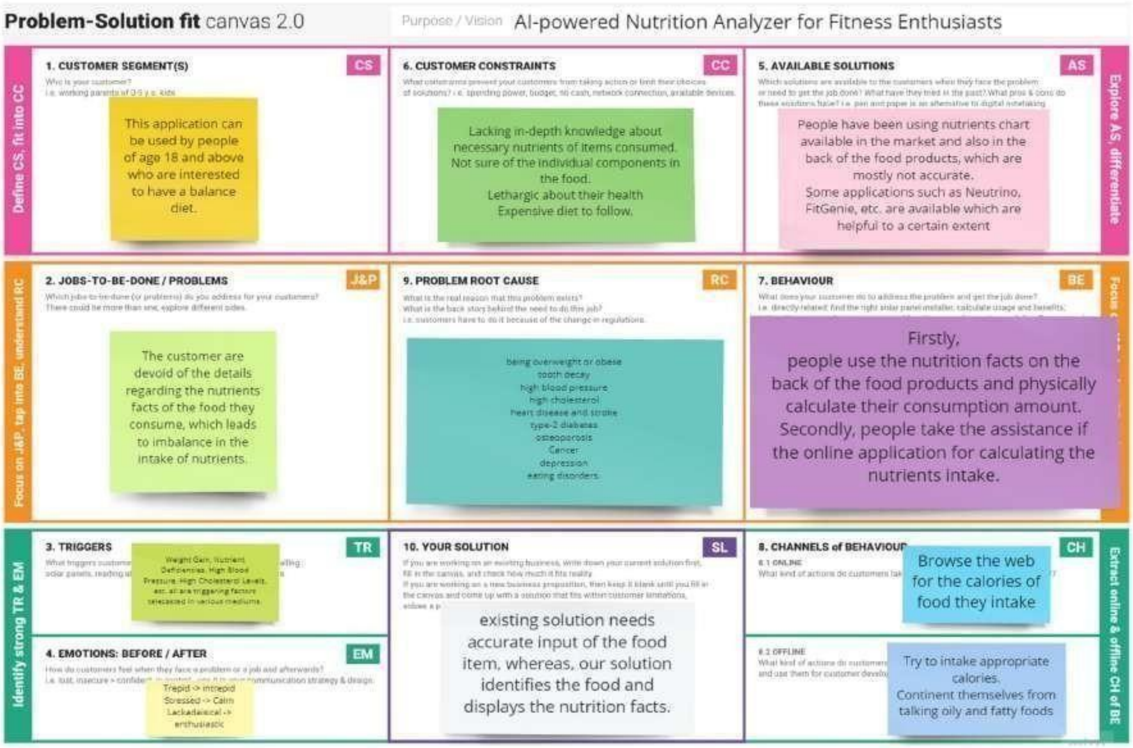
4.	Social Impact / Customer Satisfaction	• Economically stable product. • Change one's view towards health and fitness. • Quality of service. • High fiber food. • Accurate amount of nutrition.
5.	Business Model (Revenue Model)	• User friendly interface which improves the constant use of the product. • 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 communicationand 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.



Problem-Solution fit canvas 2.0

Purpose / Vision AI-powered Nutrition Analyzer for Fitness Enthusiasts

Define CS, fit into CC

1. CUSTOMER SEGMENT(S) CS

Who is your customer?
i.e. working parents of 0-5 y.o. kids

This application can be used by people of age 18 and above who are interested to have a balance diet.

6. CUSTOMER CONSTRAINTS CC

What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.

Lacking in-depth knowledge about necessary nutrients of items consumed.
Not sure of the individual components in the food.
Lethargic about their health
Expensive diet to follow.

5. AVAILABLE SOLUTIONS AS

Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking

People have been using nutrients chart available in the market and also in the back of the food products, which are mostly not accurate.
Some applications such as Neutrino, FitGenie, etc. are available which are helpful to a certain extent

Explore AS, differentiate

Focus on J&P, tap into BE, understand RC

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

Which jobs-to-be-done (or problems) do you address for your customers?
There could be more than one, explore different sides.

The customer are devoid of the details regarding the nutrients facts of the food they consume, which leads to imbalance in the intake of nutrients.

9. PROBLEM ROOT CAUSE RC

What is the real reason that this problem exists?
What is the back story behind the need to do this job?
i.e. customers have to do it because of the change in regulations.

being overweight or obese
tooth decay
high blood pressure
high cholesterol
heart disease and stroke
type-2 diabetes
osteoporosis
Cancer
depression
eating disorders

7. BEHAVIOUR BE

What does your customer do to address the problem and get the job done?
i.e. directly related: find the right solar panel installer, calculate usage and benefits;

Firstly,
people use the nutrition facts on the back of the food products and physically calculate their consumption amount.
Secondly, people take the assistance if the online application for calculating the nutrients intake.

Focus

Identify strong TR & EM

3. TRIGGERS TR

What triggers custome ... lling:
solar panels, reading a ...

Weight Gain, Nutrient Deficiencies, High Blood Pressure, High Cholesterol Levels, etc. all are triggering factors telecasted in various mediums.

4. EMOTIONS: BEFORE / AFTER EM

How do customers feel when they face a problem or a job and afterwards?
i.e. lost, insecure > confident, in control - use it in your communication strategy & design.

Trepid -> intrepid
Stressed -> Calm
Lackadaisical -> enthusiastic

10. YOUR SOLUTION SL

If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality.
If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a p

existing solution needs accurate input of the food item, whereas, our solution identifies the food and displays the nutrition facts.

8. CHANNELS of BEHAVIOUR CH

8.1 ONLINE
What kind of actions do customers tak

Browse the web for the calories of food they intake

8.2 OFFLINE
What kind of actions do customers
and use them for customer develo

Try to intake appropriate calories.
Continent themselves from talking oily and fatty foods

Extract online & offline CH of BE

4. REQUIREMENTANALYSIS

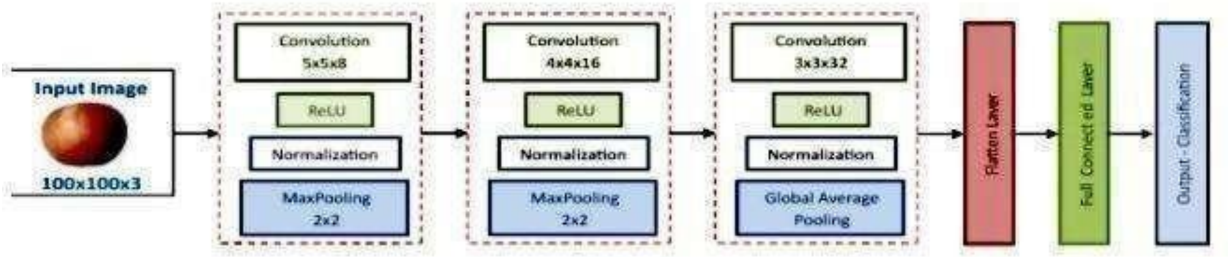
4.1 Functionalrequirement

- 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.
- Imageclassification,object detection, segmentation, face recognition.
- Classificationof crystal structure using a Convolutional neural network
- Nutritionis 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 brandnew 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 eachindividual. It began as “gym only software,” but has nowimproved its system to satisfy “at home fitness” expectations.
- Youtake 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 assistanceand dietary recommendations.

For Example:



- Thecomparison of the proposed model withthe 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.

4.2 Non-functional Requirements:

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

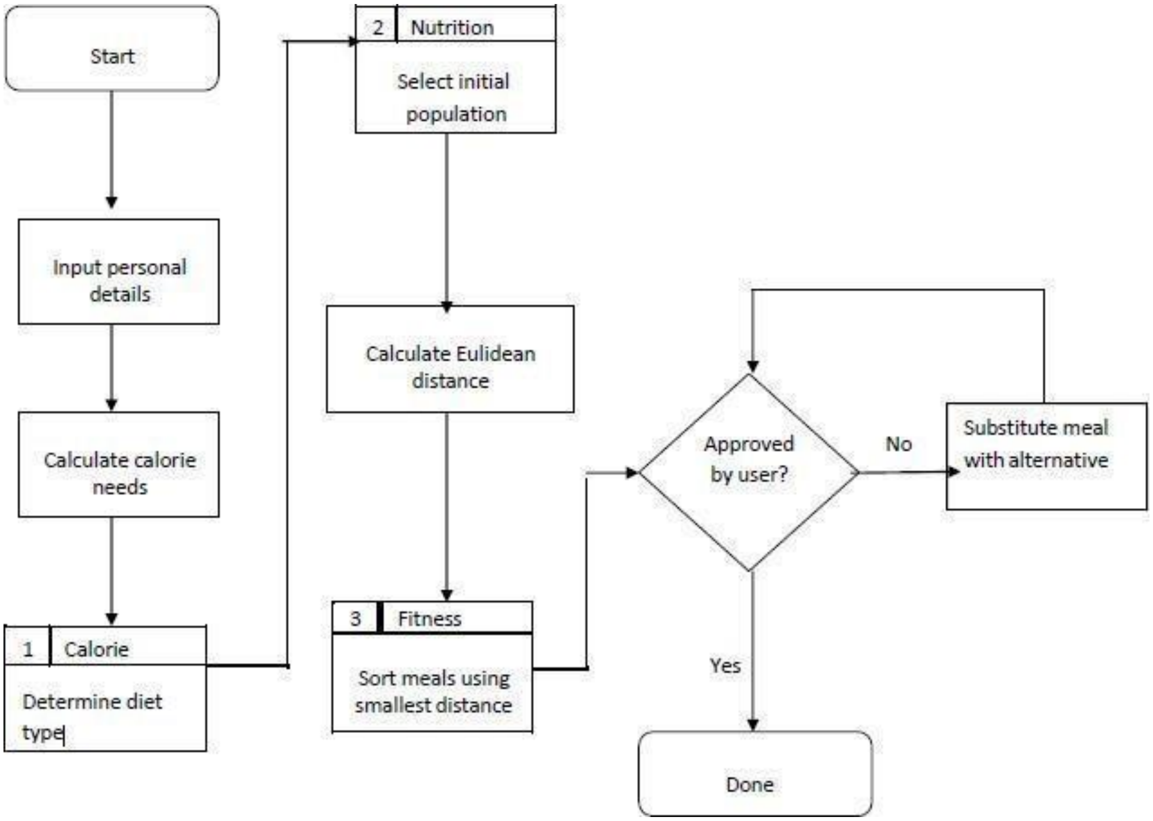
- NFR-1 Usability User can know the range before entering their own report and can easily navigate.
- NFR-2 Security The user data is very secured .It is accessed only the user and company
- NFR-3 Reliability The result or the report given is very reliable
- NFR-4 Performance Deals with the front-end load time and fast return of result of the report

- NFR-5 Availability All the reports and result will be available in user’s log in

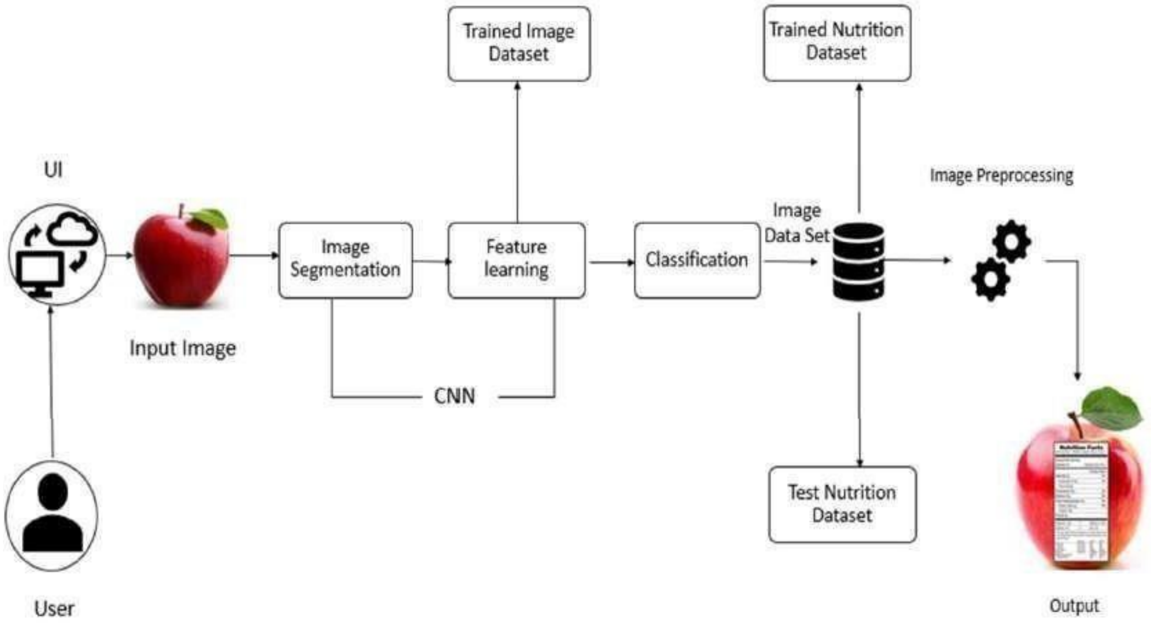
- NFR-6 Scalability Collecting response from user

5. PROJECT DESIGN

5.1 Data Flow Diagrams



5.2 Solution &Technical Architecture



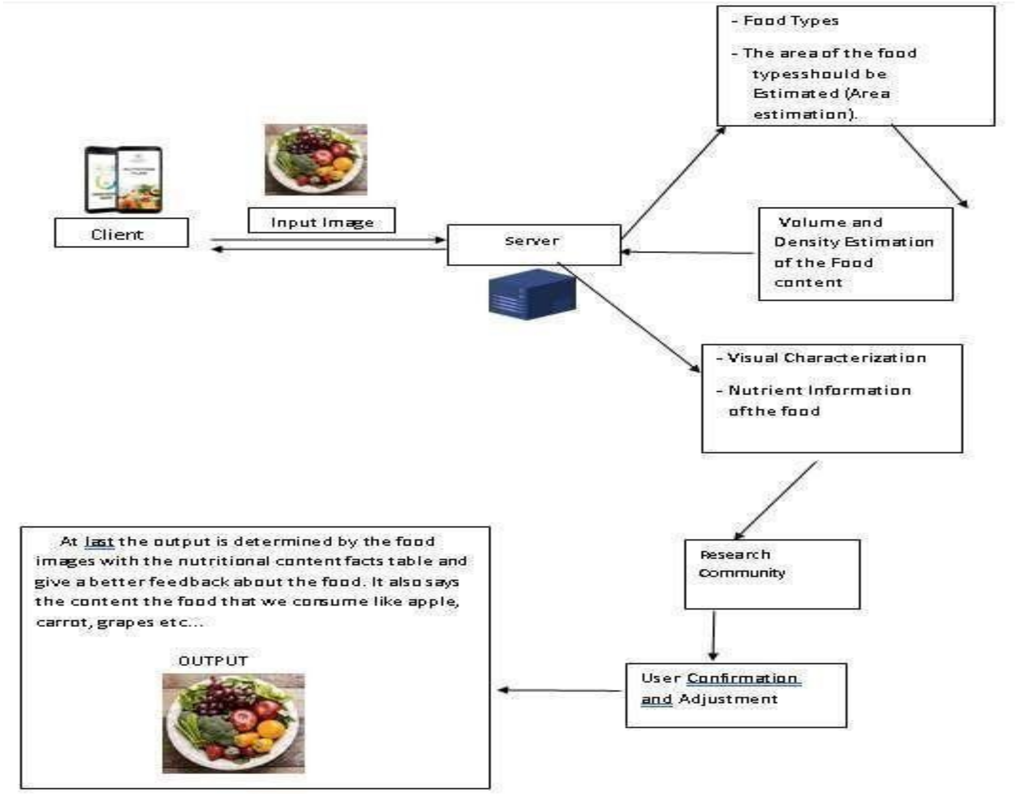
S.No	Component	Description	Technology
1.	App	User interacts with application forthe prediction of Nutrition	Python, Java, HTML, SQLite, Android studio
2.	Database	Data Type, Configurations and data will be stored	MySQL,JS
3.	CloudDatabase	Database Service on Cloud	IBM DB2, IBM Cloudant etc.
4.	File Storage	File storagerequirements	Cloud -- > drive
5.	Machine Learning Model	Purposeof Machine Learning Model	ANN, CNN, RNN
6.	Notification	Notificationwill 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	WebServer – HTML, CSS ,Javascript Application Server – Python Flask Database Server – IBM Cloud
4.	Availability	Availabilityis increased by loads balancers in cloud VPS	IBMCloud hosting
5.	Performance	The application is expected to handle up to 4000 predications per second	IBMLoad Balance

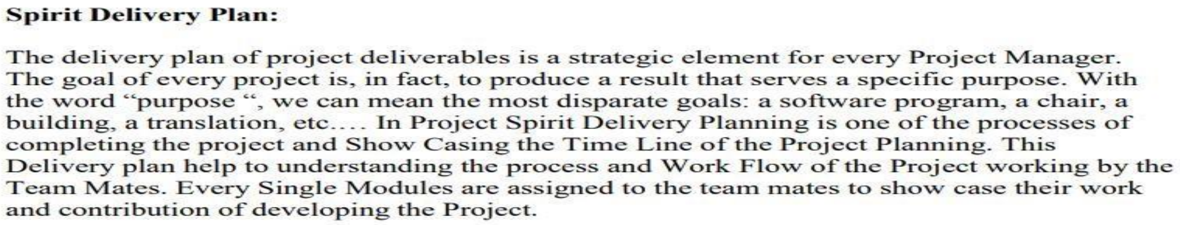
5.3 User Stories


- Food Types
- The area of the food typesshould be Estimated (Area estimation).
Client
Input Image
Server
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…

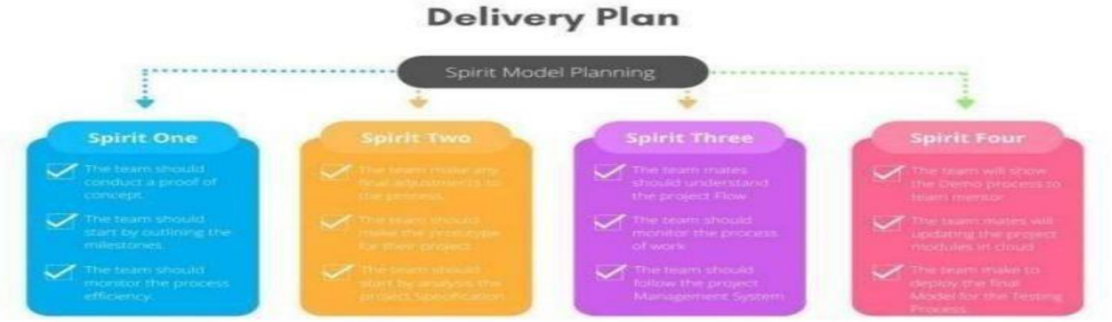
6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Delivery Schedule



Spirit Delivery Plan:

The delivery plan of project deliverables is a strategic element for every Project Manager. The goal of every project is, in fact, to produce a result that serves a specific purpose. With the word "purpose ", we can mean the most disparate goals: a software program, a chair, a building, a translation, etc.… In Project Spirit Delivery Planning is one of the processes of completing the project and Show Casing the Time Line of the Project Planning. This Delivery plan help to understanding the process and Work Flow of the Project working by the Team Mates. Every Single Modules are assigned to the team mates to show case their work and contribution of developing the Project.



Delivery Plan

Spirit Model Planning

Spirit One

- ✓ The team should conduct a proof of concept.
- ✓ The team should start by outlining the milestones.
- ✓ The team should monitor the process efficiency.

Spirit Two

- ✓ The team make any final adjustments to the process.
- ✓ The team should make the prototype for their project.
- ✓ The team should start by analysis the project Specification

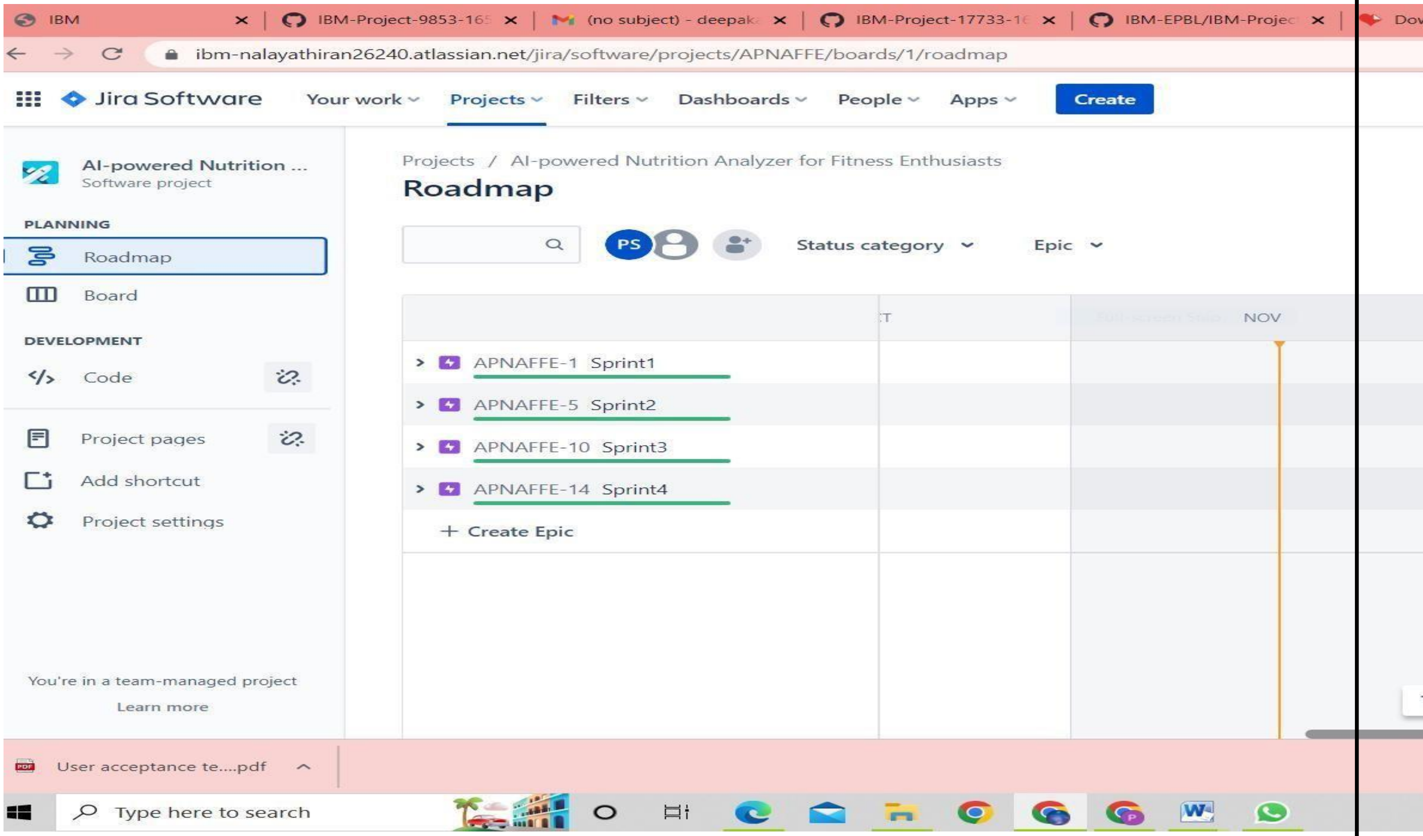
Spirit Three

- ✓ The team mates should understand the project Flow
- ✓ The team should monitor the process of work
- ✓ The team should follow the project Management System

Spirit Four

- ✓ The team will show the Demo process to team mentor
- ✓ The team mates will updating the project modules in cloud
- ✓ The team make to deploy the final Model for the Testing Process.

6.2 Jira reports and Burnt chart



ibm-nalayathiran26240.atlassian.net/jira/software/projects/APNAFFE/boards/1/roadmap

Projects / AI-powered Nutrition Analyzer for Fitness Enthusiasts

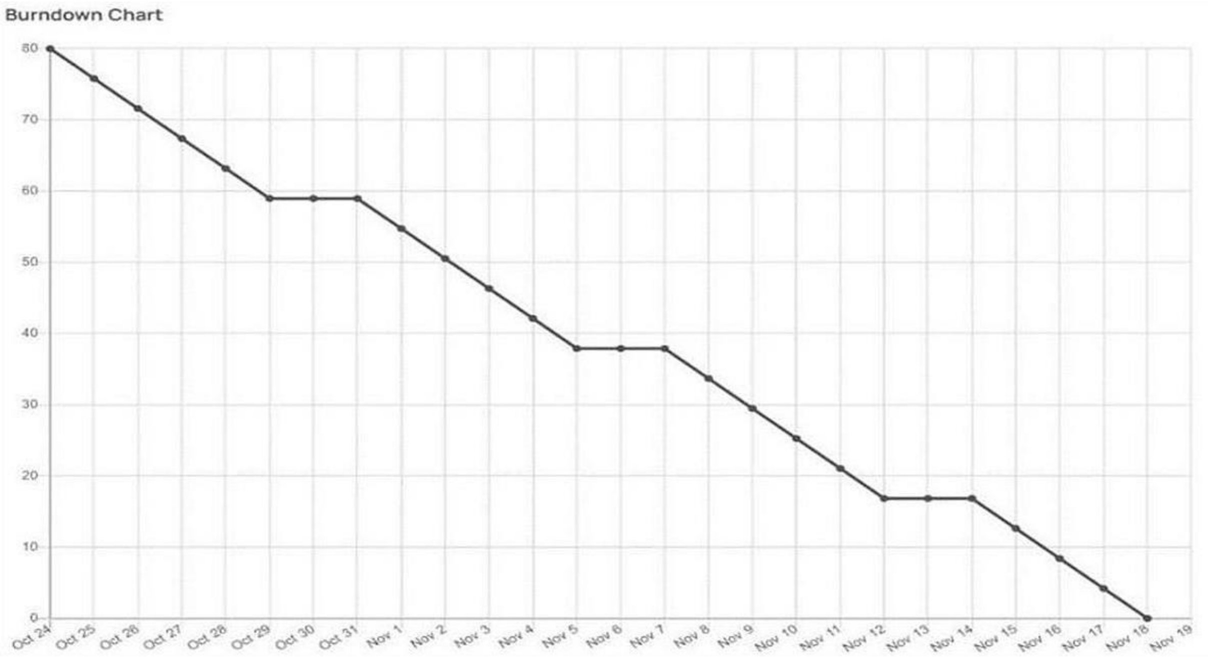
Roadmap

APNAFFE-1 Sprint1

APNAFFE-5 Sprint2

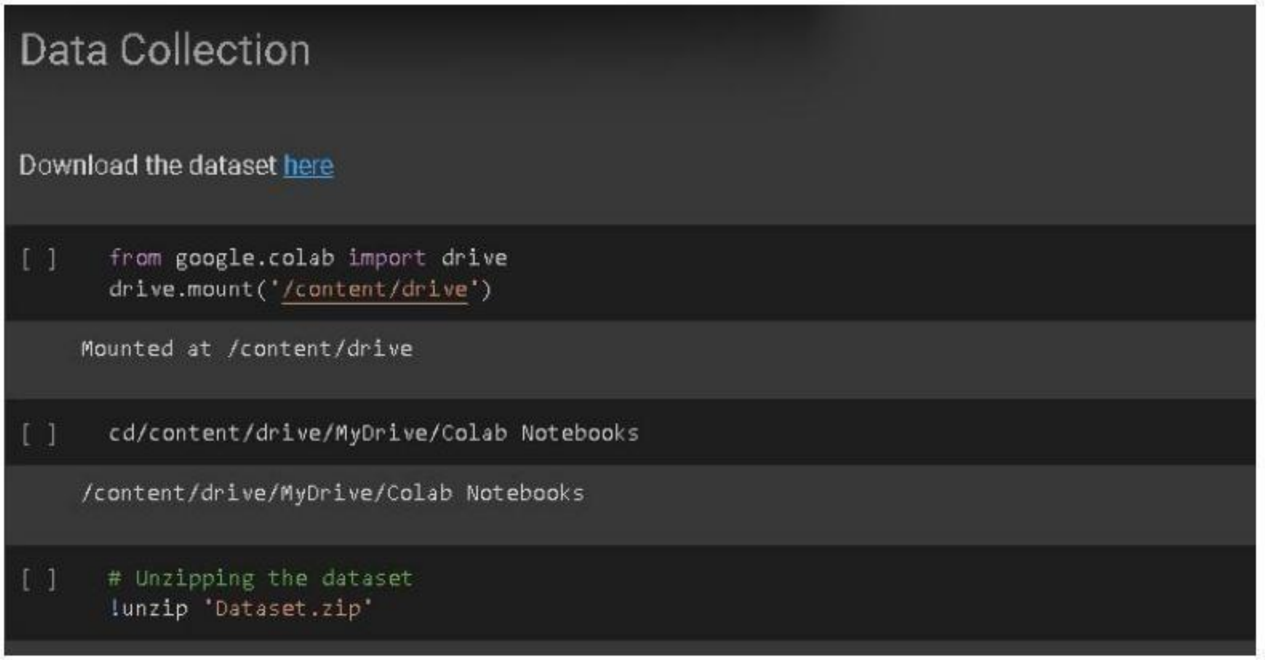
APNAFFE-10 Sprint3

APNAFFE-14 Sprint4



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'
```

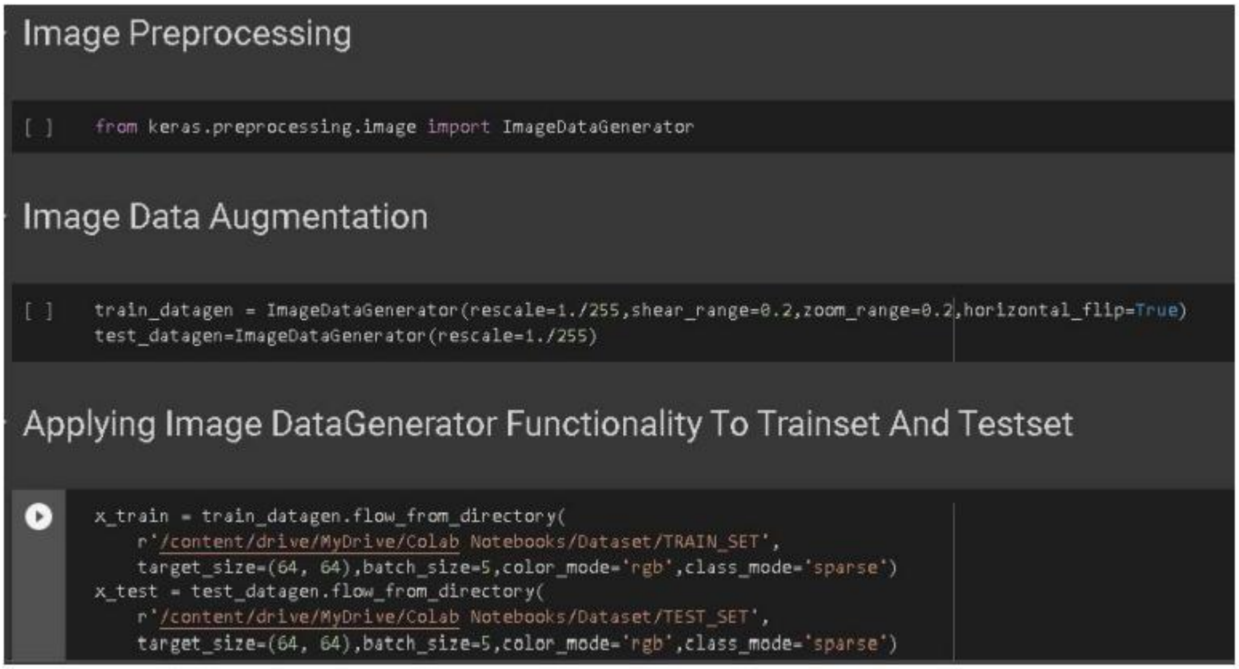


Image Preprocessing

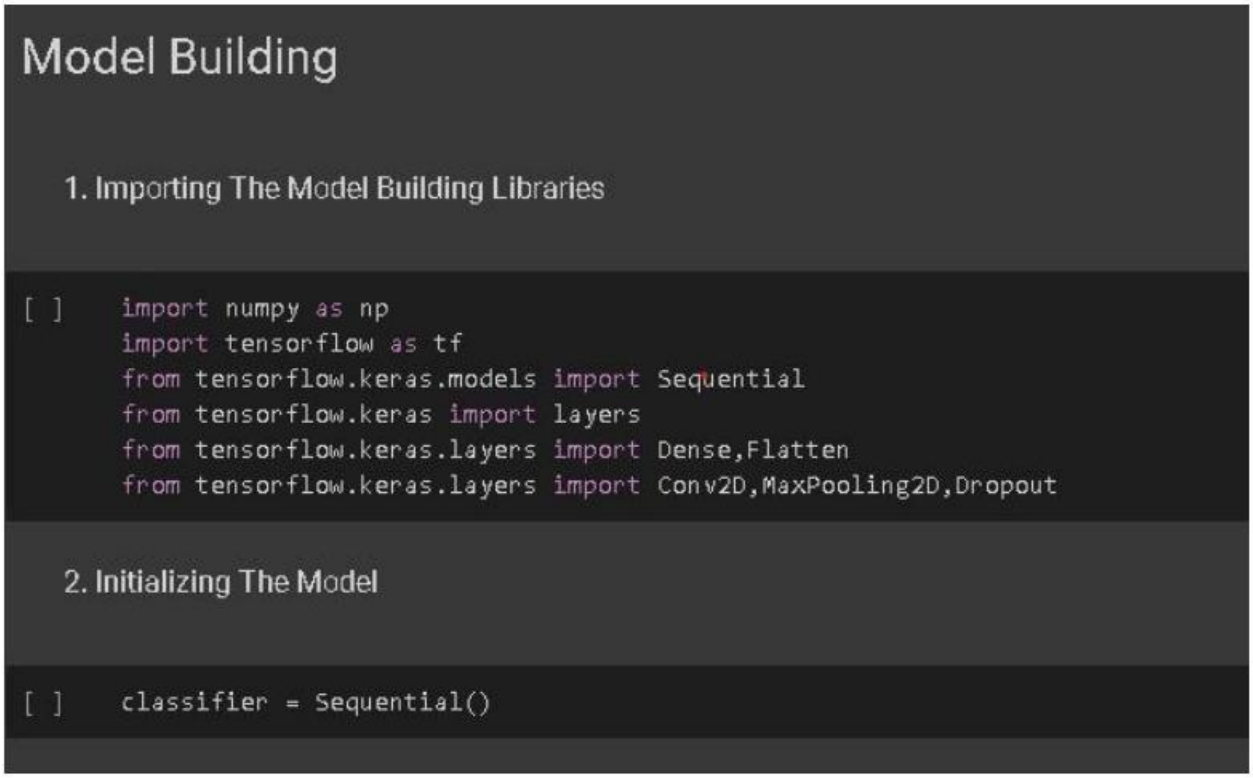
```
[ ]   from keras.preprocessing.image import ImageDataGenerator
```

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')
```



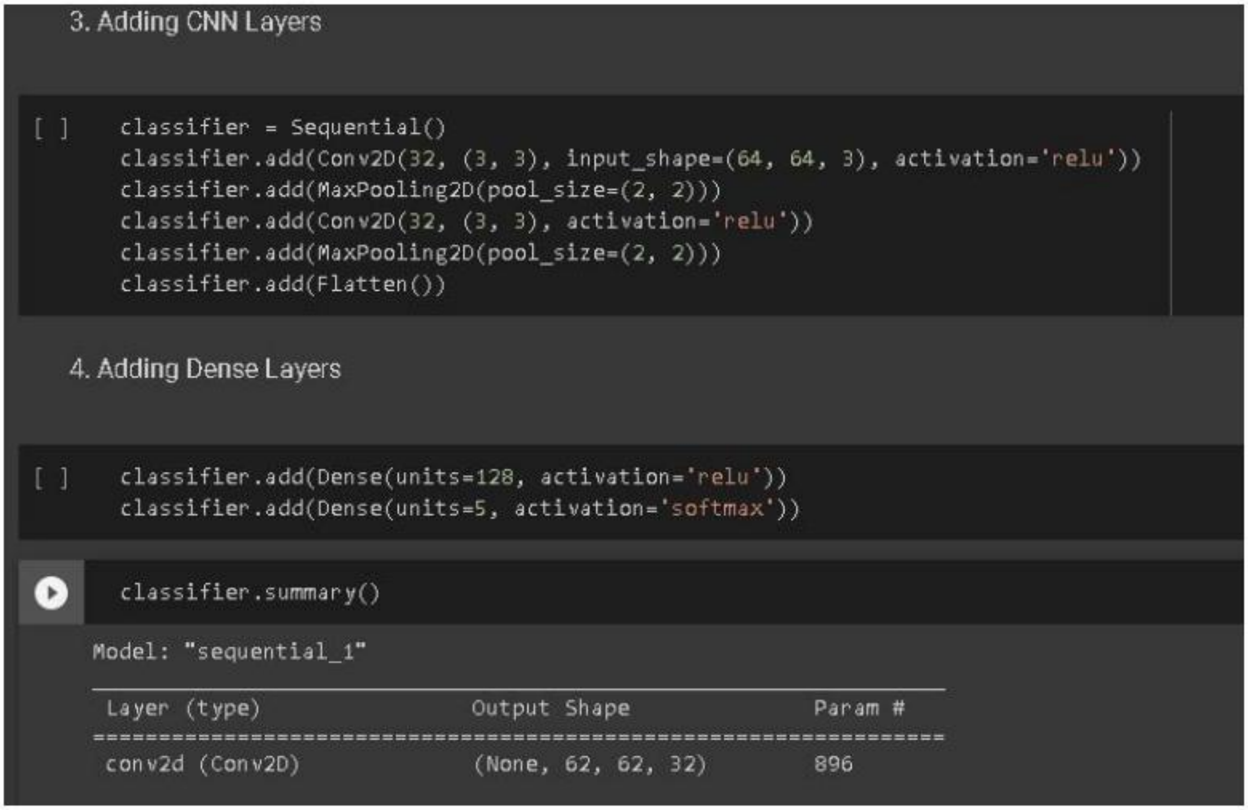
Model Building

1. Importing The Model Building Libraries

```
[ ]   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()
```



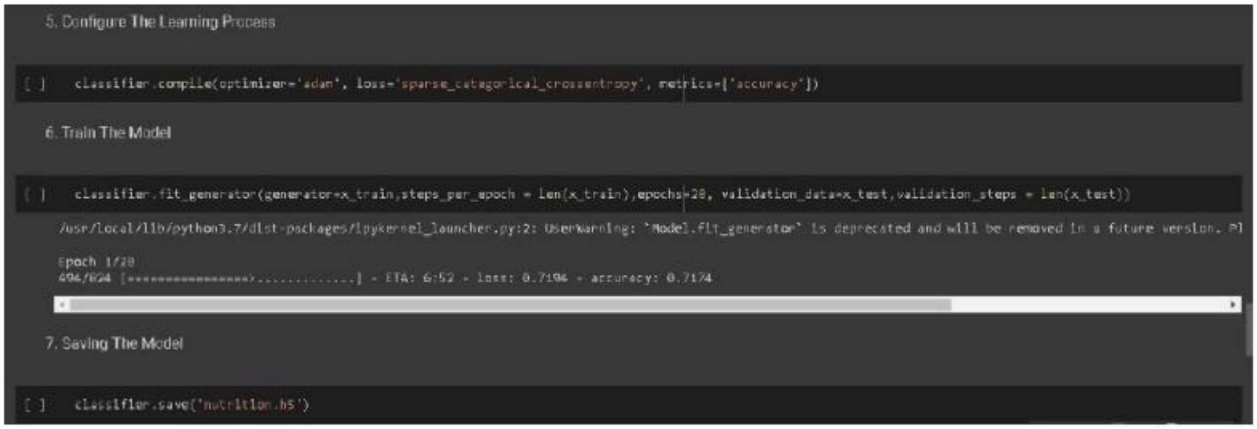
3. Adding CNN Layers

```
[ ]   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

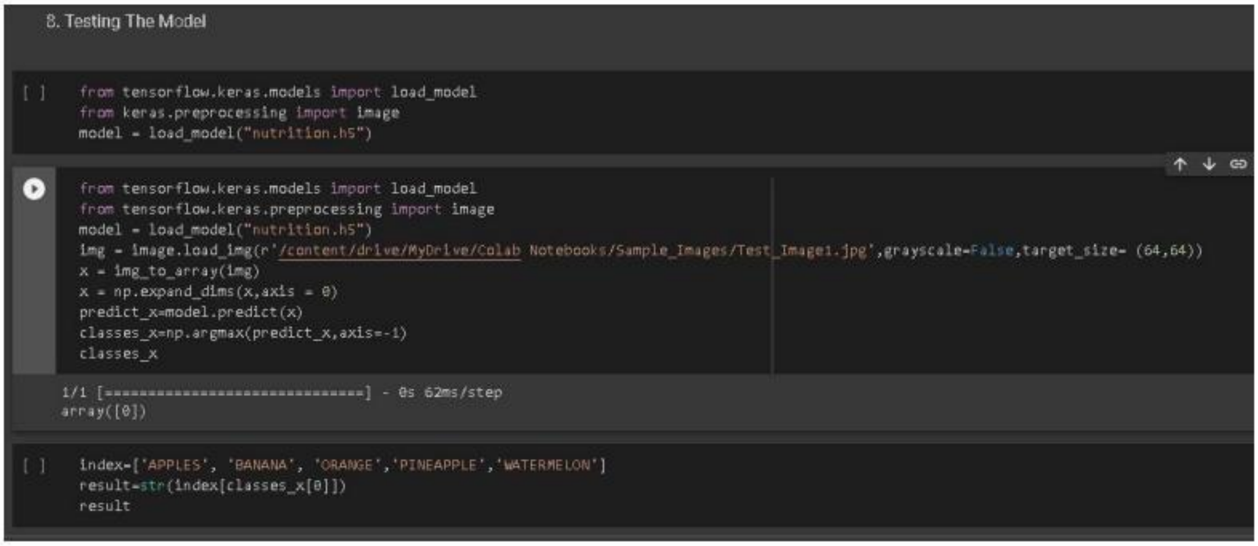
```
[ ]   classifier.compile(optimizer='adam', loss='sparse_categorical_crossentropy', metrics=['accuracy'])
```

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
    494/624 [=================>............] - ETA: 6:52 - loss: 0.7194 - accuracy: 0.7174
```

7. Saving The Model

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



8. Testing The Model

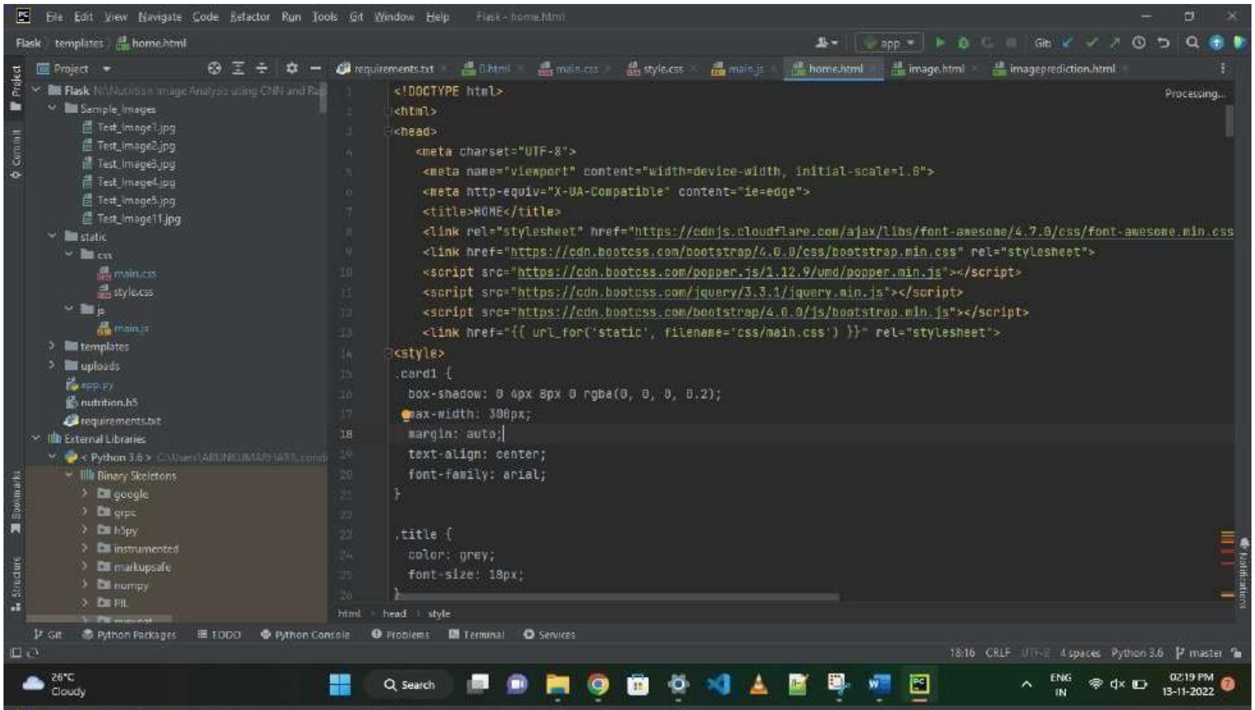
```
from tensorflow.keras.models import load_model
from keras.preprocessing import image
model = load_model("nutrition.h5")
```

```
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
```

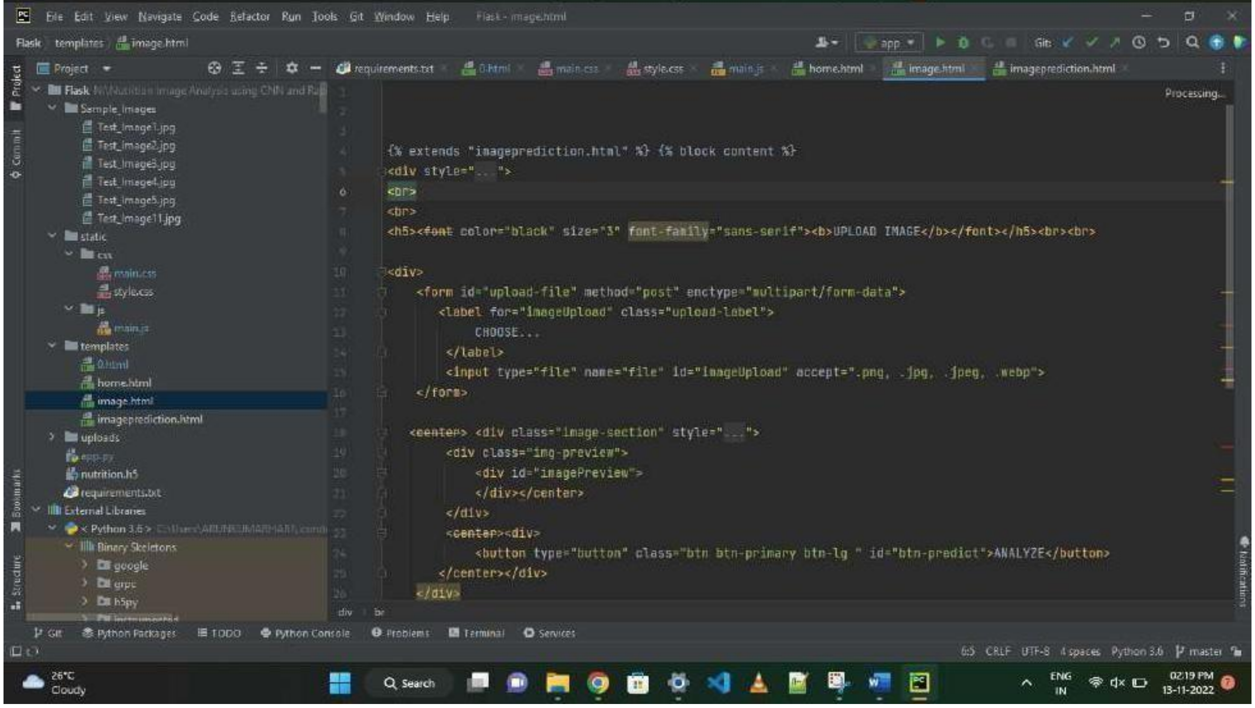
```
1/1 [==============================] - 0s 62ms/step
array([0])
```

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

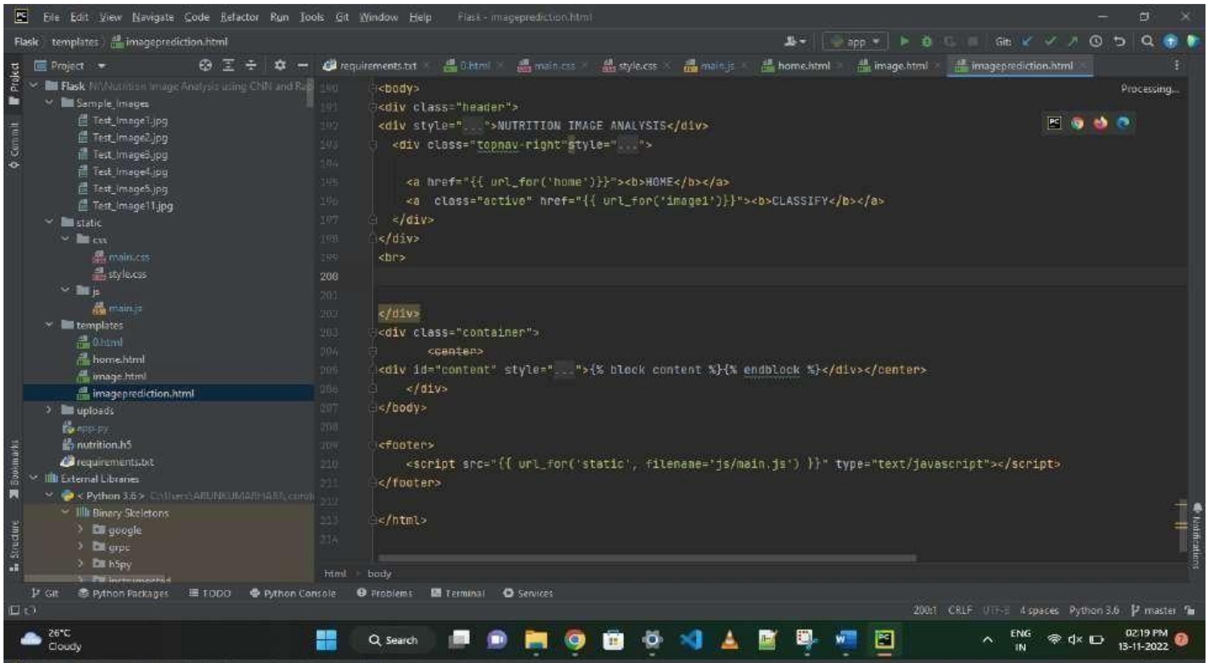
7.2 Feature 2



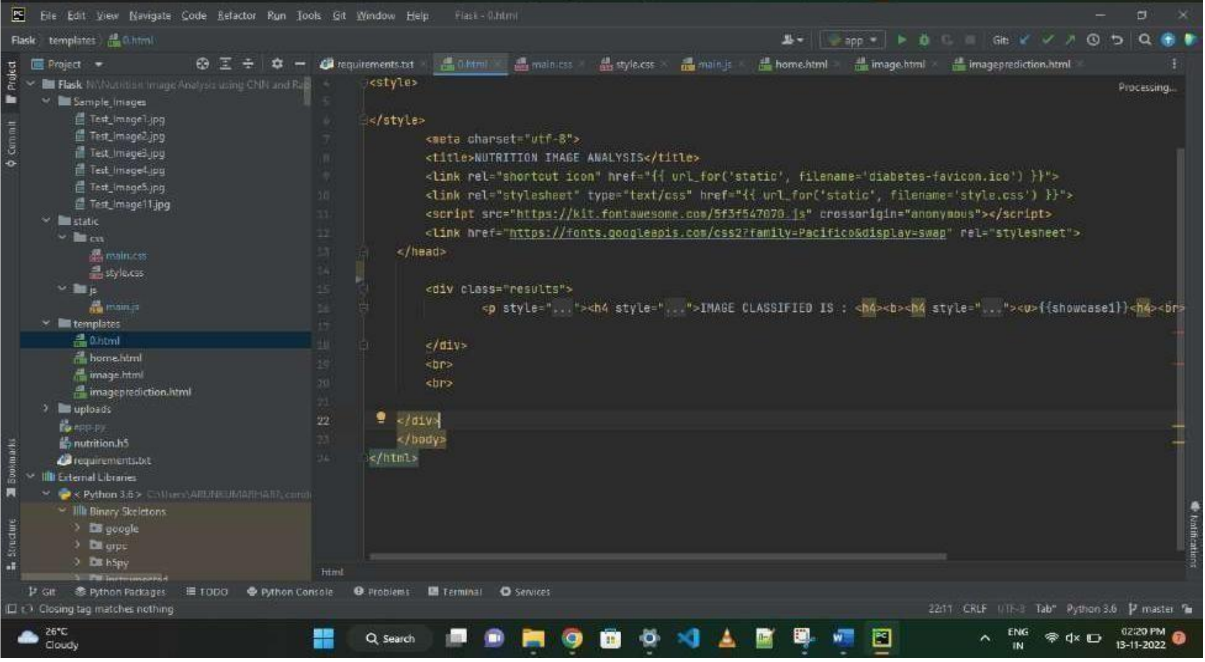
```
<!DOCTYPE html>
<html>
<head>
    <meta charset="UTF-8">
     <meta name="viewport" content="width=device-width, initial-scale=1.0">
     <meta http-equiv="X-UA-Compatible" content="ie=edge">
     <title>HOME</title>
     <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/4.7.0/css/font-awesome.min.css
     <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>
```

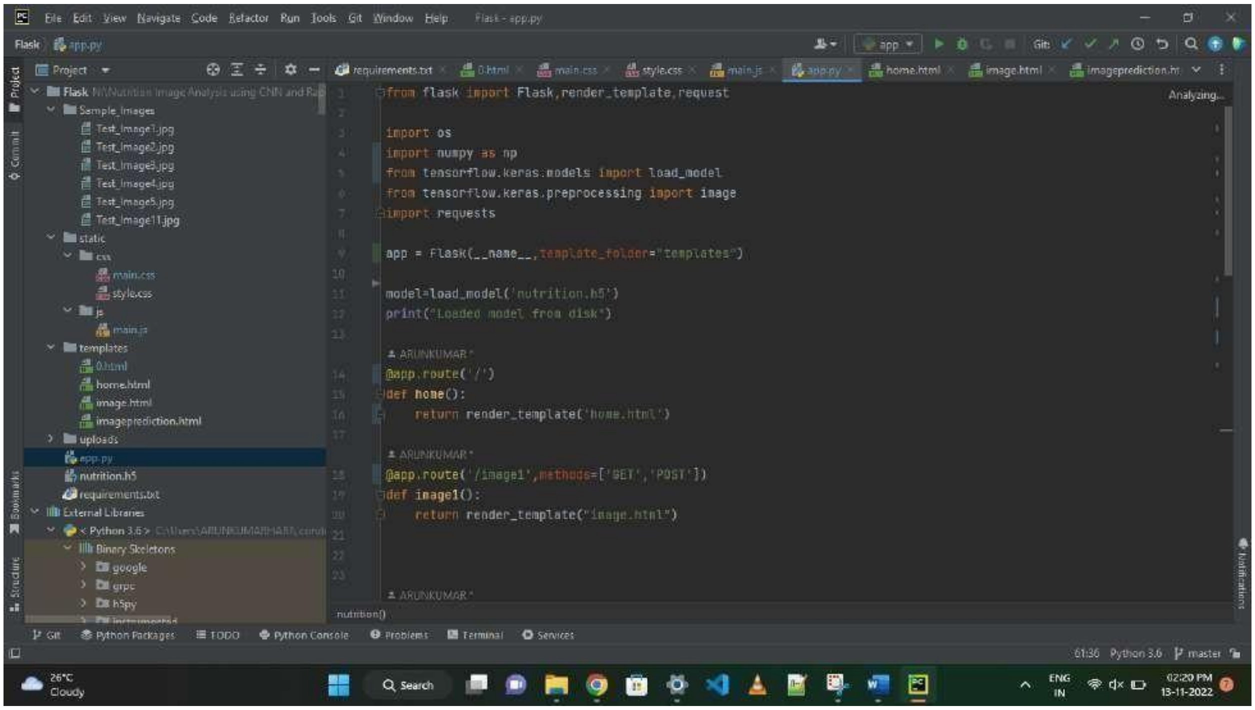


```
<body>
<div class="header">
<div style="...">NUTRITION IMAGE ANALYSIS</div>
  <div class="topnav-right"style="...">

    <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>
```

R ES



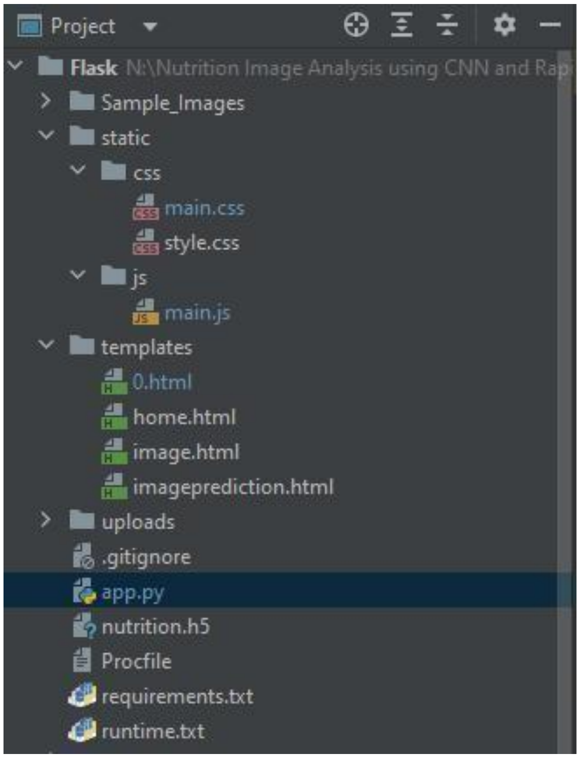
```
Flask N:\Nutrition Image Analysis using CNN and Ra
  Sample_Images
    Test_Image1.jpg
    Test_Image2.jpg
    Test_Image3.jpg
    Test_Image4.jpg
    Test_Image5.jpg
    Test_Image11.jpg
  static
    css
      main.css
      style.css
    js
      main.js
  templates
    0.html
    home.html
    image.html
    imageprediction.html
  uploads
  app.py
  nutrition.h5
  requirements.txt
External Libraries
  < Python 3.6 > C:\Users\ARUNKUMARHAHA\conda
    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 *
```

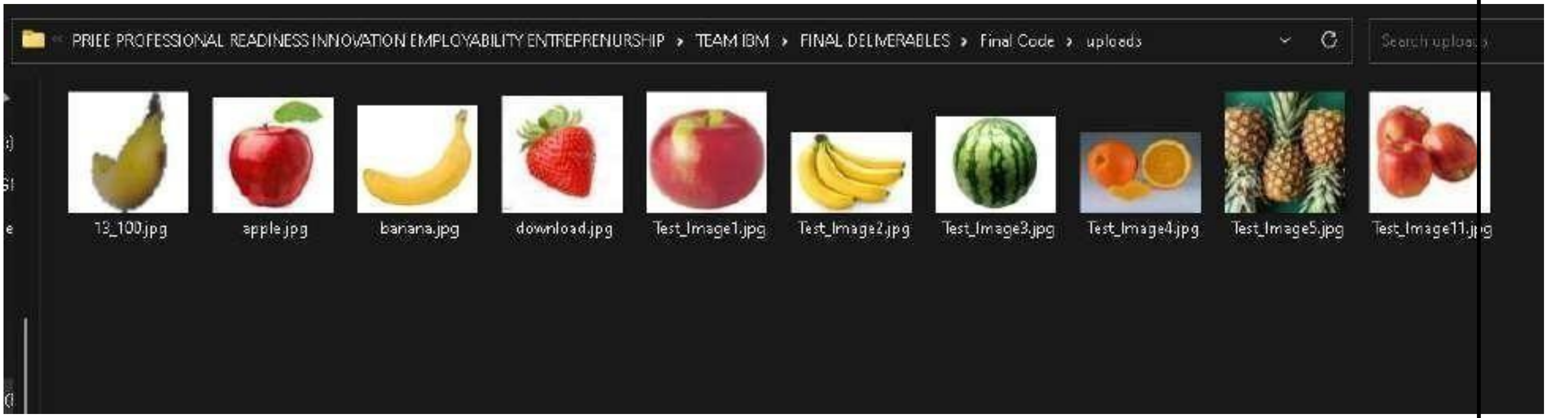
nutrition()

8 TESTING

8.1 TestCases



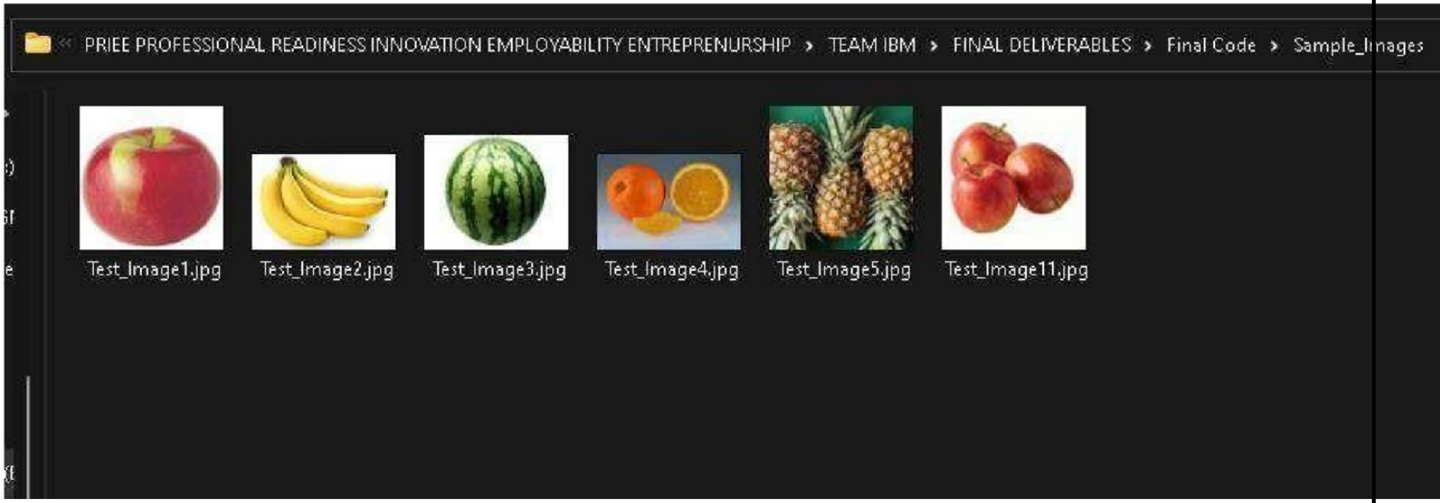
```
Flask N:\Nutrition Image Analysis using CNN and Rap
  Sample_Images
  static
    css
      main.css
      style.css
    js
      main.js
  templates
    0.html
    home.html
    image.html
    imageprediction.html
  uploads
  .gitignore
  app.py
  nutrition.h5
  Procfile
  requirements.txt
  runtime.txt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



PRIEE PROFESSIONAL READINESS INNOVATION EMPLOYABILITY ENTREPRENURSHIP › TEAM IBM › FINAL DELIVERABLES › Final Code › uploads

13_100.jpg apple.jpg banana.jpg download.jpg Test_Image1.jpg Test_Image2.jpg Test_Image3.jpg Test_Image4.jpg Test_Image5.jpg Test_Image11.jpg

8.2 User AcceptanceTesting

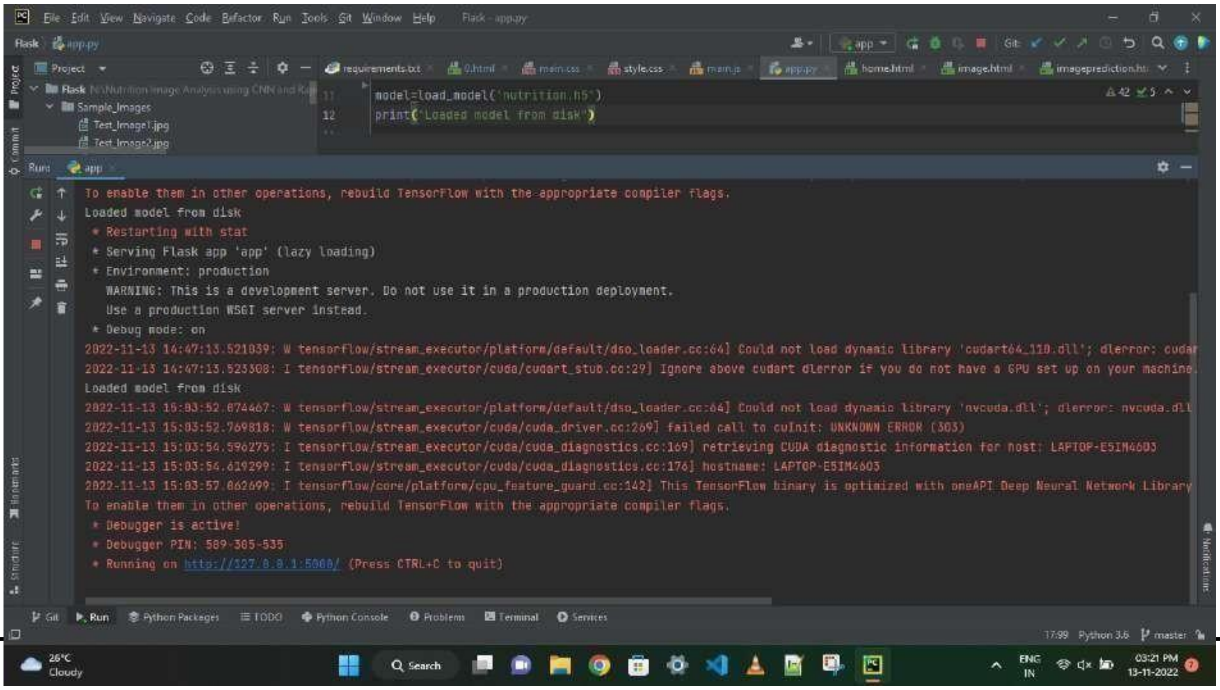


PRIEE PROFESSIONAL READINESS INNOVATION EMPLOYABILITY ENTREPRENURSHIP › TEAM IBM › FINAL DELIVERABLES › Final Code › Sample_Images

Test_Image1.jpg Test_Image2.jpg Test_Image3.jpg Test_Image4.jpg Test_Image5.jpg Test_Image11.jpg

9. RESULTS

9.1 Performance Metrics



File Edit View Navigate Code Refactor Run Tools Git Window Help Flask - app.py
Flask app.py
Project
requirements.txt 0.html main.css style.css main.js app.py home.html image.html imageprediction.html
Flask N:\Nutrition Image Analysis using CNN and Ra
Sample_Images
Test_Image1.jpg
Test_Image2.jpg
Run: app
Git Run Python Packages TODO Python Console Problems Terminal Services
17:99 Python 3.6 master
26°C Cloudy
Search
ENG IN
03:21 PM 13-11-2022

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

```
To enable them in other operations, rebuild TensorFlow with the appropriate compiler flags.
Loaded model from disk
 * Restarting with stat
 * Serving Flask app 'app' (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: on
2022-11-13 14:47:13.521039: W tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could not load dynamic library 'cudart64_110.dll'; dlerror: cudar
2022-11-13 14:47:13.523308: I tensorflow/stream_executor/cuda/cudart_stub.cc:29] Ignore above cudart dlerror if you do not have a GPU set up on your machine.
Loaded model from disk
2022-11-13 15:03:52.074467: W tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could not load dynamic library 'nvcuda.dll'; dlerror: nvcuda.dll
2022-11-13 15:03:52.769818: W tensorflow/stream_executor/cuda/cuda_driver.cc:269] failed call to cuInit: UNKNOWN ERROR (303)
2022-11-13 15:03:54.596275: I tensorflow/stream_executor/cuda/cuda_diagnostics.cc:169] retrieving CUDA diagnostic information for host: LAPTOP-E5IM4603
2022-11-13 15:03:54.619299: I tensorflow/stream_executor/cuda/cuda_diagnostics.cc:176] hostname: LAPTOP-E5IM4603
2022-11-13 15:03:57.862699: I tensorflow/core/platform/cpu_feature_guard.cc:142] This TensorFlow binary is optimized with oneAPI Deep Neural Network Library
To enable them in other operations, rebuild TensorFlow with the appropriate compiler flags.
 * Debugger is active!
 * Debugger PIN: 589-385-535
 * Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
```

10 . ADVANTAGES & DISADVANTAGES

10.1 ADVANTAGES:-

- The proposed model here produces very high accuracy of classification.
- Very large datasets can also be trained and tested.
- Images of very high can be resized within the proposed itself

10.2 DISADVANTAGES:-

- For training and testing, the proposed model requires very high computationaltime.
- The neural network architecture used in this project work has high complexity.

11. CONCLUSION

By the end of this project we will

- knowfundamental 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.

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 .

13. APPENDIX

Source code:

```
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")
@app.route('/predict',methods=['GET',
'POST']) def launch():
    if request.method=='POST':
        f=request.files['file']
        basepath=os.path.dirname('__file__')
        filepath=os.path.join(basepath,"uploads",f.filename)
        f.save(filepath)

        img=image.load_img(filepath,target_size=(64,64))
        x=image.img_to_array(img)
        x=np.expand_dims(x,axis=0)

        pred=np.argmax(model.predict(x), axis=1)
        print("prediction",pred)
        index=['APPLES','BANANA','ORANGE','PINEAPPLE','WATERMELON']

        result=str(index[pred[0]])

        x=result
        print(x)
        result=nutrition(result)
        print(result)

        return render_template("0.html",showcase=(result),showcase1=(x))
```

```
def                  nutrition(index):                  url                  =
            "https://calorieninjas.p.rapidapi.com/v1/nutrition"
    querystring = {"query": "tomato"}

    headers = {
        "X-RapidAPI-Key": "f2179b0ee2msh46dd220682815e1p1e6122jsnaea9bb30dd96", "X-RapidAPI-
        Host": "calorieninjas.p.rapidapi.com"
    } response = requests.request("GET", url, headers=headers,

    params=querystring)

    print(response.text) return
response.json()['items'] if
__name__ == "__main__":


    app.run(debug=True)
```

main.css

```
.img-preview {
  width: 256px;
  height: 256px;
  position: relative; border:
  5px solid #F8F8F8;
  box-shadow: 0px 2px 4px 0px rgba(0, 0, 0, 0.1); margin-
  top: 1em;
  margin-bottom: 1em;
}
.img-preview>div { width: 100%;
  height: 100%; background-
  size: 256px 256px;
  background-repeat: no-repeat;
  background-position: center;
}

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

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

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

.loader { border: 8px solid
   #f3f3f3; border-top: 8px solid
   #3498db; border-radius: 50%;
   width: 50px; height: 50px;
   animation: spin 1s linear infinite;
}

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

style.css

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

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

```
            overflow:hid
            den;
}

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

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

  /* Set a specific height */ min-
  height: 750px;

  /* Create the parallax scrolling effect */
  background-attachment: fixed; background-
  position: center; background-repeat: no-repeat;
  background-size: cover;
}

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

```
}
div.background     {     background:
 url("static/bgg2.jpg");   min-height:
 5px;
background-attachment: fixed; background-
position: center; background-repeat: no-repeat;
 background-size: cover;
}


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

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

#navbar li{
            display:inline;
}

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

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


#showcase h1{ width:
  100%; color:#333; font-
  size:40px; text-align:
  center; line-height:
  1em;
            padding-top:10px;
}
#showcase h2{ width:
  100%; color:#333; font-
  size:30px; text-align:
  center; line-height:
  1.6em;
            padding-top:10px;
}

#main{
```

```
            float:left;
            color:#fff;
            width:65%;
            padding:0 30px;
            box-sizing: border-box;
}

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


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

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

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

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

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

```
.myButton { border: none;
 text-align: center; cursor:
 pointer; text-transform:
 uppercase; outline: none;
 overflow: hidden; position:
 relative; color: #fff; font-
 weight: 700; font-size:
 12px; background-color:
 #ff0000; padding: 10px
 15px; margin: 0 auto;
 box-shadow: 0 5px 15px rgba(0,0,0,0.20);
}

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

.myButton:after { content: "";
 position: absolute; left: 0; top: 0;
 height: 310%; width: 150%;
 background: #f2f2f2; -webkit-
 transition: all .5s ease-in-out;
 transition: all .5s ease-in-out;
 -webkit-transform: translateX(-98%) translateY(-25%) rotate(45deg);
 transform: translateX(-98%) translateY(-25%) rotate(45deg);
}

.myButton:hover:after {
 -webkit-transform: translateX(-9%) translateY(-25%) rotate(45deg);
 transform: translateX(-9%) translateY(-25%) rotate(45deg);
}

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

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

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

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

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

main.js

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

  $('.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);
  });


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


    $(this).hide();
    $('.loader').show();
    $.ajax({ type: 'POST', url:
       '/predict', data:
       form_data, contentType:
       false, cache: false,
       processData: false,
       async: true, success:
       function (data) {

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

});
```

Project Demo Link:

https://drive.google.com/file/d/1BdI5jj3TjPlQ_hSUJnlWvabeSZrefXkh/view?usp=share_link