AI powered Nutrition Analyzer For Fitness Enthusiasts

TEAM ID:PNT2022TMID50689

1. Introduction:

1.1Overview:

- Food is fundamental for human existence and has been the worry of numerous medical services shows. These days new dietary evaluation and sustenance investigation devices empower more chances to assist individuals with understanding their everyday dietary patterns, investigating nourishment designs and keep a solid eating regimen. Healthful examination is the most common way of deciding the wholesome substance of food. A crucial piece of insightful science gives data about the compound organization, handling, quality control and tainting of food.

1.2.purpose

- The fundamental point of the venture is to building a model which is utilized for ordering the natural product relies upon the various qualities like tone, shape, surface and so on. Here the client can catch the pictures of various foods grown from the ground the picture will be sent the prepared model. The model examinations the picture and identify the sustenance in view of the natural products like (Sugar, Fiber, Protein, Calories, and so on).

2. LiteratureSurvey :

2.1 ExistingProblem:

- These days new dietary evaluation and nourishment investigation devices empower more chances to assist individuals with understanding their everyday dietary patterns, investigating sustenance designs and keep a solid eating routine. Food is fundamental for human existence and has been the worry of numerous medical care shows.

2.2 ProposedSolution:

- Dietary investigation is the most common way of deciding the nourishing substance of food. An imperative piece of insightful science gives data about the substance organization, handling, quality control and defilement of food. Here the client can catch the pictures of various foods grown from the ground the picture will be sent the prepared model. The model investigations the picture and distinguish the nourishment in view of the natural products like (Sugar, Fiber, Protein, Calories)

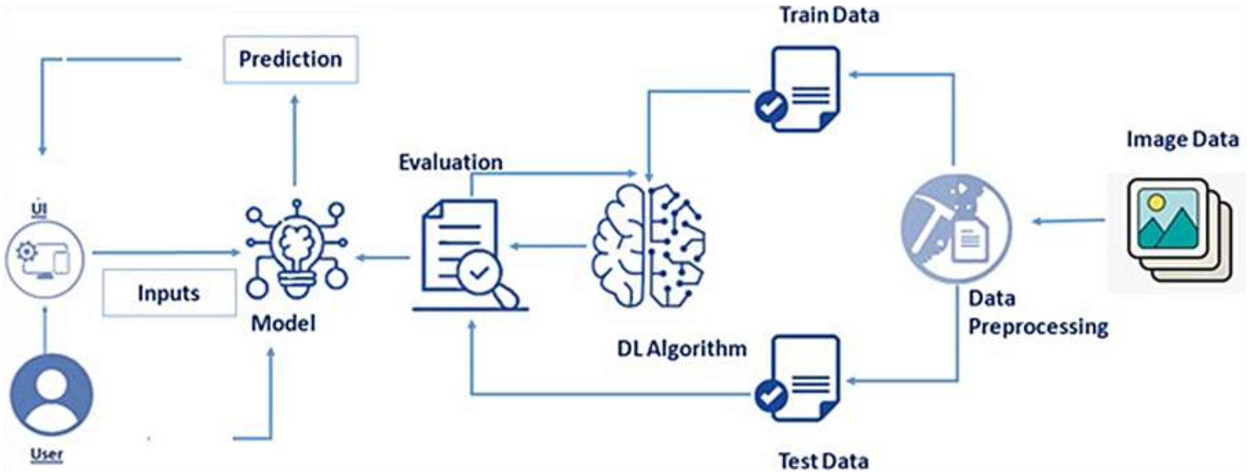
3.2 SoftwareDesign:

Software requirements

- AnacondaNavigator
- Tensorflow
- Keras
- Flask

3. TheoriticalAnalysis:

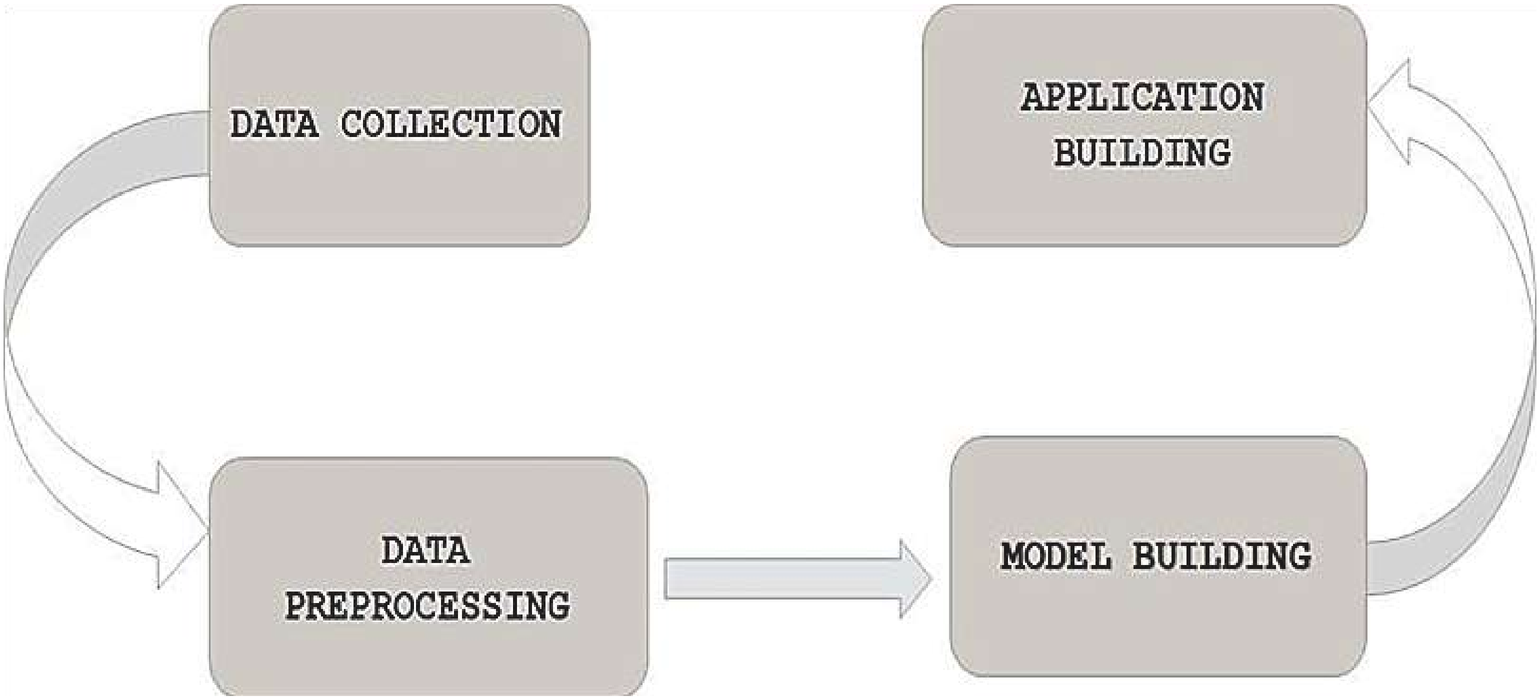
3.1 Block Diagram:



4. EXPERIMENTAL INVESTIGATIONS:

Concentrate on shows that it give different test pictures of food pictures, the model distinguishes, nourishment expectation of transferred picture. At the point when we pick a picture and snap in to the transfer it then it will shows the anticipated result.

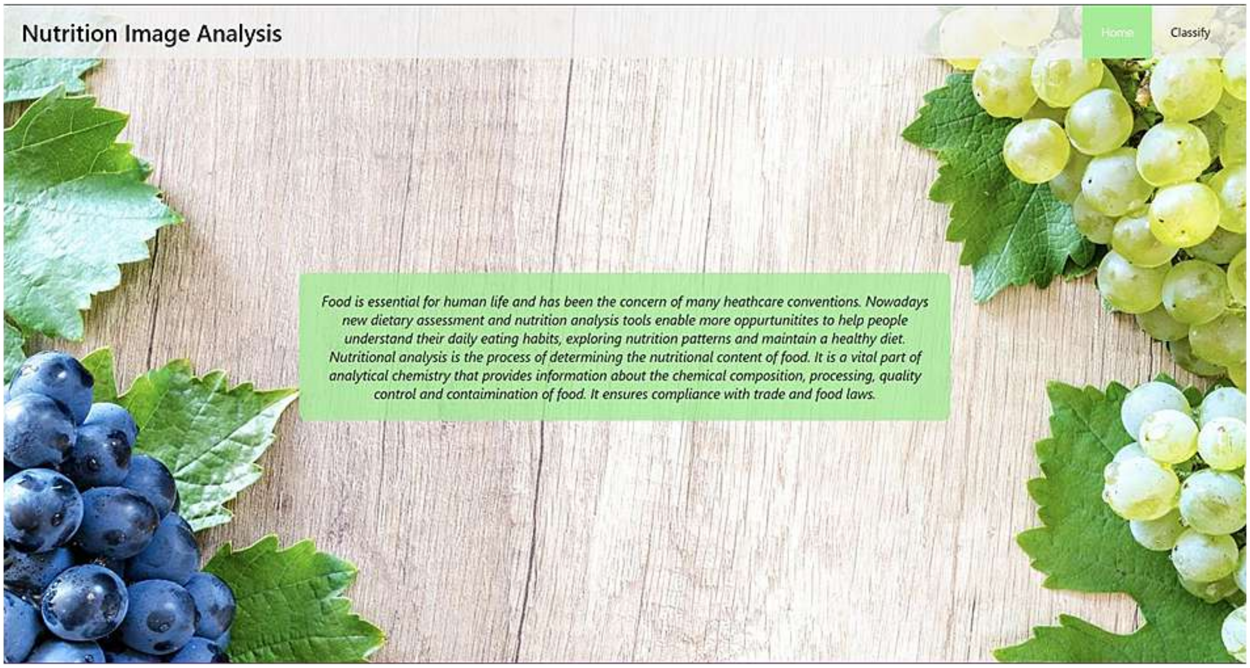
5. FLOWCHART:



6.RESULT:

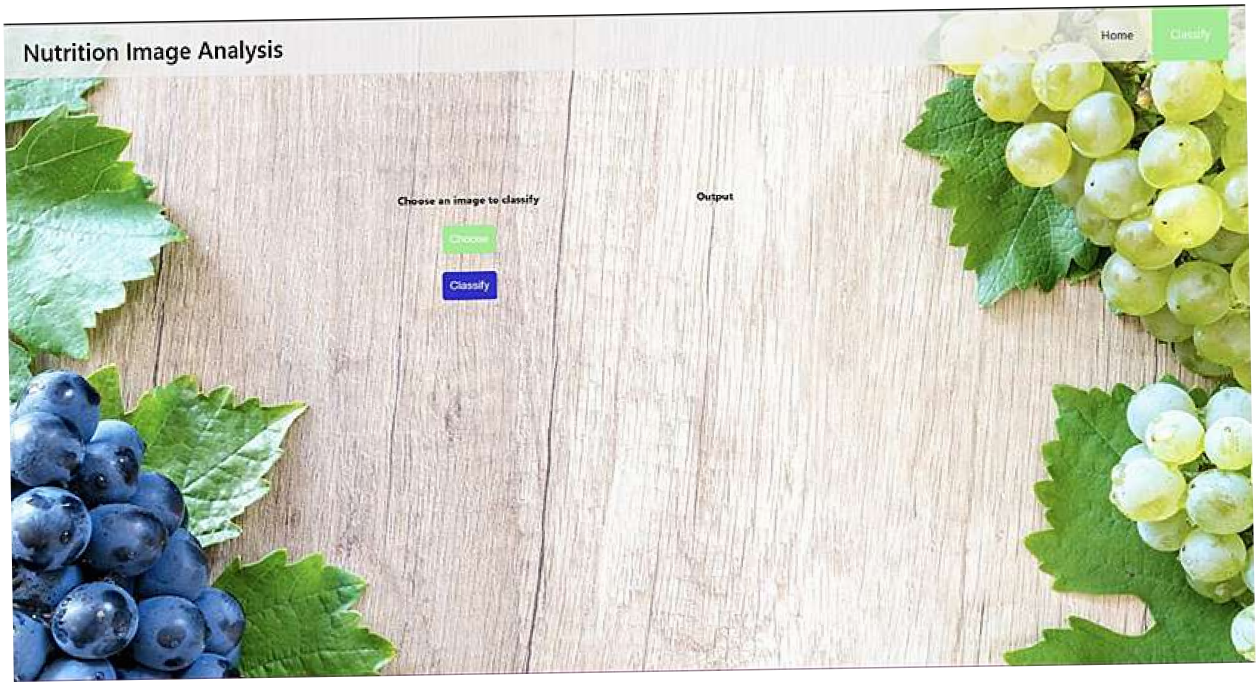
- **Final findings (Output) of the project along with screen-shots.**

HomePage:

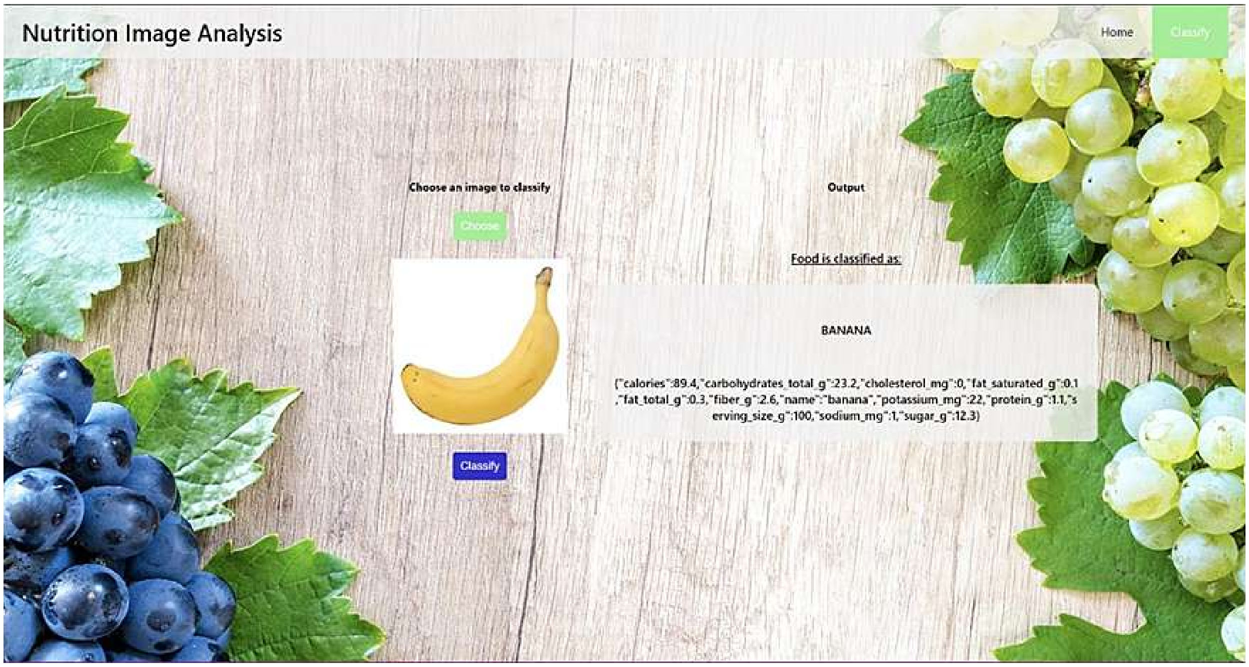


Food is essential for human life and has been the concern of many heathcare conventions. Nowadays new dietary assessment and nutrition analysis tools enable more oppurtunitites to help people understand their daily eating habits, exploring nutrition patterns and maintain a healthy diet. Nutritional analysis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

Classify Page:



Results Page:



Nutrition Image Analysis

Choose an image to 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}
```

7. ADVANTAGES & DISADVANTAGES:

Advantages:

- Monitors the calorie admission into the body.
- Assists in keeping up with the body with massing file.

Disadvantages:

- Dataminingtechniquesdoesnothelptoprovideeffectivedecisionmaking.
- Most of the research conducted by taking the one-side view of fruits. In addition, byconsideringtheone-sideimageof fruit,itis challengingto evaluatethequality fruits.

8.APPLICATIONS:

• Profound Learning innovation is viewed as one of the key innovation utilized in recognition.

• It presents the outcomes got by handling input from transferring picture.

9.Conclusion:

- **In this undertaking, we have laid out the application to foresee from transferred picture in view of the IBM cloudapplication.**

10.FutureScope:

- **The venture can be additionally improved by sending the profound learning model got utilizing a web application and bigger dataset cloud be utilized for expectation to give higher precision and produceimprovedoutcome.**

BIBILOGRAPHY:

1. **https://github.com/garodisk/Fruits-classification-120-different-fruits-**

2. **https://www.electronicsforu.com/electronics-projects/electronics-design-guides/fruit-classification-quality-detection-using-deep-convolutional-neural-network**

3. https://medium.com/ai-techsystems/fruits-classification-using-deep-learning-f8261b0ee0ca

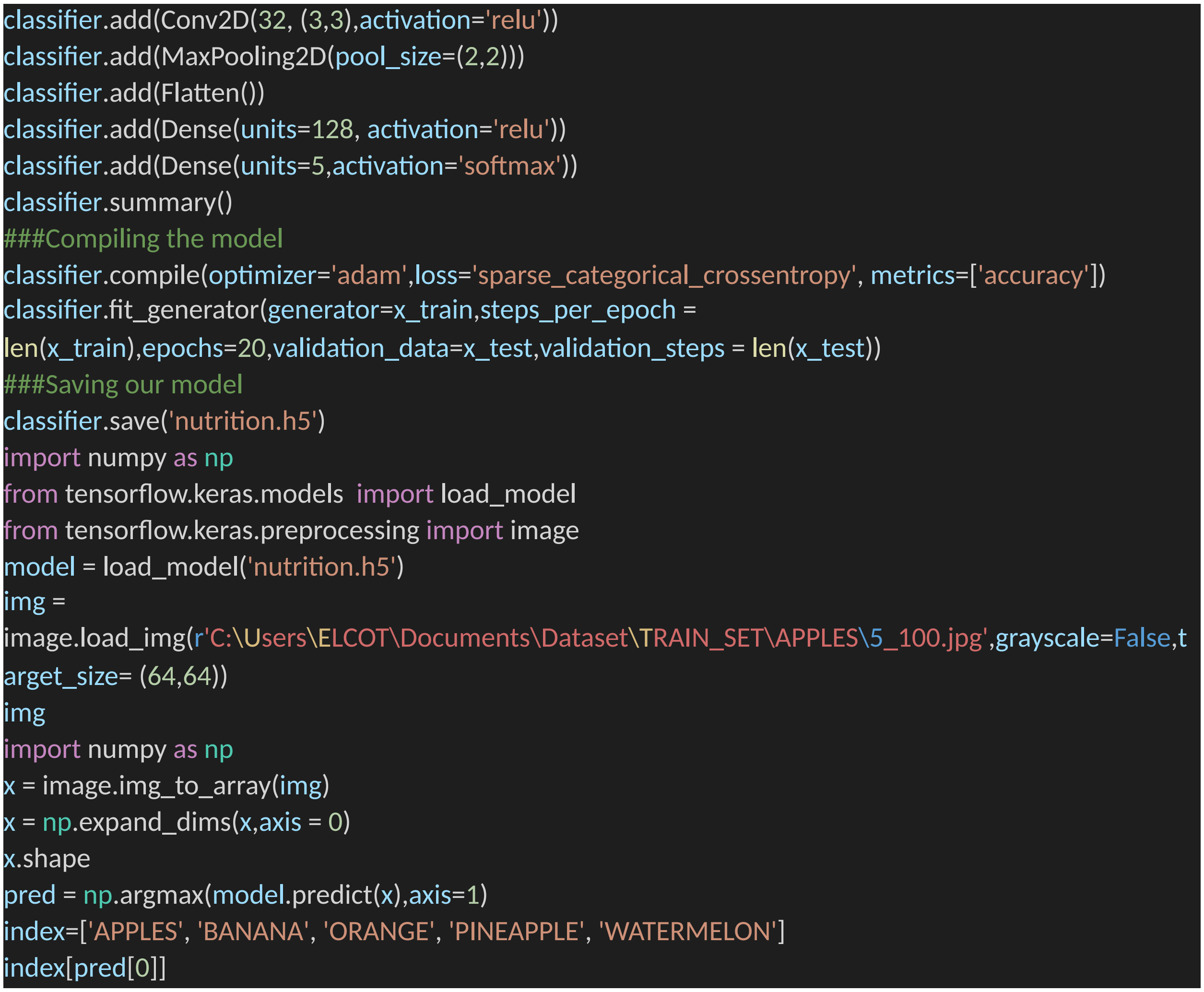
4. Khatun, Mehenag& Nine, Julker& Ali, Md. Forhad&Sarker, Pritom&Turzo, Nakib.(2020).Fruits Classification using ConvolutionalNeural Network.5. 1-6.

APPENDIX:

- In this section wepresent the source code and project structure used in this project.

DATA COLLECTION, IMAGE PREPROCESSING AND MODELBUILDING

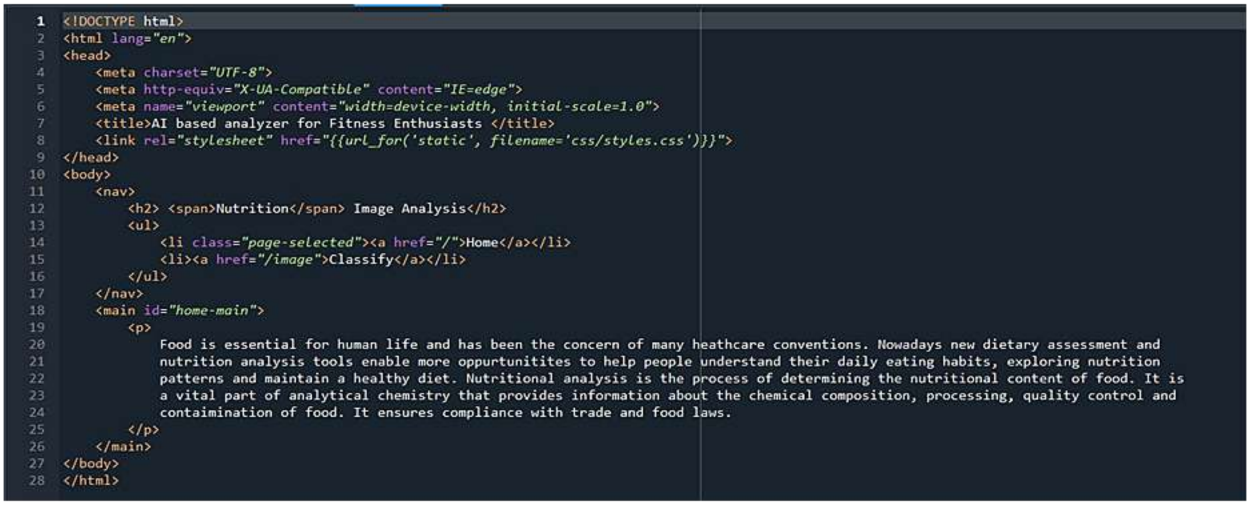
```
from keras.preprocessing.image import ImageDataGenerator
train_datagen =
ImageDataGenerator(rescale=1./255,shear_range=0.2,zoom_range=0.2,horizontal_flip=True)
test_datagen = ImageDataGenerator(rescale=1./255)
#performing data augmentation to train the data
x_train=train_datagen.flow_from_directory(r'C:\Users\ELCOT\Documents\Dataset\TRAIN_SET',target_size=(64,64),batch_size=5,color_mode='rgb',class_mode='sparse')
#performing data augmentation to test the data
x_test=test_datagen.flow_from_directory(r'C:\Users\ELCOT\Documents\Dataset\TEST_SET',target_size=(64,64),batch_size=5,color_mode='rgb',class_mode='sparse')
print(x_train.class_indices)#checking  the no. of classes
from collections import Counter as c
c(x_train.labels)
###Importing Necessary Libraries
import numpy as np
import tensorflow
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
from keras.preprocessing.image import ImageDataGenerator
model=Sequential()
###Creating the model
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())
classifier.add(Dense(units=128, activation='relu'))
classifier.add(Dense(units=5,activation='softmax'))
classifier.summary()
###Compiling the model
classifier.compile(optimizer='adam',loss='sparse_categorical_crossentropy', metrics=['accuracy'])
classifier.fit_generator(generator=x_train,steps_per_epoch = len(x_train),epochs=20,validation_data=x_test,validation_steps = len(x_test))
###Saving our model
classifier.save('nutrition.h5')
import numpy as np
from tensorflow.keras.models  import load_model
from tensorflow.keras.preprocessing import image
model = load_model('nutrition.h5')
img = image.load_img(r'C:\Users\ELCOT\Documents\Dataset\TRAIN_SET\APPLES\5_100.jpg',grayscale=False,target_size= (64,64))
img
import numpy as np
x = image.img_to_array(img)
x = np.expand_dims(x,axis = 0)
x.shape
pred = np.argmax(model.predict(x),axis=1)
index=['APPLES', 'BANANA', 'ORANGE', 'PINEAPPLE', 'WATERMELON']
index[pred[0]]
```

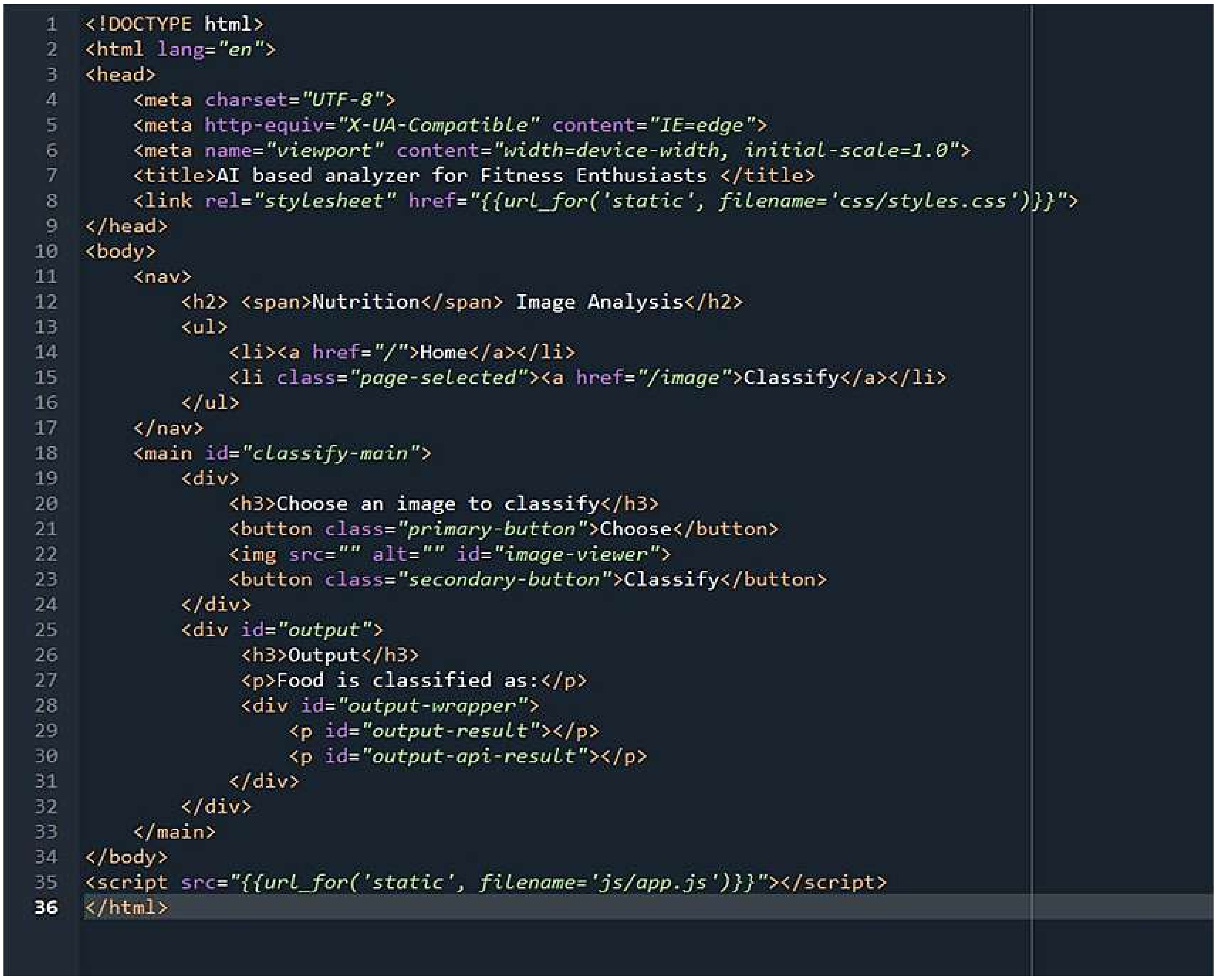
APPLICATIONBUILDING:

Home Html:



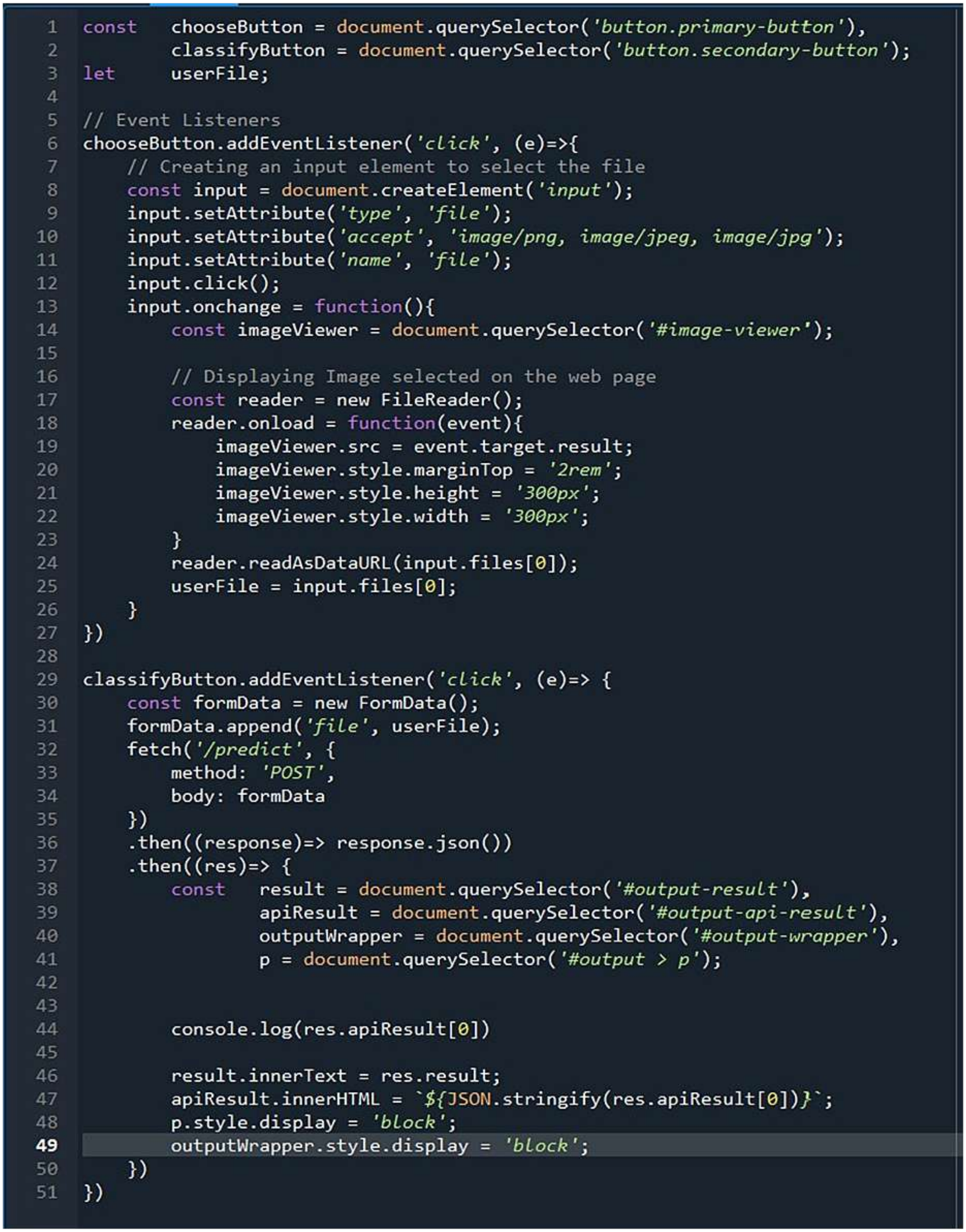
```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>AI based analyzer for Fitness Enthusiasts </title>
    <link rel="stylesheet" href="{{url_for('static', filename='css/styles.css')}}">
</head>
<body>
    <nav>
        <h2> <span>Nutrition</span> Image Analysis</h2>
        <ul>
            <li class="page-selected"><a href="/">Home</a></li>
            <li><a href="/image">Classify</a></li>
        </ul>
    </nav>
    <main id="home-main">
        <p>
            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.
        </p>
    </main>
</body>
</html>
```

image.html



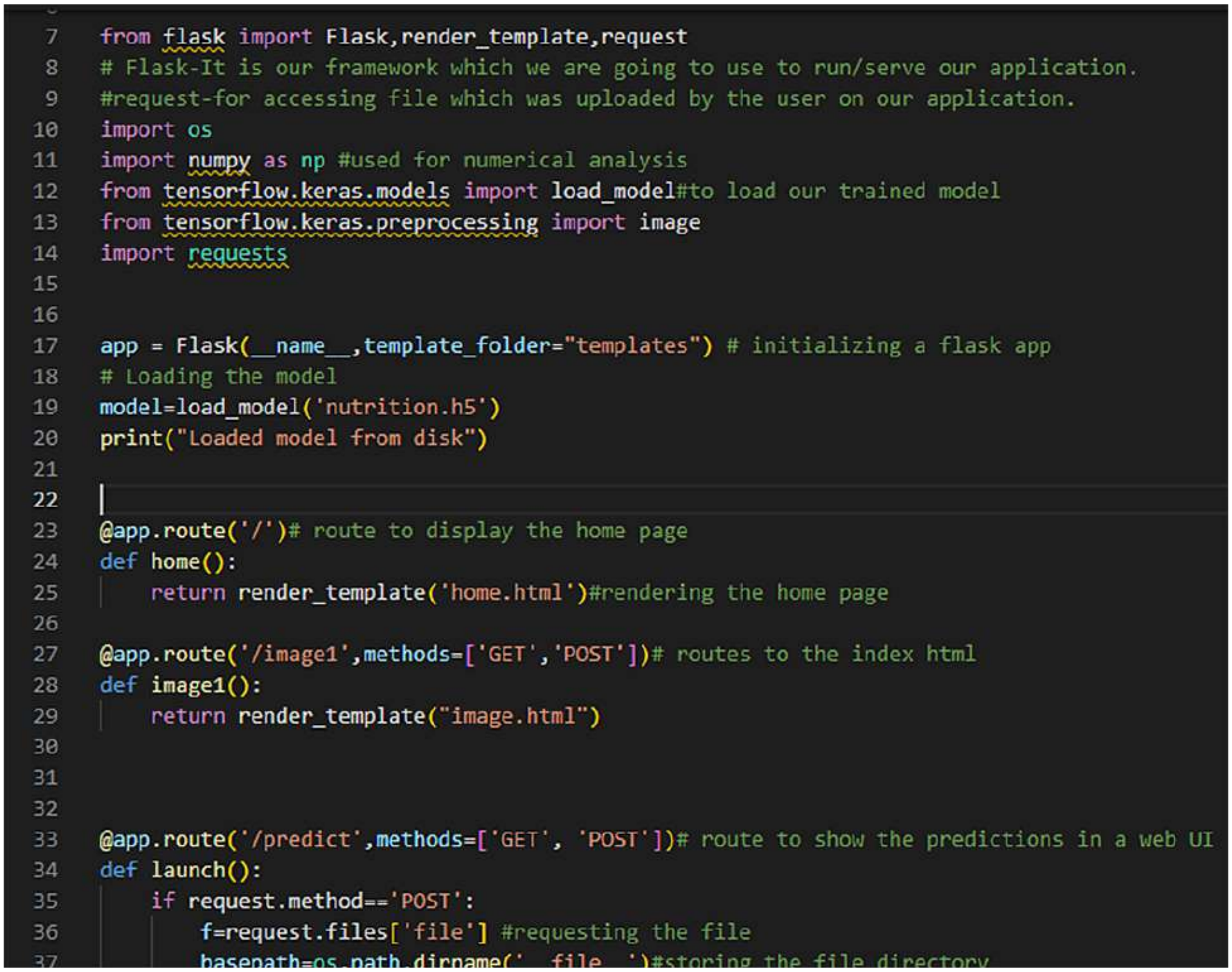
```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>AI based analyzer for Fitness Enthusiasts </title>
    <link rel="stylesheet" href="{{url_for('static', filename='css/styles.css')}}">
</head>
<body>
    <nav>
        <h2> <span>Nutrition</span> Image Analysis</h2>
        <ul>
            <li><a href="/">Home</a></li>
            <li class="page-selected"><a href="/image">Classify</a></li>
        </ul>
    </nav>
    <main id="classify-main">
        <div>
            <h3>Choose an image to classify</h3>
            <button class="primary-button">Choose</button>
            <img src="" alt="" id="image-viewer">
            <button class="secondary-button">Classify</button>
        </div>
        <div id="output">
             <h3>Output</h3>
             <p>Food is classified as:</p>
             <div id="output-wrapper">
                 <p id="output-result"></p>
                 <p id="output-api-result"></p>
            </div>
        </div>
    </main>
</body>
<script src="{{url_for('static', filename='js/app.js')}}"></script>
</html>
```

styles.css

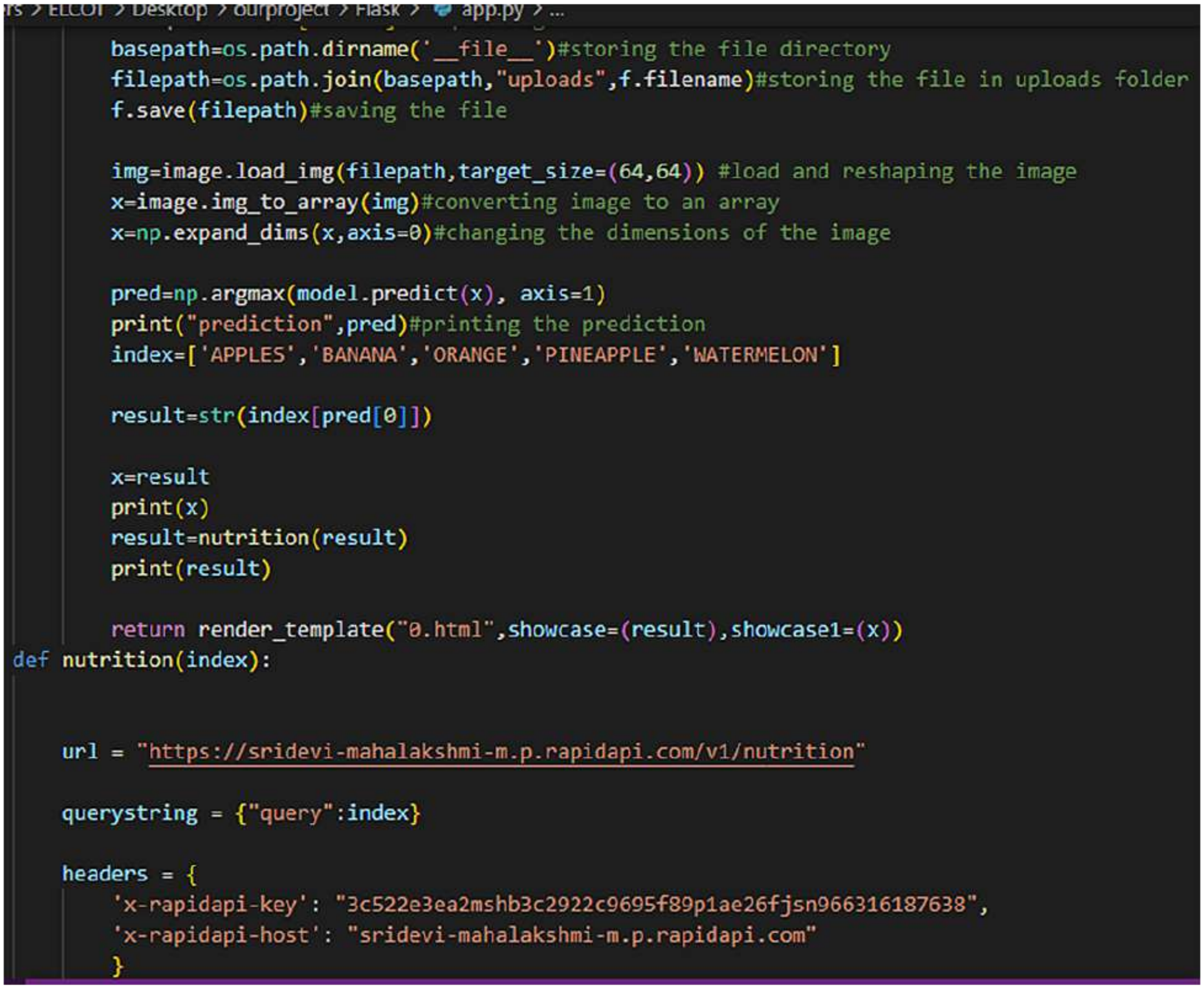


```javascript
const   chooseButton = document.querySelector('button.primary-button'),
        classifyButton = document.querySelector('button.secondary-button');
let     userFile;

// Event Listeners
chooseButton.addEventListener('click', (e)=>{
    // Creating an input element to select the file
    const input = document.createElement('input');
    input.setAttribute('type', 'file');
    input.setAttribute('accept', 'image/png, image/jpeg, image/jpg');
    input.setAttribute('name', 'file');
    input.click();
    input.onchange = function(){
        const imageViewer = document.querySelector('#image-viewer');

        // Displaying Image selected on the web page
        const reader = new FileReader();
        reader.onload = function(event){
            imageViewer.src = event.target.result;
            imageViewer.style.marginTop = '2rem';
            imageViewer.style.height = '300px';
            imageViewer.style.width = '300px';
        }
        reader.readAsDataURL(input.files[0]);
        userFile = input.files[0];
    }
})

classifyButton.addEventListener('click', (e)=> {
    const formData = new FormData();
    formData.append('file', userFile);
    fetch('/predict', {
        method: 'POST',
        body: formData
    })
    .then((response)=> response.json())
    .then((res)=> {
        const   result = document.querySelector('#output-result'),
                apiResult = document.querySelector('#output-api-result'),
                outputWrapper = document.querySelector('#output-wrapper'),
                p = document.querySelector('#output > p');


        console.log(res.apiResult[0])

        result.innerText = res.result;
        apiResult.innerHTML = `${JSON.stringify(res.apiResult[0])}`;
        p.style.display = 'block';
        outputWrapper.style.display = 'block';
    })
})
```

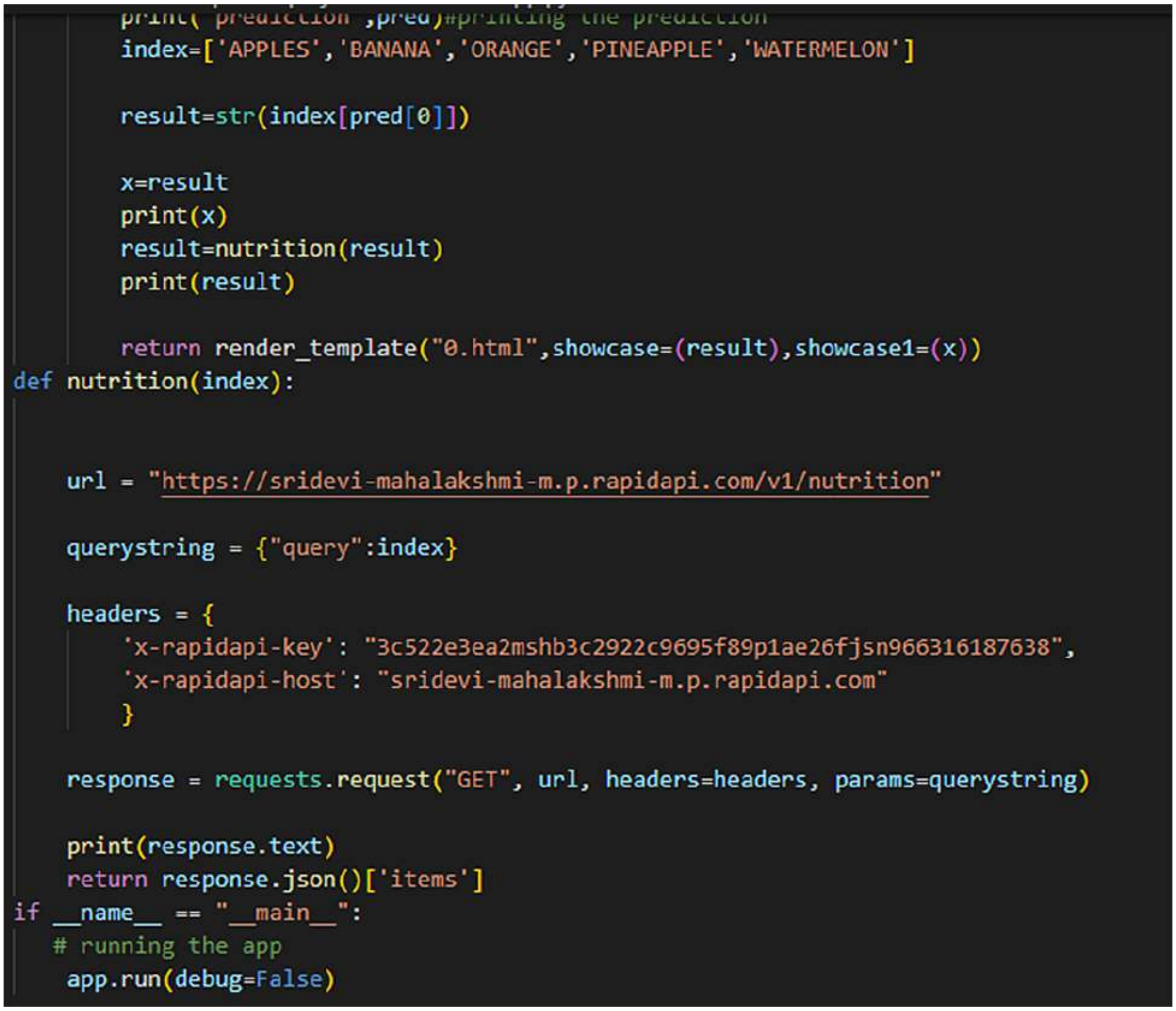
app.py



```python
from flask import Flask,render_template,request
# Flask-It is our framework which we are going to use to run/serve our application.
#request-for accessing file which was uploaded by the user on our application.
import os
import numpy as np #used for numerical analysis
from tensorflow.keras.models import load_model#to load our trained model
from tensorflow.keras.preprocessing import image
import requests


app = Flask(__name__,template_folder="templates") # initializing a flask app
# Loading the model
model=load_model('nutrition.h5')
print("Loaded model from disk")


@app.route('/')# route to display the home page
def home():
    return render_template('home.html')#rendering the home page

@app.route('/image1',methods=['GET','POST'])# routes to the index html
def image1():
    return render_template("image.html")



@app.route('/predict',methods=['GET', 'POST'])# route to show the predictions in a web UI
def launch():
    if request.method=='POST':
        f=request.files['file'] #requesting the file
        basepath=os.path.dirname('__file__')#storing the file directory
```

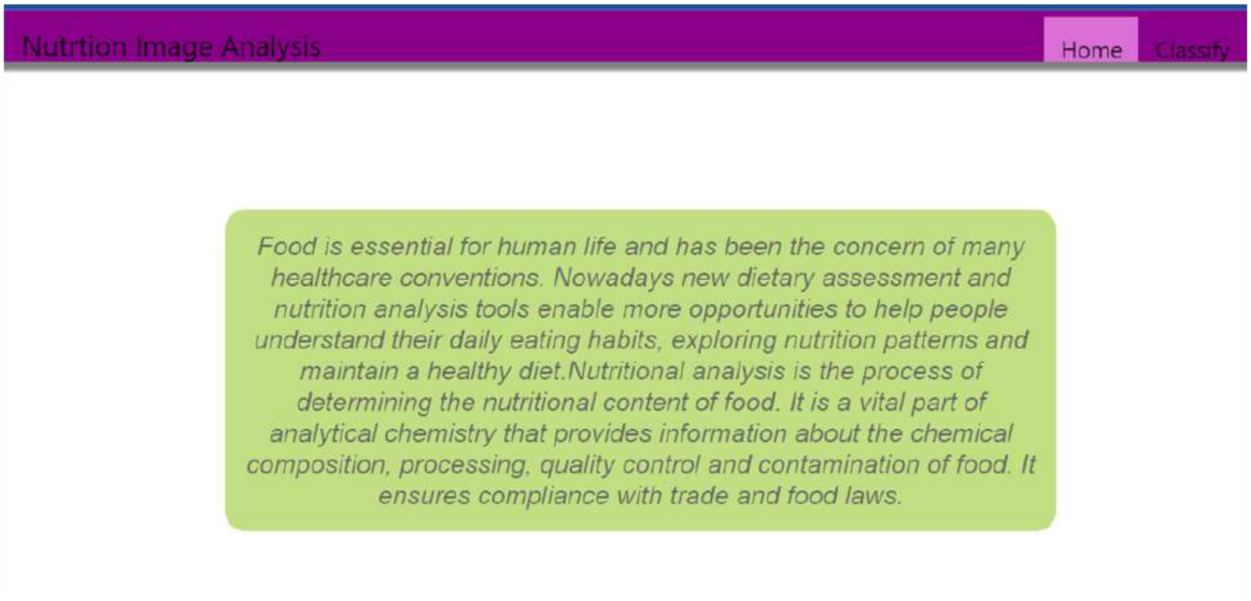


```
        basepath=os.path.dirname('__file__')#storing the file directory
        filepath=os.path.join(basepath,"uploads",f.filename)#storing the file in uploads folder
        f.save(filepath)#saving the file

        img=image.load_img(filepath,target_size=(64,64)) #load and reshaping the image
        x=image.img_to_array(img)#converting image to an array
        x=np.expand_dims(x,axis=0)#changing the dimensions of the image

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

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

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

        return render_template("0.html",showcase=(result),showcase1=(x))
def nutrition(index):


    url = "https://sridevi-mahalakshmi-m.p.rapidapi.com/v1/nutrition"

    querystring = {"query":index}

    headers = {
        'x-rapidapi-key': "3c522e3ea2mshb3c2922c9695f89p1ae26fjsn966316187638",
        'x-rapidapi-host': "sridevi-mahalakshmi-m.p.rapidapi.com"
        }
```

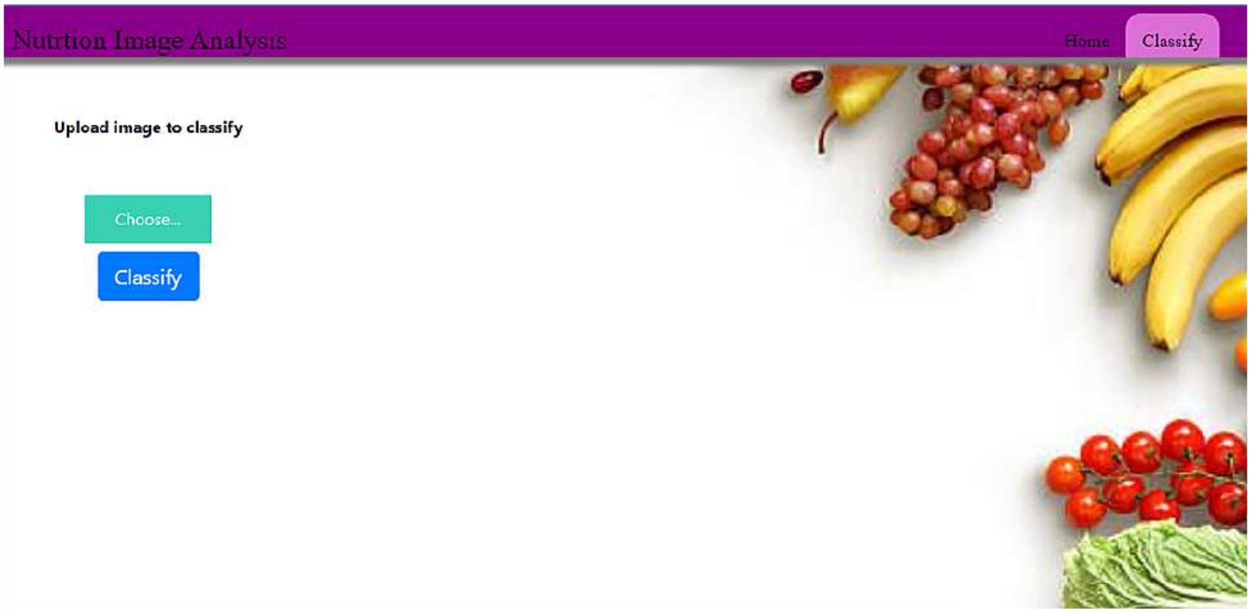


```
        print("prediction",pred)#printing the prediction
        index=['APPLES','BANANA','ORANGE','PINEAPPLE','WATERMELON']

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

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

        return render_template("0.html",showcase=(result),showcase1=(x))
def nutrition(index):


    url = "https://sridevi-mahalakshmi-m.p.rapidapi.com/v1/nutrition"

    querystring = {"query":index}

    headers = {
        'x-rapidapi-key': "3c522e3ea2mshb3c2922c9695f89p1ae26fjsn966316187638",
        'x-rapidapi-host': "sridevi-mahalakshmi-m.p.rapidapi.com"
        }

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

    print(response.text)
    return response.json()['items']
if __name__ == "__main__":
   # running the app
    app.run(debug=False)
```

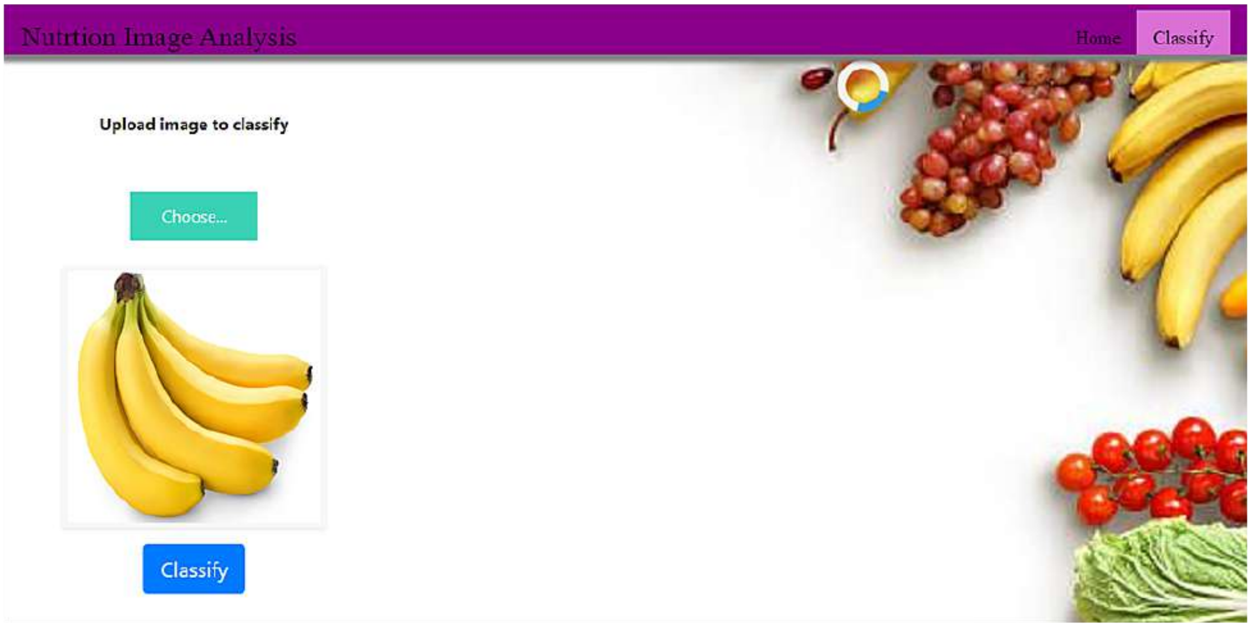
OUTPUT:

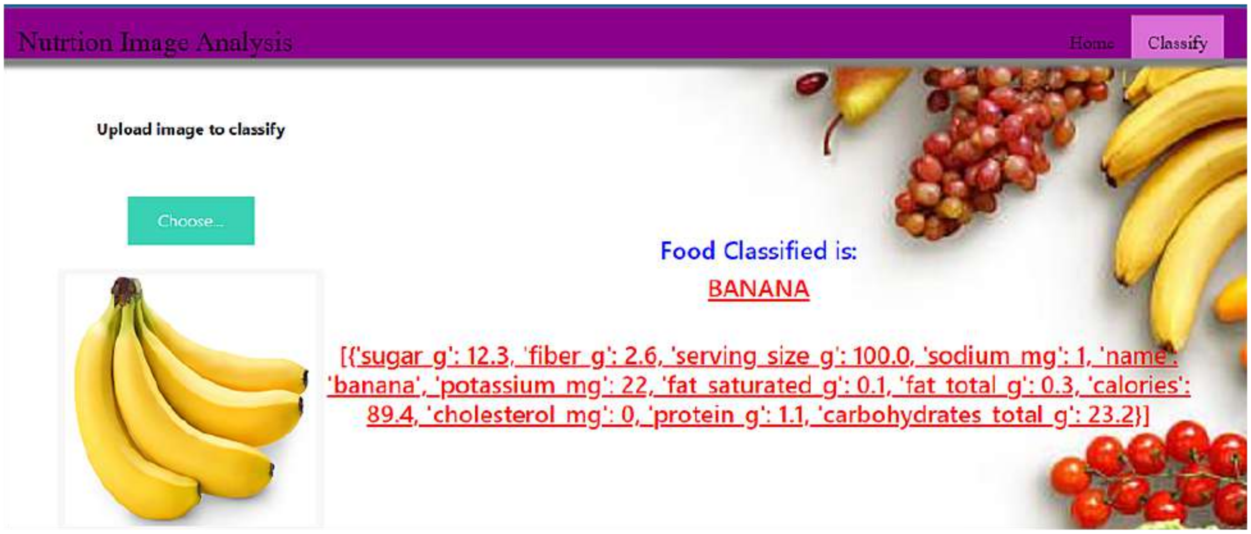


Food is essential for human life and has been the concern of many healthcare conventions. Nowadays new dietary assessment and nutrition analysis tools enable more opportunities to help people understand their daily eating habits, exploring nutrition patterns and maintain a healthy diet.Nutritional analysis is the process of determining the nutritional content of food. It is a vital part of analytical chemistry that provides information about the chemical composition, processing, quality control and contamination of food. It ensures compliance with trade and food laws.



Upload image to classify





```
Food Classified is:
BANANA

[{'sugar_g': 12.3, 'fiber_g': 2.6, 'serving_size_g': 100.0, 'sodium_mg': 1, 'name':
'banana', 'potassium_mg': 22, 'fat_saturated_g': 0.1, 'fat_total_g': 0.3, 'calories':
89.4, 'cholesterol_mg': 0, 'protein_g': 1.1, 'carbohydrates_total_g': 23.2}]
```