

AI powered nutrition analyzer for fitness Enthusiasts

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

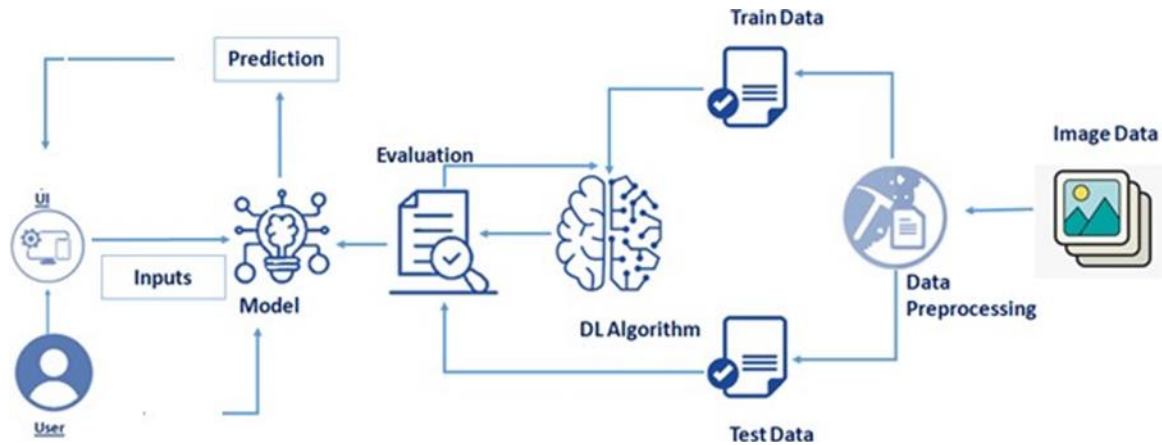
These days new dietary evaluation and nourishment investigation devices empower more chances to assist individuals with understanding their everyday dietary patterns, investigating sustenance designs and keep a solid eating routine. Food is fundamental for human existence and has been the worry of numerous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

3.TheoriticalAnalysis

3.1 Block Diagram



3.2 SoftwareDesign

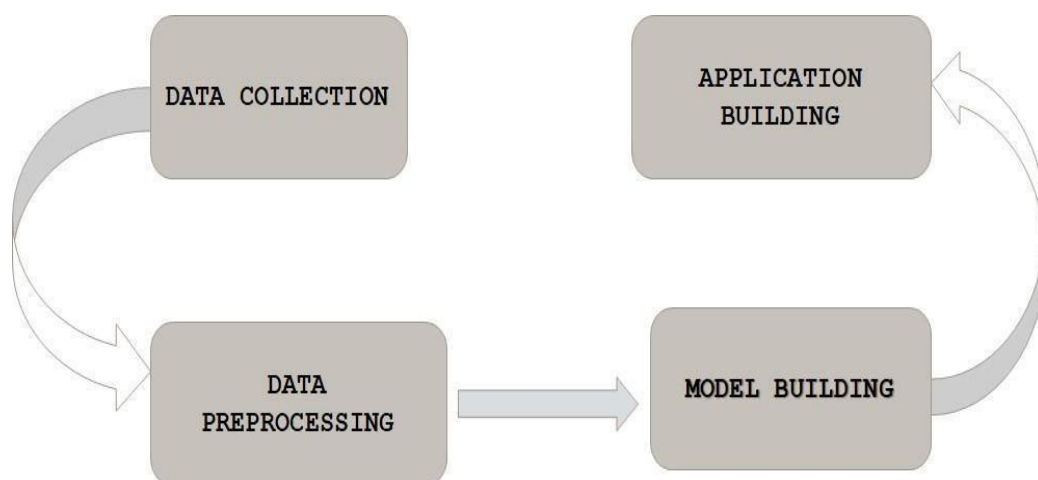
Software requirements

- AnacondaNavigator
- Tensorflow
- Keras
- Flask

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.

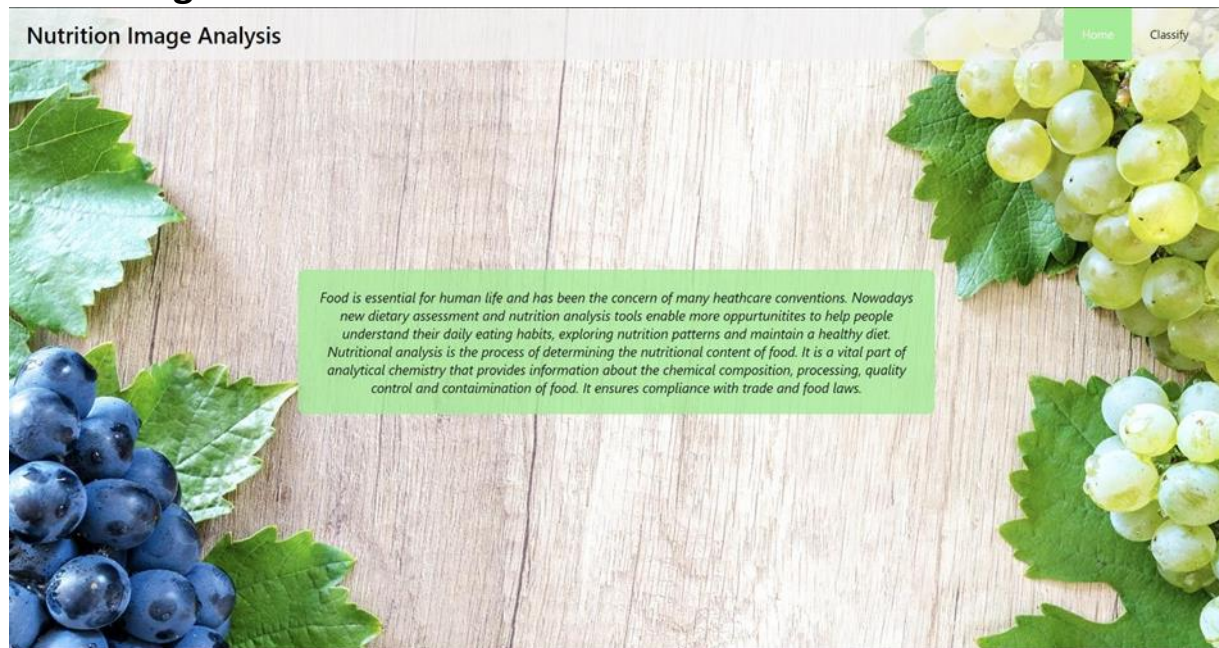
5. FLOWCHART



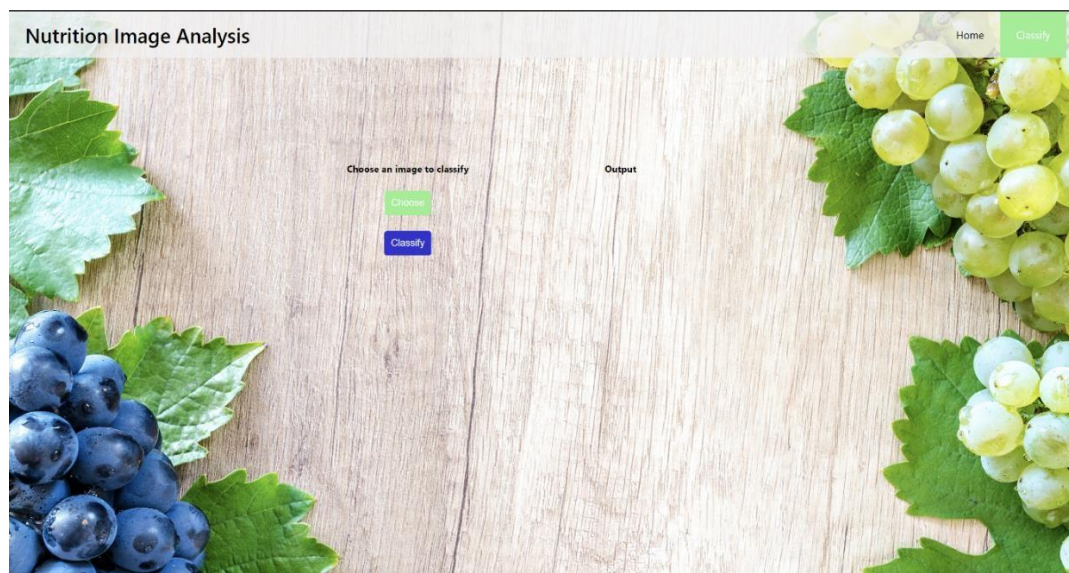
6. RESULT

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

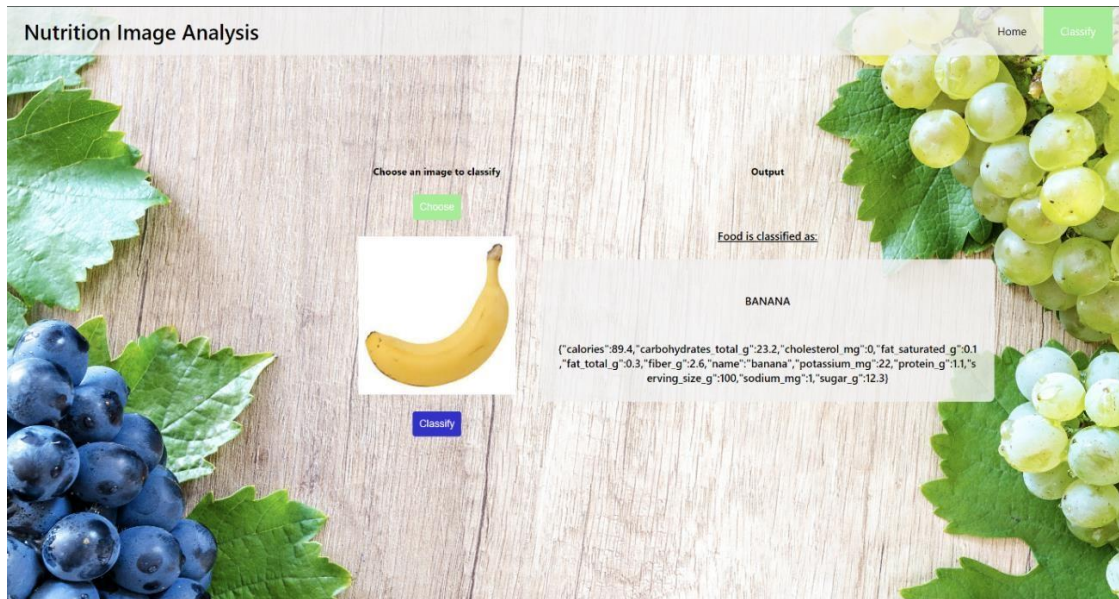
HomePage



ClassifyPage



Results page



7. ADVANTAGES &

DISADVANTAGES

Advantages:

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

Disadvantages:

- Data mining techniques do not help to provide effective decision making.
- Most of the research conducted by taking the one-side view of fruits. In addition, by considering the one-side image of fruit, it is challenging to evaluate the quality of 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.

3. BIBILOGRAPHY

:1.<https://www.youtube.com/embed/82GMw6espuQ>

2. Mureşan, Horea & Oltean, Mihai. (2018). Fruit recognition from images using deep learning. Acta Universitatis Sapientiae, Informatica. 10. 26-42. 10.2478/ausi-2018-0002.

3. <https://github.com/garodisk/Fruits-classification-120-different-fruits->

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

5. <https://medium.com/ai-techsystems/fruits-classification-using-deep-learning-f8261b0ee0ca>

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

APPENDIX:

In this section we present 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]]

```

APPLICATION BUILDING:

home.html

```

1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <meta http-equiv="X-UA-Compatible" content="IE=edge">
6   <meta name="viewport" content="width=device-width, initial-scale=1.0">
7   <title>AI based analyzer for Fitness Enthusiasts </title>
8   <link rel="stylesheet" href="{{url_for('static', filename='css/styles.css')}}">
9 </head>
10 <body>
11   <nav>
12     <h2> <span>Nutrition</span> Image Analysis</h2>
13     <ul>
14       <li class="page-selected"><a href="/">Home</a></li>
15       <li><a href="/image">Classify</a></li>
16     </ul>
17   </nav>
18   <main id="home-main">
19     <p>
20       Food is essential for human life and has been the concern of many healthcare conventions. Nowadays new dietary assessment and
21       nutrition analysis tools enable more opportunities to help people understand their daily eating habits, exploring nutrition
22       patterns and maintain a healthy diet. Nutritional analysis is the process of determining the nutritional content of food. It is
23       a vital part of analytical chemistry that provides information about the chemical composition, processing, quality control and
24       contamination of food. It ensures compliance with trade and food laws.
25     </p>
26   </main>
27 </body>
28 </html>

```

image.html

```
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <meta http-equiv="X-UA-Compatible" content="IE=edge">
6   <meta name="viewport" content="width=device-width, initial-scale=1.0">
7   <title>AI based analyzer for Fitness Enthusiasts </title>
8   <link rel="stylesheet" href="{{url_for('static', filename='css/styles.css')}}">
9 </head>
10 <body>
11   <nav>
12     <h2> <span>Nutrition</span> Image Analysis</h2>
13     <ul>
14       <li><a href="/">Home</a></li>
15       <li class="page-selected"><a href="/image">Classify</a></li>
16     </ul>
17   </nav>
18   <main id="classify-main">
19     <div>
20       <h3>Choose an image to classify</h3>
21       <button class="primary-button">Choose</button>
22       <img src="" alt="" id="image-viewer">
23       <button class="secondary-button">Classify</button>
24     </div>
25     <div id="output">
26       <h3>Output</h3>
27       <p>Food is classified as:</p>
28       <div id="output-wrapper">
29         <p id="output-result"></p>
30         <p id="output-api-result"></p>
31       </div>
32     </div>
33   </main>
34 </body>
35 <script src="{{url_for('static', filename='js/app.js')}}"></script>
36 </html>
```


styles.css

```
72 }
73 nav > ul > li > a{
74     color: black;
75     transition: 0.25s;
76 }
77
78 /* Home Page */
79 #home-main{
80     background: var(--primary-color-opacity);
81     margin: 23rem auto;
82     width: 70rem;
83     padding: 2rem;
84     font-size: 1.5rem;
85     border-radius: 15px;
86     text-align: center;
87     font-style: italic;
88 }
89
90 /* Classify Page */
91 #classify-main{
92     background: none;
93     width: 50rem;
94     margin: 13rem auto;
95     display: grid;
96     grid-template-columns: 1fr 2fr;
97     grid-gap: 3rem;
98 }
99 #classify-main h3{
100     margin-bottom: 2rem;
101 }
102 #classify-main .secondary-button{
103     margin-top: 2rem;
104 }
105 #classify-main > div, #output{
106     display: flex;
107     flex-direction: column;
108     align-items: center;
109 }
110 #output h3{
111     margin-bottom: 4rem;
112 }
113 #output > p{
114     text-decoration: underline;
115     display: none;
116 }
117 #classify-main > div p{
118     text-align: center;
119     overflow-wrap: break-word;
120     max-width: 50rem;
121     font-size: 1.3rem;
122     font-weight: 500;
123     margin-top: 2rem;
124 }
125 #output-wrapper{
126     background: rgba(243, 243, 243, 0.7);
127     margin-top: 2rem;
128     padding: 2rem;
129     border-radius: 10px;
130     display: none;
131 }
132 #output-wrapper > p:first-child{
133     margin-top: none;
134 }
135 #output-wrapper > p:last-child{
136     margin-top: 4rem;
```

app.js

```
1  const  chooseButton = document.querySelector('button.primary-button'),
2         classifyButton = document.querySelector('button.secondary-button');
3  let    userFile;
4
5  // Event Listeners
6  chooseButton.addEventListener('click', (e)=>{
7      // Creating an input element to select the file
8      const input = document.createElement('input');
9      input.setAttribute('type', 'file');
10     input.setAttribute('accept', 'image/png, image/jpeg, image/jpg');
11     input.setAttribute('name', 'file');
12     input.click();
13     input.onchange = function(){
14         const imageView = document.querySelector('#image-viewer');
15
16         // Displaying Image selected on the web page
17         const reader = new FileReader();
18         reader.onload = function(event){
19             imageView.src = event.target.result;
20             imageView.style.marginTop = '2rem';
21             imageView.style.height = '300px';
22             imageView.style.width = '300px';
23         }
24         reader.readAsDataURL(input.files[0]);
25         userFile = input.files[0];
26     }
27 })
28
29 classifyButton.addEventListener('click', (e)=> {
30     const formData = new FormData();
31     formData.append('file', userFile);
32     fetch('/predict', {
33         method: 'POST',
34         body: formData
35     })
36     .then((response)=> response.json())
37     .then((res)=> {
38         const result = document.querySelector('#output-result'),
39               apiResult = document.querySelector('#output-api-result'),
40               outputWrapper = document.querySelector('#output-wrapper'),
41               p = document.querySelector('#output > p');
42
43
44         console.log(res.apiResult[0])
45
46         result.innerText = res.result;
47         apiResult.innerHTML = `${JSON.stringify(res.apiResult[0])}`;
48         p.style.display = 'block';
49         outputWrapper.style.display = 'block';
50     })
51 })
```

app.py

```
6
7  from flask import Flask,render_template,request
8  # Flask-It is our framework which we are going to use to run/serve our application.
9  #request-for accessing file which was uploaded by the user on our application.
10 import os
11 import numpy as np #used for numerical analysis
12 from tensorflow.keras.models import load_model#to load our trained model
13 from tensorflow.keras.preprocessing import image
14 import requests
15
16
17 app = Flask(__name__,template_folder="templates") # initializing a flask app
18 # Loading the model
19 model=load_model('nutrition.h5')
20 print("Loaded model from disk")
21
22 |
23 @app.route('/')# route to display the home page
24 def home():
25 |     return render_template('home.html')#rendering the home page
26
27 @app.route('/image1',methods=['GET','POST'])# routes to the index html
28 def image1():
29 |     return render_template("image.html")
30
31
32
33 @app.route('/predict',methods=['GET', 'POST'])# route to show the predictions in a web UI
34 def launch():
35 |     if request.method=='POST':
36 |         f=request.files['file'] #requesting the file
37 |         basepath=os.path.dirname(' file ')#storing the file directory
```

is > ELCOI > Desktop > ourproject > Flask > app.py > ...

```
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)

```

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

Choose...

Classify



Upload image to classify

Choose...



Classify



Upload image to classify

Choose...



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}]