

A PROJECT REPORT ON

AI-Powered Nutrition Analyzer For Fitness Enthusiasts

DOMAIN: ARTIFICIAL INTELLIGENCE

DONE BY
TEAM ID: PNT2022TMID43802

TEAM MEMBERS:

TEAM LEADER: ADARSH

TEAM MEMBER: ARUN BINU

TEAM MEMBER: AKASH P R

TEAM MEMBER: VYSHNAV DEV T

1.ABSTRACT

Artificial intelligence (AI) as a branch of computer science, the purpose of which is to imitate thought processes, learning abilities and knowledge management, finds more and more applications in experimental and clinical medicine. In recent decades, there has been an expansion of AI applications in biomedical sciences. The possibilities of artificial intelligence in the field of medical diagnostics, risk prediction and support of therapeutic techniques are growing rapidly. The aim of the article is to analyze the current use of AI in nutrition science research. The literature review was conducted in PubMed. A total of 399 records published between 1987 and 2020 were obtained, of which, after analyzing the titles and abstracts, 261 were rejected. In the next stages, the remaining records were analyzed using the full-text versions and, finally, 55 papers were selected. These papers were divided into three areas: AI in biomedical nutrients research (20 studies), AI in clinical nutrients research (22 studies) and AI in nutritional epidemiology (13 studies). It was found that the artificial neural network (ANN) methodology was dominant in the group of research on food composition study and production of nutrients. However, machine learning (ML) algorithms were widely used in studies on the influence of nutrients on the functioning of the human body in health and disease and in studies on the gut microbiota. Deep learning (DL) algorithms prevailed in a group of research works on clinical nutrients intake. The development of dietary systems using AI technology may lead to the creation of a global network that will be able to both actively support and monitor the personalized supply of nutrients.

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2. INTRODUCTION

2.1 PROJECT DESCRIPTION

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 maintaining 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. The main aim of the project is to build a model which is used for classifying the fruit depending on the different characteristics like color, shape, texture etc. 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, Fibre, Protein, Calories, etc.).

2.2 Purposes

The AI model can be used as a reference for nutrition surveys and personal nutrition analysis. Nutritional intake is the basis for human growth and health, and the intake of different types of nutrients and micronutrients can affect health. Most diseases are inextricably linked to diet.

3. LITERATURE SURVEY

3.1 Existing problem

Neutrino delivers nutrition-based data services and analytics to its users and wants to turn into a leading source of the nutrition-related platform .The platform employs NLP and mathematical models from the optimization theory as well as predictive analysis to enable individualized data compilation.

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

1. Artificial intelligence in food science and nutrition Information Technologies Institute (ITI) Kosmas Dimitropoulos 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 BALAKRISHNA .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 knowledgeable dietician Don't value customer time Worst service.

3.2 References

1. McCarthy J., Minsky M., Rochester N., Shannon C.E. A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence. [(accessed on 6 November 2020)].
2. 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].
3. Buisson J.-C. Nutri-Educ, a nutrition software application for balancing meals, using fuzzy arithmetic and heuristic search algorithms. *Artif. Intell. med.* 2008;42:213-227. doi:10.1016/j.artmed.2007.12.001. [PubMed] [CrossRef].
4. Yu D.-J., Hu J., Yan H., Yang X., Yang J.-Y., Shen H.-B. Enhancing protein-vitamin binding residues prediction by multiple heterogeneous subspace SVMs ensemble. *BMC Bioinform.* 2014;15:297. doi: 10.1186/1471-2105-15-297. [PMC free article] [PubMed] [CrossRef] [Google Scholar].
5. Gedrich K., Hensel A., Binder I., Karg G. How optimal are computer-calculated optimal diets? *Eur. J. Clin. Nutr.* 1999;53:309 - 318. doi: 10.1038/sj.ejcn.1600727. [PubMed] [CrossRef] [Google Scholar]
6. Lo F.P.-W., Sun Y., Qiu J., Lo B. Food volume estimation based on deep learning view synthesis from a single depth map. *Nutrients.* 2018;10:2005. doi: 10.3390/nu10122005. [PMC free article] [PubMed] [CrossRef] [Google Scholar].
7. Fang S., Shao Z., Kerr D.A., Boushey C.J., Zhu F. An end-to-end image-based automatic food energy estimation technique based on learned energy distribution images: Protocol and methodology. *Nutrients.* 2019;11:877. doi: 10.3390/nu11040877. [PMC article] [PubMed] [CrossRef] [Google Scholar].
8. Ji Y., Plourde H., Bouzo V., Kilgour R.D., Cohen T.R. Validity and usability of a smartphone image-based dietary assessment app compared to 3-day food diaries in assessing dietary intake among Canadian adults: Randomized controlled trial. *JMIR Mhealth Uhealth.* 2020;8:e16953. doi: 10.2196/16953. [PMC article] [PubMed] [CrossRef] [Google Scholar]

9. Tragomalou A., Moschonis G., Manios Y., Kassari P., Ioakimidis I., Diou C., Stefanopoulos L., Lekka E., Maglaveras N., Delopoulos A., et al. Novel e-health applications for the management of cardiometabolic risk factors in children and adolescents in Greece. *Nutrients*. 2020;12:1380. doi: 10.3390/nu12051380. [PMC free article] [PubMed] [CrossRef] [Google Scholar].
10. Naushad S.M., Janaki Ramaiah M., Pavithrakumari M., Jayapriya J., Hussain T., Alrokayan S.A., Gottumukkala S.R., Digumarti R., Kutala V.K. Artificial neural network-based exploration of gene-nutrient interactions in folate and xeno-biotic metabolic pathways that modulate susceptibility to breast cancer. *Gene*. 2016;580:159FF168. doi:10.1016/j.gene.2016.01.023. [CrossRef] [Google Scholar]

3.3 Problem Statement



4. IDEATION & PROPOSED SOLUTION

4.1 Empathy Map Canvas

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviours and attitudes.

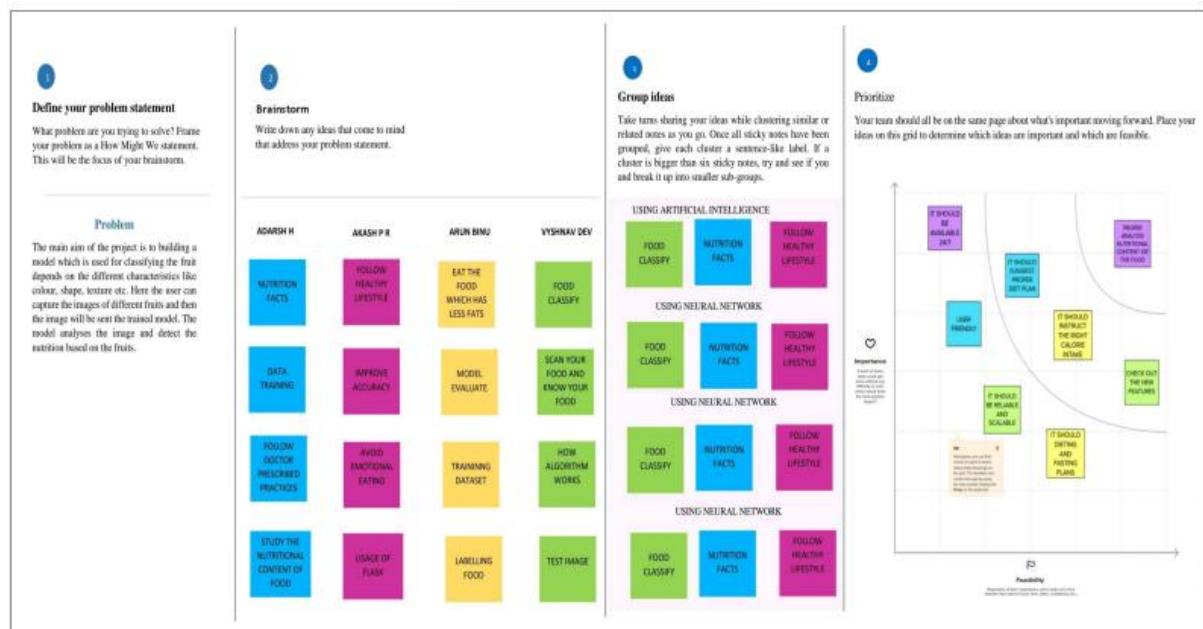
It is a useful tool to help teams better understand their users.

Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	Fitness freak	build the muscle	I don't know how many calories i want to eat	Lack of knowledge	angry and feel bad
PS-2	Patient	eat balanced diet	I am not able to eat	I don't know nutrition content proper nutrition food	helpless



4.2 Ideation & Brainstorming



4.3 Proposed Solution

1	Problem Statement (Problem to be solved)	The primary aim of the project is to construct a model which is used for figuring out the fruit relies upon on the exclusive traits like coloration, form, texture and so forth. The usage of photo processing. Here the person can capture the pics might be analysed with the trained model. The version analyses the photograph and lists out of vitamins present in the fruit like sugar, vitamins, minerals, protein and many others.
2	Idea / Solution description	The concept of this assignment is that person can seize the photos of different fruits and vegetables and then the picture may be sent to the skilled version. The version analyses the picture and detects the nutrients based totally at the end result like sugar, Fibre, Protein, Calorie intake, and so on. The above concept is carried out through the usage of the CNN (Convolution Neural community). It's far used to choose the raw pixels present within the photograph. Fruit Recognition the usage of coloration and texture functions.
3	Novelty / Uniqueness	The project has numerous unique capabilities. The primary feature is that the consumer want not have to go to or consult a Nutritionist (or) a Dietician to follow a in shape and wholesome weight loss plan. This mission has the feature of analysing the complete nutritional contents of fruits and greens by way of genuinely scanning them. It affords for a customised nutritional requirement for individuals who have Confined choices while selecting food.

4	Social Impact / Customer Satisfaction	This mission will collect understanding and offer records approximately nutrition. Now a days, no person follows the healthy diet weight reduction plan. Supplying this statistics, they arrive to know about the nutrition found in every meals item. It is used to agenda a diet regime by means of taking the image of a food item and if we send it, we will get statistics about each meals nutrition like carbohydrates, fats, proteins, vitamins, minerals ,and sugar. This could assist others to enhance their fitness and health.
5	Business Model (Revenue Model)	Internet (or) Social media is the best way to spread the word about our project and with the help of influencers we can attract normal people. Clustering and targeting the fitness people with the help of local gyms and grounds. Allowing 3 rd party vendors to sell their products through our application via advertisements is way to generate money. If the products sold through advertisements, then it is even good.
6	Scalability of the Solution	Artificial Intelligence (AI) can be used to predict investment outcomes quickly and effectively, as well as to devise strategies or establish long term-goals. Scalable AI pertains to how data models, infrastructure, and algorithms can increase or decrease their complexity, speed, or size at scale in order to best handle requirement of the situation at hand. As improvements continue with data storage capacities as well as computing resource, AI models can be created with millions of parameters. Scaling up nutrition is a global push for action and investment to improve maternal, child nutrition and various health problems.

4.4 Problem Solution Fit

Define CS, fit into CC	1. CUSTOMER SEGMENT(S) CS Individuals who want to keep their health and lead a healthy existence.	6. CUSTOMER CONSTRAINTS CC The constraints that prevent our customers to get entry to our solution are network troubles and community mistakes as there is no feasible for any other constraints when you consider that our solution is an application.	5. AVAILABLE SOLUTIONS AS Workout , yoga and aerobic are present solution. <ul style="list-style-type: none"> Pros: Our answer is the keys is to shape exercise behavior that cause durable changes to way of life Cons: No proper suggestions for fitness lover.
	2. JOBS-TO-BE-DONE / PROBLEMS J&P By means of imparting dietary records to fanatics . It will make them healthy lifestyles. This would be the main activity to be performed.	9. PROBLEM ROOT CAUSE RC The foundation purpose of this problem is lack of intake of nutrition. Improper diet and skipping the exercise.	7. BEHAVIOUR BE The clients who've problems of fitness care, Vitamins,fitness could be stated in chatbox. On the time of logging in,the clients offer the details of their health fame.After analyzing the client's repute,solution may be given.
Identify strong TR & EM	3. TRIGGERS TR After continuous advertisements of our software and listening to remarks from their buddies , neighbours . The patron gets encouraged to apply our utility.	10. YOUR SOLUTION SI Energy monitoring is the key functions in all health solutions which helps in stopping the sicknesses earlier as a result everyday humans can use this. Instructor demonstrates the unique culmination energy and offers guided assistance in order that the users.	8. CHANNELS of BEHAVIOUR CH <ul style="list-style-type: none"> ONLINE User access the application by scanning the fruit and get the nutrition info. OFFLINE Based on the nutritional info user will perform.
	4. EMOTIONS: BEFORE / AFTER EM <ul style="list-style-type: none"> Before: Customers confused and their hope will reduce to maintain healthy diet. After:After they follow their proper guidelines by using this apps they are confident to achieve their healthy diet. 		

5. REQUIREMENT ANALYSIS

5.1 Functional requirement

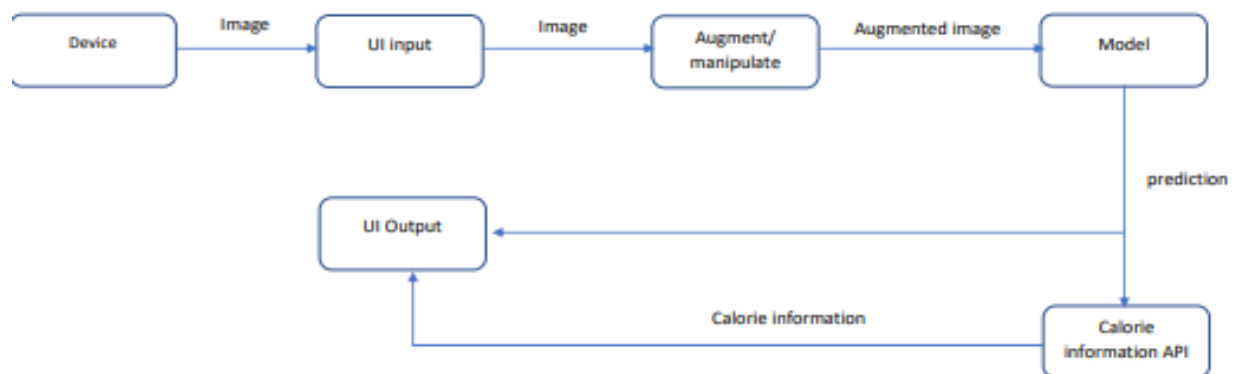
Nfr.no	Non-Functional Requirement	Description
Nfr-1	Usability	Datasets of all the food items is used to detecting the nutrition that present in the food
Nfr-2	Security	The Information belongs to the user and Nutrition are secured highly
Nfr-3	Reliability	The Image Quality of food is important for predicting the Nutrition in the food
Nfr-4	Performance	The performance is based on the Image Quality of food used for nutrition prediction

5.2 Non-functional Requirements:

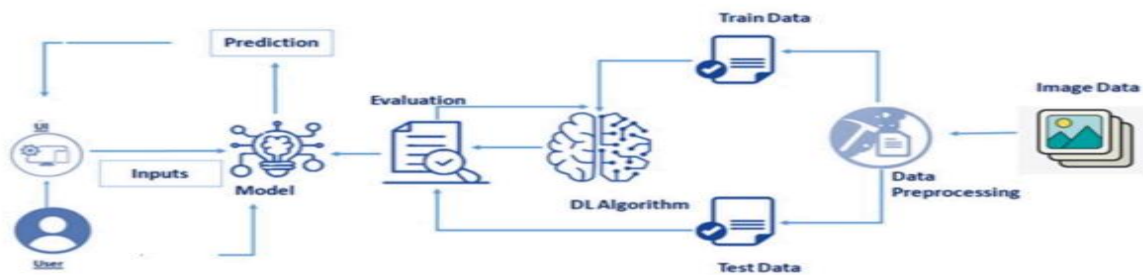
Fr.no	Functional Requirement	Sub Requirement(Story/subtask)
Fr-1	User Registration	Registration through Form Registration through Gmail
Fr-2	User Confirmation	Confirmation via OTP Confirmation via Gmail
Fr-3	Capturing Image	Capture the image of the food And check the parameter captured image
Fr-4	Image Processing	Upload the image for the prediction of the nutrition in the food
Fr-5	Food Identification	Identify the food and predict the nutrition in the food

6 PROJECT DESIGN

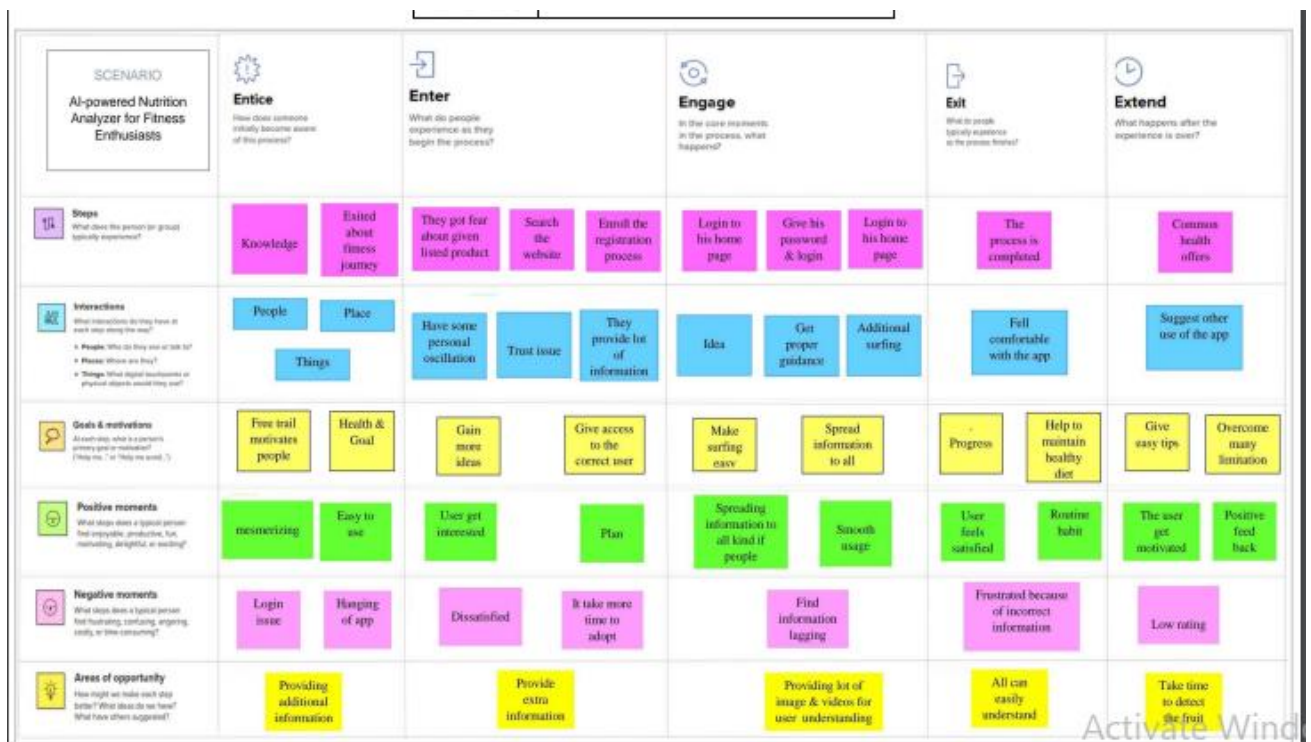
6.1 Data Flow Diagram



6.2 Solution Architecture



6.3 Customer Journey Map



7. PROJECT PLANNING & SCHEDULING

7.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story / Task	Priority	Team Members
Sprint-1	Registration	As a user, I can register for the application by entering my email, password, and confirming my password.	High	Team Leader, Team Member-1 Team Member-2 Team Member-3
Sprint-1		As a user, I will receive confirmation email once I have registered for the application	High	Team Leader, Team Member-1 Team Member-2 Team Member-3
Sprint-1		As a user, I can register for the application through Facebook	Low	Team Member-1, Team Member-2
		As a user, I can register for the application through Gmail	Medium	Team Leader, Team Member-1 Team Member-2 Team Member-3
	Login	As a user, I can log into the application by entering email & password	High	Team Leader, Team Member-1 Team Member-2 Team Member-3
	Dashboard	As a user, I can view my profile and update my details	Low	Team Leader Team Member-1,
		As a user, I can change my password	High	Team Leader Team Member-1
Sprint-2		As a user, I can view my personal calorie calendar	High	Team Leader Team Member-3, Team Member-2
Sprint-2	Data Collections	Download Food Nutrition Dataset & data collections	High	Team Leader, Team Member-1 Team Member-2 Team Member-3
	Data Preprocessing	Importing The Dataset into Workspace & image preprocessing	High	Team Leader, Team Member-1 Team Member-2 Team Member-3

	Model Building	Initializing The Model and training and testing model	High	Team Leader, Team Member-1
		Model Evaluation, save model	Medium	Team Leader, Team Member-3
Sprint-3	Data Storage	In the application, the calorie value of different food items are stored using a database	High	Team Leader, Team Member-1 Team Member-2 Team Member-3
	Application Building	Create an HTML File Create an CSS File, Create an JavaScript File	High	Team Leader, Team Member-1
		Build Python Code	High	Team Leader, Team Member-3
		Showcasing Prediction On UI	Medium	Team Leader, Team Member-2, Team Member-1
	Nutrition Analyzer	Provide diet plans and exercise	Medium	Team Leader, Team Member-2, Team Member-1
Sprint-4	Diet Plan Specification	As a user, I can specify my target based on which I receive personalized diet plans	High	Team Leader, Team Member-1
	Train The Model On IBM	Register For IBM Cloud And train The ML Model On IBM	Medium	Team Leader, Team Member-2
		Integrate Flask with Scoring End Point	Medium	Team Leader, Team Member-3
		Create User acceptance testing and performance testing	High	Team Leader, Team Member-2
	Feedback Forms	reviews and ratings	Low	Team Leader, Team Member-1, Team Member-3

8. MODEL CODE

Import Required Packages

```
In [1]: import numpy as np
import pandas as pd
from keras.preprocessing.image import ImageDataGenerator
```

Loading The Data

```
In [2]: train_directory = 'Dataset/TRAIN_SET'
test_directory = 'Dataset/TEST_SET'
```

Data Augmentation

```
In [4]: train_datagen = ImageDataGenerator(rescale=1./255, shear_range=0.2, zoom_range=0.2, horizontal_flip=True)
test_datagen = ImageDataGenerator(rescale=1./255)
```

Performing the Data Generation

```
In [5]: #performing the data augmentation to training data
x_train = train_datagen.flow_from_directory(
    train_directory,
    target_size=(64,64),
    color_mode='rgb',
    batch_size=5,
    class_mode='sparse',
)
```

Found 4118 images belonging to 5 classes.

```
In [8]: #performing the data augmentation to testing data
x_test = train_datagen.flow_from_directory(
    test_directory,
    target_size=(64,64),
    color_mode='rgb',
    batch_size=1,
    class_mode='sparse',
)
```

Found 929 images belonging to 3 classes.

```
In [7]: print(x_train.class_indices)
```

['APPLES': 0, 'BANANA': 1, 'ORANGE': 2, 'PINEAPPLE': 3, 'WATERMELON': 4]

```
In [8]: print(x_test.class_indices)
```

['APPLES': 0, 'BANANA': 1, 'ORANGE': 2, 'PINEAPPLE': 3, 'WATERMELON': 4]

Number of images for each class

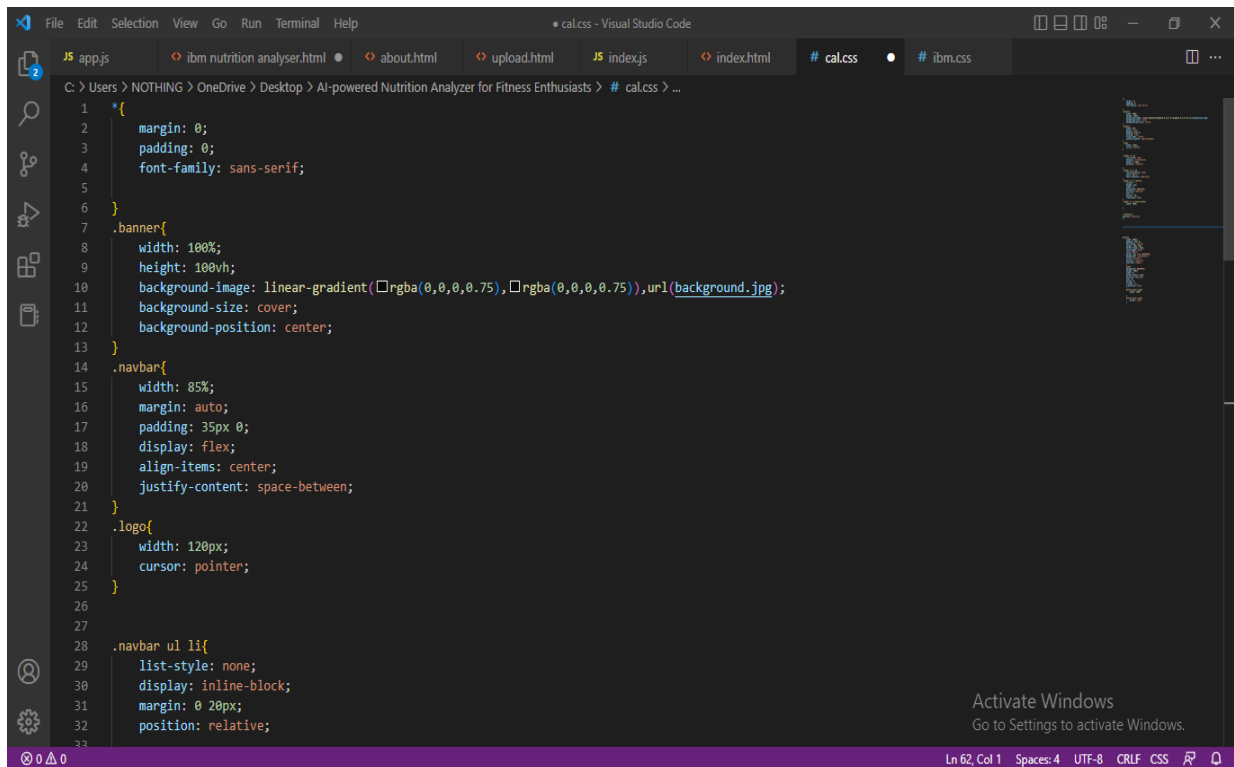
```
In [11]: from collections import Counter as c
print("Number of Images in Training data : ", c(x_train.labels))
```

Number of Images in Training data : Counter({1: 1354, 2: 1020, 0: 995, 4: 475, 3: 275})

```
In [12]: print("Number of Images in Training data : ", c(x_test.labels))
```

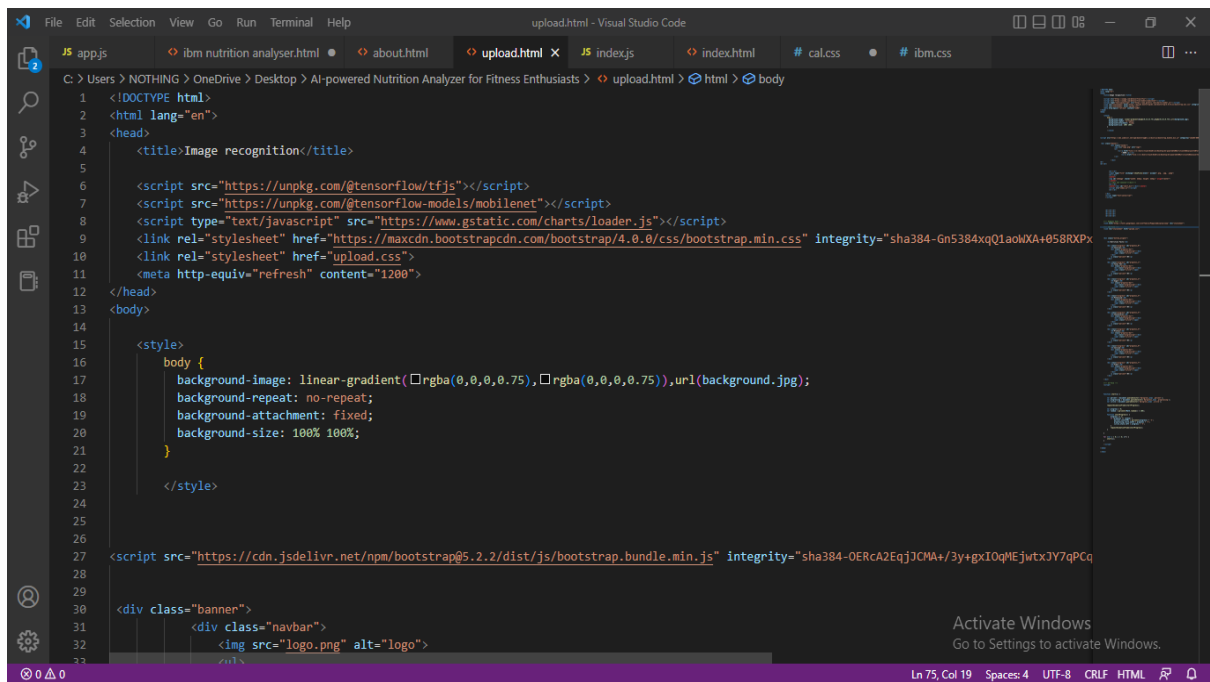
Number of Images in Training data : Counter({1: 415, 0: 266, 2: 248})

```
In [1]:
```



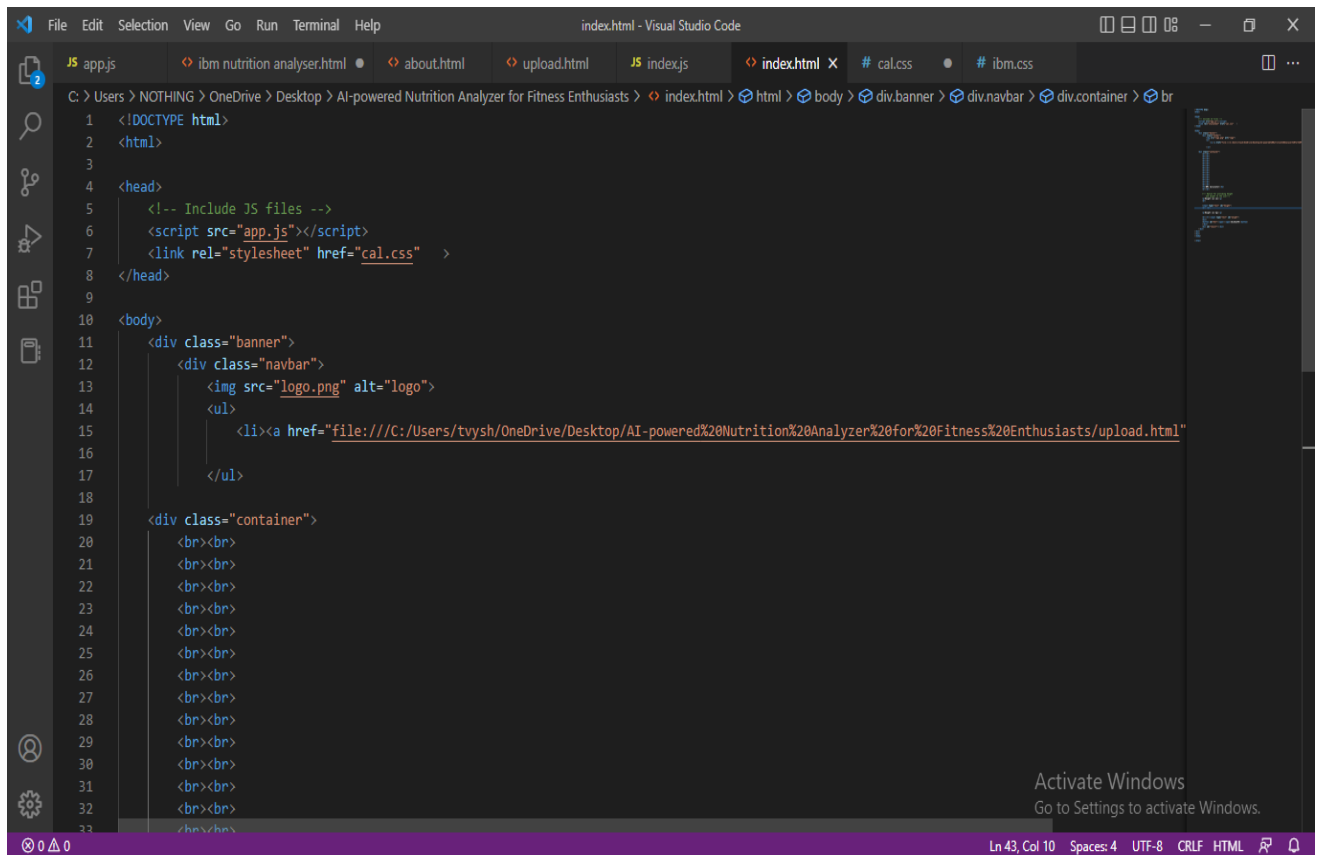
```
1  *{
2    margin: 0;
3    padding: 0;
4    font-family: sans-serif;
5  }
6
7  .banner{
8    width: 100%;
9    height: 100vh;
10   background-image: linear-gradient(rgba(0,0,0,0.75), rgba(0,0,0,0.75)),url(background.jpg);
11   background-size: cover;
12   background-position: center;
13 }
14
15 .navbar{
16   width: 85%;
17   margin: auto;
18   padding: 35px 0;
19   display: flex;
20   align-items: center;
21   justify-content: space-between;
22 }
23
24 .logo{
25   width: 120px;
26   cursor: pointer;
27 }
28
29 .navbar ul li{
30   list-style: none;
31   display: inline-block;
32   margin: 0 20px;
33   position: relative;
34 }
```

Ln 62, Col 1 Spaces: 4 UTF-8 CRLF CSS

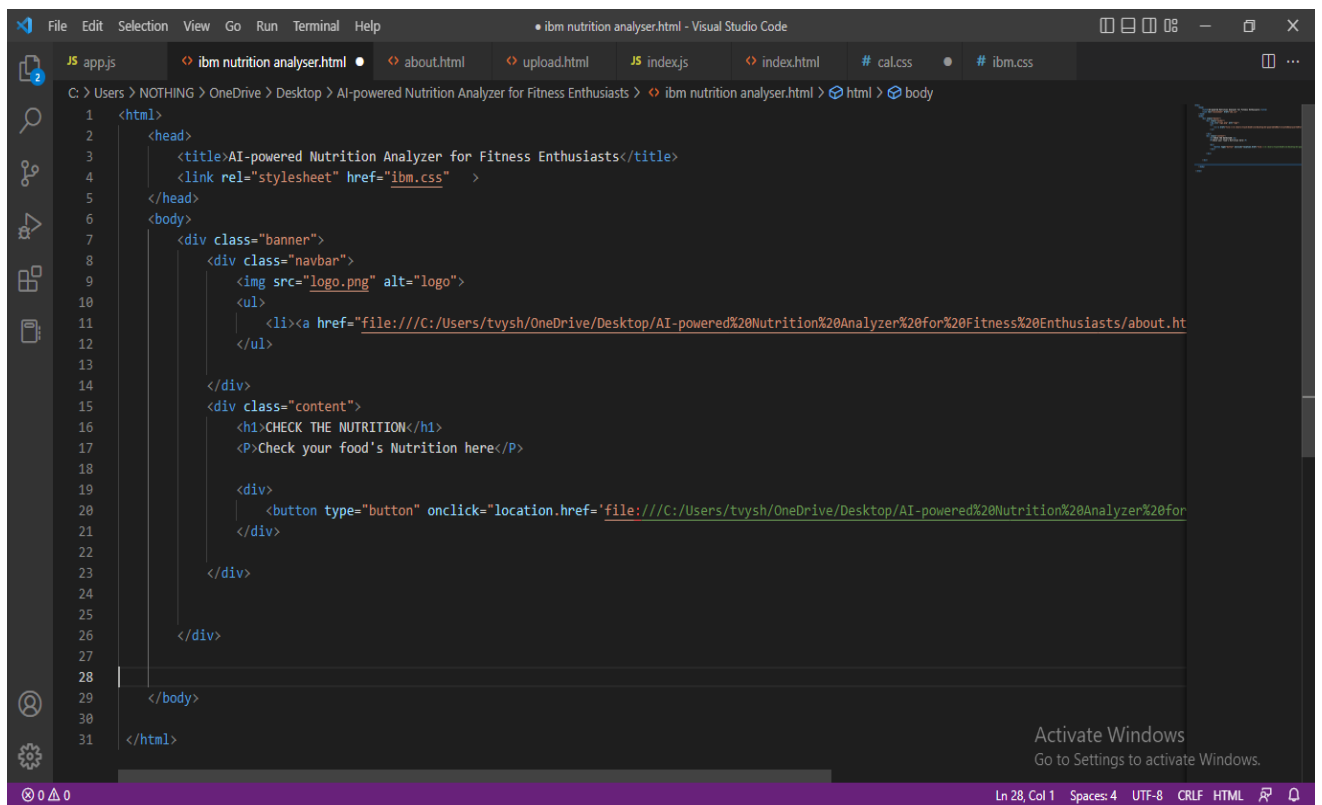


```
1  <!DOCTYPE html>
2  <html lang="en">
3  <head>
4    <title>Image recognition</title>
5
6    <script src="https://unpkg.com/@tensorflow/tfjs"></script>
7    <script src="https://unpkg.com/@tensorflow-models/mobilenet"></script>
8    <script type="text/javascript" src="https://www.gstatic.com/charts/loader.js"></script>
9    <link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/4.0.0/css/bootstrap.min.css" integrity="sha384-Gn5384xqQ1aoHXIA+058RXPx"
10   <link rel="stylesheet" href="upload.css">
11   <meta http-equiv="refresh" content="1200">
12 </head>
13 <body>
14
15   <style>
16     body {
17       background-image: linear-gradient(rgba(0,0,0,0.75), rgba(0,0,0,0.75)),url(background.jpg);
18       background-repeat: no-repeat;
19       background-attachment: fixed;
20       background-size: 100% 100%;
21     }
22   </style>
23
24   <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/js/bootstrap.bundle.min.js" integrity="sha384-OERcA2EqjJCMA+/3y+gxIOqMEjwtxJY7qPCq"
25
26   <div class="banner">
27     <div class="navbar">
28       
29     </div>
30   </div>
```

Ln 75, Col 19 Spaces: 4 UTF-8 CRLF HTML



```
1 <!DOCTYPE html>
2 <html>
3
4 <head>
5   <!-- Include JS files -->
6   <script src="app.js"></script>
7   <link rel="stylesheet" href="cal.css" >
8 </head>
9
10 <body>
11   <div class="banner">
12     <div class="navbar">
13       
14       <ul>
15         <li><a href="file:///C:/Users/tvysh/OneDrive/Desktop/AI-powered%20Nutrition%20Analyzer%20for%20Fitness%20Enthusiasts/upload.html">
16
17       </ul>
18     </div>
19     <div class="container">
20       <br><br>
21       <br><br>
22       <br><br>
23       <br><br>
24       <br><br>
25       <br><br>
26       <br><br>
27       <br><br>
28       <br><br>
29       <br><br>
30       <br><br>
31       <br><br>
32       <br><br>
33       <br><br>
```



```
1 <html>
2   <head>
3     <title>AI-powered Nutrition Analyzer for Fitness Enthusiasts</title>
4     <link rel="stylesheet" href="ibm.css" >
5   </head>
6   <body>
7     <div class="banner">
8       <div class="navbar">
9         
10        <ul>
11          <li><a href="file:///C:/Users/tvysh/OneDrive/Desktop/AI-powered%20Nutrition%20Analyzer%20for%20Fitness%20Enthusiasts/about.ht">
12
13        </ul>
14      </div>
15      <div class="content">
16        <h1>CHECK THE NUTRITION</h1>
17        <p>Check your food's Nutrition here</p>
18
19        <div>
20          <button type="button" onclick="location.href='file:///C:/Users/tvysh/OneDrive/Desktop/AI-powered%20Nutrition%20Analyzer%20for%20Fitness%20Enthusiasts/upload.html'">
21
22        </div>
23      </div>
24    </div>
25
26  </body>
27
28 </html>
```

The screenshot shows the Visual Studio Code editor with the file 'about.html' open. The editor displays the following HTML code:

```
1 <html>
2 <head>
3   <title>about</title>
4   <link rel="stylesheet" href="about.css" >
5 </head>
6 <body>
7   <div class="banner">
8     <div class="navbar">
9       <img src="" alt="">
10      <ul>
11        <li><a href="file:///C:/Users/tvysh/OneDrive/Desktop/AI-powered%20Nutrition%20Analyzer%20for%20Fitness%20Enthusiasts/ibm%20nu
12        </ul>
13      </div>
14    </div>
15    <div class="content">
16
17      <p>Food is critical for human lifestyles and has been the priority of many healthcare
18      Conventions. In recent times new nutritional assessment and vitamins evaluation gear allow
19      Extra opportunities to help people recognize their every day ingesting behavior, exploring
20      Nutrition patterns and keep a wholesome weight-reduction plan.
21      Nutritional analysis is the system of determining the nutritional content of meals.
22      It's miles a essential part of analytical chemistry that gives statistics about the chemical
23      Composition, processing, great manipulate and infection of food.
24      It guarantees compliance with alternate and food legal guidelines.</p>
25
26    </div>
27  </div>
28
29 </html>
```

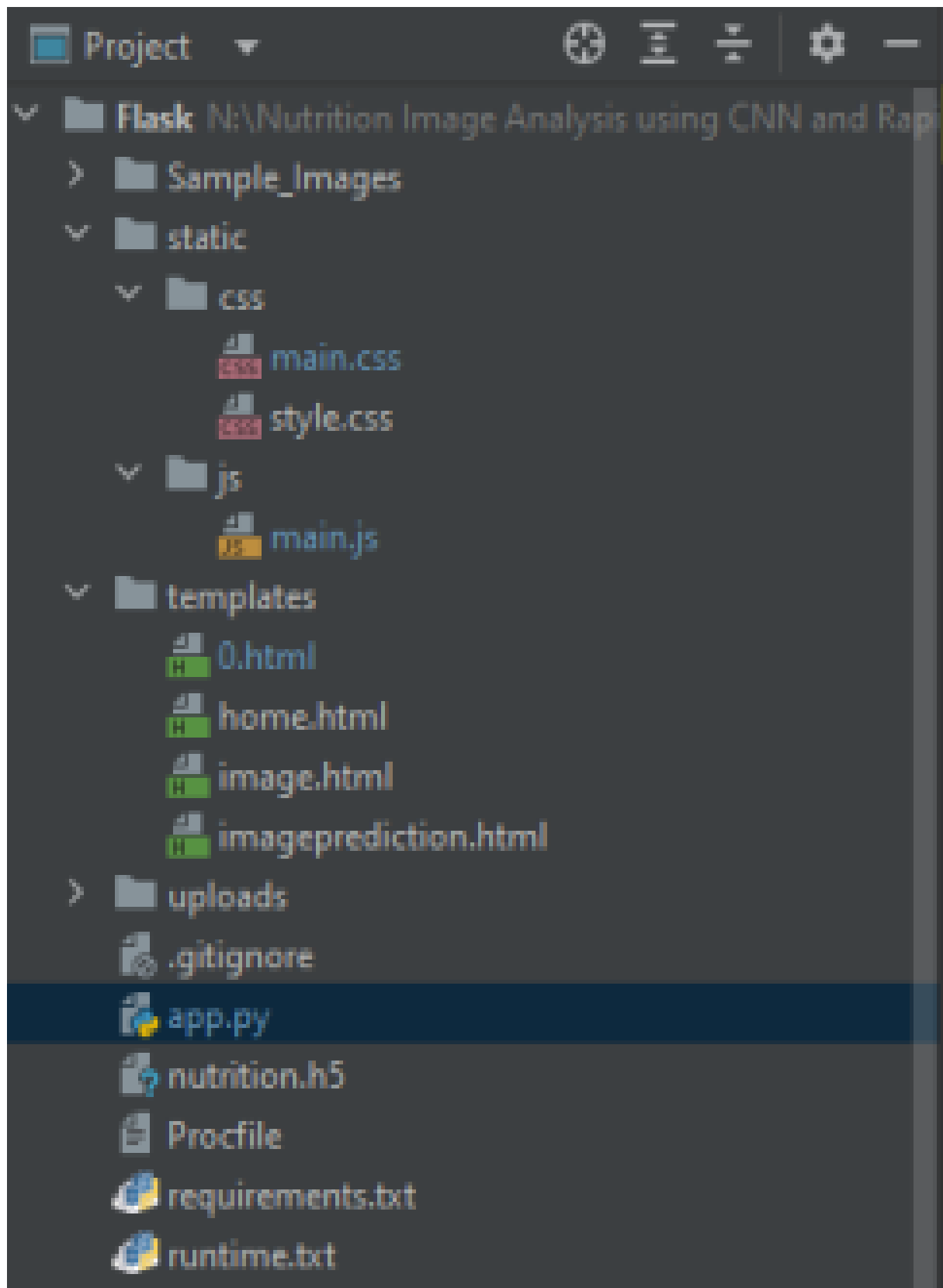
The status bar at the bottom indicates 'Ln 1, Col 1', 'Spaces: 4', 'UTF-8', 'CRLF', 'HTML', and '0 errors, 0 warnings, 0 info'.

The screenshot shows the Visual Studio Code editor with the file 'ibm.css' open. The editor displays the following CSS code:

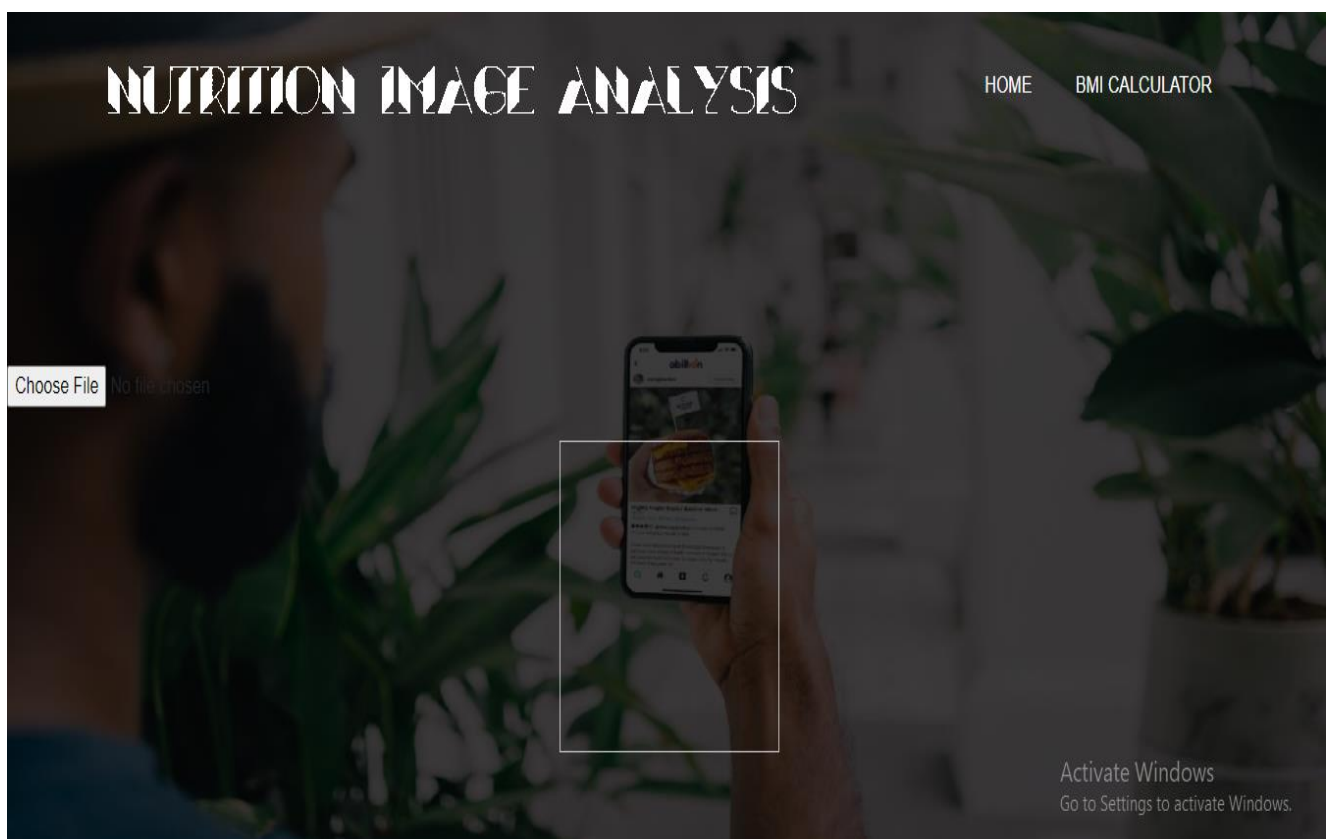
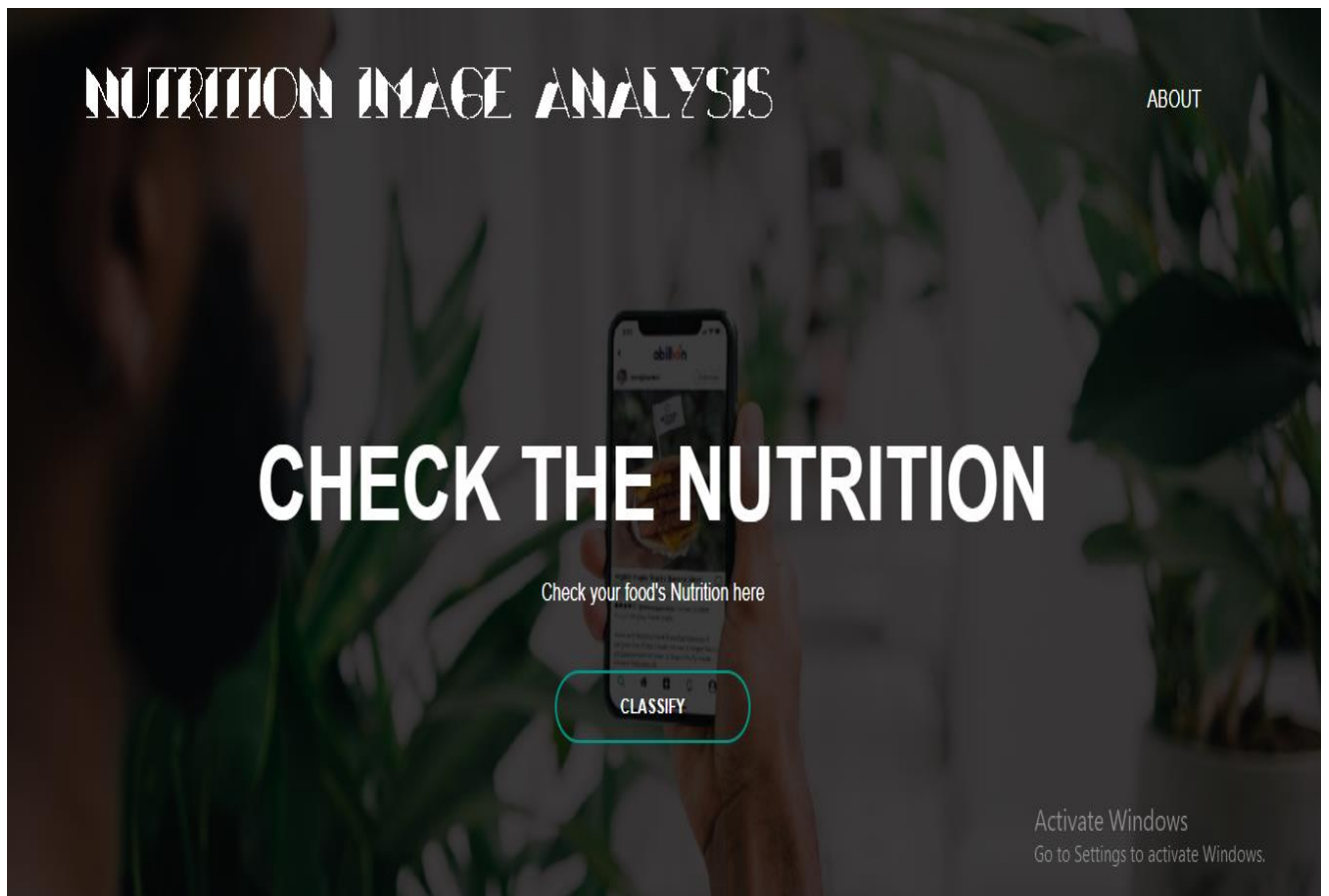
```
1 *{
2   margin: 0;
3   padding: 0;
4   font-family: sans-serif;
5 }
6
7 .banner{
8   width: 100%;
9   height: 100vh;
10  background-image: linear-gradient(rgba(0,0,0,0.75), rgba(0,0,0,0.75)), url(background.jpg);
11  background-size: cover;
12  background-position: center;
13 }
14
15 .navbar{
16   width: 85%;
17   margin: auto;
18   padding: 35px 0;
19   display: flex;
20   align-items: center;
21   justify-content: space-between;
22 }
23
24 .logo{
25   width: 120px;
26   cursor: pointer;
27 }
28
29
30
31
32 .navbar ul li{
33   list-style: none;
```

The status bar at the bottom indicates 'Ln 104, Col 16', 'Spaces: 4', 'UTF-8', 'CRLF', 'CSS', and '0 errors, 0 warnings, 0 info'.

8.1 TEST CASES



8.2 Output



NUTRITION IMAGE ANALYSIS

◀◀◀◀

BMI Calculator

Height (in cm)

Weight (in kg)

CALCULATE



HOME

Food is critical for human lifestyles and has been the priority of many healthcare Conventions. In recent times new nutritional assessment and vitamins evaluation gear allow Extra opportunities to help people recognize their every day ingesting behavior, exploring Nutrition patterns and keep a wholesome weight-reduction plan. Nutritional analysis is the system of determining the nutritional content of meals. It's miles a essential part of analytical chemistry that gives statistics about the chemical Composition, processing, great manipulate and infection of food. It guarantees compliance with alternate and food legal guidelines.

9.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 product that can perceive fruits from pictures. A new method for classifying fruits using 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 project can 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.

10. 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 type of disease and/or texture structure of fruits. All these are future direction.

11. APPENDIX

In the Dietary Reference Intake (DRI) nutrient reports, the Adequate Intake (AI) has been estimated in a number of different ways. Because of this, the exact meanings and interpretations of the AIs differ. Some AIs have been based on the observed mean intake of groups or subpopulations that are maintaining health and nutritional status consistent with meeting the criteria for adequacy. However, where reliable information about these intakes was not available, or where there were conflicting data, other approaches were used. As a result, the definition of an AI is broad and includes experimentally estimated desirable intakes. These varying methods of setting an AI make using the AI for assessing intakes of groups difficult. When the AI is based directly on intakes of apparently healthy populations, it is correct to assume that other populations (with similar distributions of intakes) have a low prevalence of inadequate intakes if the mean intake is at or above the AI. For nutrients for which the AI was not based on intakes of apparently healthy populations, a group mean intake at or above the AI would still indicate a low prevalence of inadequate intakes for that group but there is less confidence in this assessment

11.1 LINKS

11.1.1 Github

link: <https://github.com/IBM-EPBL/IBM-Project-51713-1660982057>

11.1.2 Youtube

link: <https://youtu.be/aDDxR81UIXw>

