ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "AI – POWERED NUTRITION ANALYZER FORFITNESS ENTHUSIASTS" is the bonafide work of , who carried out the project work under my supervision.

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Project Viva-Voce held on _____

INTERNAL EXAMINER   **EXTERNAL EXAMINER**

ACKNOWLEDGEMENT

First and foremost, we thank the Almighty for helping us in all situations for bringing out this project successfully.

We express our sincere heartfelt gratitude to **ALHAJ K. MOOSA,** Founder and Chairman, and **Mr. M. KADAR SHAH, B.A., M.B.A.,** Secretary, **Dhaanish Ahmed College of Engineering, Chennai.**

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Project Outline

AI – POWERED NUTRITION ANALYZER FOR FITNESS ENTHUSIASTS

PROJECT REPORT

TEAM ID: PNT2022TMID37845

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- **INTRODUCTION**

- **Project Overview**

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 thpe 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.).

- **Purpose**

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.

- **LITERATURE SURVEY**

- **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

- **References**
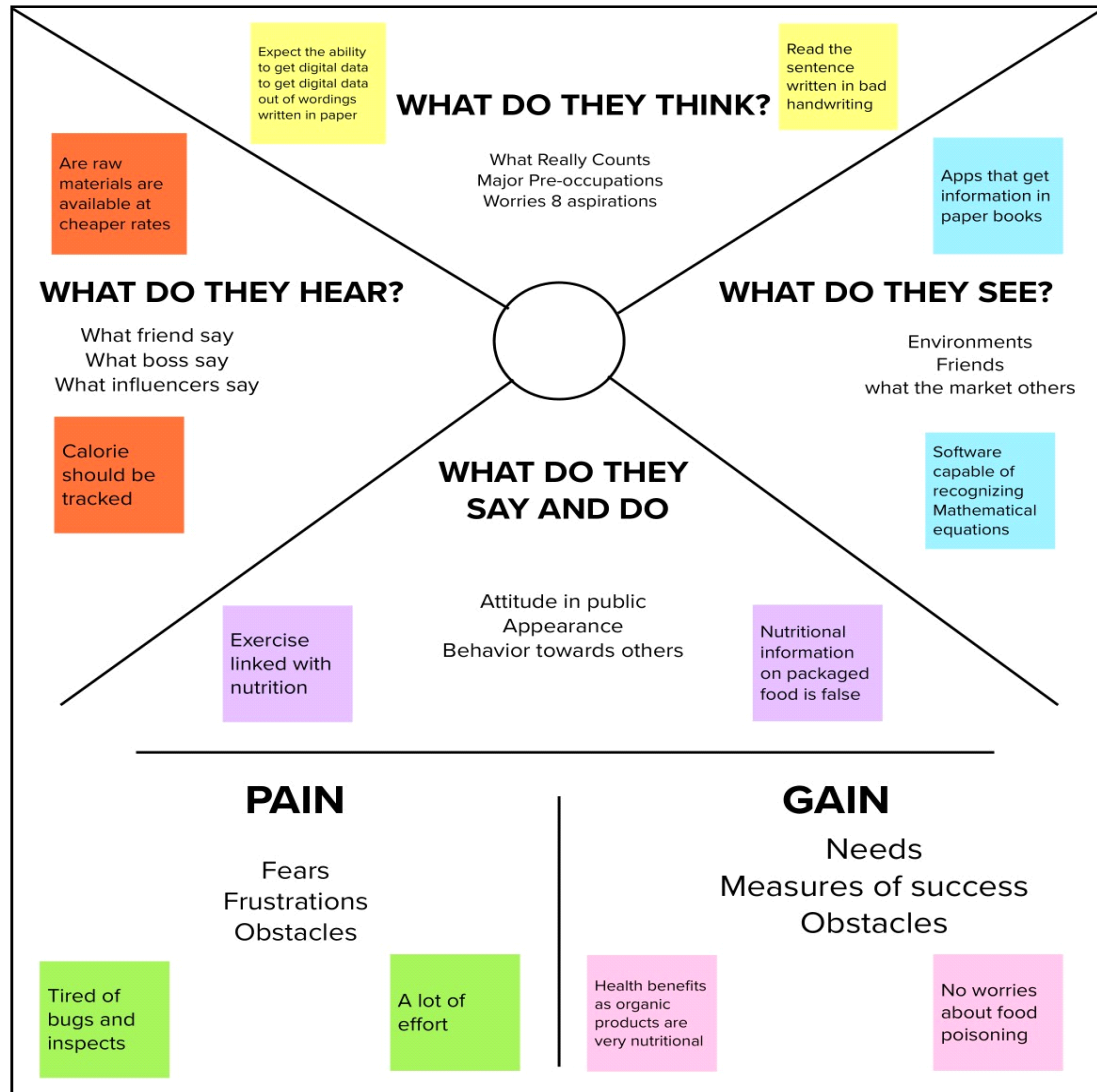
https://www.healthifyme.com/in/
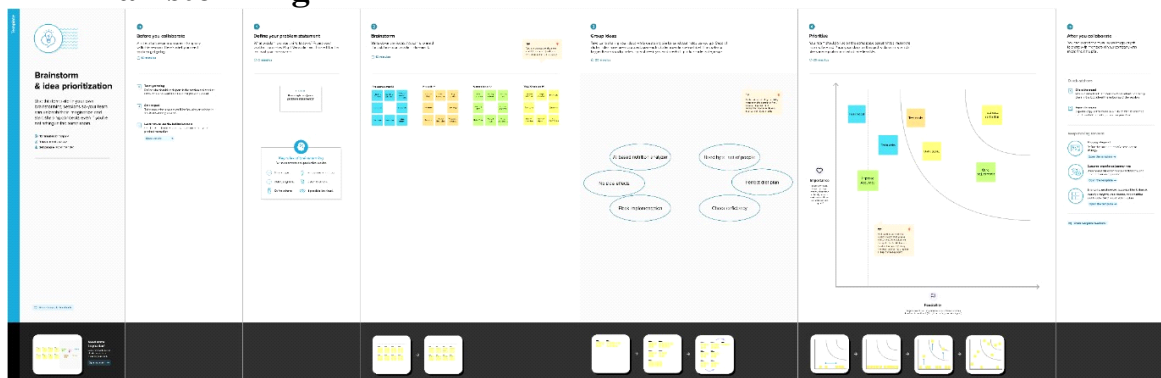
- **Problem Statement Definition**

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.)

- **IDEATION & PROPOSED SOLUTION**

- **Empathy Map**

WHAT DO THEY THINK?

Expect the ability to get digital data to get digital data out of wordings written in paper

Read the sentence written in bad handwriting

Are raw materials are available at cheaper rates

What Really Counts
Major Pre-occupations
Worries 8 aspirations

Apps that get information in paper books

WHAT DO THEY HEAR?

What friend say
What boss say
What influencers say

Calorie should be tracked

WHAT DO THEY SEE?

Environments
Friends
what the market others

Software capable of recognizing Mathematical equations

WHAT DO THEY SAY AND DO

Attitude in public
Appearance
Behavior towards others

Exercise linked with nutrition

Nutritional information on packaged food is false

PAIN

Fears
Frustrations
Obstacles

GAIN

Needs
Measures of success
Obstacles

Tired of bugs and inspects

A lot of effort

Health benefits as organic products are very nutritional

No worries about food poisoning

- **Brainstorming**

6

- **Proposed Solution**

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 thpe 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.).

- **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 behavioural 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 medium sand channels of behaviour.

- Sharpen your communication and marketing strategy with the right triggers and messaging.

- Increase touch-points with your company by finding the right problem behaviour fit and building trust by solving frequent annoyances, or urgent or costly problems.

- # REQUIREMENT ANALYSIS

- **Functional requirement**

- 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.

• Image classification, object detection, segmentation, faces recognition.

• Classification of crystal structure using a convolutional neural network

• Nutrition is 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, fibre, 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 brand-new 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 analyses the image and detects the nutrition based on the fruits like (Sugar, Fibre, Protein, Calories, etc.)

• The Ultimate Workout at Home Solution This fitness AI software is designed with personalized training regimens for each individual. It began as "gym only software," but has now improved its system to satisfy "at home fitness" expectations.

• You take 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-hourassistance and dietary recommendations.

For Example:

  • The comparison of the proposed model with the 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.
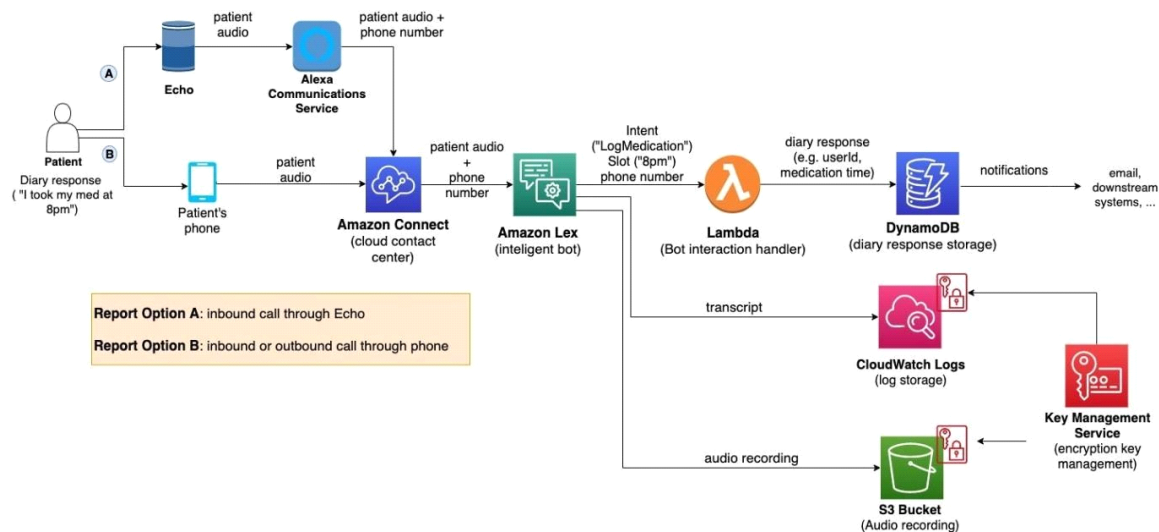
• I.e. metabolic demands, and the dietary amount which will satisfy those needs, i.e. efficiency of utilization, thus: dietary requirement = metabolic demand/efficiency of utilization.

• PROJECT DESIGN

• Data Flow Diagram
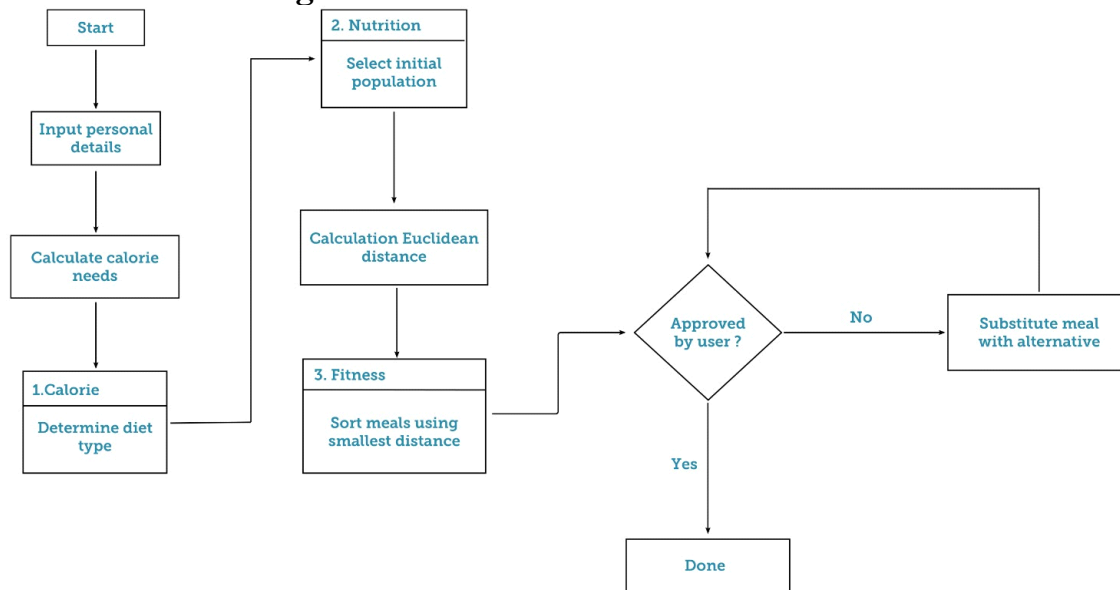
• Solution & Technical Architecture

• PROJECT PLANNING & SCHEDULING

• Sprint Planning & Estimation

Sprint	Duration	Sprint Start Date	Sprint End Date (Planned)
Sprint-1	6 Days	24 Oct 2022	29 Oct 2022
Sprint-2	6 Days	31 Oct 2022	05 Nov 2022
Sprint-3	6 Days	07 Nov 2022	12 Nov 2022
Sprint-4	6 Days	14 Nov 2022	19 Nov 2022

- **CODING AND SOLUTIONING**

- **Feature**

Initializing The Model

```python
model = models.Sequential()
```

Adding CNN Layers

```python
model.add(layers.Conv2D(32, (3, 3), activation='relu', input_shape=(32, 32, 3)))
model.add(layers.MaxPooling2D((2, 2)))
model.add(layers.Conv2D(64, (3, 3), activation='relu'))
model.add(layers.MaxPooling2D((2, 2)))
model.add(layers.Conv2D(64, (3, 3), activation='relu'))
model.add(layers.Flatten())
model.add(layers.Dense(64, activation='relu'))
model.add(layers.Dense(10))
```

Adding Dense Layer

- **Feature**

```html
<div class="topnav-right"style="padding-top:0.5%;">

    <a class="active" href="{{ url_for('home')}}">Home</a>
    <a  href="{{ url_for('image1')}}">Classify</a>
    </div>
</div>
</div>
<br>
<br>
<br>
<br>
<br>
<br>
<br>
<br>
<h1>

<center>


<h3>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.</h3>
```

```html
{% extends "imageprediction.html" %} {% block content %}
<div style="float:left">
<br>
<br>
<h5><font color="black" size="3" font-family="sans-serif"><b>Upload image to classify</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">
    </form>

    <center> <div class="image-section" style="display:none;">
        <div class="img-preview">
            <div id="imagePreview">
            </div></center>
        </div>
        <center><div>
            <button type="button" class="btn btn-primary btn-lg " id="btn-predict">Classify</button>
        </center></div>
    </div>

    <div class="loader" style="display:none;margin-left: 450px;"></div>

    <h3 id="result">

        <span><p style="padding-top: 25px;"><h4>Food Classified is : <h4><b>{{showcase}}{{showcase1}}</p> </span>
    </h3>
```



```html
<!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>Predict</title>
    <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>
body
{
    background-image: url("https://i.pinimg.com/originals/be/21/1a/be211ad5043a8d05757a3538bdd8f450.jpg");
    background-size: cover;
}
.bar
{
margin: 0px;
padding:20px;
background-color:white;
opacity:0.6;
color:black;
font-family:'Roboto',sans-serif;
font-style: italic;
border-radius:20px;
font-size:25px;
}
```
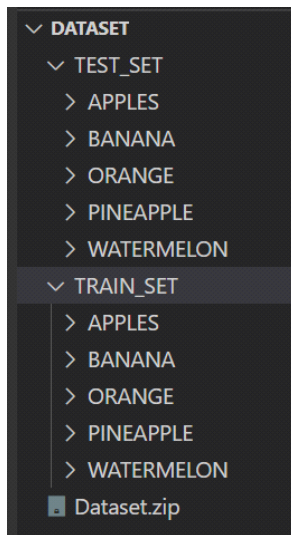
```
1    <html lang="en" dir="ltr">
2    <head>
3    <style>
4
5    </style>
6        <meta charset="utf-8">
7        <title>Nutrition Image Analysis</title>
8        <link rel="shortcut icon" href="{{ url_for('static', filename='diabetes-favicon.ico') }}">
9        <link rel="stylesheet" type="text/css" href="{{ url_for('static', filename='style.css') }}">
10       <script src="https://kit.fontawesome.com/5f3f547070.js" crossorigin="anonymous"></script>
11       <link href="https://fonts.googleapis.com/css2?family=Pacifico&display=swap" rel="stylesheet">
12   </head>
13
14       <!-- Result -->
15       <div class="results">
16            <p style="padding-top: 150px; color:🔲blue;"><h4 style="color:🔲blue;">Food Classified is: <h4><b><h
17
18       </div>
19       <br>
20       <br>
21
22   </div>
23   </body>
24   </html>
```
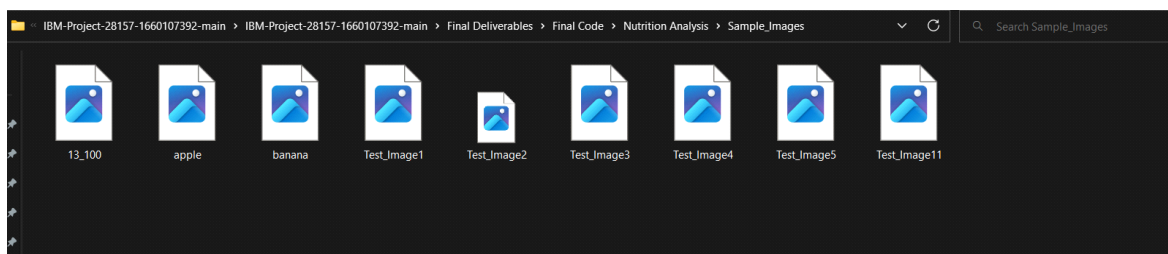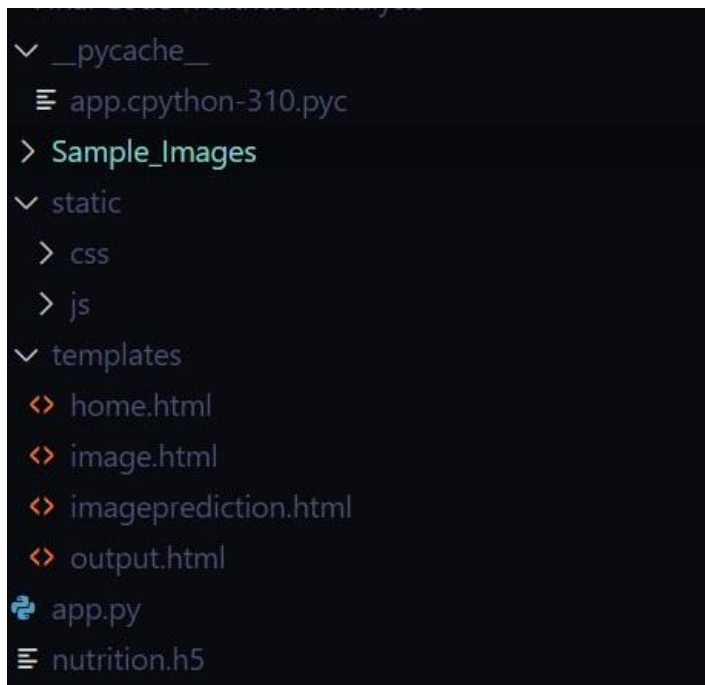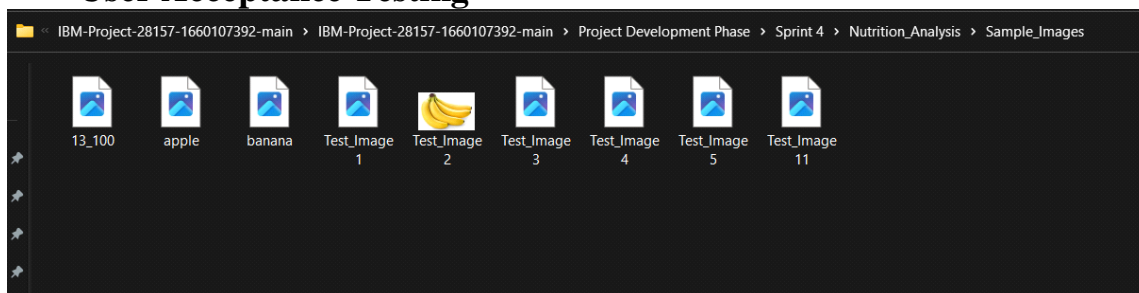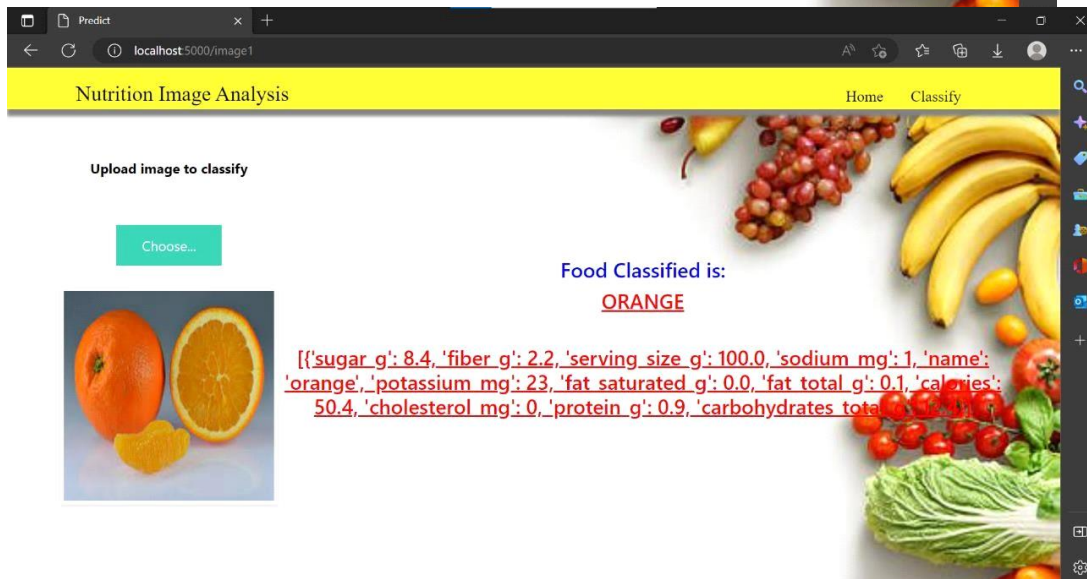

- **Dataset**

- **TESTING**
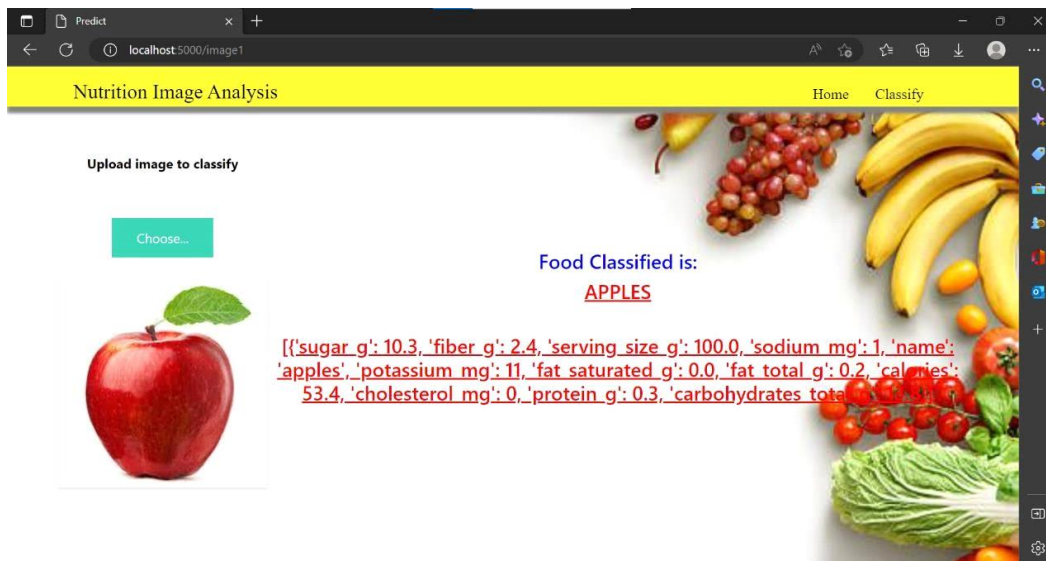
- **Test cases**

- **User Acceptance Testing**

- **RESULTS**

Sample Output Images

- ## ADVANTAGES

- Food pattern is an important factor to prevent diseases and improve lifestyle. Studies show that changes in diet affect the evolution of chronic non-communicable diseases (CNCD) like cardiovascular diseases, obesity, and depression. It is highly recommended to change eating habits to prevent non-communicable diseases. Artificial Intelligence in nutrition is becoming popular for prevention and treatment.

- Analysis of personal health metrics has become possible because of advances in Artificial Intelligence.

- While artificial intelligence is increasing its part in our daily lives, AI-based diet planning could be created where it will be dependent on user's data and machine learning to create a comprehensive meal plan for every user based on their actual metabolic need.

DISADVANTAGES

- If the dataset has not been properly uploaded ,then the detection of images can be difficult.

- If the images are not clear, the nutrition analysis can be difficult.

- The user's health condition are not described.

- ## CONCLUSION

By the end of this project we will

- Know fundamental concepts and techniques of Convolutional NeuralNetwork.

- 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 pre-processing techniques.

- ## 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 analyser 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 behaviours and repetitive exercise patterns and use the data to guide you towards your fitness journey and diet plans.

- **APPENDIX**

Github Link :

https://github.com/IBM-EPBL/IBM-Project-50260-1660901171

Demonstration Video Link :

https://drive.google.com/file/d/1bXboobR8tIlG8kzPmAZ905_s6nNNk

TXV/edit