RMK ENGINEERING COLLEGE

(An Autonomous Institution)

R.S.M. Nagar, Kavaraipettai, Gummidipoondi Taluk,
Thiruvallur District601 206.

PROJECT

AI-powered Nutrition Analyser for Fitness Enthusiasts

DONE BY

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1. INTRODUCTION

Project Overview

It is an AI based project where by seeing an image shape and colour it will predicate which item it is. When we click that image then it will show all it's nutritions, calories, calcium, fat, carbohidrades etc.

The food pattern is one of the modifiable factors for improving lifestyle and disease prevention. It is known that changes in diet have an effect on the evolution of chronic noncommunicable diseases (CNCD) of high prevalence, such as obesity, depression, anxiety, type 2 diabetes, and cardiovascular diseases. In order to prevent the CNCD, changing eating habits is strongly recommended. In addition, physical fitness, through systematized physical activities or that increase daily caloric expenditure, also contributes to the prevention of CNCD. Precision medicine, or precise health, is an approach for disease treatment and prevention that considers individual variability in genes, environment, and lifestyle. The applying of

precision medicine has been broadly improved by the recent development of the large-scale biologic database, powerful methods for characterizing patients, and the use of high and smart technology. It is important to consider the computational tools for analyzing large data sets and, in this way, health-care providers will depend on electronic clinical decision support to quickly make appropriate treatment decisions. Computer systems that have a certain degree of intelligence and human/expert independence to infer about the preexisting data, in order to support the decision, could be useful, since the data generated require rapid and reliable analysis from a large number of variables. Among the available computational tools, artificial intelligence (AI) has gained more and more attention recently, since it is able to learn and model linear and nonlinear relationships between variables by constructing an input-output mapping such that hidden and extremely useful information for decision-making is revealed and interpreted. Although AI is not yet widely used in the areas of nutrition and fitness, it was found that the current technology available (information technology,

several sensors, the use of nanotechnology and the advent of computers, IPhones, and smartphones) is favorable to the application of AI, since a large amount of data is collected by these technologies and, therefore, AI could be very useful in their mining. This chapter provides a discussion about the importance of nutrition and fitness for health and well-being; what is precision medicine, AI, precision nutrition, and precision fitness; how AI could help with precision nutrition and precision fitness; decision-making algorithm for nutritional meal planning/dietary menu planning; AI-based diet and supplements; AI used in genetic tests for precision nutrition and fitness; AI approach to nutritional meal planning for cancer, cardiovascular diseases, obesity, T2D patients; AI-based nutrition and fitness support systems and apps and some challenges and future perspectives.

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Purpose

The food pattern is one of the modifiable factors for improving lifestyle and disease prevention. It is

known that changes in diet have an effect on the evolution of chronic noncommunicable diseases (CNCD) of high prevalence, such as obesity, depression, anxiety, type 2 diabetes, and cardiovascular diseases. In order to prevent the CNCD, changing eating habits is strongly recommended. In addition, physical fitness, through systematized physical activities or that increase daily caloric expenditure, also contributes to the prevention of CNCD. Precision medicine, or precise health, is an approach for disease treatment and prevention that considers individual variability in genes, environment, and lifestyle. The applying of precision medicine has been broadly improved by the recent development of the large-scale biologic database, powerful methods for characterizing patients, and the use of high and smart technology. It is important to consider the computational tools for analyzing large data sets and, in this way, health-care providers will depend on electronic clinical decision support to quickly make appropriate treatment decisions. Computer systems that have a certain degree of intelligence and human/expert independence to infer about the preexisting data, in

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planning/dietary menu planning; AI-based diet and supplements; AI used in genetic tests for precision nutrition and fitness; AI approach to nutritional meal planning for cancer, cardiovascular diseases, obesity, T2D patients; AI-based nutrition and fitness support systems and apps and some challenges and future perspectives.

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2.1 LITERATURE SURVEY

2.2Existing problem

Neutrino delivers nutrition-based data services and analytics to its users and wants to turn intoaleading 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 datacompilation. The application relies on Artificial Intelligence to produce custom data related to smart caloriecounter powered by AI. Their artificial intelligence learns an individual’s tastes, preferences, andbody type. All of this is packaged in a comprehensive nutrition and activity tracker.

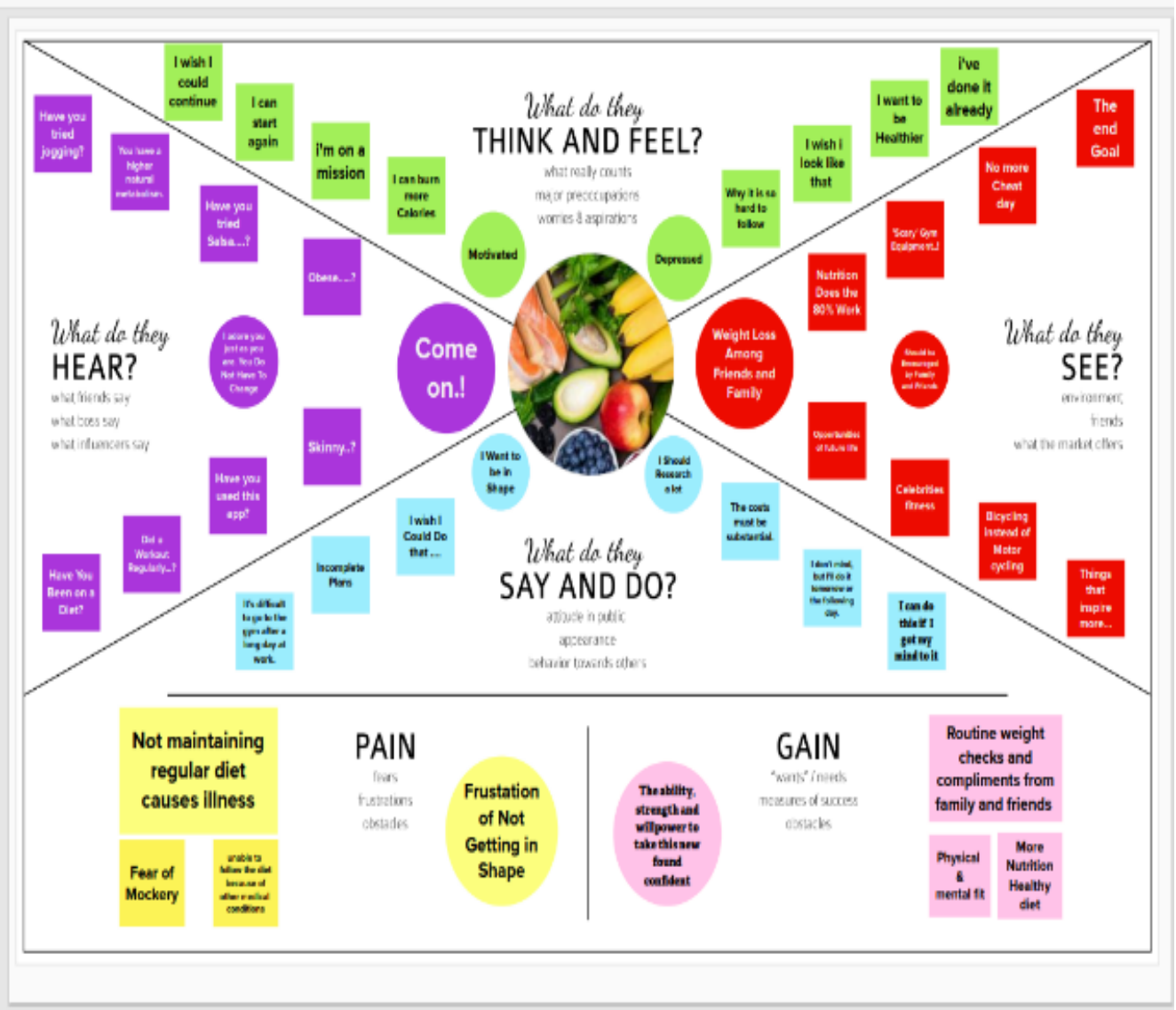
2.3 Problem Statement Definition

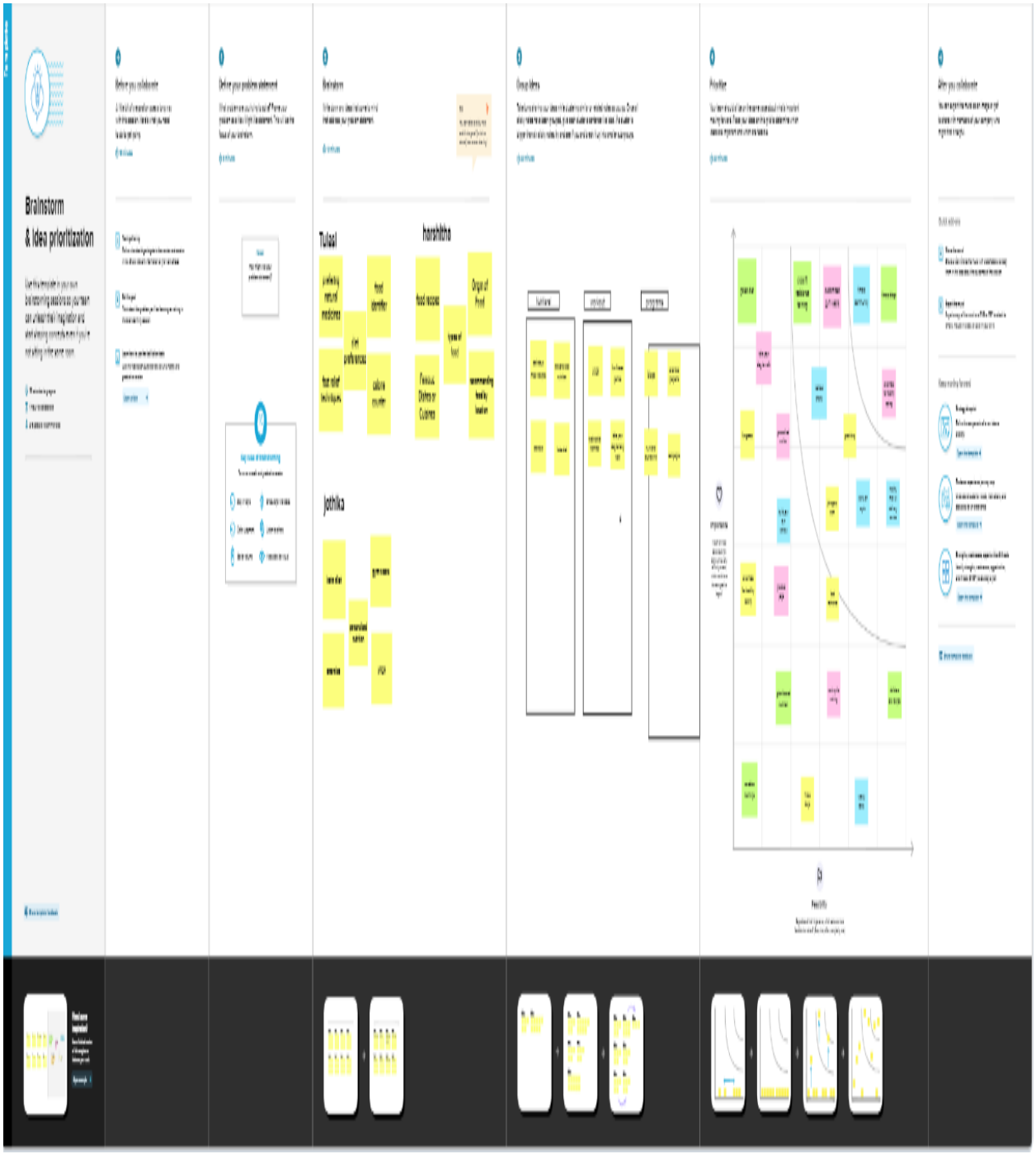
Food is essential for human life and has been the concern of many healthcare conventions. Nowadays new dietary assessment and nutrition analysis tools enable more opportunities to help people understand their daily eating habits, exploring nutrition patterns and maintain a healthy diet. Nutritional analysis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

I am	The fitness Analyst, who is in need of an assistance to choose to my best food for my health based on nutrition.
I'm trying to	Use the recent technologies to check the nutrition of fruits and choose my consumption based on it.
But	I am unaware of the existing technology that can help me to guess the nutrition of various fruits for the given input.
Because	I don't want to make any wrong decision about nutrition.
Which makes me feel	I'm not capable of choosing the right food for the maintenance of my health, thus leading a healthy life.

IDEATION & PROPOSED SOLUTION

Empathy map





Ideation & Brainstorming

3 Proposed Solution

- **Problem Statement (Problem to be solved)**

  A regular person must use cutting-edge AI-based analyzing software to identify fruits and vegetables based on color, texture, form, and other characteristics. At the time of identification, the user must also be aware of the nutritional content of that specific edible.

- **Idea / Solution description**

  Main Solution:

  Clear and proper identification of the given input data.

  Provide nutritional facts based on the obtained data.

  Fitness analysis and maintenance as per the user's body conditions Additional benefits:

  Analysis of daily dietary requirements

- **Novelty / Uniqueness**

  The availability of fitness plans with addon bonuses

  Suggestion of home remedies and simple solutions for basic problems.

An individualized food plan based on health condition and deficiency.

Allowing for diet flexibility helps promote a healthy and effective eating pattern

- **Social Impact / Customer Satisfaction**

  Healthy lifestyle development

  Constant calorie management monitoring results in a fitness mindset.

- **Business Model (Revenue Model)**

  Consultation with nearest trainers and nutritionist for personalized plans.

  Adopt a specialized diet plan under the direction of an expert.

  Advertise and offer nutritional supplements and fitness gear.

  Promotion for fitness centers and hospitals.

- **Scalability of the Solution**

  Improving accuracy by expanding the data collection using user input data

  Storage requirements of a specific food.

  User friendly UI for everyone to use and get benefit from it

Problem Solution fit

- Customer segment(s)
- Jobs-to-be-done/problem
- Triggers
- Emotions : before/after
- Customer constrains
- Available solution
- Problem root cause
- Behaviour
- Your solutions
- Channels of behaviour

4.REQUIREMENT ANALYSIS

4.1 Functional requirement

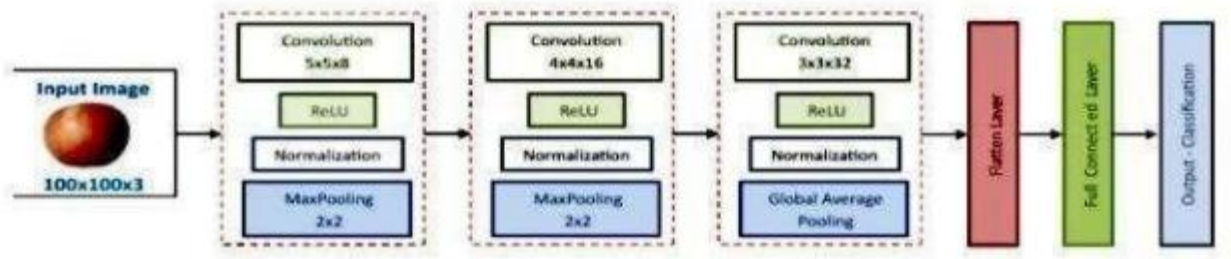
- It will generate the diet plan as well as monitor the user's health to classify the category of the disease and to create the diet plan. It will also reduce the cost of consulting the person nutritionist.
- The task of food detection/classification is not easy as it seems. All possible options related to the given Image.
- Image classification, object detection, segmentation, face 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, 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 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 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 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-hour assistance and dietary recommendations.

For Example:

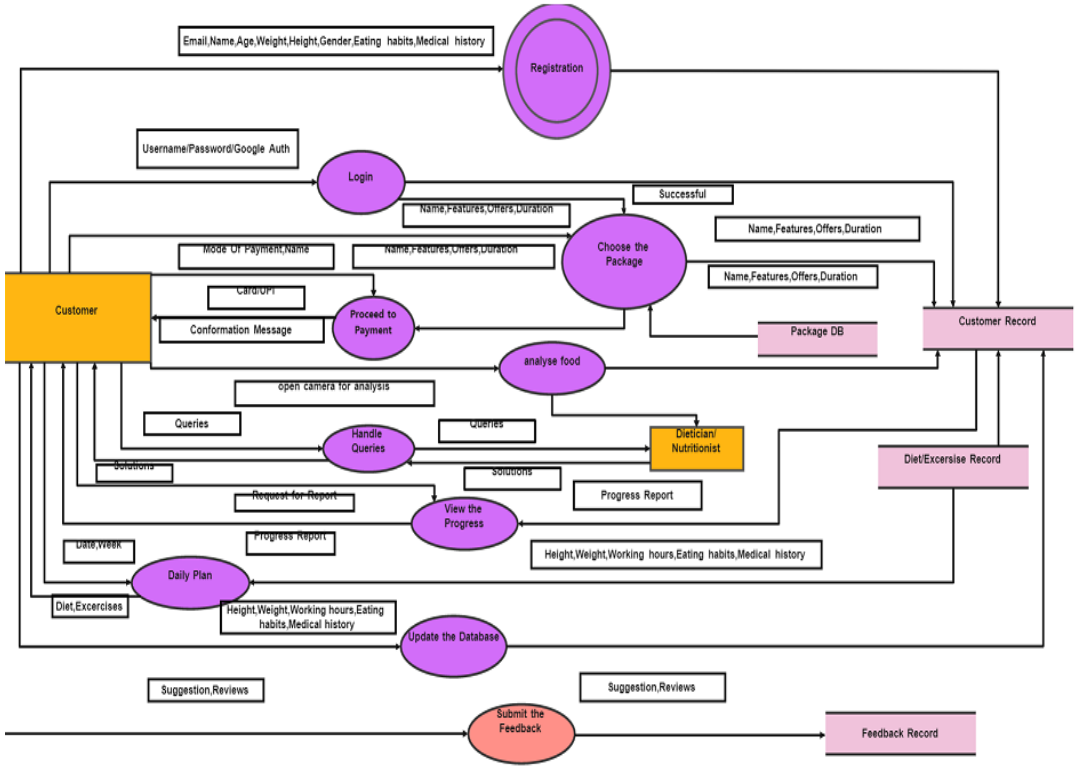


- The comparison of the proposed model with the conventional models shows that the results of this model are exceptionally good and promising to use in real-world applications.
- This sort of higher accuracy and precision will work to boost the machine’s general efficiency in fruit recognition more appropriately.

- 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.

5 PROJECT DESIGN

5.1 Data Flow Diagrams



5.2 Solution requirements (functional and non-functional) & Technical Architecture

Functional Requirements:

- **User Registration**

  Registration through Form

  Registration through Gmail

  Registration through LinkedIn

- **User Confirmation**

  Confirmation via Email Confirmation via OTP
- **User Login**

  Login through Google Login through Email
- **Choose package**

  Selection of desired package
- **Generate the daily plan**

  Daily plans will be generated by dietician
- **Manage progress report**

  Gathering information from database and generating report
- **Query**

  The user can ask for changes in plan

Non-Functional Requirements

- **Usability**

  Easy to use with interactive User Interface
- **Security**

  User can access only their personal information and not that of other users.

- **Reliability**

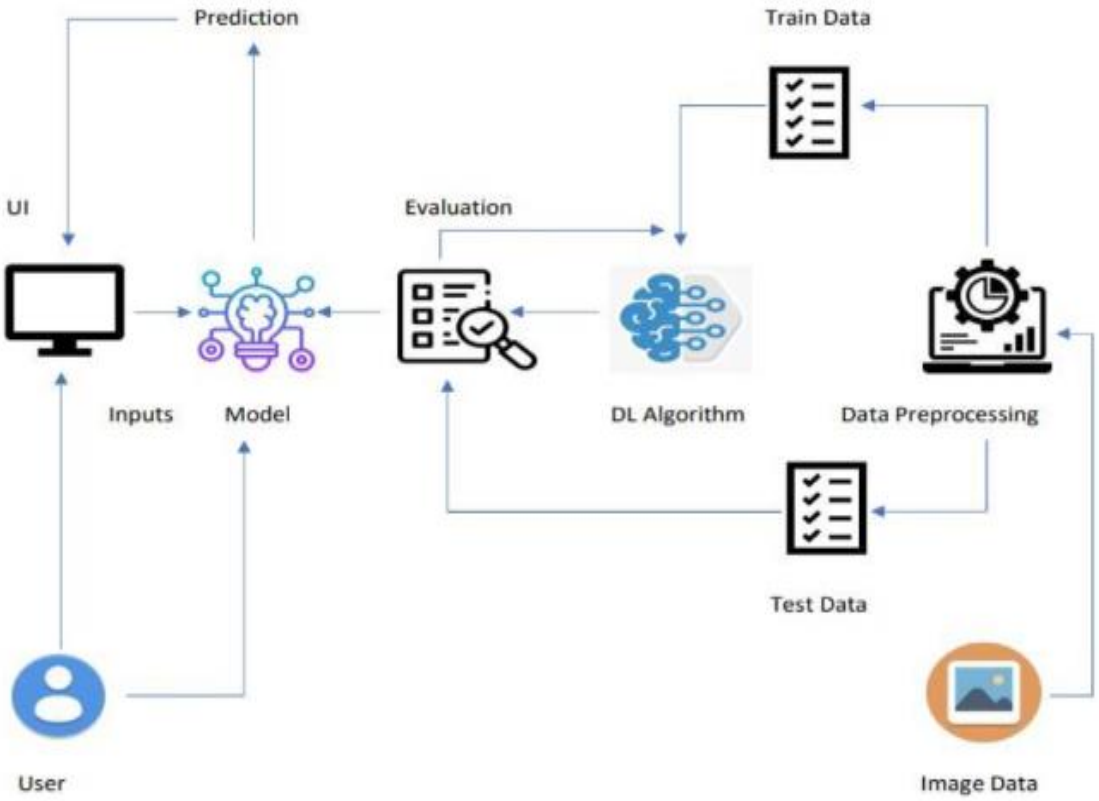
  The average time of failure shall be 7 days
- Performance

  The results has to be shown within 10 sec
- **Availability**

  The dietician shall be available to users 24 hours a day, 7 days a week.
- **Scalability**

  Supports various food items

Technical Architecture



5.4 User Stories

User Stories

Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Google	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Microsoft	I can access the Dashboard with Microsoft.	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password	I can login the Application by entering password	High	Sprint-1
	Main Interface	USN-6	As a user I can view my calorie intake by clicking photo of the food I eat	Access the proper information about the nutrition and the calorie intake	High	Sprint-2
	Package DB, Dashboard	USN-7	As a user I can choose variety of packages based on my requirement	Selecting an appropriate package	Medium	Sprint-2
Customer Care Executive	Feedbacks DB , Tollfree number, chat bot	USN-8	As a customer care executive, I collect feedbacks from customers	Maintaining proper environment for the customers	High	Sprint-2
Dietitian	Customer Record	USN-9	As a dietitian I provide daily plans for the betterment of the user	Positive results from user	High	Sprint-2
Administrator	Dashboard	USN-10	As an administrator I take care of all the operations which takes place in the app	Zero issues from the user	High	Sprint-2

6 PROJECT PLANNING & SCHEDULING

6.2 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Pre- requisites forModel Building	USN-0	As a developer I have to collect different type of data possible and other data supporting the model	5	High	Padamata Tulasi Venkata srivarshini Jothika B Kuppam Harshita
Sprint-1		USN-1	As a user, I can register forthe application by entering my email, password, and confirming my password	5	High	Padamata Tulasi Venkata srivarshini Jothika B Kuppam Harshita
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	5	High	Padamata Tulasi Venkata srivarshini Jothika B Kuppam Harshita
Sprint-2		USN-3	As a user, I will receive confirmation email once I have registered for the application	3	Low	Padamata Tulasi Venkata srivarshini Jothika B Kuppam Harshita
Sprint-1		USN-4	As a user, I can register forthe application through Gmail	3	Medium	Padamata Tulasi Venkata srivarshini

						JothikaB Kuppam Harshita
Sprint-1	Login	USN-5	As a user, I can log into the application by entering email& password	5	High	Padamata Tulasi Venkata srivarshini Jothika B Kuppam Harshita
Sprint-2	Module building	USN-6	As a user, I can log into the application by entering email& password	5	High	Padamata Tulasi Venkata srivarshin Jothika B Kuppam Harshita
Sprint-2	Main Interface	USN-7	As a user I can view my calorie intake by clicking photo of the food I eat	5	High	Padamata Tulasi Venkata srivarshini Jothika B Kuppam Harshita
Sprint-2	Package, Dashboard	USN-8	As a user I can choose variety of packages basedon my requirement	4	Medium	Padamata Tulasi Venkata srivarshini Jothika B Kuppam Harshita

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint - 3	Diet Plan for free users	USN - 9	As a dietitian I provide daily plans for the betterment of the user	5	High	Padamata Tulasi Venkata srivarshini Jothika B Kuppam Harshita
Sprint - 3	Personalized user food habit -based diet plan for premium users	USN - 10	As a Premium User, I can choose to follow diet plan based on my food habits orthe generalized one	3	Medium	Padamata Tulasi Venkata srivarshini Jothika B Kuppam Harshita
Sprint - 2	User image Analysis	USN - 11	As a user I can track my calorie intake, and know about my food in detail.	5	High	Padamata Tulasi Venkata srivarshini Jothika B Kuppam Harshita
Sprint - 3	Improve efficiency of AI model	-	As a developer I have to give a better model that will analyse food precisely and provide accurate results	3	Medium	Padamata Tulasi Venkata srivarshini Jothika B Kuppam Harshita
Sprint - 2	User Analysis record	USN - 12	As a user, I can check the previous records and I can analyse my food habits	4	Medium	Padamata Tulasi Venkata srivarshini Jothika B Kuppam Harshita
Sprint - 4	Fitness tips and basic exercises	USN - 13	As a user I can follow some fitness tips and I can maintain weight as required	5	Medium	Padamata Tulasi Venkata srivarshini Jothika B Kuppam Harshita

Sprint - 4	Home remedies	USN - 14	As a user I can follow some natural home remedies for common diseases like (cold, cough ,fever) and treat myself	5	High	Padamata Tulasi Venkata srivarshini Jothika B Kuppam Harshita
Sprint - 4	Optimize the user experience with the app		As a developer I have to provide clean and smooth interface to my user	5	High	Padamata Tulasi Venkata srivarshini Jothika B Kuppam Harshita
Sprint - 4	Payment Gateway for purchasing package		As a developer I have to create a environment which makes user feel ease to complete his/her Payments with various Payment options	3	Medium	Padamata Tulasi Venkata srivarshini Jothika B Kuppam Harshita

6.3 Sprint Delivery Schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20ADD	6 Days	24 Oct 2022	29 Oct 2022	23	28 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	26	04 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	11	11 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	18	17 Nov 2022

6.4 Reports from JIRA

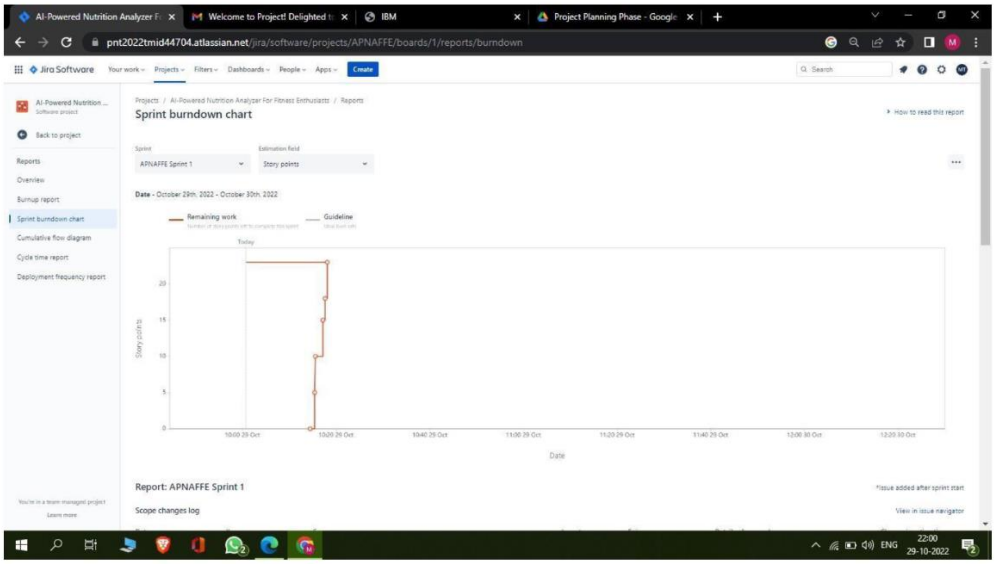
Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let'scalculate the team's average velocity (AV) per iteration unit (story points per day)

$$AV = \text{Sprint duration} / \text{velocity} = 20 / 10 = 2$$

Burndown Chart:

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to anyproject containing measurable progress over time.



7.1 Coding&Solutions(Explain the features added in the project along with code

Feature 1

```
<html lang="en" dir="ltr">
<head>
<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>

    <!-- Result -->
    <div class="results">
        <p style="padding-top: 150px; color:blue;"><h4 style="color:blue;">Food Classified is: <h4><b><h4 style="color:red;"><u>{{showcase1}}<h4><br><h4 style="color:red;"><u>{{showcase}}<h4></p>

    </div>
    <br>
    <br>

  </div>
  </body>
</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><u>{{showcase}}{{showcase1}}</p> </span>
 </h3>

</div>
</div>
```

```
<!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;
```

```
font-style: italic;
border-radius:20px;
font-size:25px;
}
a
{
color:grey;
float:right;
text-decoration:none;
font-style:normal;
padding-right:20px;
}
a:hover{
background-color:black;
color:white;
border-radius:15px;
font-size:30px;
padding-left:10px;
}
.div1{
  background-color: lightgrey;
  width: 500px;
  border: 10px solid peach;
  padding: 20px;
  margin: 20px;
  height: 500px;
}
```

```
.header { position: relative;
      top:0;
      margin:0px;
      z-index: 1;
      left: 0px;
      right: 0px;
      position: fixed;
      background-color: #8B008B ;
      color: white;
      box-shadow: 0px 8px 4px grey;
      overflow: hidden;
      padding-left:20px;
      font-family: 'Josefin Sans';
      font-size: 2vw;
      width: 100%;
      height:8%;
      text-align: center;
    }
    .topnav {
  overflow: hidden;
  background-color: #FCAD98;
}

.topnav-right a {
  float: left;
  color: black;
```

```
  color: black;
  text-align: center;
  padding: 14px 16px;
  text-decoration: none;
  font-size: 18px;
}

.topnav-right a:hover {
  background-color: #FF69B4;
  color: black;
}

.topnav-right a.active {
  background-color: #DA70D6;
  color: black;
}

.topnav-right {
  float: right;
  padding-right:100px;
}
</style>
</head>
<body>
<div class="header">
<div style="width:50%;float:left;font-size:2vw;text-align:left;color:black; padding-top:1%;padding-left:5%;">Nutrtion
```

```
<body>
<div class="header">
<div style="width:50%;float:left;font-size:2vw;text-align:left;color:black; padding-top:1%;padding-left:5%;">Nutrtion
Image Analysis</div>
  <div class="topnav-right"style="padding-top:0.5%;">

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


</div>
<div class="container">
      <center>
<div id="content" style="margin-top:2em">{% block content %}{% endblock %}</div></center>
    </div>
</body>

<footer>
    <script src="{{ url_for('static', filename='js/main.js') }}" type="text/javascript"></script>
</footer>

</html>
```

Feature 2

```
.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;
```

```css
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; /* Light grey */
    border-top: 8px solid #3498db; /* Blue */
    border-radius: 50%;
    width: 50px;
    height: 50px;
    animation: spin 1s linear infinite;
}
```

```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:hidden;
}

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

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

```css
  /* 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;
}
```

```javascript
$(document).ready(function () {
    // Init
    $('.image-section').hide();
    $('.loader').hide();
    $('#result').hide();

    // Upload Preview
    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);
    });

    // Predict
```

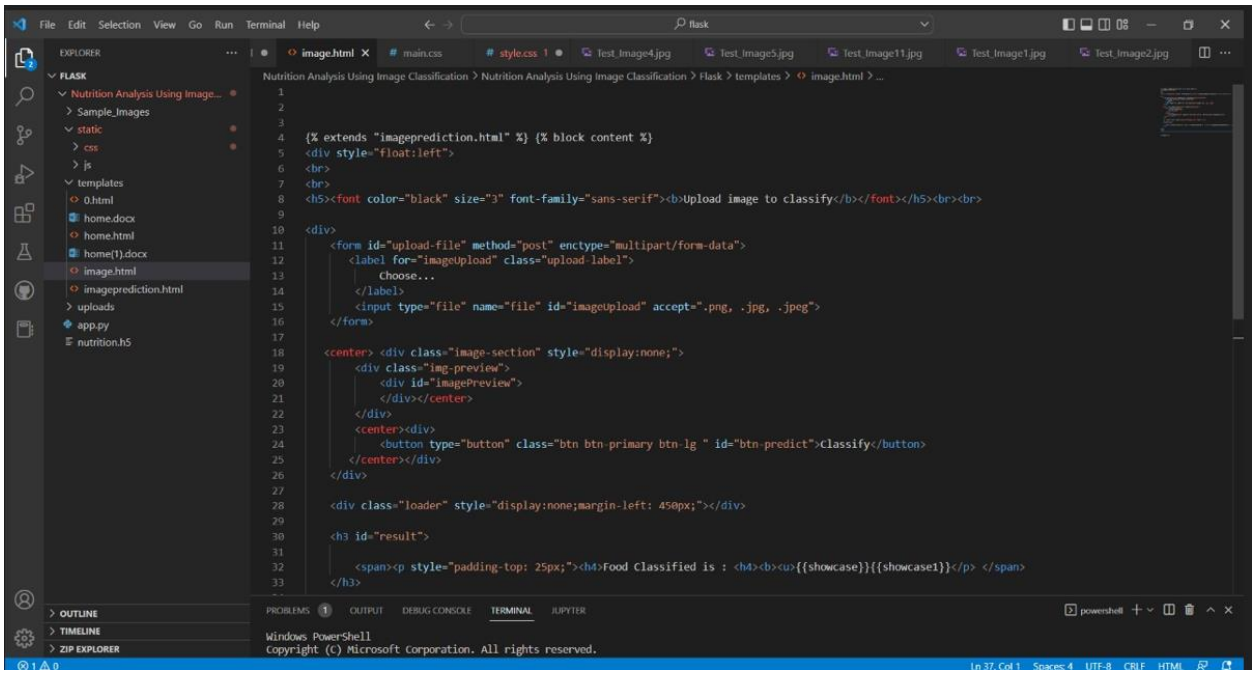
```
    // Predict
    $('#btn-predict').click(function () {
        var form_data = new FormData($('#upload-file')[0]);

        // Show loading animation
        $(this).hide();
        $('.loader').show();

        // Make prediction by calling api /predict
        $.ajax({
            type: 'POST',
            url: '/predict',
            data: form_data,
            contentType: false,
            cache: false,
            processData: false,
            async: true,
            success: function (data) {
                // Get and display the result
                $('.loader').hide();
                $('#result').fadeIn(600);
                $('#result').html(data);
                console.log('Success!');
            },
        });
    });
```

```
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 keras.models import Sequential, load_model#to load our trained model
from keras_preprocessing.image 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
```

.

8 TESTING

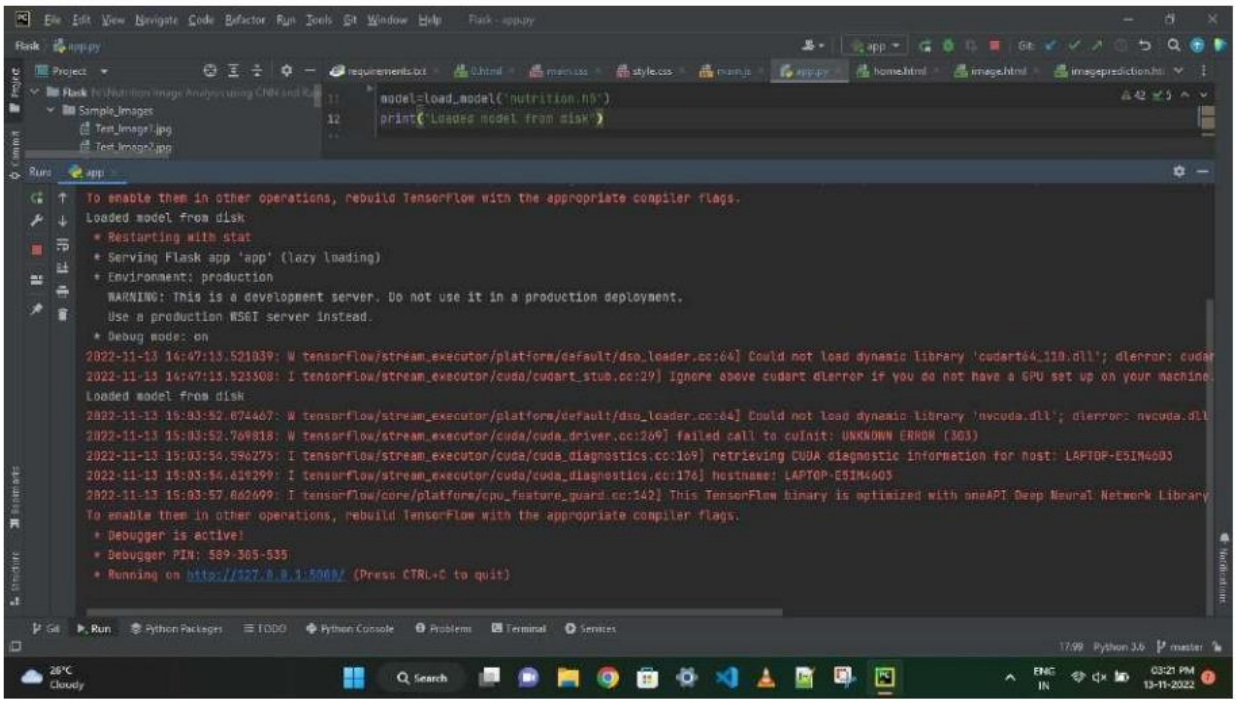
8.1 **Test Cases**



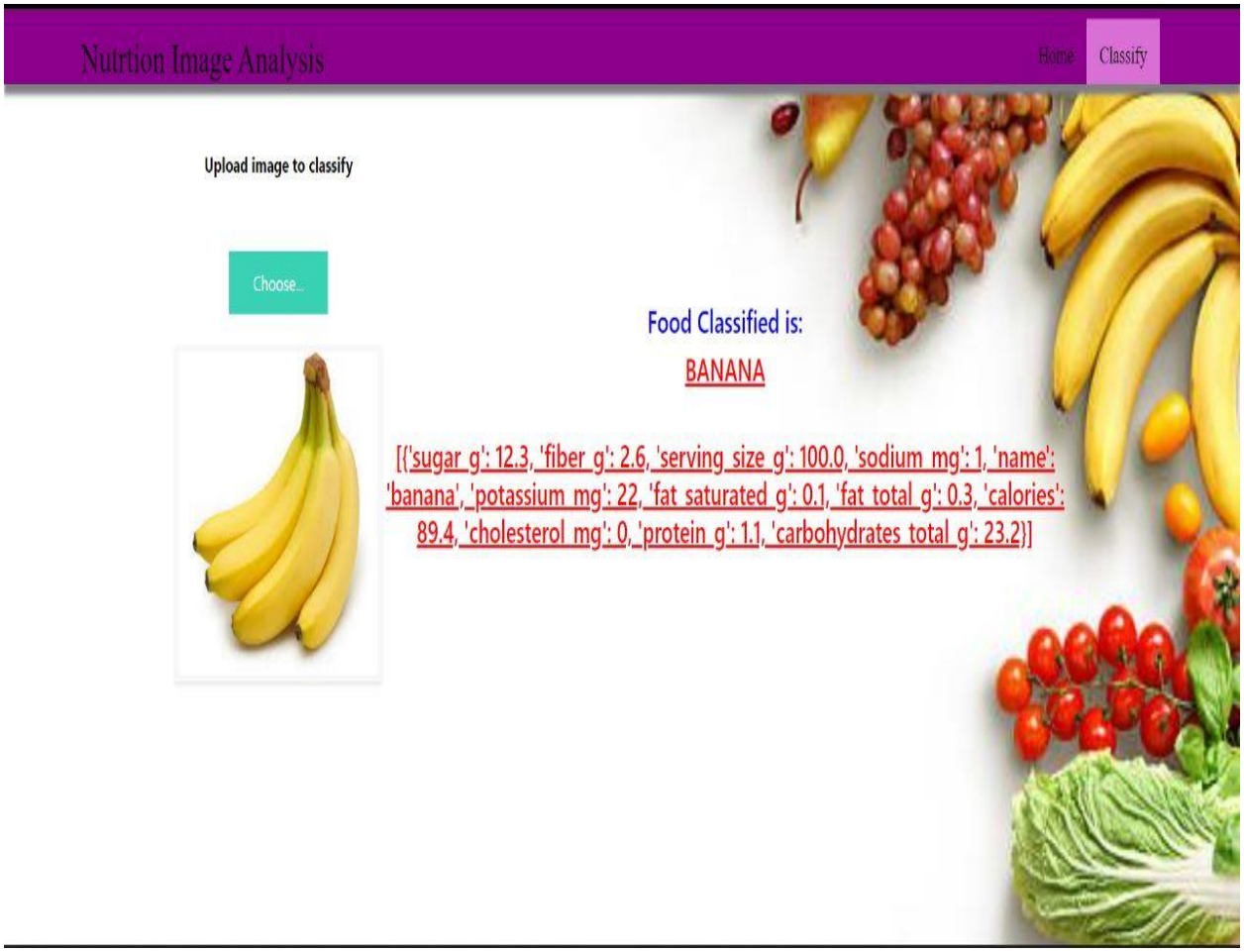
User acceptance testing

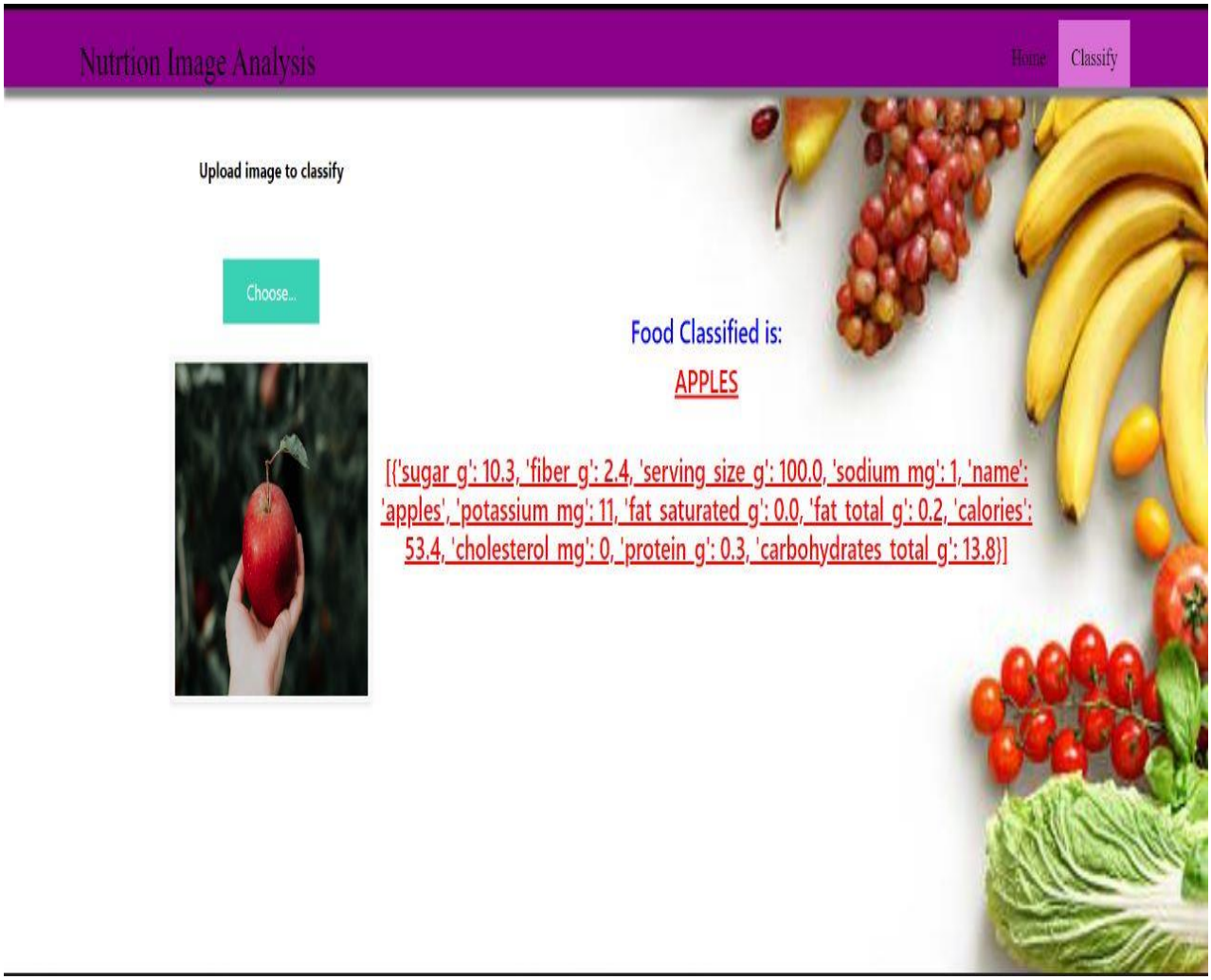
9 RESULTS

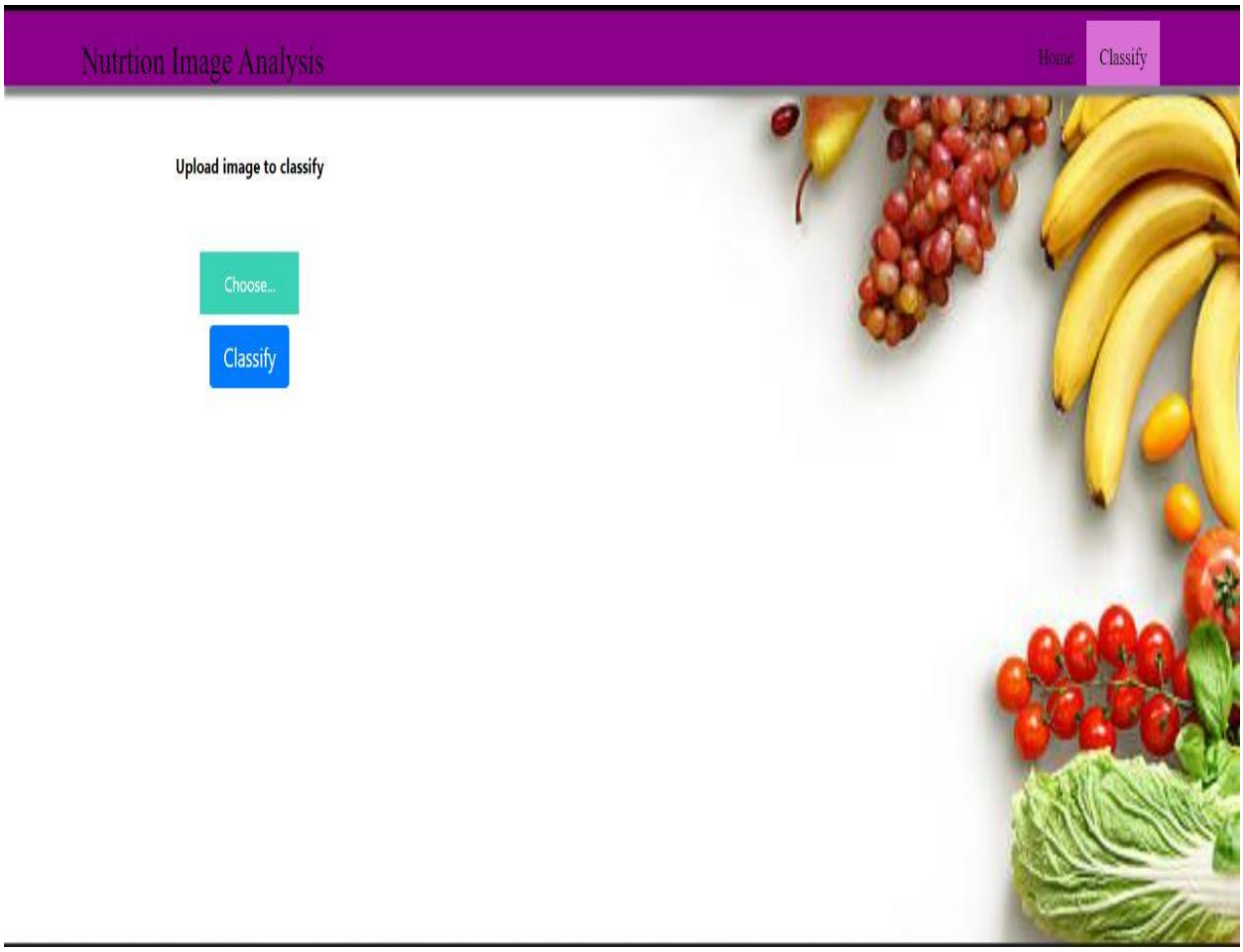
9.1 Performance Metrics

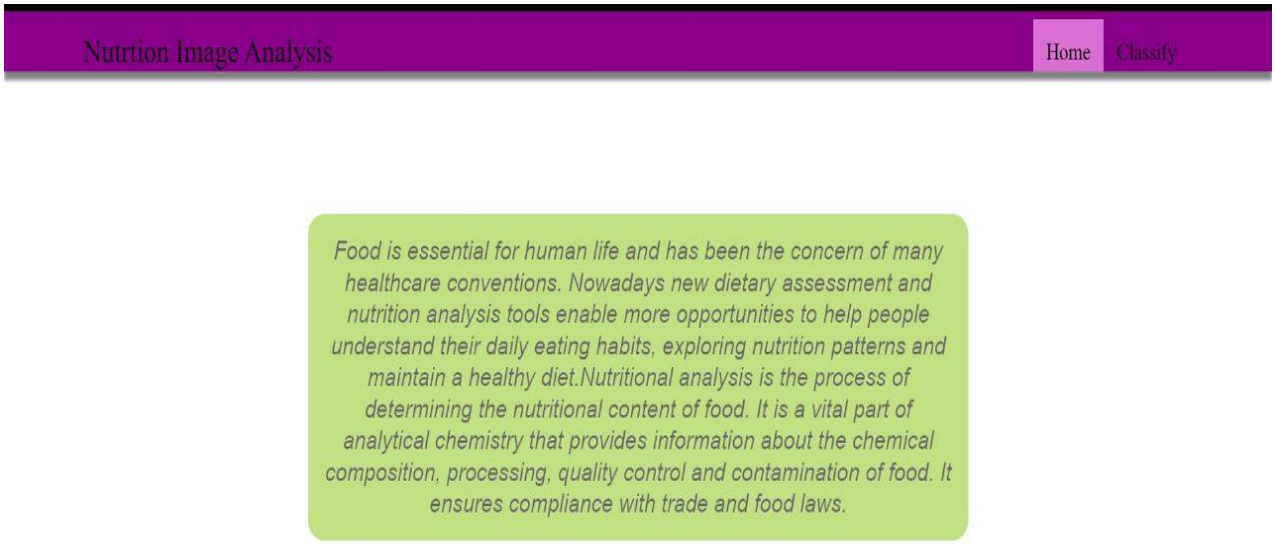


9.2 OUTPUT


Nutrtion Image Analysis
Home
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}]


Nutrtion Image Analysis
Home
Classify
Upload image to classify
Choose...
Food Classified is:
APPLES
[{'sugar_g': 10.3, 'fiber_g': 2.4, 'serving_size_g': 100.0, 'sodium_mg': 1, 'name': 'apples', 'potassium_mg': 11, 'fat_saturated_g': 0.0, 'fat_total_g': 0.2, 'calories': 53.4, 'cholesterol_mg': 0, 'protein_g': 0.3, 'carbohydrates_total_g': 13.8}]


Nutrtion Image Analysis
Home
Classify
Upload image to classify
Choose...
Classify



10. ADVANTAGES & DISADVANTAGES

Advantages:

One of the major goal of fruit image processing is to retrieve calorie and nutrient information from the given fruit image. In addition, automatic fruit recognition is beneficial to health care related applications, such as obesity management. They are capable of processing a real time application. Since the present smartphones can handle the high fruit image quality and focused on developing real time applications which capture image

then scan and automatically can detect the good quality of fruits. The system's main applications are:-

1. Eating a diet rich in vegetable and fruits as part of an overall healthy diet may reduce risk for heart disease.
2. Eating a diet rich in some vegetable and fruits as part of an overall healthy diet may protect against certain types of cancer.
3. Eating foods such as vegetables that are lower in calories per cup instead of some other higher calories food may be useful in helping to lower calories intake.

Disadvantages

For this implementation AI also needs to operate on the latest hardware and software to stay updated and meet the latest requirements, thus making it quite costly.They can complete tasks they have been developed or programmed for, If they are asked to complete anything else, they frequently fail or provide useless results,which can have

significant negative effects.Thus unable to make anything conventional.

11.1 CONCLUSION

By the end of this project we will

- Know fundamental 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.

12.1 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 is available in github

Github link: https://github.com/IBM-EPBL/IBM-Project-28878-1660118109