AI – POWERED NUTRITION ANALYZER FOR FITNESS ENTHUSIATSTS

TEAM ID: PNT2022TMID37892

Submitted by

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1. INTRODUCTION :

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.

1.1 PROJECT OVERVIEW:

The project is to building a model which is used for classifying the fruit depends on the difference characteristics like color, 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 analysis the image and detect the nutrition based on the fruits like (Sugar, Fiber, Protein, Calories, etc.).

1.2 PURPOSE:

Nutritional Analysis detects the exact nutritional value of any given food item. It determines the percentage of macro and micronutrients present in that food item as well as the presence of inhibitors, toxic chemicals, or any other new component. It is also important in nutrition mapping where a variety of food items are regularly being tested and included in the standardized book of Nutritive Value of Indian Foods by the Indian Council of Medical Research. Presences of inhibitors, toxic chemicals in various foods are tested in food nutrition analysis. And toxic chemicals like saponin, trypsin inhibitors, pathogens, etc. cause mild to serve aliments in the human body.

2 LITERATURE SURVEY:

S.NO	TITLE	JOURNAL	AUTHOR	CHALLENGES/FUTURE SCOPES
1	Precision nutrition: A systematic literature review	Information Technology Group, Wageningen University and Research, Wageningen, the Netherlands	Daniel Krik, Cagaty Catal	The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.
2	Evidence-based nutrition - Using a meta-analysis	South African Journal of Clinical Nutrition	H H Vorster, C S Venter, R L Thompson,	A meta-analysis is the structured result of a literature review in which results from several independent but related or comparable studies

S.NO	TITLE	JOURNAL	AUTHOR	CHALLENGES/FUTURE SCOPES
3	A Blind Man Leads a Blind Man? Personalised Nutrition-Related Attitudes, Knowledge and Behaviours of Fitness Trainers in Hungary	Faculty of Food Science, Szent István University, 1118 Budapest, Hungary;	Anna Kiss Laura Pfeiffer József Popp Judit Oláh Zoltán Lakner	"In efficiency of workout, 40% has the nutrition. If the client wants to lose weight, nutrition plays a role of 70%.
4	A SURVEY ON NUTRITION MONITORING AND DIETARY MANAGEMENT SYSTEM	St. Joseph's College, Tiruchirappalli, Tamil Nadu, India.	Kamakshi Priya Prakash Dr L Arokiam	Food image segmentation Feature extraction Food classification

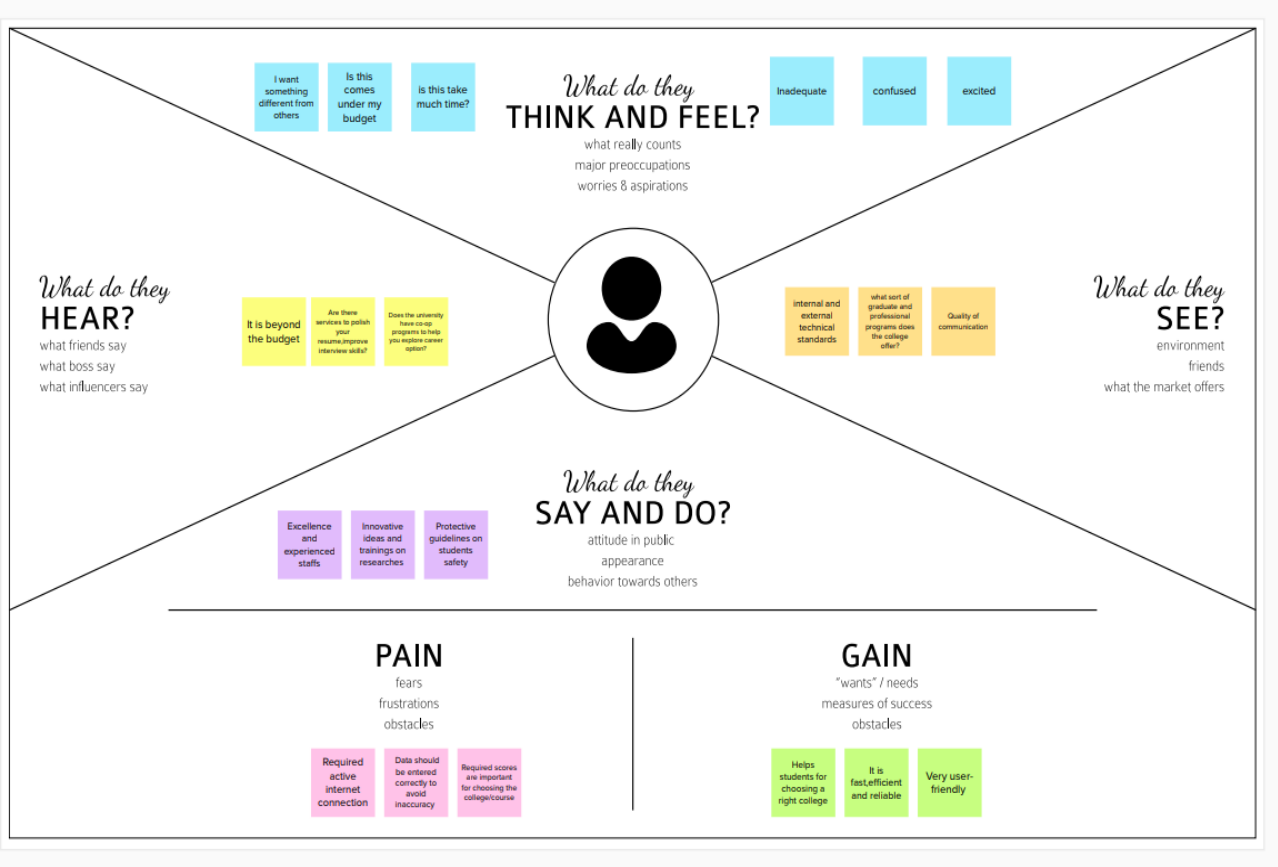
S.NO	TITLE	JOURNAL	AUTHOR	CHALLENGES/FUTURE SCOPES
5	THE IMPACT OF EXERCISE (PHYSICAL ACTIVITY) AND HEALTHY LIFESTYLE (EATING) AMONG THE YOUTH:	LAPIN AMK – Lapland University of Applied Sciences	Lucy Mburu-Matiba Thesis	Applying practical screening criteria Application of methodological screening criteria
6	Artificial Intelligence in Nutrients Science Research:	Chair and Department of Humanities and Social Medicine, Medical University of Lublin, 20-093 Lublin, Poland	Jarosław Sak Magdalena Suchodolska	AI in Physical Monitoring Systems

S.NO	TITLE	JOURNAL	AUTHOR	CHALLENGES/FUTURE SCOPES
7	Advances in dietary pattern analysis in nutritional epidemiology	*European Journal of Nutrition* **volume**	Christina-Alexandra Schulz, Kolade Oluwagbemigun & Ute Nöthlings	Food-based dietary guidelines focused Disease relationship oriented
8	**A review of statistical methods for dietary pattern analysis**	**Department of Health Statistics, School of Public Health, Shanxi Medical University, No.56 Xinjian South Road, Taiyuan, 030001, Shanxi province, China**	Junkang Zhao, Zhiyao Li, Qian Gao, Haifeng Zhao, Shuting Chen, Lun Huang, Wenjie Wang & Tong Wang *Nutrition Journal*	With the development of nutritional epidemiology over the past decades, there is extensive research on dietary patterns describing the features of dietary behavior or habits and explaining the relationship

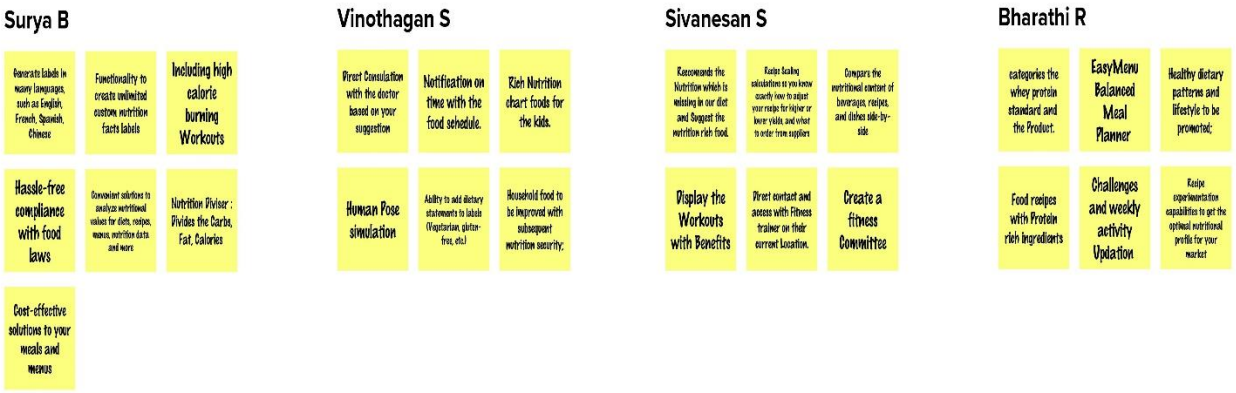
3 IDEATION AND PROPOSED SOLUTION

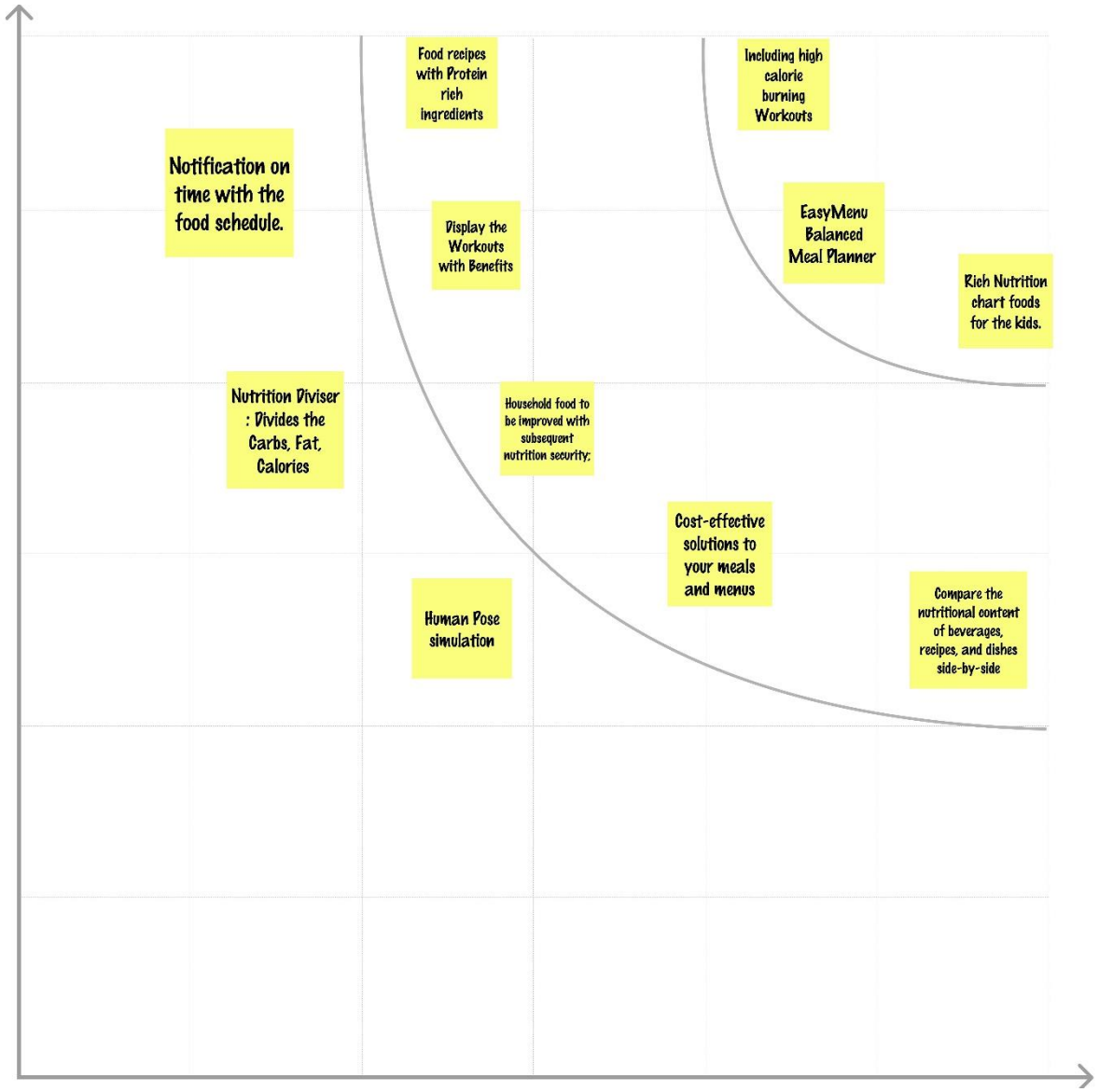
3.1. EMPATHY MAP CANVAS

AI-Powered Nutrition Analyzer for Fitness Enthusiasts



3.2 IDEATION AND BRAINSTORMING



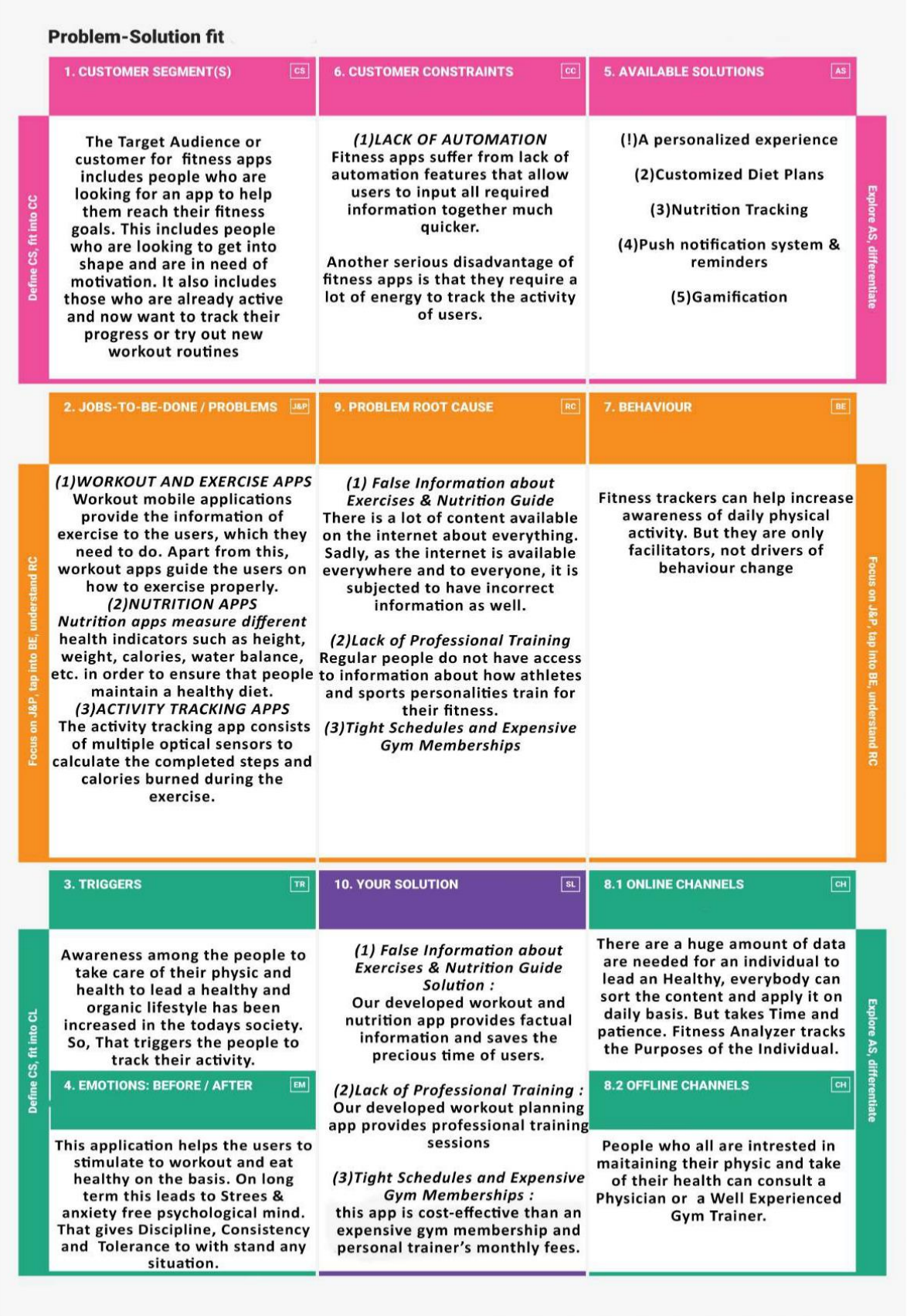

Food recipes with Protein rich ingredients
Including high calorie burning Workouts
Notification on time with the food schedule.
Display the Workouts with Benefits
EasyMenu Balanced Meal Planner
Rich Nutrition chart foods for the kids.
Nutrition Diviser : Divides the Carbs, Fat, Calories
Household food to be improved with subsequent nutrition security;
Cost-effective solutions to your meals and menus
Human Pose simulation
Compare the nutritional content of beverages, recipes, and dishes side-by-side

3.3 PROPOSED SOLUTION:

S.No	Parameters	Description
1	Problem Statement (Problem to be solved)	The model analyses the image and detect the nutrition based on the fruits like (Sugar, Fibre, Protein, Calories, etc.)
2	Idea / Solution description	**Tensor Flow** is an open-sourced end-to-end platform, a library for multiple machine learning tasks, while Keras is a high-level neural network library that runs on top of Tensor Flow. A **convolutional neural network (CNN)** is a type of artificial neural network used in image recognition and processing that is specifically designed to process pixel data.
3	Novelty / Uniqueness	Tracks and recommends the perfect diet plan needed for the person based on their and Maintenance calorie **BMI (Body Mass Index).**
4	Social Impact / Customer Satisfaction	**Accurate Food Nutrition** chart and providing value to customer that can help to prepare themselves a weekly proper diet. Based on the Solution of the Real time Fitness Enthusiasts and Trainer. **Artificial Intelligence** detects the algorithm on the person which plan may work and won't work
5	Business Model (Revenue Model)	Fitness Analyzer comes up with Premium version where customers can directly contact the Nutritional experts and Fitness Trainers. Also Community can be built so that people can add review about their fitness journey. This increases the Productivity and converts the product in terms of Revenue Model.

6	Scalability of the Solution	**Convolutional neural networks** solution consists of two Level solutions. Namely **Convolution & ReLu Layer**. A convolution converts all the pixels in its receptive field into a single value. **ReLu Layer** remove every negative value from the filtered image and replace it with zero

3.4 SOLUTION FIT TEMPLATE:



4. REQUIRMENT ANALYSIS:

4.1. FUNCTIONAL REQUIRMENTS:

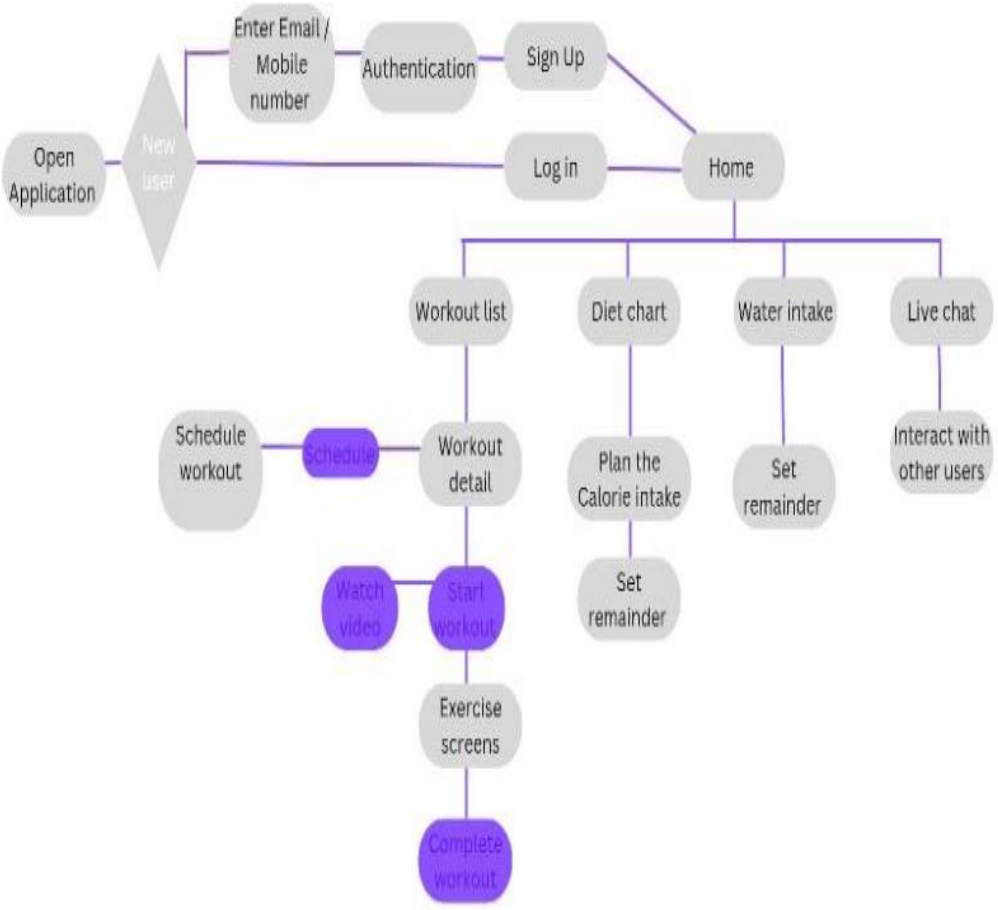
FR NO	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	• Registration through Gmail
FR-2	User Confirmation	• Confirmation via Email • Confirmation via OTP
FR-3	User Authentication	• Authentication Via Password
FR-4	User Details	• Enter the User age • Enter the User Height • Enter the User Weight
FR-5	Priority	• The system will provide the user to access the data bases inside the application and customize according to their basis.
FR-6	Features for User	• The user can customize their Nutrition Content Chart based upon their BMI and Weight goal to be achieved.

4.2. NON-FUNCTIONAL REQUIRMENTS:

FRNO	Non-Functional Requirement	Description
FR-1	Usability	The Application can be used by the Any kind of user who's having a basic knowledge about their Body and their Maintenance calories.
FR-2	Security	The Security system of the application is up to date the data keeps the data safe and secure.
FR-3	Reliability	The application system work all the day to keep pushing of the remainder notification of the Individual to take nutrients
FR-4	Performance	The Application works on a simple calculation mechanism which can well perform in any kind of System.
FR-5	Availability	The Application is generally designed for all every Operating system including both IOS & Android.
FR-6	Scalability	The Application is more dynamic so that user can adjust their Data and Chart anywhere, anytime.

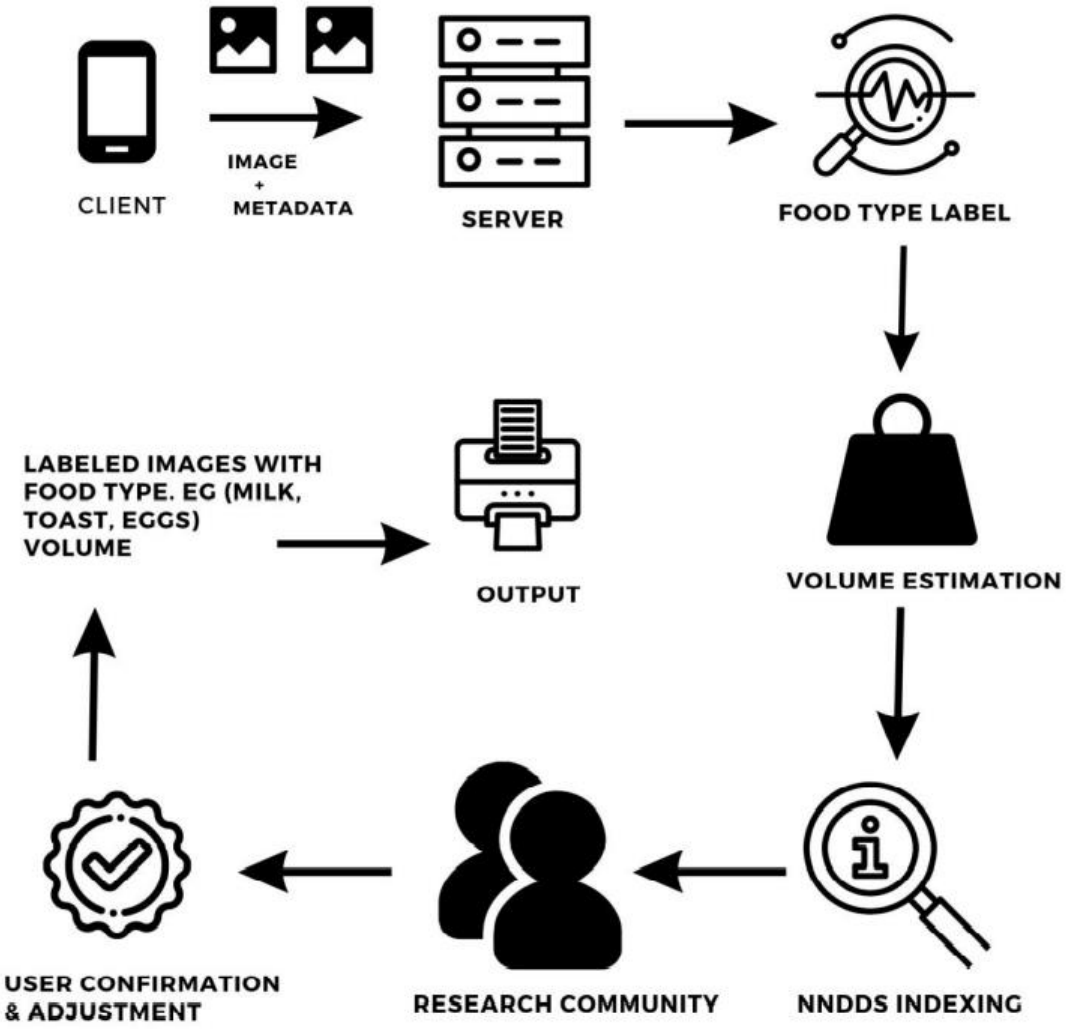
5. PROJECT DESIGN:

5.1. DATAFLOW DIAGRAM:

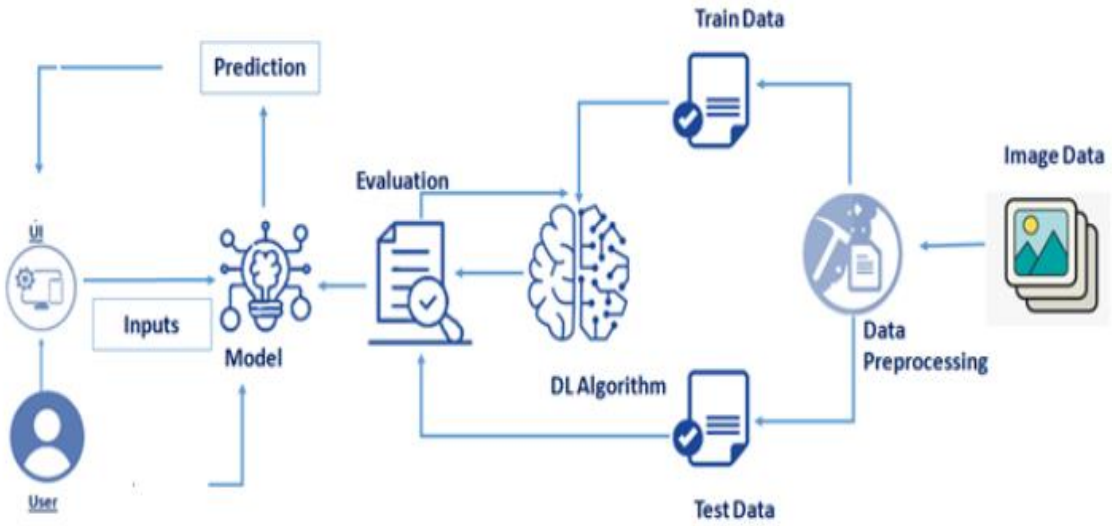


5.2. SOLUTION AND TECHNICAL ARCHITECTURE:

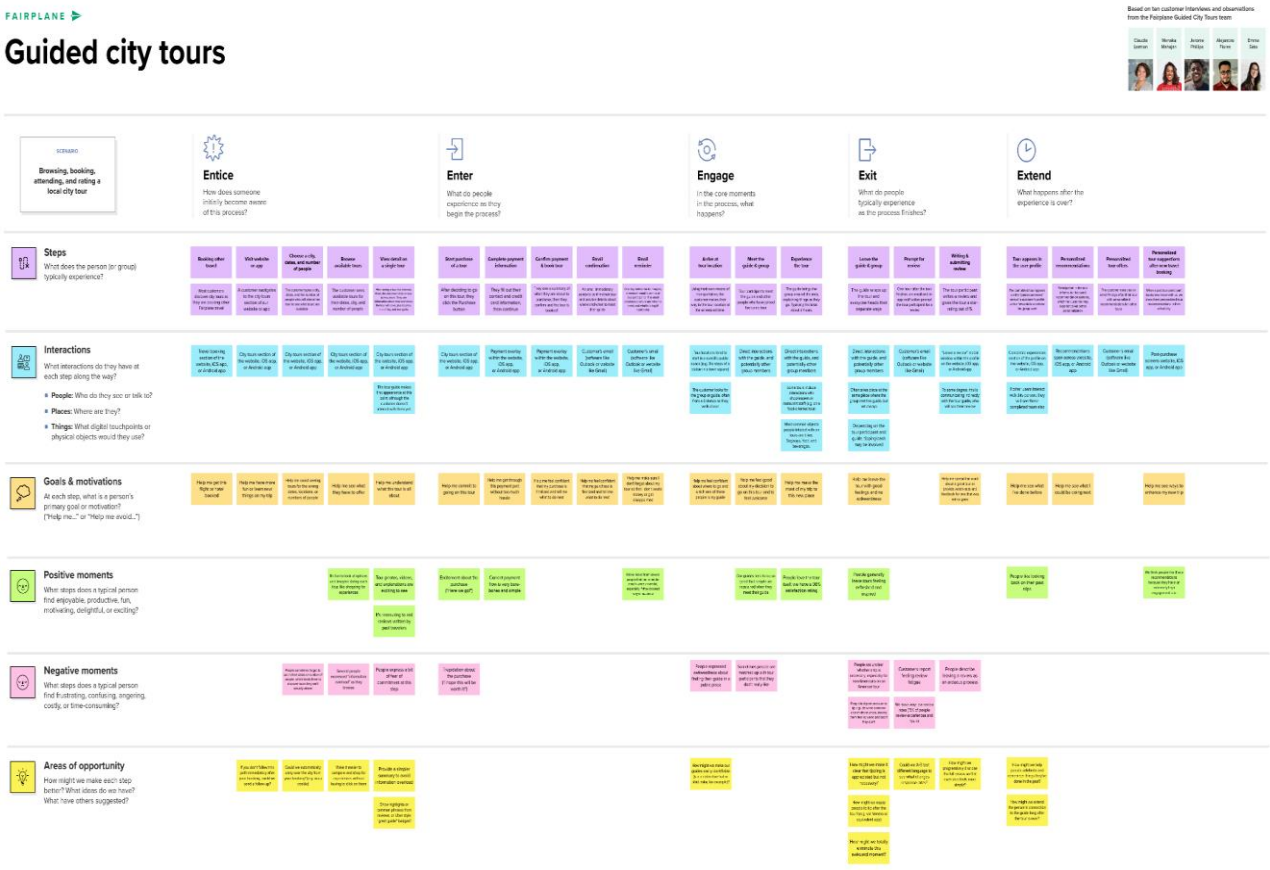
SOLUTION ARCHITECTURE:



TECHNICAL ARCHITECTURE:



5.3 USER STORIES:

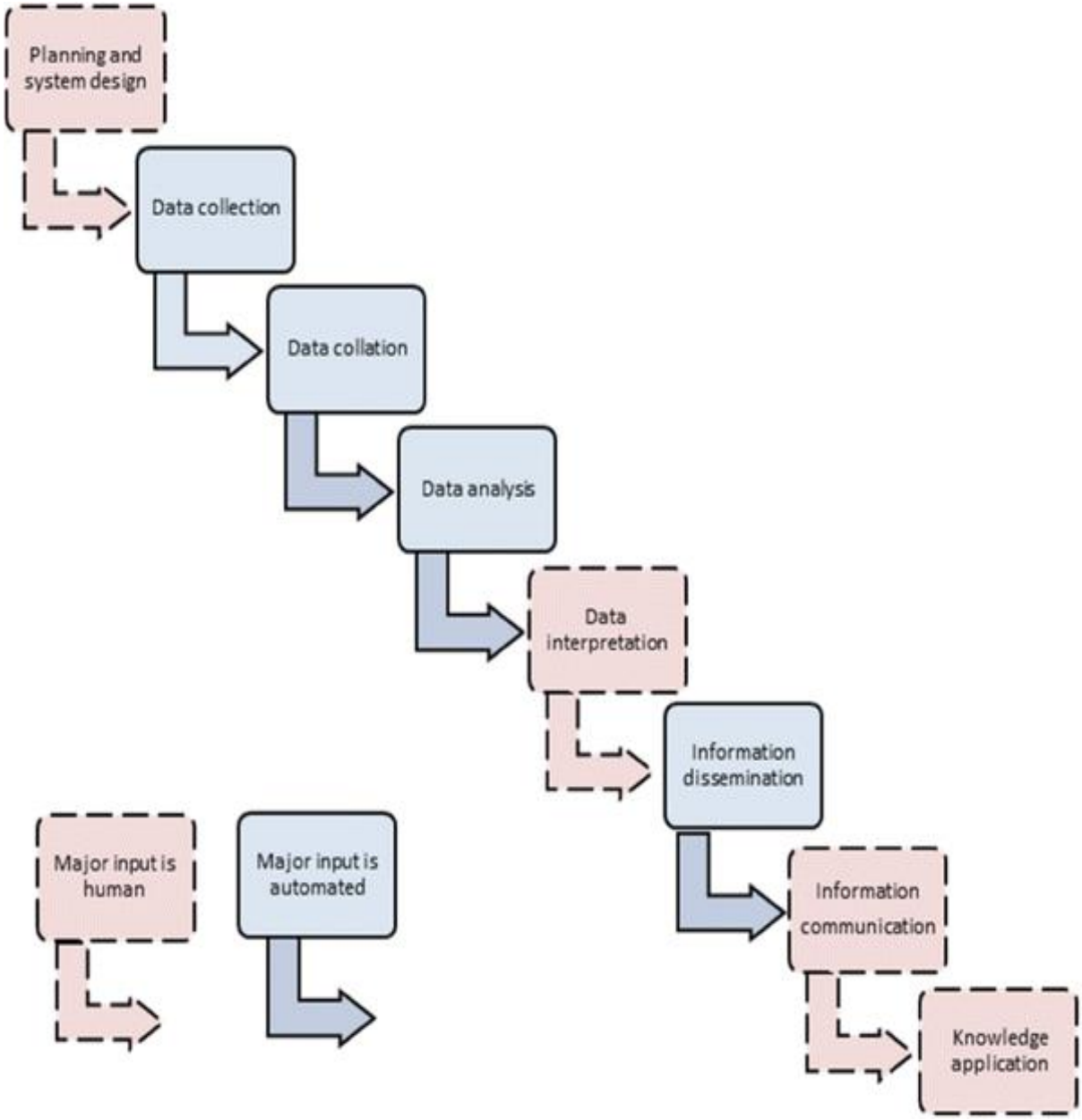


6. PROJECT PLANNING:

6.1 SPRIT DELIVERY PLAN:

Every project manager should consider the delivery strategy of the project deliverables as a strategic component. Every project's objective is to deliver a product that fulfils a certain need. The word "purpose" can be used to refer to wide range of objectives, including those for a chair, a building, a translation, etc. Delivery planning is one of the activities used in project spirit to finish the project and display the project timeline. This delivery plan aids in comprehending the team members' workflow and project procedure. Each individual module is given to a team member so they can showcase their efforts and contributions to the to the project's development.

DELIVERY PLAN:



MILESTONE:

Thanks to modern technology, artificial intelligence (AI) model performance is improving. The development of a model that is used to categories fruit is dependent on various traits, including color, shape, texture, etc. Here, users can take pictures of various fruits, which are subsequently uploaded to a trained algorithm for analysis. The algorithm examines the image and determines the nutritious content of fruits, such as sugar, fiber, protein, calories, etc.

ACTIVITY LIST:

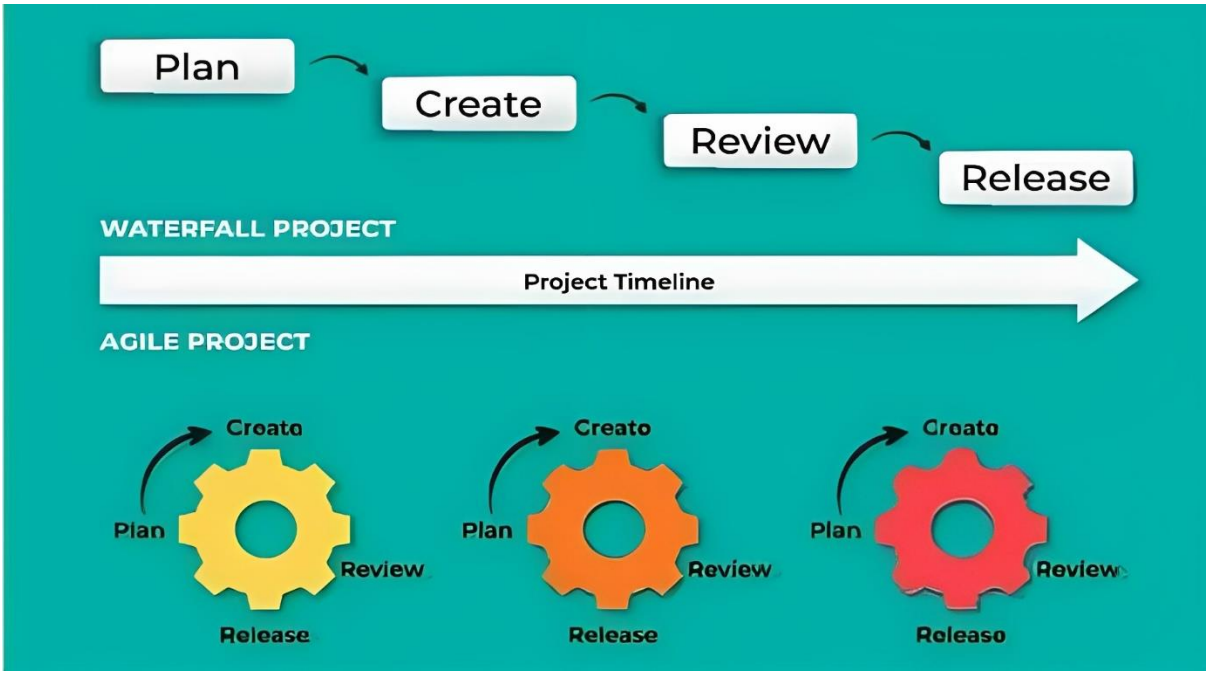
In project management planning is an important task to scheduling the phase of the project to the team member. In this Activity can shows the various activity are allocated and done by the Team Members. In project we can split into the four step of phrases are

Phrase 1: Information collection and Requirement Analysis.

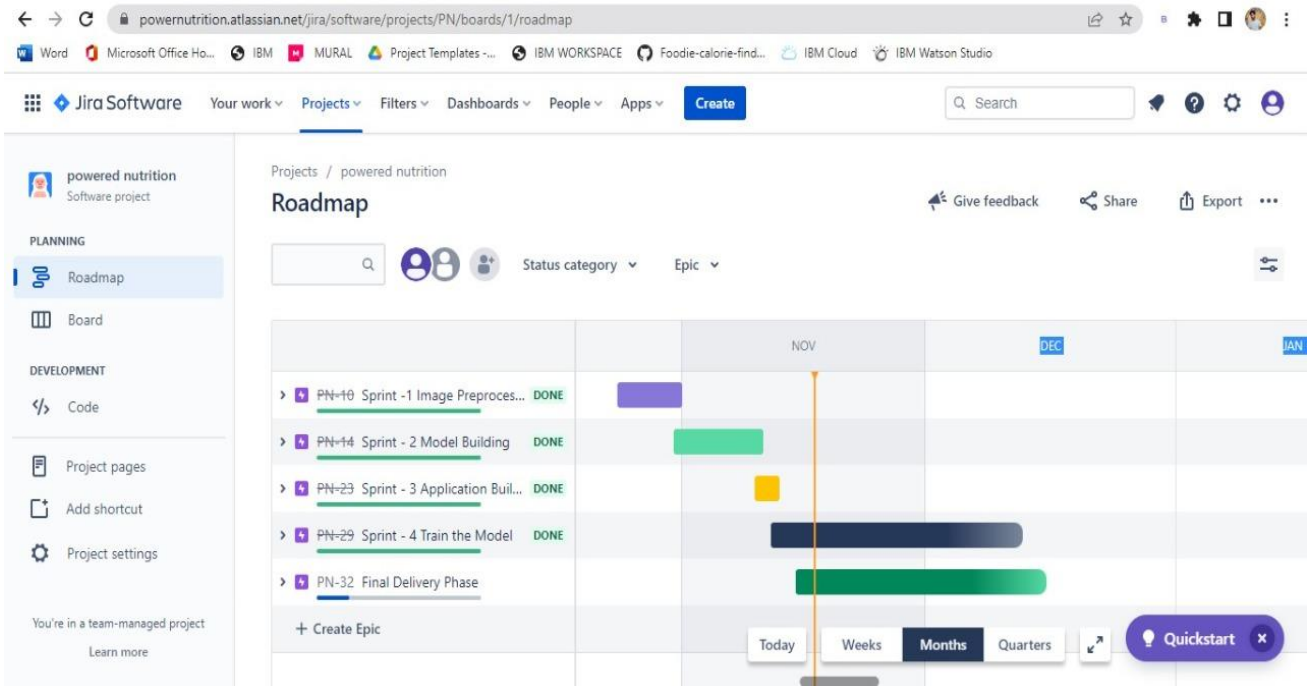
Phrase 2: Project Planning and Developing Modules.

Phrase 3: Implementing the High Accuracy Deep Learning Algorithm to perform.

Phrase 4: Deploying the model on cloud and testing the Module and UI performance.

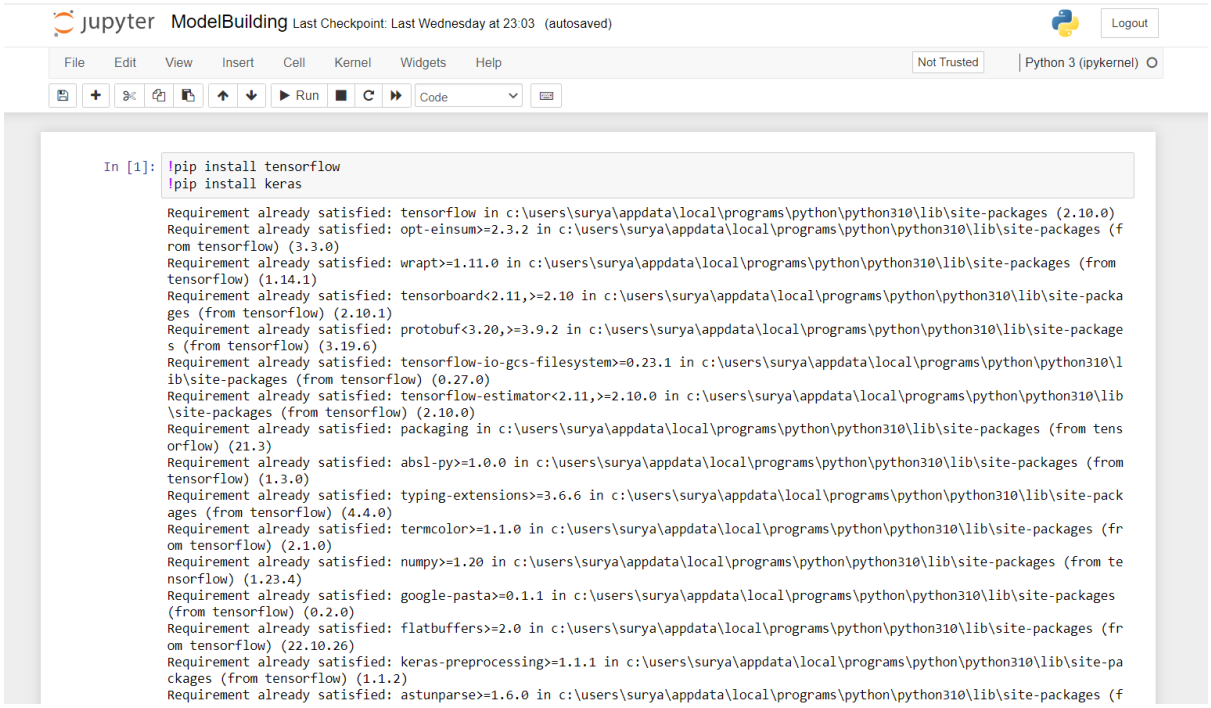


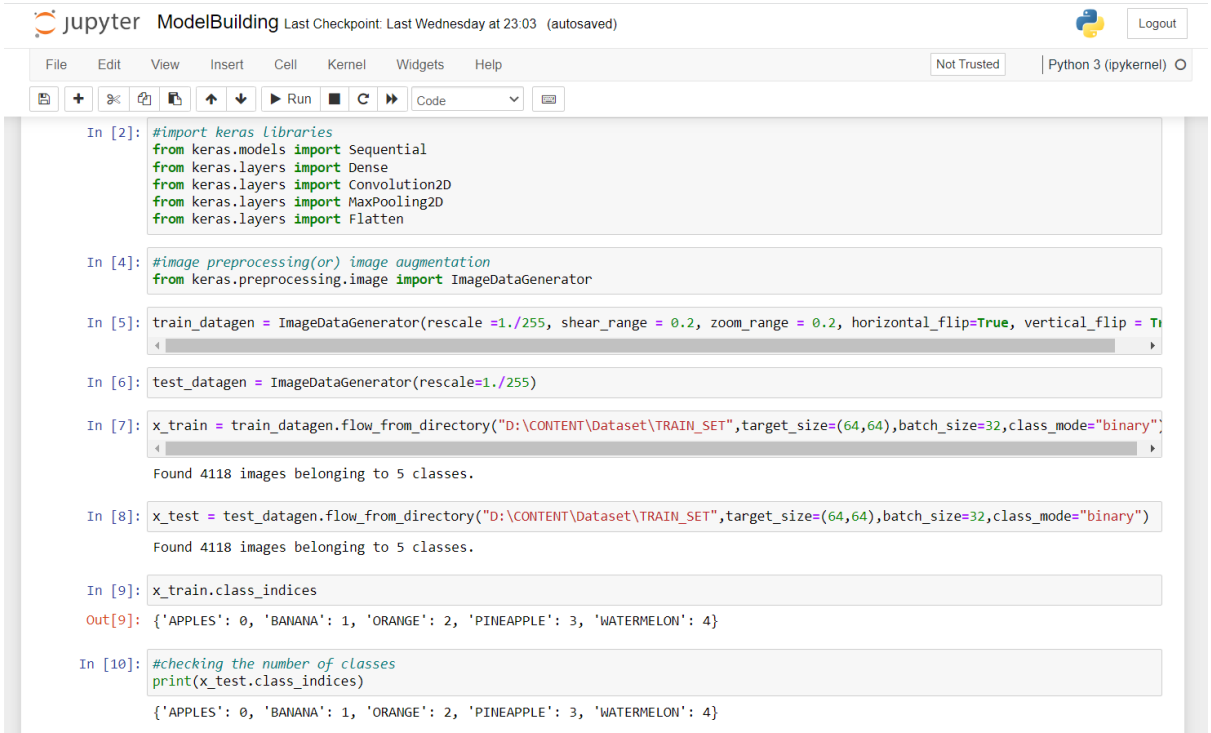
6.2. REPORTS FROM JIRA:



7. CODING AND SOLUTIONING:

7.1. Feature 1





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Run Code

In [11]:
```
from collections import Counter as c
c(x_train .labels)
```

Out[11]:
```
Counter({0: 995, 1: 1354, 2: 1019, 3: 275, 4: 475})
```

In [12]:
```
#Initializing the model
model = Sequential()
```

In [13]:
```
# add First convolution layer
```

In [14]:
```
model.add(Convolution2D(32,(3,3),input_shape=(64,64,3),activation="relu"))
# 32 indicates => no of feature detectors
#(3,3)=> kernel size (feature detector size)
```

In [15]:
```
# add Maxpooling layer
```

In [16]:
```
model.add(MaxPooling2D(pool_size=(2,2)))
```

In [17]:
```
#Flattening the layers
model.add(Flatten())
```

In [18]:
```
model.add(Dense(units=128,activation='relu'))
```

In [19]:
```
model.add(Dense(units=5,activation='softmax'))
```

In [20]:
```
# add flatten layer => input to your ANN
```

In [21]:
```
model.summary()
```

```
Model: "sequential"
```

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Run Code

In [21]:
```
model.summary()
```

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d (Conv2D)             (None, 62, 62, 32)        896

 max_pooling2d (MaxPooling2D  (None, 31, 31, 32)       0
 )

 flatten (Flatten)           (None, 30752)             0

 dense (Dense)               (None, 128)               3936384

 dense_1 (Dense)             (None, 5)                 645

=================================================================
Total params: 3,937,925
Trainable params: 3,937,925
Non-trainable params: 0
_________________________________________________________________
```

In [22]:
```
#hidden layer
```

In [23]:
```
model.add(Dense(units=300,kernel_initializer="random_uniform",activation="relu"))
model.add(Dense(units=200,kernel_initializer="random_uniform",activation="relu"))
```

In [24]:
```
#output layer
```

In [25]:
```
model.add(Dense(units=4,kernel_initializer="random_uniform",activation="softmax"))
len(x_train)
```

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Run Code

Out[25]: 129

In [26]:
```
#Ann starts so need to add dense layers
```

In [27]:
```
model.add(Dense(units=128,activation="relu",kernel_initializer="random_uniform"))
```

In [28]:
```
model.add(Dense(units=1,activation="sigmoid",kernel_initializer="random_uniform"))
```

In [29]:
```
#Compile the model
model.compile(loss="binary_crossentropy",optimizer="adam",metrics=['accuracy'])
```

In [30]:
```
#Train the model
```

In [31]:
```
model.fit_generator(x_train,steps_per_epoch=len(x_train), validation_data=x_test, validation_steps=len(x_test), epochs= 20)
```

```
C:\Users\Surya\AppData\Local\Temp\ipykernel_10872\2282505131.py:1: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future version. Please use `Model.fit`, which supports generators.
  model.fit_generator(x_train,steps_per_epoch=len(x_train), validation_data=x_test, validation_steps=len(x_test), epochs= 20)
Epoch 1/20
129/129 [==============================] - 91s 685ms/step - loss: -0.0594 - accuracy: 0.3293 - val_loss: -1.4405 - val_accuracy: 0.3288
Epoch 2/20
129/129 [==============================] - 52s 406ms/step - loss: -3.5415 - accuracy: 0.3288 - val_loss: -6.2924 - val_accuracy: 0.3288
Epoch 3/20
129/129 [==============================] - 53s 408ms/step - loss: -10.3612 - accuracy: 0.3288 - val_loss: -15.2431 - val_accuracy: 0.3288
Epoch 4/20
129/129 [==============================] - 52s 403ms/step - loss: -21.2552 - accuracy: 0.3288 - val_loss: -28.0009 - val_accuracy: 0.3288
Epoch 5/20
129/129 [==============================] - 53s 408ms/step - loss: -35.8088 - accuracy: 0.3288 - val_loss: -44.6395 - val_accura
```

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Run Code

Out[31]: <keras.callbacks.History at 0x20c5c63db40>

In [32]:
```
model.save("nutrition.h5")
```

In [33]:
```
#Prediction the result
```

In [34]:
```
from tensorflow.keras.models import load_model
from keras.preprocessing  import image
model =load_model("nutrition.h5")
```

In [35]:
```
import numpy as np
```

In [36]:
```
!pip install  watson-machine-learning-client
```

```
Requirement already satisfied: watson-machine-learning-client in c:\users\surya\appdata\local\programs\python\python310\lib\site-packages (1.0.391)
Requirement already satisfied: tabulate in c:\users\surya\appdata\local\programs\python\python310\lib\site-packages (from watson-machine-learning-client) (0.9.0)
Requirement already satisfied: lomond in c:\users\surya\appdata\local\programs\python\python310\lib\site-packages (from watson-machine-learning-client) (0.3.3)
Requirement already satisfied: boto3 in c:\users\surya\appdata\local\programs\python\python310\lib\site-packages (from watson-machine-learning-client) (1.26.7)
Requirement already satisfied: tqdm in c:\users\surya\appdata\local\programs\python\python310\lib\site-packages (from watson-machine-learning-client) (4.64.1)
Requirement already satisfied: requests in c:\users\surya\appdata\local\programs\python\python310\lib\site-packages (from watson-machine-learning-client) (2.28.1)
Requirement already satisfied: certifi in c:\users\surya\appdata\local\programs\python\python310\lib\site-packages (from watson-machine-learning-client) (2022.9.24)
Requirement already satisfied: ibm-cos-sdk in c:\users\surya\appdata\local\programs\python\python310\lib\site-packages (from watson-machine-learning-client) (2.12.0)
Requirement already satisfied: pandas in c:\users\surya\appdata\local\programs\python\python310\lib\site-packages (from watson-machine-learning-client) (1.4.4)
Requirement already satisfied: urllib3 in c:\users\surya\appdata\local\programs\python\python310\lib\site-packages (from watson
```

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Run Code

In [37]:
```
from ibm_watson_machine_learning import APIClient
wml_credentials={
    "url":"https://us-south.ml.cloud.ibm.com",
    "apikey":"QFv5PKmrY04pl7rRZU7ZsEDmVs9u8DDa2CwLG1rWUNJm"

}

client=APIClient(wml_credentials)
```

In [38]:
```
client
```

Out[38]: <ibm_watson_machine_learning.client.APIClient at 0x20c5c5546d0>

In [39]:
```
def guid_from_space_name(client, Nutrition_Fitness):
     space=client.spaces.get_details()
     #print(space)
     return(next(item for item in space['resources'] if item['entity']['name']== 'Nutrition_Fitness')['metadata']['id'])
```

In [40]:
```
space_uid=guid_from_space_name(client,'CNN_NUTRITION') #imageclassification is the deployment space name
print("Space UID ="+space_uid)
```

```
Space UID =de668bcd-600c-4e91-a78a-82d47ce3176a
```

In [41]:
```
client.set.default_space(space_uid)
```

Out[41]: 'SUCCESS'

In [42]:
```
client.software_specifications.list()
```

NAME	ASSET_ID	TYPE
default_py3.6	0062b8c9-8b7d-44a0-a9b9-46c416adcbd9	base
kernel-spark3.2-scala2.12	020d69ce-7ac1-5e68-ac1a-31189867356a	base

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Run Code

autoai-ts_3.8-py3.8	2aa0c932-798f-5ae9-abd6-15e0c2402fb5	base
tensorflow_1.15-py3.6	2b73a275-7cbf-420b-a912-eae7f436e0bc	base
kernel-spark3.3-py3.9	2b7961e2-e3b1-5a8c-a491-482c8368839a	base
pytorch_1.2-py3.6	2c8ef57d-2687-4b7d-acce-01f94976dac1	base
spark-mllib_2.3	2e51f700-bca0-4b0d-88dc-5c6791338875	base
pytorch-onnx_1.1-py3.6-edt	32983cea-3f32-4400-8965-dde874a8d67e	base
spark-mllib_3.0-py37	36507ebe-8770-55ba-ab2a-eafe787600e9	base
spark-mllib_2.4	390d21f8-e58b-4fac-9c55-d7ceda621326	base
autoai-ts_rt22.2-py3.10	396b2e83-0953-5b86-9a55-7ce1628a406f	base
xgboost_0.82-py3.6	39e31acd-5f30-41dc-ae44-60233c80306e	base
pytorch-onnx_1.2-py3.6-edt	40589d0e-7019-4e28-8daa-fb03b6f4fe12	base
pytorch-onnx_rt22.2-py3.10	40e73f55-783a-5535-b3fa-0c8b94291431	base
default_r36py38	41c247d3-45f8-5a71-b065-8580229facf0	base
autoai-ts_rt22.1-py3.9	4269d26e-07ba-5d40-8f66-2d495b0c71f7	base
autoai-obm_3.0	42b92e18-d9ab-567f-988a-4240ba1ed5f7	base
pmml-3.0_4.3	493bcb95-16f1-5bc5-bee8-81b8af80e9c7	base
spark-mllib_2.4-r_3.6	49403dff-92e9-4c87-a3d7-a42d0021c095	base
xgboost_0.90-py3.6	4ff8d6c2-1343-4c18-85e1-689c965304d3	base
pytorch-onnx_1.1-py3.6	50f95b2a-bc16-43bb-bc94-b0bed208c60b	base
autoai-ts_3.9-py3.8	52c57136-80fa-572e-8728-a5e7cbb42cde	base
spark-mllib_2.4-scala_2.11	55a70f99-7320-4be5-9fb9-9edb5a443af5	base
spark-mllib_3.0	5c1b0ca2-4977-5c2e-9439-ffd44ea8ffe9	base
autoai-obm_2.0	5c2e37fa-80b8-5e77-840f-d912469614ee	base
spss-modeler_18.1	5c3cad7e-507f-4b2a-a9a3-ab53a21dee8b	base
cuda-py3.8	5d3232bf-c86b-5df4-a2cd-7bb870a1cd4e	base
autoai-kb_3.1-py3.7	632d4b22-10aa-5180-88f0-f52dfb6444d7	base
pytorch-onnx_1.7-py3.8	634d3cdc-b562-5bf9-a2d4-ea90a478456b	base

Note: Only first 50 records were displayed. To display more use 'limit' parameter.

In [43]:
```
software_spec_uid = client.software_specifications.get_uid_by_name("tensorflow_2.4-py3.7-horovod")
```

In [44]:
```
software_spec_uid
```

Out[44]: '1092590a-307d-563d-9b62-4eb7d64b3f22'

jupyter nutrition (unsaved changes)

Logout

File Edit View Insert Cell Kernel Widgets Help

Not Trusted | Python 3 (ipykernel)

Run Code

In [10]:
```
import tensorflow
tensorflow.__version__
```

Out[10]:
```
'2.10.0'
```

In [11]:
```
ls
```

```
 Volume in drive C has no label.
 Volume Serial Number is E034-37AF

 Directory of C:\Users\Surya\Desktop\NUTRITION ANALYZER

13-11-2022  13:17    <DIR>          .
13-11-2022  13:17    <DIR>          ..
12-11-2022  12:29    <DIR>          .ipynb_checkpoints
13-11-2022  00:36        44,315,883 image-classification-model_new.tgz
12-11-2022  13:05        48,092,832 nutrition.h5
13-11-2022  13:17            56,557 nutrition.ipynb
12-11-2022  23:28        48,091,800 nutritionanalyser.h5
               4 File(s)    140,557,072 bytes
               3 Dir(s)  56,701,218,816 bytes free
```

In [52]:
```
!tar -zcvf image-classification-model_new.tgz nutritionanalyser.h5
```

```
a nutritionanalyser.h5
```

In [54]:
```
model_details=client.repository.store_model(model= 'image-classification-model_new.tgz',meta_props={
    client.repository.ModelMetaNames.NAME:"CNN MODEL",
    client.repository.ModelMetaNames.TYPE:"tensorflow_2.7",
    client.repository.ModelMetaNames.SOFTWARE_SPEC_UID:software_spec_uid}
                                                )
model_id = client.repository.get_model_id(model_details)
```

jupyter nutrition (unsaved changes)

Logout

File Edit View Insert Cell Kernel Widgets Help

Not Trusted | Python 3 (ipykernel)

Run Code

```
12-11-2022  23:28        48,091,800 nutritionanalyser.h5
               4 File(s)    140,557,072 bytes
               3 Dir(s)  56,701,218,816 bytes free
```

In [52]:
```
!tar -zcvf image-classification-model_new.tgz nutritionanalyser.h5
```

```
a nutritionanalyser.h5
```

In [54]:
```
model_details=client.repository.store_model(model= 'image-classification-model_new.tgz',meta_props={
    client.repository.ModelMetaNames.NAME:"CNN MODEL",
    client.repository.ModelMetaNames.TYPE:"tensorflow_2.7",
    client.repository.ModelMetaNames.SOFTWARE_SPEC_UID:software_spec_uid}
                                                )
model_id = client.repository.get_model_id(model_details)
```

In [55]:
```
model_id
```

Out[55]:
```
'211170ea-6ad1-4fd3-9fcf-e1c46b0f1fbd'
```

In [56]:
```
client.repository.download(model_id, 'nutrition.tar.gb')
```

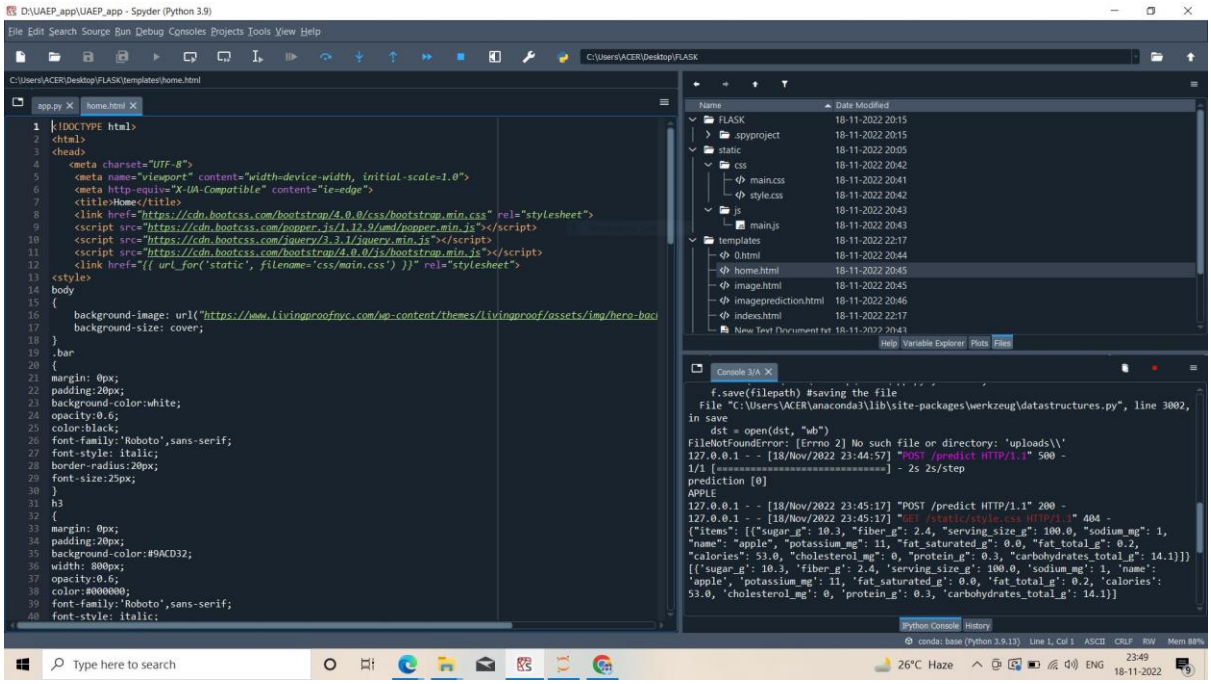
```
Successfully saved model content to file: 'nutrition.tar.gb'
```

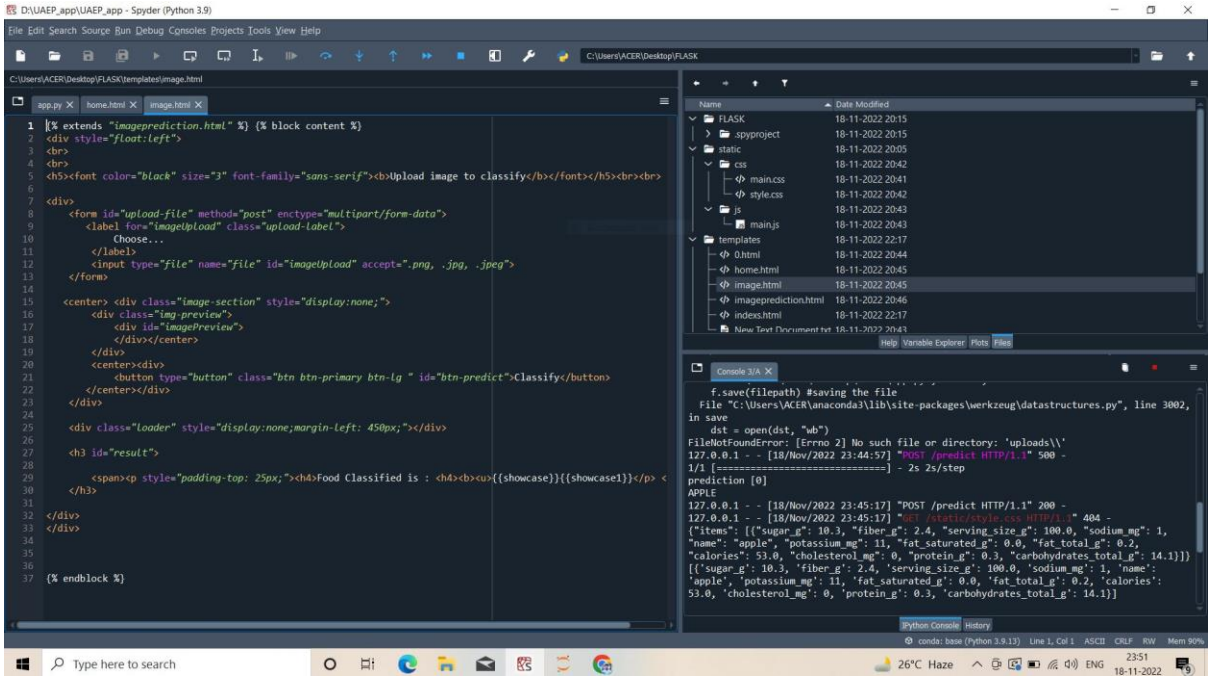
Out[56]:
```
'C:\\Users\\Surya\\Desktop\\NUTRITION ANALYZER/nutrition.tar.gb'
```

In [ ]:
```

```

7.2 Feature 2:


D:\UAEP_app\UAEP_app - Spyder (Python 3.9)
File Edit Search Source Run Debug Consoles Projects Tools View Help
C:\Users\ACER\Desktop\FLASK\templates\home.html
app.py
home.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>Home</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://www.livingproofnyc.com/wp-content/themes/livingproof/assets/img/hero-baci
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;
}
h3
{
margin: 0px;
padding:20px;
background-color:#9ACD32;
width: 800px;
opacity:0.6;
color:#000000;
font-family:'Roboto',sans-serif;
font-style: italic;
Name
Date Modified
FLASK
.spyproject
static
css
main.css
style.css
js
main.js
templates
0.html
home.html
image.html
imageprediction.html
indexs.html
18-11-2022 20:15
18-11-2022 20:05
18-11-2022 20:42
18-11-2022 20:41
18-11-2022 20:43
18-11-2022 22:17
18-11-2022 20:44
18-11-2022 20:45
18-11-2022 20:46
18-11-2022 22:17
Help
Variable Explorer
Plots
Files
Console 3/A
f.save(filepath) #saving the file
File "C:\Users\ACER\anaconda3\lib\site-packages\werkzeug\datastructures.py", line 3002, in save
dst = open(dst, "wb")
FileNotFoundError: [Errno 2] No such file or directory: 'uploads\\'
127.0.0.1 - - [18/Nov/2022 23:44:57] "POST /predict HTTP/1.1" 500 -
1/1 [==============================] - 2s 2s/step
prediction [0]
APPLE
127.0.0.1 - - [18/Nov/2022 23:45:17] "POST /predict HTTP/1.1" 200 -
127.0.0.1 - - [18/Nov/2022 23:45:17] "GET /static/style.css HTTP/1.1" 404 -
{"items": [{"sugar_g": 10.3, "fiber_g": 2.4, "serving_size_g": 100.0, "sodium_mg": 1, "name": "apple", "potassium_mg": 11, "fat_saturated_g": 0.0, "fat_total_g": 0.2, "calories": 53.0, "cholesterol_mg": 0, "protein_g": 0.3, "carbohydrates_total_g": 14.1}]}
[{'sugar_g': 10.3, 'fiber_g': 2.4, 'serving_size_g': 100.0, 'sodium_mg': 1, 'name': 'apple', 'potassium_mg': 11, 'fat_saturated_g': 0.0, 'fat_total_g': 0.2, 'calories': 53.0, 'cholesterol_mg': 0, 'protein_g': 0.3, 'carbohydrates_total_g': 14.1}]
IPython Console
History
conda: base (Python 3.9.13)
Line 1, Col 1
ASCII
CRLF
RW
Mem 88%
Type here to search
26°C Haze
ENG
23:49
18-11-2022


D:\UAEP_app\UAEP_app - Spyder (Python 3.9)
File Edit Search Source Run Debug Consoles Projects Tools View Help
C:\Users\ACER\Desktop\FLASK\templates\image.html
app.py
home.html
image.html
{% extends "imageprediction.html" %} {% block content %}

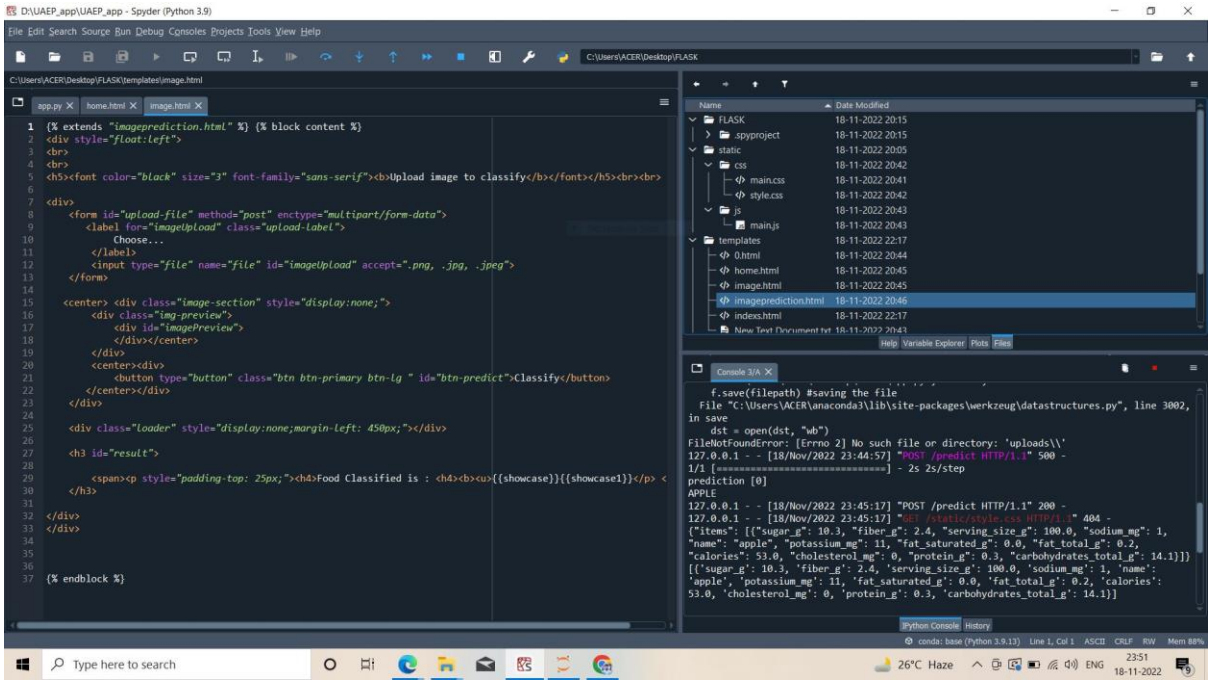
<h5>Upload image to classify</h5>

<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>

<button type="button" class="btn btn-primary btn-lg " id="btn-predict">Classify</button>

<h3 id="result">
<h4>Food Classified is : <h4><u>{{showcase}}{{showcase1}} <
</h3>

{% endblock %}
Name
Date Modified
FLASK
.spyproject
static
css
main.css
style.css
js
main.js
templates
0.html
home.html
image.html
imageprediction.html
indexs.html
18-11-2022 20:15
18-11-2022 20:05
18-11-2022 20:42
18-11-2022 20:41
18-11-2022 20:43
18-11-2022 22:17
18-11-2022 20:44
18-11-2022 20:45
18-11-2022 20:46
18-11-2022 22:17
Help
Variable Explorer
Plots
Files
Console 3/A
f.save(filepath) #saving the file
File "C:\Users\ACER\anaconda3\lib\site-packages\werkzeug\datastructures.py", line 3002, in save
dst = open(dst, "wb")
FileNotFoundError: [Errno 2] No such file or directory: 'uploads\\'
127.0.0.1 - - [18/Nov/2022 23:44:57] "POST /predict HTTP/1.1" 500 -
1/1 [==============================] - 2s 2s/step
prediction [0]
APPLE
127.0.0.1 - - [18/Nov/2022 23:45:17] "POST /predict HTTP/1.1" 200 -
127.0.0.1 - - [18/Nov/2022 23:45:17] "GET /static/style.css HTTP/1.1" 404 -
{"items": [{"sugar_g": 10.3, "fiber_g": 2.4, "serving_size_g": 100.0, "sodium_mg": 1, "name": "apple", "potassium_mg": 11, "fat_saturated_g": 0.0, "fat_total_g": 0.2, "calories": 53.0, "cholesterol_mg": 0, "protein_g": 0.3, "carbohydrates_total_g": 14.1}]}
[{'sugar_g': 10.3, 'fiber_g': 2.4, 'serving_size_g': 100.0, 'sodium_mg': 1, 'name': 'apple', 'potassium_mg': 11, 'fat_saturated_g': 0.0, 'fat_total_g': 0.2, 'calories': 53.0, 'cholesterol_mg': 0, 'protein_g': 0.3, 'carbohydrates_total_g': 14.1}]
IPython Console
History
conda: base (Python 3.9.13)
Line 1, Col 1
ASCII
CRLF
RW
Mem 90%
Type here to search
26°C Haze
ENG
23:51
18-11-2022


D:\UAEP_app\UAEP_app - Spyder (Python 3.9)
File Edit Search Source Run Debug Consoles Projects Tools View Help
C:\Users\ACER\Desktop\FLASK\templates\image.html
app.py
home.html
image.html
{% extends "imageprediction.html" %} {% block content %}

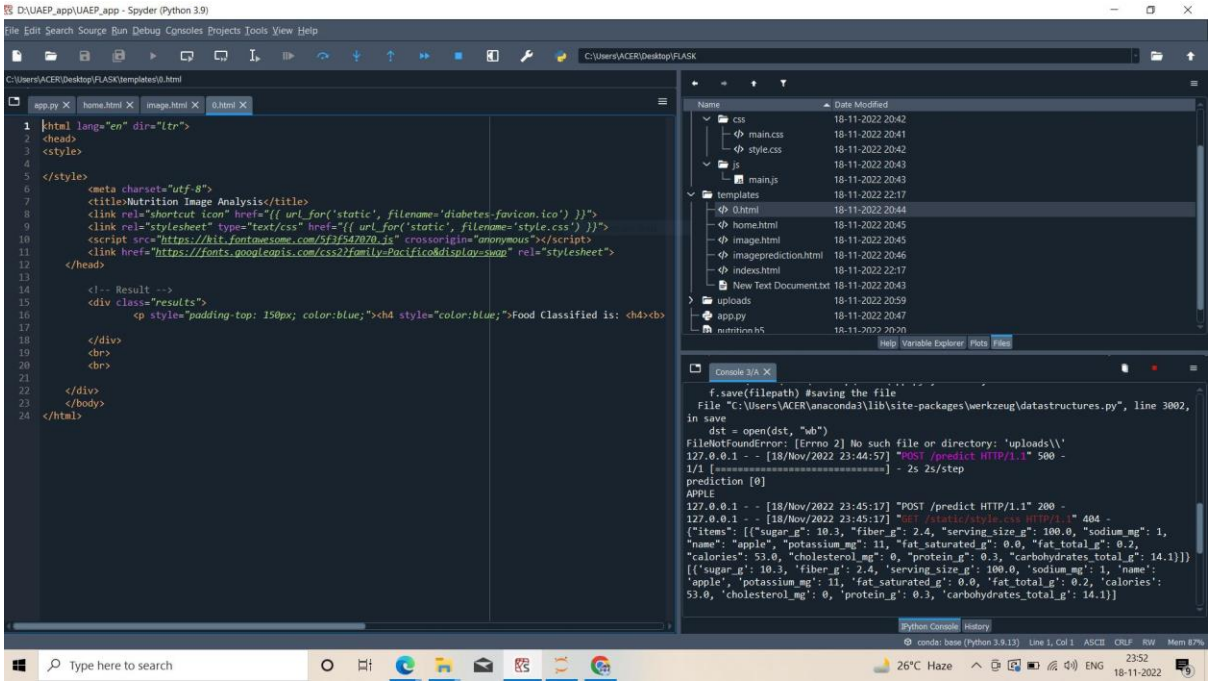
<h5>Upload image to classify</h5>

<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>

<button type="button" class="btn btn-primary btn-lg " id="btn-predict">Classify</button>

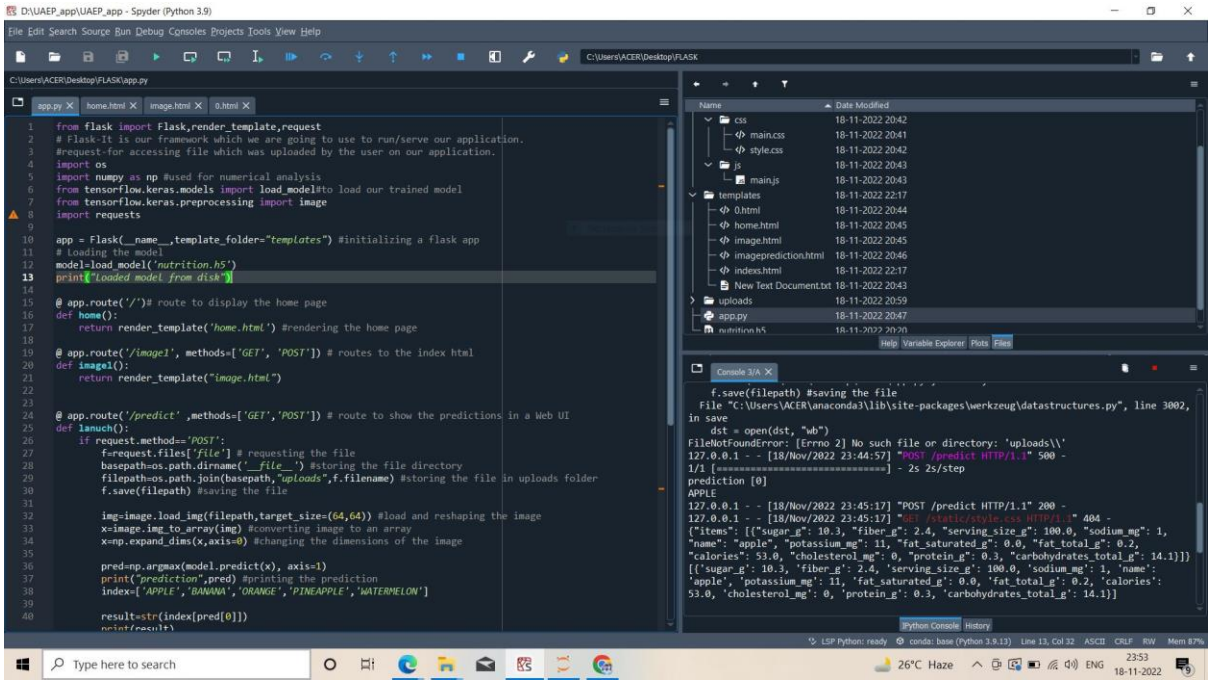
<h3 id="result">
<h4>Food Classified is : <h4><u>{{showcase}}{{showcase1}} <
</h3>

{% endblock %}
Name
Date Modified
FLASK 18-11-2022 20:15
spyproject 18-11-2022 20:15
static 18-11-2022 20:05
css 18-11-2022 20:42
main.css 18-11-2022 20:41
style.css 18-11-2022 20:42
js 18-11-2022 20:43
main.js 18-11-2022 20:43
templates 18-11-2022 22:17
0.html 18-11-2022 20:44
home.html 18-11-2022 20:45
image.html 18-11-2022 20:45
imageprediction.html 18-11-2022 20:46
indexs.html 18-11-2022 22:17
Help
Variable Explorer
Plots
Files
Console 3/A
f.save(filepath) #saving the file
File "C:\Users\ACER\anaconda3\lib\site-packages\werkzeug\datastructures.py", line 3002, in save
dst = open(dst, "wb")
FileNotFoundError: [Errno 2] No such file or directory: 'uploads\\'
127.0.0.1 - - [18/Nov/2022 23:44:57] "POST /predict HTTP/1.1" 500 -
1/1 [==============================] - 2s 2s/step
prediction [0]
APPLE
127.0.0.1 - - [18/Nov/2022 23:45:17] "POST /predict HTTP/1.1" 200 -
127.0.0.1 - - [18/Nov/2022 23:45:17] "GET /static/style.css HTTP/1.1" 404 -
{"items": [{"sugar_g": 10.3, "fiber_g": 2.4, "serving_size_g": 100.0, "sodium_mg": 1, "name": "apple", "potassium_mg": 11, "fat_saturated_g": 0.0, "fat_total_g": 0.2, "calories": 53.0, "cholesterol_mg": 0, "protein_g": 0.3, "carbohydrates_total_g": 14.1}]}
[{'sugar_g': 10.3, 'fiber_g': 2.4, 'serving_size_g': 100.0, 'sodium_mg': 1, 'name': 'apple', 'potassium_mg': 11, 'fat_saturated_g': 0.0, 'fat_total_g': 0.2, 'calories': 53.0, 'cholesterol_mg': 0, 'protein_g': 0.3, 'carbohydrates_total_g': 14.1}]
IPython Console
History
conda: base (Python 3.9.13)
Line 1, Col 1
ASCII
CRLF
RW
Mem 88%
Type here to search
26°C Haze
ENG
23:51
18-11-2022


D:\UAEP_app\UAEP_app - Spyder (Python 3.9)
File Edit Search Source Run Debug Consoles Projects Tools View Help
C:\Users\ACER\Desktop\FLASK\templates\0.html
app.py
home.html
image.html
0.html
<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 -->

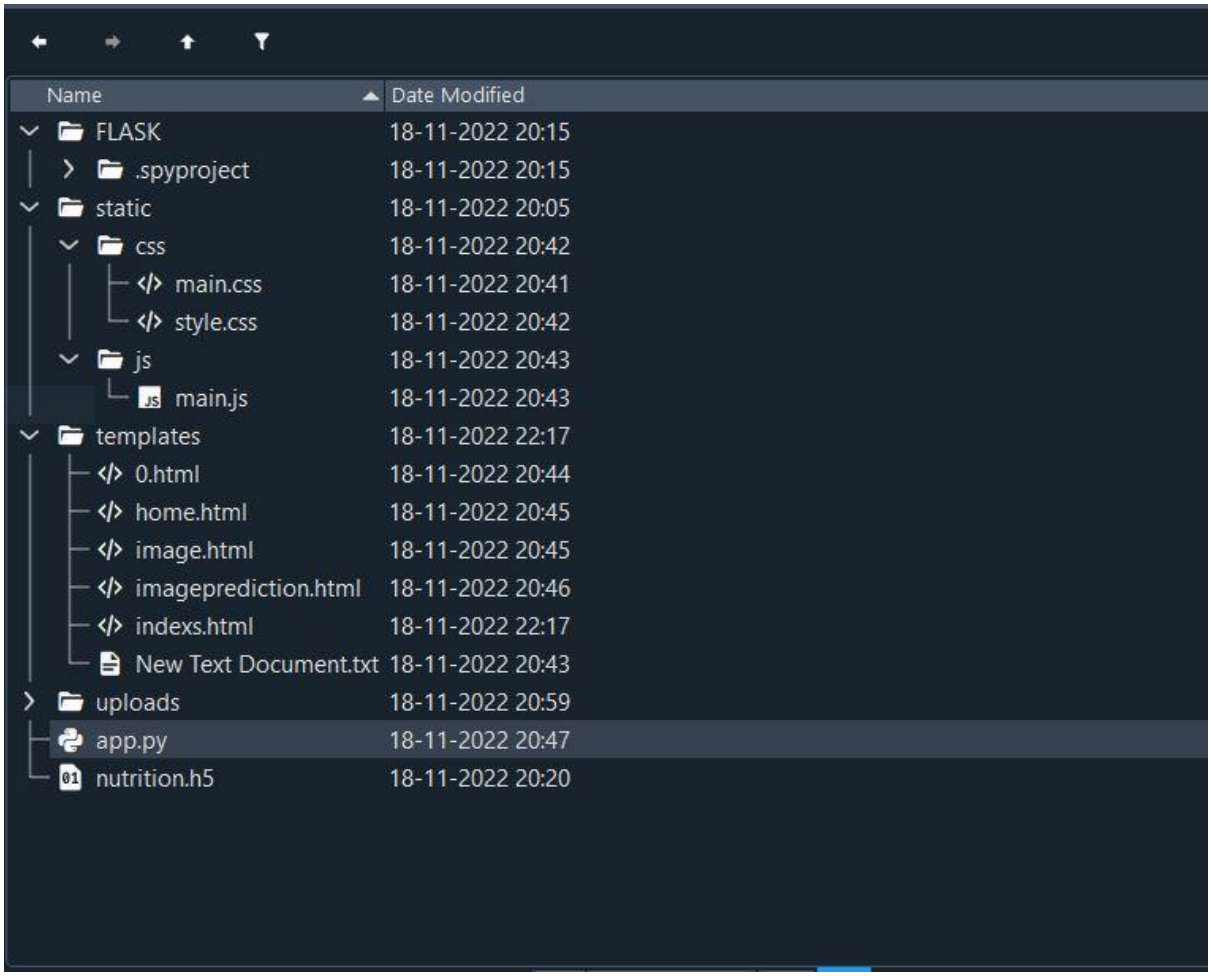
<h4 style="color:blue;">Food Classified is: <h4>

</body>
</html>
Name
Date Modified
css 18-11-2022 20:42
main.css 18-11-2022 20:41
style.css 18-11-2022 20:42
js 18-11-2022 20:43
main.js 18-11-2022 20:43
templates 18-11-2022 22:17
0.html 18-11-2022 20:44
home.html 18-11-2022 20:45
image.html 18-11-2022 20:45
imageprediction.html 18-11-2022 20:46
indexs.html 18-11-2022 22:17
New Text Document.txt 18-11-2022 20:43
uploads 18-11-2022 20:59
app.py 18-11-2022 20:47
Help
Variable Explorer
Plots
Files
Console 3/A
f.save(filepath) #saving the file
File "C:\Users\ACER\anaconda3\lib\site-packages\werkzeug\datastructures.py", line 3002, in save
dst = open(dst, "wb")
FileNotFoundError: [Errno 2] No such file or directory: 'uploads\\'
127.0.0.1 - - [18/Nov/2022 23:44:57] "POST /predict HTTP/1.1" 500 -
1/1 [==============================] - 2s 2s/step
prediction [0]
APPLE
127.0.0.1 - - [18/Nov/2022 23:45:17] "POST /predict HTTP/1.1" 200 -
127.0.0.1 - - [18/Nov/2022 23:45:17] "GET /static/style.css HTTP/1.1" 404 -
{"items": [{"sugar_g": 10.3, "fiber_g": 2.4, "serving_size_g": 100.0, "sodium_mg": 1, "name": "apple", "potassium_mg": 11, "fat_saturated_g": 0.0, "fat_total_g": 0.2, "calories": 53.0, "cholesterol_mg": 0, "protein_g": 0.3, "carbohydrates_total_g": 14.1}]}
[{'sugar_g': 10.3, 'fiber_g': 2.4, 'serving_size_g': 100.0, 'sodium_mg': 1, 'name': 'apple', 'potassium_mg': 11, 'fat_saturated_g': 0.0, 'fat_total_g': 0.2, 'calories': 53.0, 'cholesterol_mg': 0, 'protein_g': 0.3, 'carbohydrates_total_g': 14.1}]
IPython Console
History
conda: base (Python 3.9.13)
Line 1, Col 1
ASCII
CRLF
RW
Mem 87%
Type here to search
26°C Haze
ENG
23:52
18-11-2022


D:\UAEP_app\UAEP_app - Spyder (Python 3.9)
File Edit Search Source Run Debug Consoles Projects Tools View Help
C:\Users\ACER\Desktop\FLASK\app.py
app.py
home.html
image.html
0.html
from flask import Flask,render_template,request
# Flask-It is our framework which we are going to use to run/serve our application.
#request-for accessing file which was uploaded by the user on our application.
import os
import numpy as np #used for numerical analysis
from tensorflow.keras.models import load_model#to load our trained model
from tensorflow.keras.preprocessing import image
import requests
app = Flask(__name__,template_folder="templates") #initializing a flask app
# Loading the model
model=load_model('nutrition.h5')
print("Loaded model from disk")
@ app.route('/')# route to display the home page
def home():
return render_template('home.html') #rendering the home page
@ app.route('/image1', methods=['GET', 'POST']) # routes to the index html
def image1():
return render_template("image.html")
@ app.route('/predict' ,methods=['GET','POST']) # route to show the predictions in a Web UI
def lanuch():
if request.method=='POST':
f=request.files['file'] # requesting the file
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=['APPLE','BANANA','ORANGE','PINEAPPLE','WATERMELON']
result=str(index[pred[0]])
C:\Users\ACER\Desktop\FLASK
Name
Date Modified
css
main.css 18-11-2022 20:41
style.css 18-11-2022 20:42
js
main.js 18-11-2022 20:43
templates
0.html 18-11-2022 20:44
home.html 18-11-2022 20:45
image.html 18-11-2022 20:45
imageprediction.html 18-11-2022 20:46
indexs.html 18-11-2022 22:17
New Text Document.txt 18-11-2022 20:43
uploads 18-11-2022 20:59
app.py 18-11-2022 20:47
Help
Variable Explorer
Plots
Files
Console 3/A
f.save(filepath) #saving the file
File "C:\Users\ACER\anaconda3\lib\site-packages\werkzeug\datastructures.py", line 3002, in save
dst = open(dst, "wb")
FileNotFoundError: [Errno 2] No such file or directory: 'uploads\\'
127.0.0.1 - - [18/Nov/2022 23:44:57] "POST /predict HTTP/1.1" 500 -
1/1 [==============================] - 2s 2s/step
prediction [0]
APPLE
127.0.0.1 - - [18/Nov/2022 23:45:17] "POST /predict HTTP/1.1" 200 -
127.0.0.1 - - [18/Nov/2022 23:45:17] "GET /static/style.css HTTP/1.1" 404 -
{"items": [{"sugar_g": 10.3, "fiber_g": 2.4, "serving_size_g": 100.0, "sodium_mg": 1, "name": "apple", "potassium_mg": 11, "fat_saturated_g": 0.0, "fat_total_g": 0.2, "calories": 53.0, "cholesterol_mg": 0, "protein_g": 0.3, "carbohydrates_total_g": 14.1}]}
[{'sugar_g': 10.3, 'fiber_g': 2.4, 'serving_size_g': 100.0, 'sodium_mg': 1, 'name': 'apple', 'potassium_mg': 11, 'fat_saturated_g': 0.0, 'fat_total_g': 0.2, 'calories': 53.0, 'cholesterol_mg': 0, 'protein_g': 0.3, 'carbohydrates_total_g': 14.1}]
IPython Console
History
LSP Python: ready
conda: base (Python 3.9.13)
Line 13, Col 32
ASCII
CRLF
RW
Mem 87%
Type here to search
26°C Haze
ENG
23:53
18-11-2022

8. TESTING:

8.1. Test case:



8.2.User Acceptance Testing:

1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the [AI-powered Nutrition Analyzer for Fitness Enthusiasts] project at the time of the release to User Acceptance Testing (UAT).

2. Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	7	8	8	7	30
Duplicate	1	0	3	0	4
External	0	1	0	1	2
Fixed	9	7	8	6	30
Not Reproduced	0	0	1	0	1
Skipped	0	2	1	1	4
Won't Fix	0	0	0	1	1
Totals	17	18	19	15	69

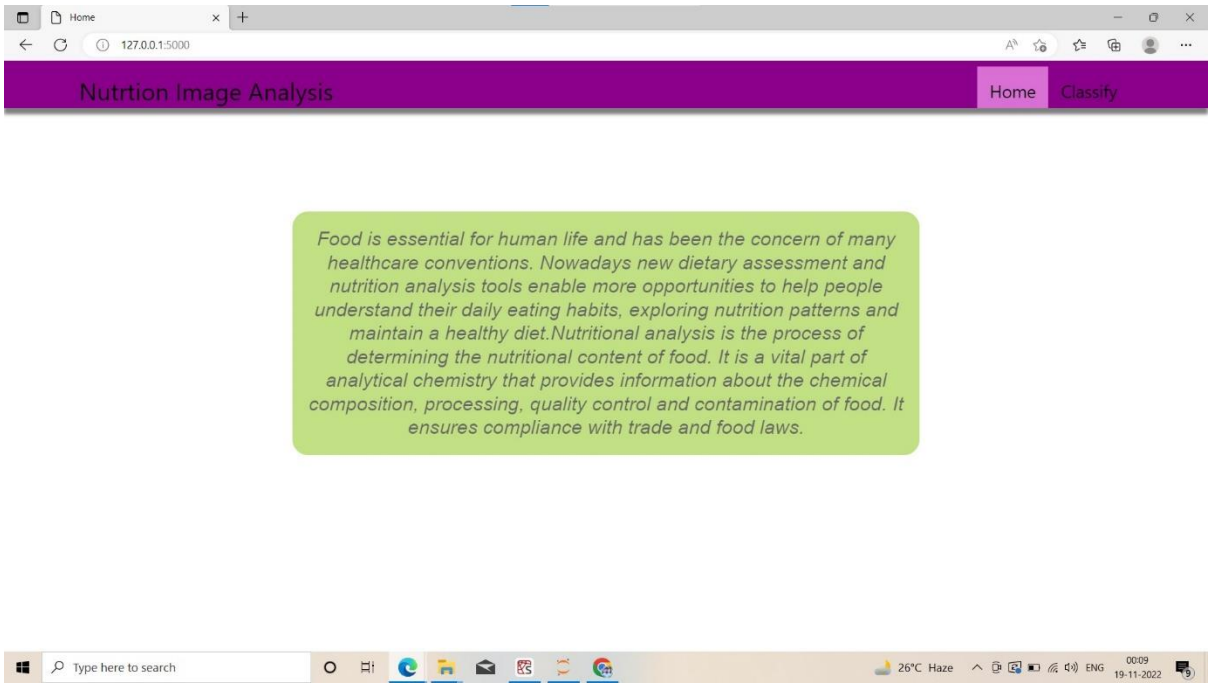
3. Test Case Analysis

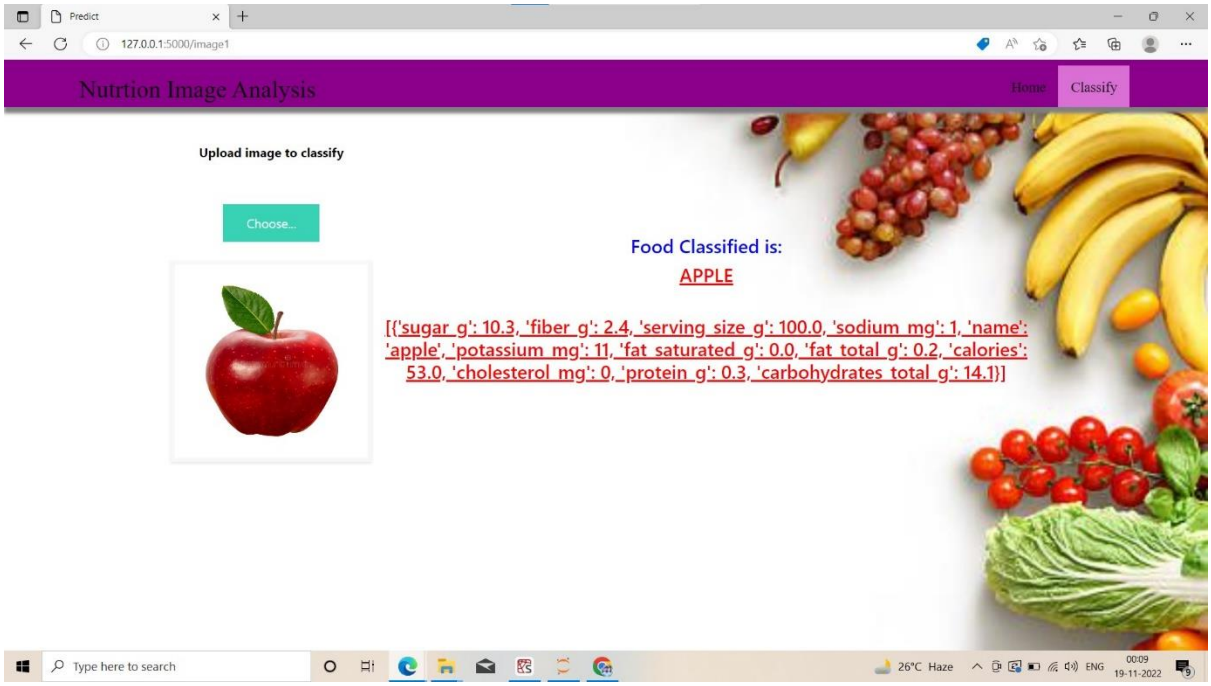
This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	10	0	0	7
Client Application	9	0	0	9
Security	10	0	0	8
Outsource Shipping	2	0	0	1
Exception Reporting	6	0	0	5
Final Report Output	9	0	0	8
Version Control	3	0	0	2

9. RESULTS:

9.1. Performance Metrics:





10. ADVANTAGES AND DISADVANTAGES:

ADVANTAGES:

- Yet people consume foods, not nutrients, so it is helpful to view food or a meal as more than just a set nutrients that impacts our health.

- Some weight-loss diets have assigned a negative connotation to certain nutrients, such as low fat or low-carbohydrate diets.

- This can create a view that a specific nutrient is bad, regardless of the role it plays when foods containing that nutrient are consumed as part of a healthy, balanced diet.

- This model helps in analyzing a nutrition in the food.

DISADVANTAGES:

- Like anything, there are always drawbacks.

- In some cases the predicting algorithm may give the wrong output.

11. CONCLUSION:

The good nutrition is fundamental for children's current and future health, as well as their development and learning. The benefits of developing healthy dietary and lifestyle patterns from an early age onwards can positively impact on people's Nutrition education is an important element in an overall strategy aimed at improving food security and preventing all forms of malnutrition.

Most countries in the region implement school health and nutrition programs, including school feeding, deworming, vitamin and mineral supplementation, etc. innovative, creative and effective school nutrition education programs exist in some countries in the region. However, these are often small-scale and implemented as pilot projects, focus on children with special needs and prioritize the transfer of knowledge over the promotion of active learning and the creation of appropriate attitudes, life skills and behaviors.

12. 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

14.APPENDIX:

SOURCE CODE:

```
from keras.preprocessing.image import ImageDataGenerator
train_datagen= ImageDataGenerator(rescale=1./255,shear_range=0.2,zoom_r
ange=0.2,horizontal_flip=True)
test_datagen=ImageDataGenerator(rescale=1./255)
x_train=train_datagen.flow_from_directory(
    r'/content/drive/MyDrive/TRAIN_SET',target_size=(64,64),batch_size=
5,color_mode='rgb',class_mode='sparse'
)

x_test=test_datagen.flow_from_directory(
    r'/content/drive/MyDrive/TRAIN_SET',target_size=(64,64),batch_size=
5,color_mode='rgb',class_mode='sparse'
)


print(x_train.class_indices)

print(x_test.class_indices)

from collections import Counter as c



c(x_train .labels)


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
import tensorflow as tf

from tensorflow.keras import datasets, layers, models
import matplotlib.pyplot as plt
(train_images, train_labels), (test_images, test_labels) = datasets.cif
ar10.load_data()

# Normalize pixel values to be between 0 and 1
train_images, test_images = train_images / 255.0, test_images / 255.0
model = models.Sequential()
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))
model.summary()
#Compiling the model
model.compile(optimizer='adam',
              loss=tf.keras.losses.SparseCategoricalCrossentropy(from_l
ogits=True),
              metrics=['accuracy'])
#Fitting the model
history = model.fit(train_images, train_labels, epochs=10,
                    validation_data=(test_images, test_labels))
#Saving our model
model.save('nutrition.h5')
#Prediciting our results
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
model=load_model('nutrition.h5')
img=image.load_img('/content/drive/MyDrive/1_100.jpg',target_size=(70,7
0))
```

```
img
x= image.img_to_array(img)
x = np.expand_dims(x, axis=0)
index=['APPLES', 'BANANA', 'ORANGE', 'PINEAPPLE', 'WATERMELON']
result=str(index[0])
result
```

Github link:

https://github.com/IBM-EPBL/IBM-Project-48347-1660806939

Demo link:

https://youtu.be/JvWOJjl4xZo