HINDUSTHAN INSTITUTE OF TECHNOLOGY

(An Autonomous Institution, Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai, Accredited with "A" Grade by NAAC) Valley Campus, Pollachi Main Road, Coimbatore 641 032.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

REPORT ON

HX 8001 PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP
(Naalaiya Thiran Program)

PROJECT TITLE

AI-POWERED NUTRITION ANALYER FOR FITNESS ENTHUSIASTS

TEAM ID: PNT2022TMID10557

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Project Report Index

1.INTRODUCTION:

PROJECT OVERVIEW:

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.

PURPOSE:

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 and vegetables like (Sugar, Fibre, Protein, Calories, etc.).

2. LITERATURE SURVEY:

2.1 EXISTING PROBLEM:

- Deep Foods:

Food Image Analysis and Dietary Assessment via Deep Model. This system will analyse the nutritional ingredients based on the recognition results and generate a dietary assessment report by calculating the number of calories, fat, carbohydrate and protein.

ALGORITHMS USED:

• Region-based Convolutional Neural Network

• Convolutional Neural Network

• Non-maximum suppression

• Bounding Box Regression

• Deep learning techniques CHALLENGES:

Three main challenges in real food image recognition and analysis are addressed as follows:

1. Region of Interest

2. The Delay of Food Recognition

3. Insufficient Information of Nutrition Content for dietary assessment

- A New Deep Learning-based Food Recognition System for Dietary Assessment on An Edge Computing Service Infrastructure A design of food recognition system employing edge computing-based service computing paradigm to overcome some inherent problems of traditional mobile cloud computing paradigm, such as unacceptable system latency and low battery life of mobile devices.

ALGORITHMS USED:

• K-means clustering algorithms

• Convolutional Neural Network

• Bounding Box Regression
• Deep learning CHALLENGES: Using this simple cropping-based approach will not work well if the food is scattered on different parts of the image.

Precision Nutrient Management

Precision Nutrient Management Using Artificial Intelligence Based on Digital Data Collection Framework Nutritional intake is fundamental to human growth and health, and the intake of different types of nutrients and micronutrients can affect health. The content of the diet affects the occurrence of disease, with the incidence of many diseases increasing each year while the age group at which they occur is gradually decreasing.

2.2 REFERENCES:

REFERENCES ALGORITHM USED:

• Okapi

• TF-IDF

• Levenshtein

• Jaccard

• Dravid

Synonyms CHALLENGES: This model has very little error and can significantly improve the efficiency of the analysis. Calculating Nutrition Facts with Computer Vision People are becoming more health-conscious than before. However, there is a lack of knowledge about different fitness and wellness aspects of food. Thus, I come up with Foodify.ai—a deep learning-based application that detects food from the image and provides information of food such as protein, vitamins, calories, minerals, carbs, etc. ALGORITHM USED: • Deep learning • Machine learning •

2.3 PROBLEM STATEMENT DEFINITION:

Image Processing Challenges:

1. This is to collect images to create a huge dataset.

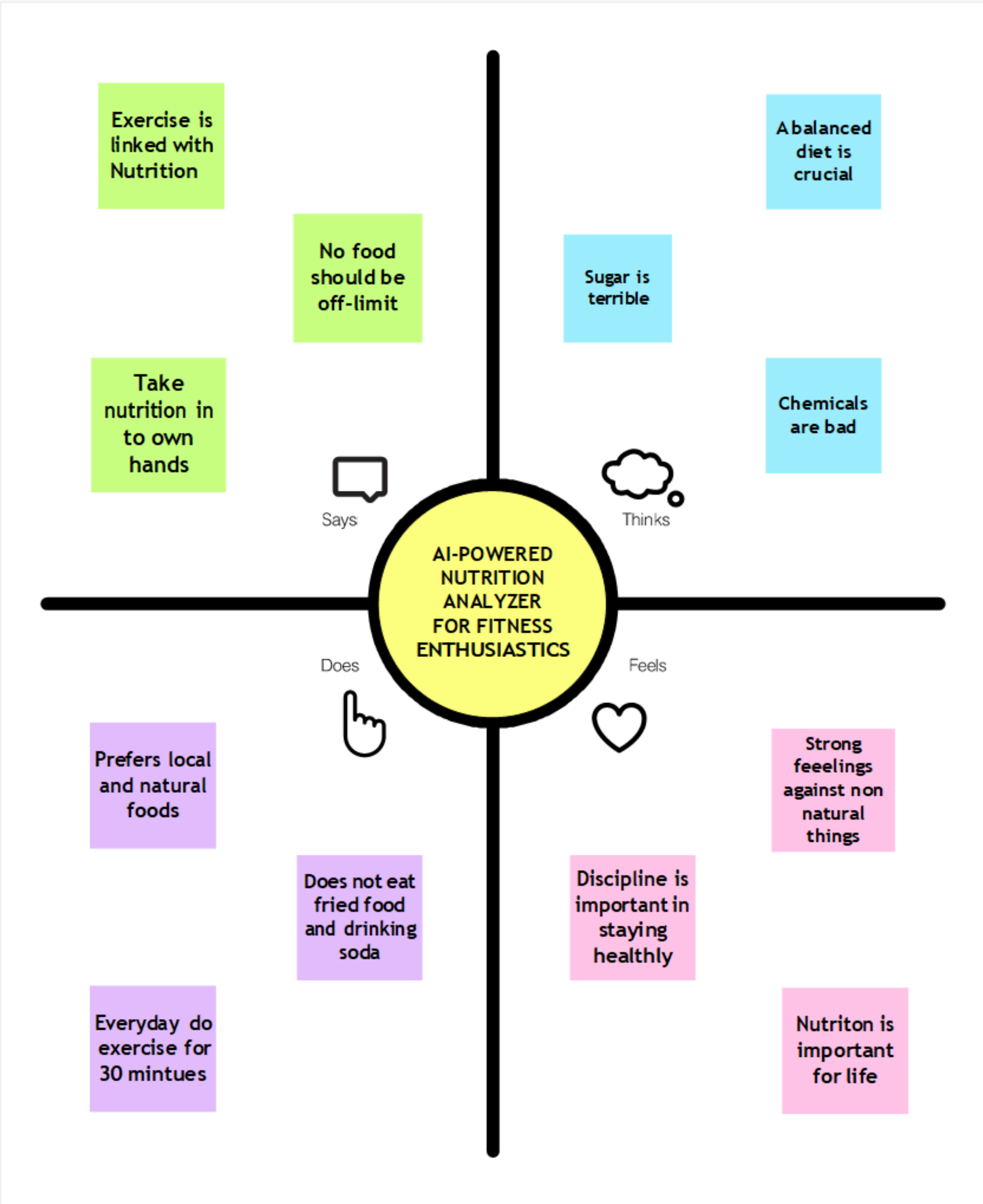
2. This is related to training the deep learning model. It is an extremely computationally expensive and time-consuming task to train the model again and again. This can be solved by using cloud-based services.

Users Facing Challenges:

Problem Statement (PS)	**I am (Customer)**	**I'm trying to**	**But**	**Because**	**Which makes me feel**
PS-1	I am the overweight person	I'm trying to Weight loss and make my body healthy	But I can't archive by my regular food-cycle	Because of my unstable food cycle contains the unhealthy and unwanted components	It makes me to more frustrated and discourage about the weight loss
PS-2	I am the sports person	I am trying to maintain my body and fitness level regularly	But I can't make it properly sometimes and lacking of energy to play regularly	Because I can't track my nutrition intakes	It makes me to feel the clueless about my intakes and diet plan

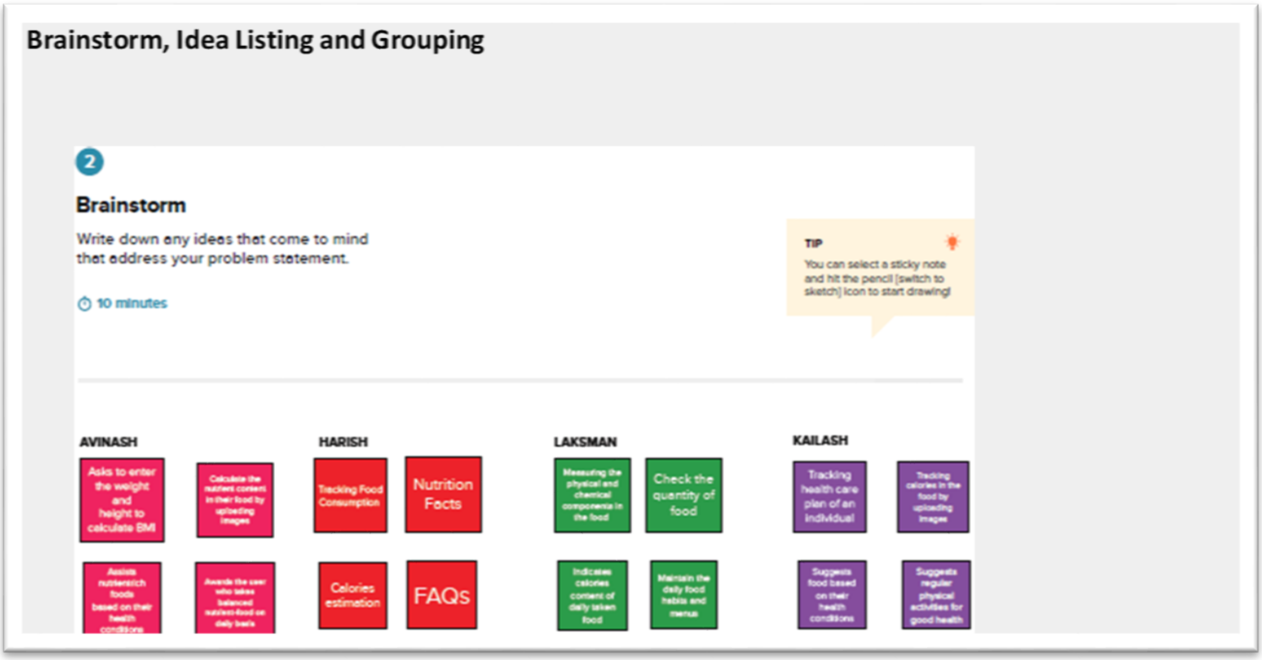
3. IDEATION AND PROPOSED SOLUTION: EMPATHY

MAP CANVAS:



3.2 IDEATION AND BRAINSTROMING:

Brainstorm, Idea Listing and Grouping



Brainstorming provides a free and open environment that encourages everyone within a teamto participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants areencouraged to collaborate, helping each other develop a rich number of creative solutions.

Use this template in your own brainstorming sessions so your team can unleash theirimagination and start shaping concepts even if you're not sitting in the same room.

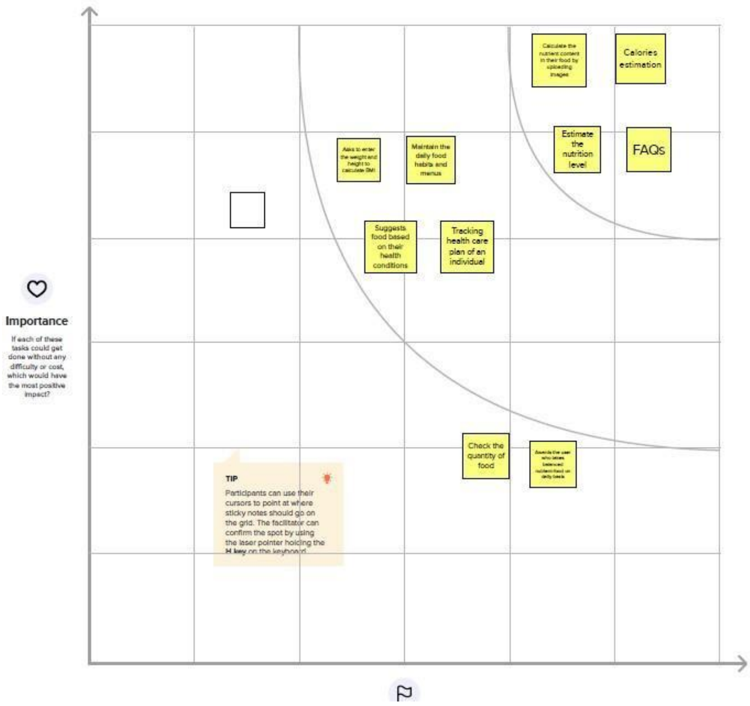
Reference: https://www.mural.co/templates/empathy-map-canvas

Idea Prioritization

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes



After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

Quick add-ons

A **Share the mural**
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.

B **Export the mural**
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

Keep moving forward

Strategy blueprint
Define the components of a new idea or strategy.
Open the template →

Customer experience journey map
Understand customer needs, motivations, and obstacles for an experience.
Open the template →

Strengths, weaknesses, opportunities & threats
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.
Open the template →

Share template feedback

3.3 PROPOSED SOLUTION:

S.NO	Parameter	Description
1	Problem Statement (Problem to be solved)	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.
2	Idea / Solution description	The idea 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.
3	Novelty / Uniqueness	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.).
4	Social Impact / Customer Satisfaction	This project is very helpful to People. Everyone Maintaining their own diet, to manage the time.
5	Business Model (Revenue Model)	By using this system, the users can predict and analyse the picture of the fruits and foods. In which it results to the visualizing the description of the foods taken as input.
6	Scalability of the Solution	By implementing this system, the people can efficiently and effectively to gain knowledge about the fitness. They want and they wish to use at any time. This system can also be integrated with the future technologies.

3.4 PROBLEM SOLUTION FIT

Define CS, fit into CC

1.CUSTOMER SEGMENT(S) CS

- Healthy Eaters
- Sports Persons
- Senior Citizens

6. CUSTOMER CONSTRAINTS CC

- Internet Facility
- Spending Time

5. AVAILABLE SOLUTIONS AS

To detect the nutrition based on fruits like Sugar, Fibre, Protein, Calories,etc. to make the users conscious about their foods.

Explore AS, differentiate

Focus on J&P, tap into

2. JOBS-TO-BE-DONE / PROBLEMS J&P

- Incorrect Details
- Low quality image leads to wrong prediction of nutrients

9. PROBLEM ROOT CAUSE RC

- Busy Schedule
- Laziness

7. BEHAVIOUR BE

- Consulting Doctors
- Maintaining their own diet

Focus on J&P, tap into

Identify TR &strong EM

3. TRIGGERS TR

Through advertisements, neighbors or through social media

4. EMOTIONS: BEFORE / AFTER

Before: Unhealthy,Confused
After:Healthy,Confident

10. YOUR SOLUTION

To track the health care plan of an individual.To track the calories in the food by uploading images.To suggests food based on their health conditions.

8.CHANNELS OF BEHAVIOUR

ONLINE:

- Through Social Media
- Channel Advertisements

OFFLINE:

- Suggests neighbors
- Through pamplets

Identify TR &strong EM

4. REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT:

Following are the functional requirements of the proposed solution.

Fr.no	Functional requirement	Sub requirement (story/subtask)
Fr-1	User registration	Registration through form Registration through Gmail
Fr-2	User confirmation	Confirmation via OTP Confirmation via Email
Fr-3	Capturing image	Capture the image of the leaf And check the parameter of the captured image .
Fr-4	Image processing	Upload the image for the prediction of the disease in the leaf.
Fr-5	Leaf identification	Identify the leaf and predict the disease in leaf.
Fr-6	Image description	Suggesting the best fertilizer for the disease.

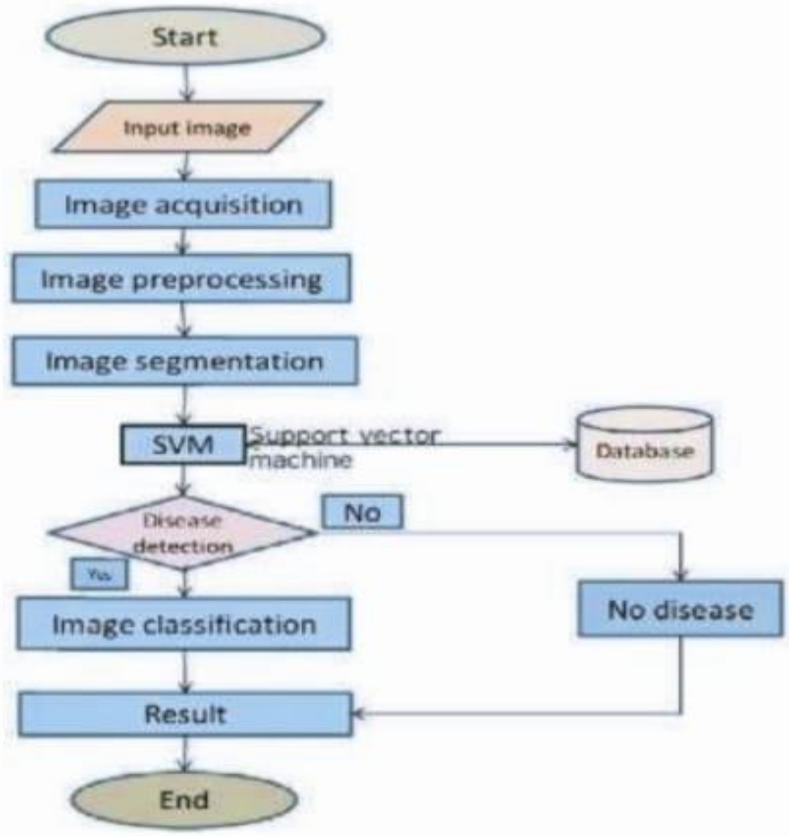
4.2 Non-Functional Requirement:

Following is the non-functional requirement of the proposed solution.

NFr.no	Non-functional requirement	Description
Nfr-1	Usability	Datasets of all the leaf is used to detecting the disease that present in the leaf.
Nfr-2	Security	The information belongs to the user and leaf are secured highly.
Nfr-3	Reliability	The leaf quality is important for the predicting the disease in leaf.
Nfr-4	Performance	The performance is based on the quality of the leaf used for disease prediction
Nfr-5	Availability	It is available for all user to predict the disease in the plant
Nfr-6	Scalability	Increasing the prediction of the disease in the leaf

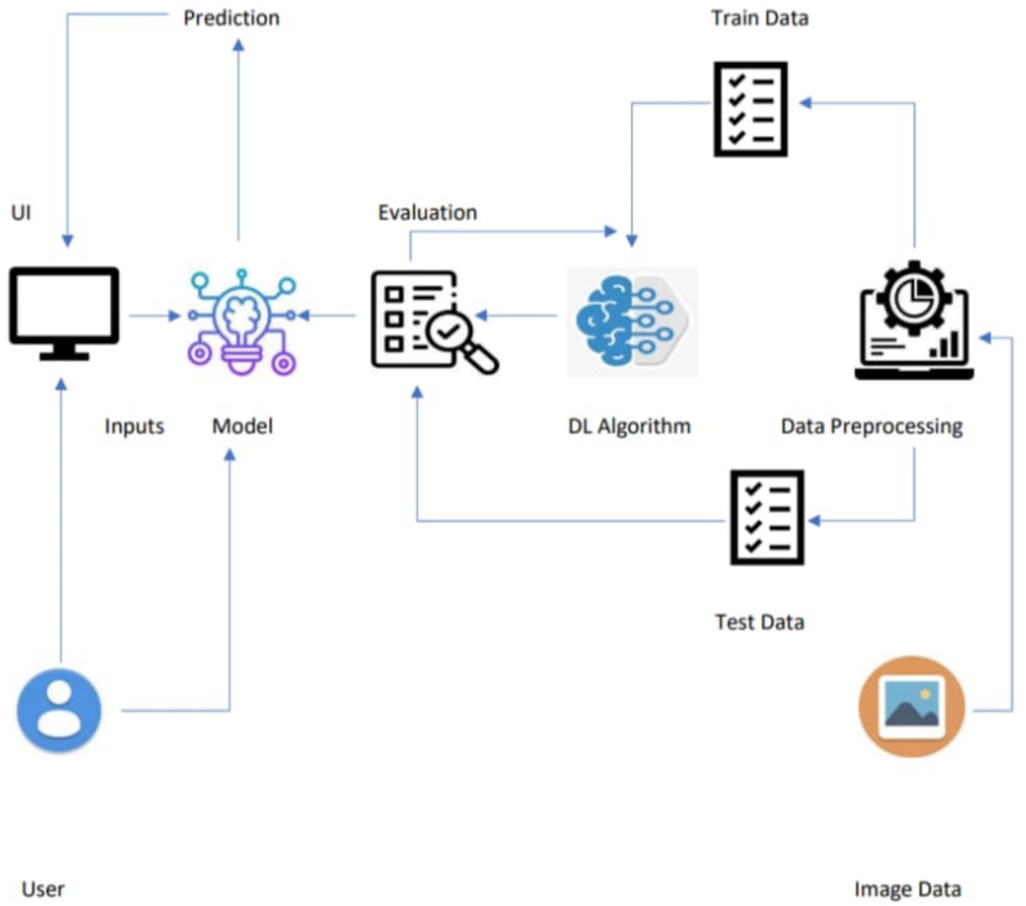
5. PROJECT DESIGN

Data flow Diagrams & User Stories:

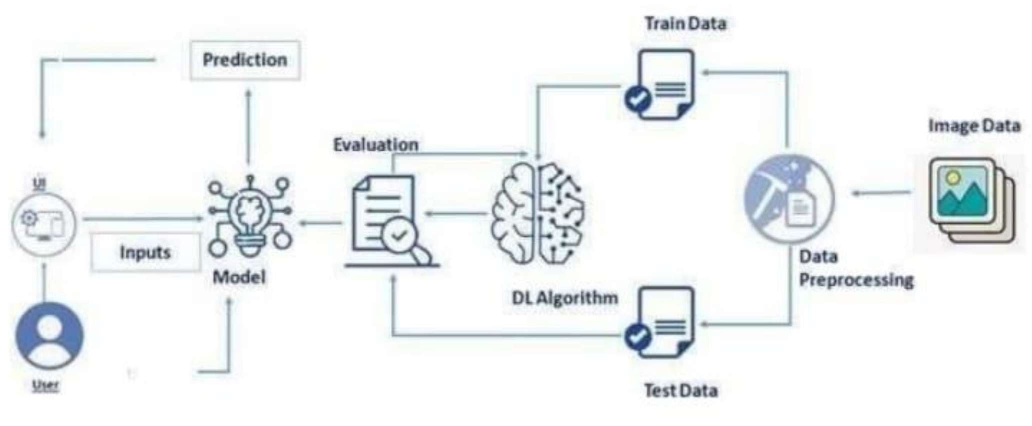


5.2 SOLUTION AND TECHNICAL ARCHITECTURE:

SOLUTION ARCHITECTURE:



Technical Stack:



5.3 USER STORIES

Here Come the Artificial Intelligence Nutritionists
Companies are experimenting with personalized diet apps, saying the future of healthy eating is A.I

After 20 years of living with Type 2 diabetes, Tom Idema had given up hope of controlling his condition. He had tried many diets that proved unsuccessful and even considered weight loss surgery. When his employer offered him a chance to try a new dietary app that uses artificial intelligence to control blood sugar, he took it.

Mr. Idema, 50, sent in a stool sample to get his microbiome sequenced and filled out an online questionnaire with his blood sugar, height, weight and medical conditions. That data was used to create a profile for him, to which he added continued blood sugar measurements for a couple of weeks. After that, the app, called Day Two, rated different foods according to how good or bad they might be for Mr. Idema’s blood sugar, to aid him in making better food choices.

After nearly 500 days using the program, his diabetes is in remission and his blood sugar levels have dropped to the upper end of normal. And even though day Two says the app isn’t aimed at weight loss, he’s gone from 320 pounds to 229 pounds. “I’m wearing pant sizes I haven’t worn since high school,” said Mr. Idema, who is an administrator at Central Michigan University in Mount Pleasant, Mich.

Day Two is just one of a host of apps claiming to offer A.I. eating solutions. Instead of a traditional diet, which often has a set list of “good” and “bad” foods, these programs are more like personal assistants that help someone quickly make healthy food choices. They are based on research showing that bodies each react differently to the same foods, and the healthiest choices are likely to be unique to each individual.

Whether these A.I. nutritionists are ready for widespread use is still unclear, and there is very little research available from sources outside the companies’ selling apps. Users should be wary of overly broad claims that go beyond predicting how foods affect blood sugar.

But proponents say blood sugar is just the beginning and that artificial intelligence programs could target other aspects of metabolic health, such as obesity and heart disease, eventually helping to guide a person’s everyday meal choices.

6.PROJECT PLANNING AND SCHEDULING:

6.1 SPRINT PLANNING & ESTIMATION

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	User input	USN-1	As a user, I can input the particular URL in the required field and waiting for validation.	2	High	Vishal, Yaddalapalli venkatesh
Sprint-1	Feature extraction	USN-1	Here system can extract feature using heuristic and visual similarity approach	1	High	Vinu, Yelluri naveen
Sprint-1	Prediction	USN-1	Here the Model will predict the URL websites using Machine Learning algorithms	2	High	Vishal, Yaddalapalli venkatesh
Sprint-1	Classifier	USN-1	Here it will send all the model output to classifier in order to produce final result	2	High	Vinu, Yelluri naveen
Sprint-1	Announcement	USN-1	Displays whether website is a legal site or a phishing site.	1	High	Vishal, Yaddalapalli venkatesh
Sprint-2	Bugs	USN-2	As a user, I can report bugs in the application	1	Medium	Vinu, Yelluri naveen
Sprint-2	Feedback	USN-3	As a user, I can send feedback about the application and opinions for improvement	1	Low	Vishal, Yaddalapalli venkatesh
Sprint-3	Tips	USN-4	Here cyber security tips are provided for the Customers/Users	1	Low	Vinu, Yelluri

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	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

6.2 SPRINT DELIVERY SCHEDULE:

TITLE	DESCRIPTION	DATE
Literature Survey & Information Gathering	Gather/collect the relevant information on project use case, refer the existing solutions, technical papers, research publications etc.	17 SEPTEMBER 2022
Prepare Empathy Map	Prepare the empathy map canvas to capture the user pains and gains, Prepare list of problem statements	17 SEPTEMBER 2022
Ideation	List them by organizing the brainstorming session and prioritize the top 3 ideas based on the feasibility & importance.	17 SEPTEMBER 2022
Proposed Solution	Prepare the proposed solution document, which includes the novelty, feasibility of idea, business model, social impact, scalability of solution, etc.	19 SEPTEMBER 2022
Problem Solution Fit	Prepare problem - solution fit document.	19 SEPTEMBER 2022
Solution Architecture	Prepare solution architecture document.	19 SEPTEMBER 2022
Customer Journey	Prepare the customer journey maps to understand the user interactions & experiences with the application (entry to exit).	03 OCTOBER 2022

Functional Requirement	Prepare the functional requirement document.	03 OCTOBER 2022
Data Flow Diagrams	Prepare the data flow diagrams and submit for review.	03 OCTOBER 2022
Technology Architecture	Draw the technology architecture diagram.	04 OCTOBER 2022
Prepare Milestone & Activity List	Prepare the milestones & activity list of the project.	21 OCTOBER 2022
Project Development - Delivery of Sprint-1, 2, 3 & 4	Develop & submit the developed code by testing it.	9 NOVEMBER 2022

6.3 REPORTS FROM JIRA

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.

7.CODING AND SOLUTIONING:

7.1 IMAGE PRE -PROCESSING

Loading and pre-processing the data: Data is gold as far as deep learning models are concerned. Your image classification model has a far better chance of performing well if you have a good number of images in the training set. Also, the shape of the data varies according to the architecture/framework that we use. Hence, the critical data pre-processing step (the eternally important step in any project). I highly recommend going through the “basics of image processing using Python we use Keras’ ImageDataGenerator class to perform data augmentation. i.e., we are using some kind of parameters to process our collected data. The word “augment” means to make something “greater” or “increase” something (in this case, data), the Keras ImageDataGenerator class actually works by

Accepting a batch of images used for training.

Taking this batch and applying a series of random transformations to each image in the batch (including random rotation, resizing, shearing, etc.).

Replacing the original batch with the new, randomly transformed batch. Training the CNN on this randomly transformed batch (i.e., the original data itself is not used for training). Note: The ImageDataGenerator accepts the original data, randomly transforms it, and returns only the new, transformed data. ϖ Import the library ϖ Define the parameters /arguments for ImageDataGenerator class Note: The ImageDataGenerator transforms each image in the batch by a series of random translations, these translations are based on the arguments

- Applying ImageDataGenerator functionality to trainset and testset.

 Import the library

```
In [9]: from keras.preprocessing.image import ImageDataGenerator
```

** Define the parameters /arguments for ImageDataGenerator class**

```
train_datagen=ImageDataGenerator(rescale=1./255,shear_range=0.2,zoom_range=0.2,horizontal_flip=True)
test_datagen = ImageDataGenerator(rescale=1./255)
```

Note: The ImageDataGenerator transforms each image in the batch by a series of random translations, these translations are based on the arguments.

** Applying ImageDataGenerator functionality to trainset and testset**

```
train_datagen=ImageDataGenerator(rescale=1./255,shear_range=0.2,zoom_range=0.2,horizontal_flip=True)
test_datagen = ImageDataGenerator(rescale=1./255)
```

```
x_train = train_datagen.flow_from_directory(r'E:\dataset\training_set',target_size=(64,64),batch_size=32,class_mode='categorical'
x_test = train_datagen.flow_from_directory(r'E:\dataset\test_set',target_size=(64,64),batch_size=32,class_mode='catagorical')
```

```
Found 8000 images belonging to 2 classes.
Found 2000 images belonging to 2 classes.
```

Image data augmentation is a technique that can be used to artificially expand the size of a training dataset by creating modified versions of images in the dataset.

The Keras deep learning neural network library provides the capability to fit models using image data augmentation via the ImageDataGenerator class.
Let us import the ImageDataGenerator class from Keras

```
from keras.preprocessing.image import ImageDataGenerator
```

ImageDataGenerator class is instantiated and the configuration for the types of data augmentation

There are five main types of data augmentation techniques for image data; specifically:

Image shifts via the width_shift_range and height_shift_range arguments.
The image flips via the horizontal_flip and vertical_flip arguments.
Image rotations via the rotation_range argument
Image brightness via the brightness_range argument.
Image zooms via the zoom_range argument.

An instance of the ImageDataGenerator class can be constructed for train and test.

Image Data Agumentation

```
#setting parameter for Image Data agumentation to the traing data
train_datagen = ImageDataGenerator(rescale=1./255,shear_range=0.2,zoom_range=0.2,horizontal_flip=True)
#Image Data agumentation to the testing data
test_datagen=ImageDataGenerator(rescale=1./255)
```

FEATURE-2:

➢ This study developed an AI model based on semantic text to analyse the nutritional ingredients of a nutrient, and a digital data semantic analysis model was designed to determine the names and servings of the dishes consumed.

➢ The AI model is based on the ingredients of automatically calculates the nutrient intake. **Market Status to Support Investment in Fitness and Nutrition App:**
With time the tools of food and nutrition apps have gained immense popularity and have become a necessity for many. Since there is no better and faster way for one to count their calories and work on their diet and food consumption, these apps have made it possible to keep a tab on what they eat and when they eat it. There is high competition in this vertical, but what keeps a diet and nutrition app going are the features it offers to

With both the training data defined and model defined, it's time configure the learning process. This is accomplished with a call to the compile() method of the Sequential model class. Compilation requires 3 arguments: an optimizer, a loss function, and a list of metrics. In our example, set up as a multi-class classification problem, we will use the Adam optimizer, the categorical cross entropy loss function, and include solely the accuracy metric. The last and final step is to make use of Saved model to do predictions. We use load model class to load the model. We use imread() class from open The last and final step is to make use of Saved model to do predictions. We

use load model class to load the model. We use imread() class from opencv

library to read an image and give it to the model to predict the result. Before

giving the original image to predict the class, we have to pre-process that

image and apply predictions to get accurate resultscv library to read an image and give it to the model to predict the result. Before giving the original image to predict the class, we have to pre-process that image and apply predictions to get accurate results.

```
In [8]: from keras.models import load_model
        import numpy as np
        import cv2
        model =load_model('mymodel.h5')

In [9]: model.compile(optimizer='adam',loss='binary_crossentropy

In [10]: from skimage.transform import resize
         def detect(frame):
             try:
                 img= resize(frame,(64,64))
                 img = np.expand_dims(img,axis=0)
                 if(np.max(img)>1):
                     img =img/255.0
                 prediction =model.predict(img)
                 print (prediction)
                 prediction_class = model.predict_classes(img)
                 print(prediction_class)
             except AttributeError:
                 print("shape not found")

In [12]: frame= cv2.imread("cat.jpg")
         data= detect(frame)
```

Keras has 2 ways to define a neural network:

• Sequential

• Function API The Sequential class is used to define a linear initializations of network layers which then, collectively, constitute a model. In our example below, we will use the Sequential constructor to create a model, which will then have layers added to it using the add() method.

We will be adding three layers for CNN

- **Convolution layer**
- **Pooling layer**
- **Flattening layer**

fit_generator functions used to train a deep learning neural network
Arguments:

- steps_per_epoch: it specifies the total number of steps taken from the generator as soon as one epoch is finished and the next epoch has started. We can calculate the value of steps_per_epoch as the total number of samples in your dataset divided by the batch size.
- Epochs: an integer and number of epochs we want to train our model for.
- validation data can be either:
  - an inputs and targets list
  - a generator
  - inputs, targets, and sample_weights list which can be used to evaluate the loss and metrics for any model after any epoch has ended.
- validation_steps: only if the validation_data is a generator then only this argument can be used. It specifies the total number of steps taken from the generator before it is stopped at every epoch and its value is calculated as the total number of validation data points in your dataset divided by the validation batch size.

8.TESTING:

8.1 TEST CASES:

1 Exception Base

Class for all exceptions

2 StopIteration:

Raised when the next() method of an iterator does not point to any object.

3 SystemExit:

Raised by the sys.exit() function.

4 StandardError:

Base class for all built-in exceptions except StopIteration and SystemExit.

5 ArithmeticError:

Base class for all errors that occur for numeric calculation.

6 OverflowError:

Raised when a calculation exceeds maximum limit for a numeric type.

7 FloatingPointError :

Raised when a floating point calculation fails.

8 ZeroDivisionError :

Raised when division or modulo by zero takes place for all numeric types.

9 AssertionError:

Raised in case of failure of the Assert statement.

10 AttributeError:

Raised in case of failure of attribute reference or assignment.

11 EOF Error :

Raised when there is no input from either the raw_input() or input() function and the endfile is reached.

12 Import Error :

Raised when an import statement fails.

13 KeyboardInterrupt :

Raised when the user interrupts program execution, usually by pressing Ctrl+c.

14 LookupError :

Base class for all lookup errors.

15 IndexError :

Raised when an index is not found in a sequence.

16 KeyError :

Raised when the specified key is not found in the dictionary.

17 NameError:

Raised when an identifier is not found in the local or global namespace.

18 UnboundLocalError :

Raised when trying to access a local variable in a function or method but no value has be assigned to it.

19 EnvironmentError :

Base class for all exceptions that occur outside the Python environment.

20 IOError:

Raised when an input/ output operation fails, such as the print statement or the open function when trying to open a file that does not exist.

21 IOError:

Raised for operating system-related errors.

22 SyntaxError :

Raised when there is an error in Python syntax.

23 IndentationError:

Raised when indentation is not specified properly.

24 SystemError:

Raised when the interpreter finds an internal problem, but when this error is encounter the Python interpreter does not exit.

25 SystemExit:

Raised when Python interpreter is quit by using the sys.exit() function. If not handled incode, causes the interpreter to exit.

26 TypeError:

Raised when an operation or function is attempted that is invalid for the specified data ty .

Assertions in Python:

An assertion is a sanity-check that you can turn on or turn off when you are done with your testing of the program.

The easiest way to think of an assertion is to liken it to a raise-if statement (or to be more accurate, a raise-if-not statement). An expression is tested, and if the result comes up false, an exception is raised.

Programmers often place assertions at the start of a function to check for valid input, and after a function call to check for valid output.

The assert Statement :

When it encounters an assert statement, Python evaluates the accompanying expression, which is hopefully true. If the expression is false, Python raises an AssertionError exception.

The syntax for assert is − assert Expression[, Arguments]
If the assertion fails, Python uses ArgumentExpression as the argument for the AssertionError. AssertionError exceptions can be caught and handled like any other exception using the try-except statement, but if not handled, they will terminate the program and produce a traceback.

8.2 USER ACCEPTANCE TESTING:

There are specific APIs and tools that will help you in developing these great apps. These tools and APis have various functions, and each is important in its own way. It depends solely on your choice to integrate them or not, but to develop an efficient fitness app that can be popular among the users, these tools are necessary. The APIs that are in the list are Google Fitness API, Lumo API, Starve, Health Graph, MisFit, Breezometer air quality API, Jawbone UP Unofficial fitocracy API, Runscope API, etc. The list of tools includes BMI calculator, Withings, FoodSpex. These APIs and tools work in the background, hidden from the users behind the hardware There are specific hardware requirements for the wearables that will connect to your app to fetch the required data, such as Ambient light sensors, Bioimpedance sensors, Skin response sensors, Barometric altimeter, Accelerometer, Gyroscopes, Compasses, etc.

9.RESULTS:

PERFORMANCE METRICS:

Performance metrics are data used to track processes within a business. This is achieved using activities, employee behaviour, and productivity as key metrics. These metrics are then used by employers to evaluate performance. This is in relation to an established goal such as employee productivity or sales objectives.The project AI-powered Nutrition Analyzer for Fitness Enthusiasts has work well with good performance metrics .

10.ADVANTAGES AND DISADVANTAGES:

ADVANTAGES

AI algorithms may help to

- Better understand
- Predict the complex
- Non-linear interactions between nutrition-related data and health outcomes.

DISADVANTAGES:

- when large amounts of data need to be structured and integrated, such as in metabolomics.
- It takes long time process
- Maintains is complex

11.CONCLUSION:

The purpose of nutritional assessment, however, is to define a patient's nutritional status, to define clinically relevant malnutrition and to monitor changes in nutritional status.

12.FUTURE SCOPE:

Nutrition also focuses on how people can use dietary choices to reduce the risk of disease, what happens if a person has too much or too little of a nutrient, and how allergies work. Nutrients provide nourishment. Proteins, carbohydrates, fat, vitamins, minerals, fibre, and water are all nutrients.

13.APPENDIX:

SOURCE CODE:

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Development Phase\\Sprint-4\n"
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```

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```

```
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b[39;00m\u001b[39m.\u001b[39;00m\u001b[39mpreprocessing\u001b[39;00m\u001b[39
m.\u001b[39;00m\u001b[39mimage\u001b[39;00m \u001b[39mimport\u001b[39;00m
ImageDataGenerator\u001b[39m#scaling,zooming\u001b[39;00m\n",
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```

```
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testing set"
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      "outputs": [
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        }
      ],
      "source": [
```

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t\",target_size=(64,64),class_mode=\"categorical\",batch_size=24)"
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        "from tensorflow.keras.models import Sequential\n",
        "from tensorflow.keras import layers\n",
        "from tensorflow.keras.layers import Dense,Flatten\n",
        "from tensorflow.keras.layers import Conv2D\n",
        "from tensorflow.keras.layers import MaxPooling2D\n",
        "from tensorflow.keras.layers import Dropout"
      ]

```
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    },
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64,3)))"
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    },
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      "metadata": {
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      },
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        "model.add(MaxPooling2D(pool_size=(2,2)))"
      ]
    },
    {
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            " Layer (type)                Output Shape              Param #
\n",
"=================================================================\n",
            " conv2d (Conv2D)             (None, 62, 62, 32)        896
\n",
            "
\n",
```

```
            " max_pooling2d (MaxPooling2D  (None, 31, 31, 32)       0
\n",
            " )
\n",
            "
\n",
            " flatten (Flatten)           (None, 30752)            0
\n",
            "
\n",
            " dense (Dense)               (None, 300)              9225900
\n",
            "
\n",
            " dense_1 (Dense)             (None, 300)              90300
\n",
            "
\n",
            " dense_2 (Dense)             (None, 5)                1505
\n",
            "
\n",

"=================================================================\n",
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"_________________________________________________________________\n"
          ]
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```

```
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```

```
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loss: 0.4205 - accuracy: 0.8861 - val_loss: 48.9065 - val_accuracy:
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            "Epoch 2/10\n",
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            "110/110 [==============================] - 28s 255ms/step -
loss: 0.0014 - accuracy: 1.0000 - val_loss: 66.6759 - val_accuracy:
0.1488\n",
            "Epoch 4/10\n",
            "110/110 [==============================] - 27s 242ms/step -
loss: 3.3364e-04 - accuracy: 1.0000 - val_loss: 70.6794 - val_accuracy:
0.1488\n",
            "Epoch 5/10\n",
            "110/110 [==============================] - 27s 248ms/step -
loss: 1.9990e-04 - accuracy: 1.0000 - val_loss: 74.1865 - val_accuracy:
0.1488\n",
            "Epoch 6/10\n",
            "110/110 [==============================] - 26s 236ms/step -
loss: 4.5090e-04 - accuracy: 1.0000 - val_loss: 75.5190 - val_accuracy:
0.1308\n",
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            "110/110 [==============================] - 27s 248ms/step -
loss: 1.0600e-04 - accuracy: 1.0000 - val_loss: 78.4789 - val_accuracy:
0.1488\n",
            "Epoch 8/10\n",
            "110/110 [==============================] - 26s 237ms/step -
loss: 7.9529e-05 - accuracy: 1.0000 - val_loss: 80.7918 - val_accuracy:
0.1403\n",
            "Epoch 9/10\n",
            "110/110 [==============================] - 26s 236ms/step -
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0.1431\n",
            "Epoch 10/10\n",
            "110/110 [==============================] - 29s 266ms/step -
loss: 9.1324e-05 - accuracy: 1.0000 - val_loss: 83.0943 - val_accuracy:
0.1393\n"
          ]
        },
        {
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            ]
          },
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        }
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est,validation_steps=len(x_test))"
      ]
```

```
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  ]
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  ]
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},
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    ]
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    ]
  },
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    "execution_count": null,
    "metadata": {
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    },
    "outputs": [],
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    ]
  },
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    ]
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```

```
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      },
      "outputs": [
        {
          "name": "stdout",
          "output_type": "stream",
          "text": [
            "nutrition.h5\n"
          ]
        }
      ],
      "source": [
        "!tar zcvf nutrition-classification-model.tgz nutrition.h5"
      ]
    },
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      "metadata": {
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      "source": [
        "# Connecting with IBM Cloud\n"
      ]
    },
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            "Collecting watson-machine-learning-client\n",
```

```
            "  Downloading watson_machine_learning_client-1.0.391-py3-none-
any.whl (538 kB)\n",
            "\u001b[K     |████████████████████████████████| 538 kB 31.7 MB/s
\n",
            "\u001b[?25hRequirement already satisfied: certifi in
/usr/local/lib/python3.7/dist-packages (from watson-machine-learning-client)
(2022.9.24)\n",
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(0.8.10)\n",
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/usr/local/lib/python3.7/dist-packages (from watson-machine-learning-client)
(1.24.3)\n",
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/usr/local/lib/python3.7/dist-packages (from watson-machine-learning-client)
(4.64.1)\n",
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(1.15.0)\n",
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```
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learning-client) (2.10)\n",
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client) (1.21.6)\n",
            "Requirement already satisfied: pytz>=2017.3 in
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sdk-core, ibm-cos-sdk-s3transfer\n",
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e2ea57\n",
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s3transfer\n",
            "Installing collected packages: urllib3, requests, jmespath, ibm-
cos-sdk-core, botocore, s3transfer, ibm-cos-sdk-s3transfer, lomond, ibm-cos-
sdk, boto3, watson-machine-learning-client\n",
            "  Attempting uninstall: urllib3\n",
            "    Found existing installation: urllib3 1.24.3\n",
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            "      Successfully uninstalled urllib3-1.24.3\n",
```

```
            "  Attempting uninstall: requests\n",
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            "    Uninstalling requests-2.23.0:\n",
            "      Successfully uninstalled requests-2.23.0\n",
            "Successfully installed boto3-1.26.8 botocore-1.29.8 ibm-cos-sdk-
2.12.0 ibm-cos-sdk-core-2.12.0 ibm-cos-sdk-s3transfer-2.12.0 jmespath-0.10.0
lomond-0.3.3 requests-2.28.1 s3transfer-0.6.0 urllib3-1.26.12 watson-machine-
learning-client-1.0.391\n"
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                  "urllib3"
                ]
              }
            }
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python.pkg.dev/colab-wheels/public/simple/\n",
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            "  Downloading ibm_watson_machine_learning-1.0.257-py3-none-
any.whl (1.8 MB)\n",
            "\u001b[K     |████████████████████████████████| 1.8 MB 27.3 MB/s
\n",
            "\u001b[?25hRequirement already satisfied: importlib-metadata in
/usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning)
(4.13.0)\n",
            "Requirement already satisfied: tabulate in
/usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning)
(0.8.10)\n",
```

```
            "Requirement already satisfied: packaging in
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(21.3)\n",
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            "  Downloading ibm-cos-sdk-2.7.0.tar.gz (51 kB)\n",
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(2.28.1)\n",
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(1.3.5)\n",
            "Requirement already satisfied: certifi in
/usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning)
(2022.9.24)\n",
            "Requirement already satisfied: lomond in
/usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning)
(0.3.3)\n",
            "Requirement already satisfied: urllib3 in
/usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning)
(1.26.12)\n",
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            "  Downloading ibm-cos-sdk-core-2.7.0.tar.gz (824 kB)\n",
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            "\u001b[?25hCollecting ibm-cos-sdk-s3transfer==2.7.0\n",
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\n",
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dateutil<3.0.0,>=2.1 in /usr/local/lib/python3.7/dist-packages (from ibm-cos-
sdk-core==2.7.0->ibm-cos-sdk==2.7.*->ibm_watson_machine_learning) (2.8.2)\n",
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/usr/local/lib/python3.7/dist-packages (from pandas<1.5.0,>=0.24.2-
>ibm_watson_machine_learning) (1.21.6)\n",
            "Requirement already satisfied: pytz>=2017.3 in
/usr/local/lib/python3.7/dist-packages (from pandas<1.5.0,>=0.24.2-
>ibm_watson_machine_learning) (2022.6)\n",
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/usr/local/lib/python3.7/dist-packages (from python-dateutil<3.0.0,>=2.1-
>ibm-cos-sdk-core==2.7.0->ibm-cos-sdk==2.7.*->ibm_watson_machine_learning)
(1.15.0)\n",
            "Requirement already satisfied: charset-normalizer<3,>=2 in
/usr/local/lib/python3.7/dist-packages (from requests-
>ibm_watson_machine_learning) (2.1.1)\n",
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/usr/local/lib/python3.7/dist-packages (from requests-
>ibm_watson_machine_learning) (2.10)\n",
```

```
            "Requirement already satisfied: typing-extensions>=3.6.4 in
/usr/local/lib/python3.7/dist-packages (from importlib-metadata-
>ibm_watson_machine_learning) (4.1.1)\n",
            "Requirement already satisfied: zipp>=0.5 in
/usr/local/lib/python3.7/dist-packages (from importlib-metadata-
>ibm_watson_machine_learning) (3.10.0)\n",
            "Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in
/usr/local/lib/python3.7/dist-packages (from packaging-
>ibm_watson_machine_learning) (3.0.9)\n",
            "Building wheels for collected packages: ibm-cos-sdk, ibm-cos-
sdk-core, ibm-cos-sdk-s3transfer\n",
            "  Building wheel for ibm-cos-sdk (setup.py) ...
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py2.py3-none-any.whl size=72563
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6b44c2\n",
            "  Building wheel for ibm-cos-sdk-core (setup.py) ...
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2.7.0-py2.py3-none-any.whl size=501013
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/root/.cache/pip/wheels/6c/a2/e4/c16d02f809a3ea998e17cfd02c13369281f3d232aaf5
902c19\n",
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\u001b[?25l\u001b[?25hdone\n",
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64b9da\n",
            "Successfully built ibm-cos-sdk ibm-cos-sdk-core ibm-cos-sdk-
s3transfer\n",
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cos-sdk-s3transfer, ibm-cos-sdk, ibm-watson-machine-learning\n",
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2.12.0\n",
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```

```
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        "    \"apikey\" : \"V8hik2Q5eS1s_K8jZ72O5X-
READkcQBr_qVGtJ37by5j\"\n",
        "    \n",
        "}"
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    },
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        "outputId": "92ef41c0-16db-48a4-f691-f7d4fdf6fe0f"
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          "output_type": "stream",
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            "Python 3.7 and 3.8 frameworks are deprecated and will be removed
in a future release. Use Python 3.9 framework instead.\n"
          ]
        }
      ],
```

```
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        "client = APIClient(wml_credentials)"
      ]
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      },
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0x7f94330c5f10>"
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11T07:33:27.438Z\n",
            "------------------------------------  ---------  ---------------
---------\n"
          ]
        }
      ],
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```
        "client.spaces.list(50)"
      ]
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EJg5z3V6Ou',\n",
              "        'secret_access_key':
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'6b54460b839b47d8bdecefd6d1b7685e',\n",
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'R_mVpQGXP72NFzQDYSl1xITf2uCilclaqhHomhXxCxTq',\n",
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object-storage:global:a/eb0a09c9a4b84a999a2f55a11273104a:d3d402e4-18a3-4c4c-
a68d-181992554abd::',\n",
              "        'secret_access_key':
'1871f382f2e7cf1cc144cacaa843a45ff7a97619edebc80d',\n",
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7bdcb19a8d19'},\n",
              "       'viewer': {'access_key_id':
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              "        'api_key': 'WHQBw1rLdtkBlioUfnUwoc-
p7QMlN8B61k6x9zqJAnoE',\n",
```

```
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object-storage:global:a/eb0a09c9a4b84a999a2f55a11273104a:d3d402e4-18a3-4c4c-
a68d-181992554abd::',\n",
               "        'secret_access_key':
'c022454703e4daad610f7eb5b654e927957574e95c88637a',\n",
               "        'service_id': 'ServiceId-d24c0a42-1bab-418b-b784-
7f9cea997a60'}},\n",
               "      'endpoint_url': 'https://s3.eu-de.cloud-object-
storage.appdomain.cloud',\n",
               "      'guid': 'd3d402e4-18a3-4c4c-a68d-181992554abd',\n",
               "      'resource_crn': 'crn:v1:bluemix:public:cloud-object-
storage:global:a/eb0a09c9a4b84a999a2f55a11273104a:d3d402e4-18a3-4c4c-a68d-
181992554abd::'},\n",
               "     'type': 'bmcos_object_storage'}},\n",
               "   'metadata': {'created_at': '2022-11-11T07:33:27.438Z',\n",
               "    'creator_id': 'IBMid-668000C43R',\n",
               "    'id': '34050180-23c9-44f5-8800-32db49349e5d',\n",
               "    'updated_at': '2022-11-11T07:33:42.590Z',\n",
               "    'url': '/v2/spaces/34050180-23c9-44f5-8800-
32db49349e5d'}}]}"
            ]
          },
          "execution_count": 42,
          "metadata": {},
          "output_type": "execute_result"
        }
      ],
      "source": [
        "client.spaces.get_details()"
      ]
    },
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      },
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      ]
    },
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      "execution_count": null,
      "metadata": {
        "colab": {
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          "height": 35
        },
        "id": "IUcgJkxRMdvs",
        "outputId": "306cbba0-5681-46b5-b472-0ba9da1817e6"
      },
      "outputs": [
        {
          "data": {
            "application/vnd.google.colaboratory.intrinsic+json": {
```

```
              "type": "string"
            },
            "text/plain": [
              "'SUCCESS'"
            ]
          },
          "execution_count": 44,
          "metadata": {},
          "output_type": "execute_result"
        }
      ],
      "source": [
        "client.set.default_space(space_uid)"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "colab": {
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        },
        "id": "UDPI5ci3mwEv",
        "outputId": "bd2d8cea-b2ee-4085-a6e7-3f9b135341d4"
      },
      "outputs": [
        {
          "name": "stdout",
          "output_type": "stream",
          "text": [
            "----------------------------  --------------------------------
---  ----\n",
            "NAME                          ASSET_ID
TYPE\n",
            "default_py3.6                 0062b8c9-8b7d-44a0-a9b9-
46c416adcbd9  base\n",
            "kernel-spark3.2-scala2.12     020d69ce-7ac1-5e68-ac1a-
31189867356a  base\n",
            "pytorch-onnx_1.3-py3.7-edt    069ea134-3346-5748-b513-
49120e15d288  base\n",
            "scikit-learn_0.20-py3.6       09c5a1d0-9c1e-4473-a344-
eb7b665ff687  base\n",
            "spark-mllib_3.0-scala_2.12    09f4cff0-90a7-5899-b9ed-
1ef348aebdee  base\n",
            "pytorch-onnx_rt22.1-py3.9     0b848dd4-e681-5599-be41-
b5f6fccc6471  base\n",
            "ai-function_0.1-py3.6         0cdb0f1e-5376-4f4d-92dd-
da3b69aa9bda  base\n",
            "shiny-r3.6                    0e6e79df-875e-4f24-8ae9-
62dcc2148306  base\n",
            "tensorflow_2.4-py3.7-horovod  1092590a-307d-563d-9b62-
4eb7d64b3f22  base\n",
            "pytorch_1.1-py3.6             10ac12d6-6b30-4ccd-8392-
3e922c096a92  base\n",
            "tensorflow_1.15-py3.6-ddl     111e41b3-de2d-5422-a4d6-
bf776828c4b7  base\n",
```

```
            "autoai-kb_rt22.2-py3.10        125b6d9a-5b1f-5e8d-972a-
b251688ccf40  base\n",
            "runtime-22.1-py3.9             12b83a17-24d8-5082-900f-
0ab31fbfd3cb  base\n",
            "scikit-learn_0.22-py3.6        154010fa-5b3b-4ac1-82af-
4d5ee5abbc85  base\n",
            "default_r3.6                   1b70aec3-ab34-4b87-8aa0-
a4a3c8296a36  base\n",
            "pytorch-onnx_1.3-py3.6         1bc6029a-cc97-56da-b8e0-
39c3880dbbe7  base\n",
            "kernel-spark3.3-r3.6           1c9e5454-f216-59dd-a20e-
474a5cdf5988  base\n",
            "pytorch-onnx_rt22.1-py3.9-edt  1d362186-7ad5-5b59-8b6c-
9d0880bde37f  base\n",
            "tensorflow_2.1-py3.6           1eb25b84-d6ed-5dde-b6a5-
3fbdf1665666  base\n",
            "spark-mllib_3.2                20047f72-0a98-58c7-9ff5-
a77b012eb8f5  base\n",
            "tensorflow_2.4-py3.8-horovod   217c16f6-178f-56bf-824a-
b19f20564c49  base\n",
            "runtime-22.1-py3.9-cuda        26215f05-08c3-5a41-a1b0-
da66306ce658  base\n",
            "do_py3.8                       295addb5-9ef9-547e-9bf4-
92ae3563e720  base\n",
            "autoai-ts_3.8-py3.8            2aa0c932-798f-5ae9-abd6-
15e0c2402fb5  base\n",
            "tensorflow_1.15-py3.6          2b73a275-7cbf-420b-a912-
eae7f436e0bc  base\n",
            "kernel-spark3.3-py3.9          2b7961e2-e3b1-5a8c-a491-
482c8368839a  base\n",
            "pytorch_1.2-py3.6              2c8ef57d-2687-4b7d-acce-
01f94976dac1  base\n",
            "spark-mllib_2.3                2e51f700-bca0-4b0d-88dc-
5c6791338875  base\n",
            "pytorch-onnx_1.1-py3.6-edt     32983cea-3f32-4400-8965-
dde874a8d67e  base\n",
            "spark-mllib_3.0-py37           36507ebe-8770-55ba-ab2a-
eafe787600e9  base\n",
            "spark-mllib_2.4                390d21f8-e58b-4fac-9c55-
d7ceda621326  base\n",
            "autoai-ts_rt22.2-py3.10        396b2e83-0953-5b86-9a55-
7ce1628a406f  base\n",
            "xgboost_0.82-py3.6             39e31acd-5f30-41dc-ae44-
60233c80306e  base\n",
            "pytorch-onnx_1.2-py3.6-edt     40589d0e-7019-4e28-8daa-
fb03b6f4fe12  base\n",
            "pytorch-onnx_rt22.2-py3.10     40e73f55-783a-5535-b3fa-
0c8b94291431  base\n",
            "default_r36py38                41c247d3-45f8-5a71-b065-
8580229facf0  base\n",
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2d495b0c71f7  base\n",
            "autoai-obm_3.0                 42b92e18-d9ab-567f-988a-
4240ba1ed5f7  base\n",
            "pmml-3.0_4.3                   493bcb95-16f1-5bc5-bee8-
81b8af80e9c7  base\n",
```

```
            "spark-mllib_2.4-r_3.6          49403dff-92e9-4c87-a3d7-
a42d0021c095  base\n",
            "xgboost_0.90-py3.6             4ff8d6c2-1343-4c18-85e1-
689c965304d3  base\n",
            "pytorch-onnx_1.1-py3.6         50f95b2a-bc16-43bb-bc94-
b0bed208c60b  base\n",
            "autoai-ts_3.9-py3.8            52c57136-80fa-572e-8728-
a5e7cbb42cde  base\n",
            "spark-mllib_2.4-scala_2.11     55a70f99-7320-4be5-9fb9-
9edb5a443af5  base\n",
            "spark-mllib_3.0                5c1b0ca2-4977-5c2e-9439-
ffd44ea8ffe9  base\n",
            "autoai-obm_2.0                 5c2e37fa-80b8-5e77-840f-
d912469614ee  base\n",
            "spss-modeler_18.1              5c3cad7e-507f-4b2a-a9a3-
ab53a21dee8b  base\n",
            "cuda-py3.8                     5d3232bf-c86b-5df4-a2cd-
7bb870a1cd4e  base\n",
            "autoai-kb_3.1-py3.7            632d4b22-10aa-5180-88f0-
f52dfb6444d7  base\n",
            "pytorch-onnx_1.7-py3.8         634d3cdc-b562-5bf9-a2d4-
ea90a478456b  base\n",
            "----------------------------  ------------------------------------
---  ----\n",
            "Note: Only first 50 records were displayed. To display more use
'limit' parameter.\n"
          ]
        }
      ],
      "source": [
        "client.software_specifications.list()"
      ]
    },
    {
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      },
      "outputs": [],
      "source": [
        "# setting up the tensorflow python\n",
        "software_space_uid=
client.software_specifications.get_uid_by_name(\"tensorflow_rt22.1-py3.9\")"
      ]
    },
    {
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          "height": 35
        },
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        "outputId": "d742534a-3279-4e8b-f5e7-668861c0439c"
      },
```

```
      "outputs": [
        {
          "data": {
            "application/vnd.google.colaboratory.intrinsic+json": {
              "type": "string"
            },
            "text/plain": [
              "'acd9c798-6974-5d2f-a657-ce06e986df4d'"
            ]
          },
          "execution_count": 47,
          "metadata": {},
          "output_type": "execute_result"
        }
      ],
      "source": [
        "software_space_uid"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "id": "B70WAnjEuIJT"
      },
      "outputs": [],
      "source": [
        "model_details = client.repository.store_model(model = \"nutrition-
classification-model.tgz\",meta_props={\n",
        "    client.repository.ModelMetaNames.NAME : \"CNN Model\",\n",
        "    client.repository.ModelMetaNames.TYPE : \"tensorflow_2.7\",\n",
        "    client.repository.ModelMetaNames.SOFTWARE_SPEC_UID : \"acd9c798-
6974-5d2f-a657-ce06e986df4d\"\n",
        "    })\n"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "id": "3fRMG9Bp2FeC"
      },
      "outputs": [],
      "source": [
        "model_id= client.repository.get_model_id(model_details)"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "colab": {
          "base_uri": "https://localhost:8080/",
          "height": 35
        },
        "id": "LQIvh7c32GMj",
        "outputId": "0da6af2d-c69b-4f45-b6a6-c54355bef834"
```

```
    },
    "outputs": [
      {
        "data": {
          "application/vnd.google.colaboratory.intrinsic+json": {
            "type": "string"
          },
          "text/plain": [
            "'131631a4-f15d-49bf-851c-dd918e50ca96'"
          ]
        },
        "execution_count": 50,
        "metadata": {},
        "output_type": "execute_result"
      }
    ],
    "source": [
      "model_id"
    ]
  },
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    "execution_count": null,
    "metadata": {
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        "height": 53
      },
      "id": "lvQhs3WO3ryq",
      "outputId": "d60f24fe-cc8b-4111-9d5d-ae75b5357509"
    },
    "outputs": [
      {
        "name": "stdout",
        "output_type": "stream",
        "text": [
          "Successfully saved model content to file: 'nutrition.tar.biz'\n"
        ]
      },
      {
        "data": {
          "application/vnd.google.colaboratory.intrinsic+json": {
            "type": "string"
          },
          "text/plain": [
            "'/content/drive/MyDrive/CNN/nutrition.tar.biz'"
          ]
        },
        "execution_count": 51,
        "metadata": {},
        "output_type": "execute_result"
      }
    ],
    "source": [
      "client.repository.download(model_id,'nutrition.tar.biz')"
    ]
  },
```

```
    {
      "cell_type": "markdown",
      "metadata": {
        "id": "CGu_19dgviMJ"
      },
      "source": [
        "Build Python Code"
      ]
    },
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      "execution_count": null,
      "metadata": {
        "id": "GqYtNRYFEzcB"
      },
      "outputs": [],
      "source": [
        "from flask import Flask,render_template,request\n",
        "# Flask-It is our framework which we are going to use to run/serve
our application.\n",
        "#request-for accessing file which was uploaded by the user on our
application.\n",
        "import os\n",
        "import numpy as np #used for numerical analysis\n",
        "from tensorflow.keras.models import load_model#to load our trained
model\n",
        "from tensorflow.keras.preprocessing import image\n",
        "import requests"
      ]
    },
    {
      "cell_type": "markdown",
      "metadata": {
        "id": "8tXE-8zTvWhL"
      },
      "source": [
        "Creating our flask application and loading our model by using the
load_model method"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
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        },
        "id": "OXF89Pc43sTf",
        "outputId": "ddb67b10-d563-4112-8d1e-5d186ec0c5e1"
      },
      "outputs": [
        {
          "name": "stdout",
          "output_type": "stream",
          "text": [
            "Loaded model from disk\n"
          ]
```

```
        }
      ],
      "source": [
        "app = Flask(__name__,template_folder=\"templates\") # initializing a
flask app\n",
        "# Loading the model\n",
        "model=load_model('nutrition.h5')\n",
        "print(\"Loaded model from disk\")"
      ]
    },
    {
      "cell_type": "markdown",
      "metadata": {
        "id": "ue8tQsZPvGOI"
      },
      "source": [
        "Routing To The Html Page"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "id": "clCvamQ3Sprz"
      },
      "outputs": [],
      "source": [
        "@app.route('/')# route to display the home page\n",
        "def home():\n",
        "    return render_template('home.html')"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "id": "k-qOc79CSunG"
      },
      "outputs": [],
      "source": [
        "@app.route('/image1',methods=['GET','POST'])# routes to the index
html\n",
        "def image1():\n",
        "    return render_template(\"image.html\")"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "id": "7Z-mVYWvSu_C"
      },
      "outputs": [],
      "source": [
        "@app.route('/predict',methods=['GET', 'POST'])# route to show the
predictions in a web UI\n",
        "def launches():\n",
```

```
        "    if request.methods=='POST':\n",
        "        f=request.files['file'] #requesting the file\n",
        "        basepath=os.path.dirname('__file__')#storing the file
directory\n",
        "
filepath=os.path.join(basepath,\"uploads\",f.filename)#storing the file in
uploads folder\n",
        "        f.save(filepath)#saving the file\n",
        "        img=image.load_img(filepath,target_size=(64,64)) #load and
reshaping the image\n",
        "        x=image.img_to_array(img)#converting image to an array\n",
        "        x=np.expand_dims(x,axis=0)#changing the dimensions of the
image\n",
        "        pred=np.argmax(model.predict(x), axis=1)\n",
        "        print(\"prediction\",pred)#printing the prediction\n",
        "
index=['APPLES','BANANA','ORANGE','PINEAPPLE','WATERMELON']\n",
        "        result=str(index[pred[0]])\n",
        "        x=result\n",
        "        print(x)\n",
        "        result=nutrition(result)\n",
        "        print(result)\n",
        "        return render_template(\"0.html\",showcase=(result))\n",
        "\n",
        "        "
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "id": "7ciMjLjXTf35"
      },
      "outputs": [],
      "source": [
        "pred = model.predict"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "colab": {
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        },
        "id": "lsZjjRbSTiY2",
        "outputId": "90d4b3b8-2e53-4e58-9073-e2d6cdd1c241"
      },
      "outputs": [
        {
          "name": "stdout",
          "output_type": "stream",
          "text": [
            "44/44 [==============================] - 3s 61ms/step\n"
          ]
        }
      ],
```

```
      "source": [
        "predict_x=model.predict(x_test) \n",
        "classes_x=np.argmax(predict_x,axis=1)"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "id": "yjjbgSpITqJC"
      },
      "outputs": [],
      "source": [
        "index=['APPLE','BANANA','ORANGE','WATERMELON','PINEAPPLE']"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "id": "usEGRqZITwxD"
      },
      "outputs": [],
      "source": [
        "result=str(index[classes_x[0]])"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "colab": {
          "base_uri": "https://localhost:8080/"
        },
        "id": "2CzFj6-6T8lj",
        "outputId": "3d703b75-1797-42e8-82ae-62ab3eb05d1b"
      },
      "outputs": [
        {
          "name": "stdout",
          "output_type": "stream",
          "text": [
            "APPLE\n",
            "{\"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}]}\n",
            "[{'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}]\n"
          ]
        }
      ],
      "source": [
        "x=result\n",
```

```
        "print(x)\n",
        "result=nutrition(result)\n",
        "print(result)"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "colab": {
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        },
        "id": "CYFb0uzceNqH",
        "outputId": "1bbe8bb6-5284-4489-ecf0-654febf677a4"
      },
      "outputs": [
        {
          "name": "stdout",
          "output_type": "stream",
          "text": [
            "{\"items\": [{\"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}]}\n"
          ]
        }
      ],
      "source": [
        "import http.client\n",
        "\n",
        "conn =
http.client.HTTPSConnection(\"calorieninjas.p.rapidapi.com\")\n",
        "\n",
        "headers = {\n",
        "    'X-RapidAPI-Key':
\"e5805fbf62mshf8d7308c0600c2dp197087jsn93407e3cce35\",\n",
        "    'X-RapidAPI-Host': \"calorieninjas.p.rapidapi.com\"\n",
        "    }\n",
        "\n",
        "conn.request(\"GET\", \"/v1/nutrition?query=Apples\",
headers=headers)\n",
        "\n",
        "res = conn.getresponse()\n",
        "data = res.read()\n",
        "\n",
        "print(data.decode(\"utf-8\"))"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "colab": {
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        },
        "id": "s_DYgptWdNyk",
```

```
        "outputId": "72024f19-51a4-4bf0-b6df-5b049271f189"
      },
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        "url = \"https://calorieninjas.p.rapidapi.com/v1/nutrition\"\n",
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        "querystring = {\"query\":\"apples\"}\n",
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        "headers = {\n",
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        "\t\"X-RapidAPI-Host\": \"calorieninjas.p.rapidapi.com\"\n",
        "}\n",
        "\n",
        "response = requests.request(\"GET\", url, headers=headers,
params=querystring)\n",
        "\n",
        "print(response.text)"
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            "\u001b[31m   WARNING: This is a development server. Do not use
it in a production deployment.\u001b[0m\n",
            "\u001b[2m   Use a production WSGI server instead.\u001b[0m\n",
            " * Debug mode: off\n"
          ]
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```

```
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```
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    "x=np.expand_dims(x,axis=0)"
   ]
  },
  {
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   "execution_count": null,
   "metadata": {
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    },
    "id": "zlIUHa13NHd0",
    "outputId": "e4fe3ff6-9eec-4875-dde4-7464a9875ebc"
   },
   "outputs": [
    {
     "data": {
      "text/plain": [
       "array([[[[255., 255., 255.],\n",
       "          [255., 255., 255.],\n",
       "          [255., 255., 255.],\n",
       "          ...,\n",
       "          [255., 255., 255.],\n",
       "          [255., 255., 255.],\n",
       "          [255., 255., 255.]],\n",
       "\n",
       "         [[255., 255., 255.],\n",
       "          [255., 255., 255.],\n",
       "          [255., 255., 255.],\n",
       "          ...,\n",
       "          [255., 255., 255.],\n",
       "          [255., 255., 255.],\n",
       "          [255., 255., 255.]],\n",
       "\n",
       "         [[255., 255., 255.],\n",
       "          [255., 255., 255.],\n",
       "          [255., 255., 255.],\n",
       "          ...,\n",
       "          [255., 255., 255.],\n",
       "          [255., 255., 255.],\n",
       "          [255., 255., 255.]],\n",
       "\n",
       "         ...,\n",
       "\n",
       "         [[255., 255., 255.],\n",
       "          [255., 255., 255.],\n",
       "          [255., 255., 255.],\n",
```

```
          "         ...,\n",
          "         [255., 255., 255.],\n",
          "         [255., 255., 255.],\n",
          "         [255., 255., 255.]],\n",
          "\n",
          "        [[255., 255., 255.],\n",
          "         [255., 255., 255.],\n",
          "         [255., 255., 255.],\n",
          "         ...,\n",
          "         [255., 255., 255.],\n",
          "         [255., 255., 255.],\n",
          "         [255., 255., 255.]],\n",
          "\n",
          "        [[255., 255., 255.],\n",
          "         [255., 255., 255.],\n",
          "         [255., 255., 255.],\n",
          "         ...,\n",
          "         [255., 255., 255.],\n",
          "         [255., 255., 255.],\n",
          "         [255., 255., 255.]]]], dtype=float32)"
         ]
        },
        "execution_count": 63,
        "metadata": {},
        "output_type": "execute_result"
       }
     ],
     "source": [
       "x"
     ]
   },
   {
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     "execution_count": null,
     "metadata": {
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     },
     "outputs": [],
     "source": [
       "pred = model.predict"
     ]
   },
   {
     "cell_type": "code",
     "execution_count": null,
     "metadata": {
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       },
       "id": "-L8pdqZUWIF8",
       "outputId": "ca682b9c-52c0-4d43-c08f-bed149272733"
     },
     "outputs": [
       {
         "data": {
           "text/plain": [
```

```
              "<bound method Model.predict of
<keras.engine.sequential.Sequential object at 0x7f94abfd7c10>>"
            ]
          },
          "execution_count": 69,
          "metadata": {},
          "output_type": "execute_result"
        }
      ],
      "source": [
        "pred"
      ]
    },
    {
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      "execution_count": null,
      "metadata": {
        "colab": {
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        },
        "id": "3OtSt9OfPZrw",
        "outputId": "dc67cc1d-10fa-44c2-db5b-5eb5b13775c4"
      },
      "outputs": [
        {
          "name": "stdout",
          "output_type": "stream",
          "text": [
            "44/44 [==============================] - 3s 60ms/step\n"
          ]
        }
      ],
      "source": [
        "predict_x=model.predict(x_test) \n",
        "classes_x=np.argmax(predict_x,axis=1)"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "id": "KD2_5_xpvDQZ"
      },
      "outputs": [],
      "source": []
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "colab": {
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        },
        "id": "xjpQ3Ut3Pn2L",
        "outputId": "15a828aa-e508-494b-ed5e-5ed6e6172d5b"
      },
      "outputs": [
```

```
        {
          "data": {
            "text/plain": [
              "array([[0.25227112, 0.17414774, 0.15219809, 0.20493415,
0.21644896],\n",
              "       [0.26760292, 0.1759095 , 0.15206912, 0.19424875,
0.21016978],\n",
              "       [0.26474723, 0.165203  , 0.14452063, 0.20434381,
0.2211853 ],\n",
              "       ...,\n",
              "       [0.24550524, 0.1721549 , 0.16282505, 0.21065485,
0.20885986],\n",
              "       [0.25395462, 0.1735253 , 0.16055605, 0.20655352,
0.20541045],\n",
              "       [0.24495909, 0.15889102, 0.16927534, 0.20705006,
0.21982446]],\n",
              "      dtype=float32)"
            ]
          },
          "execution_count": 71,
          "metadata": {},
          "output_type": "execute_result"
        }
      ],
      "source": [
        "predict_x"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "colab": {
          "base_uri": "https://localhost:8080/"
        },
        "id": "f4rSigQPXmMq",
        "outputId": "36ad0d2f-e2e8-4ec6-dca4-10264ec24eca"
      },
      "outputs": [
        {
          "data": {
            "text/plain": [
              "array([0, 0, 0, ..., 0, 0, 0])"
            ]
          },
          "execution_count": 73,
          "metadata": {},
          "output_type": "execute_result"
        }
      ],
      "source": [
        "classes_x"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
```

```
   "metadata": {
    "colab": {
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    },
    "id": "FW4s-12kP4J0",
    "outputId": "0a30dc97-4c04-47fe-d171-54ceca1c9d47"
   },
   "outputs": [
    {
     "data": {
      "text/plain": [
       "{'TEST_SET': 0}"
      ]
     },
     "execution_count": 74,
     "metadata": {},
     "output_type": "execute_result"
    }
   ],
   "source": [
    "x_test.class_indices"
   ]
  },
  {
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   "execution_count": null,
   "metadata": {
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   },
   "outputs": [],
   "source": [
    "index=['APPLE','BANANA','ORANGE','WATERMELON','PINEAPPLE']"
   ]
  },
  {
   "cell_type": "code",
   "execution_count": null,
   "metadata": {
    "id": "bhe6Jg-TVek1"
   },
   "outputs": [],
   "source": [
    "result=str(index[classes_x[0]])"
   ]
  },
  {
   "cell_type": "code",
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   "metadata": {
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     "height": 35
    },
    "id": "Kyu-IkCTYmxg",
    "outputId": "5fdaeb81-dcaa-4d7a-951b-84c563b8dd3b"
   },
   "outputs": [
```

```
        {
          "data": {
            "application/vnd.google.colaboratory.intrinsic+json": {
              "type": "string"
            },
            "text/plain": [
              "'PINEAPPLE'"
            ]
          },
          "execution_count": 88,
          "metadata": {},
          "output_type": "execute_result"
        }
      ],
      "source": [
        "result"
      ]
    },
    {
      "cell_type": "markdown",
      "metadata": {
        "id": "umxJnA9uva-w"
      },
      "source": [
        "Build Python Code"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "id": "dYOmBRFo6_za"
      },
      "outputs": [
        {
          "ename": "ModuleNotFoundError",
          "evalue": "No module named 'flask'",
          "output_type": "error",
          "traceback": [
            "\u001b[1;31m----------------------------------------------------
-----------------------\u001b[0m",
            "\u001b[1;31mModuleNotFoundError\u001b[0m
Traceback (most recent call last)",
            "Cell \u001b[1;32mIn [1], line 1\u001b[0m\n\u001b[1;32m---->
1\u001b[0m \u001b[39mfrom\u001b[39;00m \u001b[39mflask\u001b[39;00m
\u001b[39mimport\u001b[39;00m Flask,render_template,request\n\u001b[0;32m
2\u001b[0m \u001b[39m# Flask-It is our framework which we are going to use to
run/serve our application.\u001b[39;00m\n\u001b[0;32m      3\u001b[0m
\u001b[39m#request-for accessing file which was uploaded by the user on our
application.\u001b[39;00m\n\u001b[0;32m      4\u001b[0m
\u001b[39mimport\u001b[39;00m \u001b[39mos\u001b[39;00m\n",
            "\u001b[1;31mModuleNotFoundError\u001b[0m: No module named
'flask'"
          ]
        }
      ],
      "source": [
```

        "from flask import Flask,render_template,request\n",
        "# Flask-It is our framework which we are going to use to run/serve
our application.\n",
        "#request-for accessing file which was uploaded by the user on our
application.\n",
        "import os\n",
        "import numpy as np #used for numerical analysis\n",
        "from tensorflow.keras.models import load_model#to load our trained
model\n",
        "from tensorflow.keras.preprocessing import image\n",
        "import requests"
      ]
    },
    {
      "cell_type": "markdown",
      "metadata": {
        "id": "84zUnQwAvZxL"
      },
      "source": [
        "Creating our flask application and loading our model by using the
load_model method"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "colab": {
          "base_uri": "https://localhost:8080/"
        },
        "id": "3wNxVrM6l5UZ",
        "outputId": "8c1ddf67-a382-4f13-d277-7bd71ebaa87f"
      },
      "outputs": [
        {
          "name": "stdout",
          "output_type": "stream",
          "text": [
            "Loaded model from disk\n"
          ]
        }
      ],
      "source": [
        "app = Flask(__name__,template_folder=\"templates\") # initializing a
flask app\n",
        "# Loading the model\n",
        "model=load_model('nutrition.h5')\n",
        "print(\"Loaded model from disk\")"
      ]
    },
    {
      "cell_type": "markdown",
      "metadata": {
        "id": "_fjEcsXtu2bm"
      },
      "source": [
        "Routing To The Html Page"

```
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "id": "pSY8IxzIl6LC"
      },
      "outputs": [],
      "source": [
        "@app.route('/')# route to display the home page\n",
        "def home():\n",
        "    return render_template('home.html')"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "id": "XP0Gr6Pkl6bV"
      },
      "outputs": [],
      "source": [
        "@app.route('/image1',methods=['GET','POST'])# routes to the index
html\n",
        "def image1():\n",
        "    return render_template(\"image.html\")"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "id": "tBHRBgdImZoz"
      },
      "outputs": [],
      "source": [
        "@app.route('/predict',methods=['GET', 'POST'])# route to show the
predictions in a web UI\n",
        "def launch():\n",
        "    if request.methods=='POST':\n",
        "        f=request.files['file'] #requesting the file\n",
        "        basepath=os.path.dirname('__file__')#storing the file
directory\n",
        "
filepath=os.path.join(basepath,\"uploads\",f.filename)#storing the file in
uploads folder\n",
        "        f.save(filepath)#saving the file\n",
        "        img=image.load_img(filepath,target_size=(64,64)) #load and
reshaping the image\n",
        "        x=image.img_to_array(img)#converting image to an array\n",
        "        x=np.expand_dims(x,axis=0)#changing the dimensions of the
image\n",
        "        pred=np.argmax(model.predict(x), axis=1)\n",
        "        print(\"prediction\",pred)#printing the prediction\n",
        "
index=['APPLES','BANANA','ORANGE','PINEAPPLE','WATERMELON']\n",
```

```
    "        result=str(index[pred[0]])\n",
    "        x=result\n",
    "        print(x)\n",
    "        result=nutrition(result)\n",
    "        print(result)\n",
    "        return render_template(\"0.html\",showcase=(result))"
   ]
  },
  {
   "cell_type": "code",
   "execution_count": null,
   "metadata": {
    "id": "7yrLfsyJp5PT"
   },
   "outputs": [],
   "source": [
    "pred = model.predict"
   ]
  },
  {
   "cell_type": "code",
   "execution_count": null,
   "metadata": {
    "colab": {
     "base_uri": "https://localhost:8080/"
    },
    "id": "IV8ninJjp7I2",
    "outputId": "0303d20c-a6ea-4d73-d83e-58b94e059c85"
   },
   "outputs": [
    {
     "name": "stdout",
     "output_type": "stream",
     "text": [
      "44/44 [==============================] - 3s 65ms/step\n"
     ]
    }
   ],
   "source": [
    "predict_x=model.predict(x_test) \n",
    "classes_x=np.argmax(predict_x,axis=1)"
   ]
  },
  {
   "cell_type": "code",
   "execution_count": null,
   "metadata": {
    "id": "CwagMwt0qBSs"
   },
   "outputs": [],
   "source": [
    "index=['APPLE','BANANA','ORANGE','WATERMELON','PINEAPPLE']"
   ]
  },
  {
   "cell_type": "code",
   "execution_count": null,
```

```
    "metadata": {
      "id": "ieoFE35SqGnO"
    },
    "outputs": [],
    "source": [
      "result=str(index[classes_x[0]])\n"
    ]
  },
  {
    "cell_type": "code",
    "execution_count": null,
    "metadata": {
      "id": "z_4kgtvHqQ6J"
    },
    "outputs": [],
    "source": [
      "x=result"
    ]
  },
  {
    "cell_type": "code",
    "execution_count": null,
    "metadata": {
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        "base_uri": "https://localhost:8080/"
      },
      "id": "zMSJ8pi2qVez",
      "outputId": "627daa6e-a146-4fb3-d593-30021dbac89f"
    },
    "outputs": [
      {
        "name": "stdout",
        "output_type": "stream",
        "text": [
          "APPLE\n"
        ]
      }
    ],
    "source": [
      "print(x)"
    ]
  },
  {
    "cell_type": "code",
    "execution_count": null,
    "metadata": {
      "colab": {
        "base_uri": "https://localhost:8080/"
      },
      "id": "6ay7XBWDqJLq",
      "outputId": "86df4e0c-838c-44ce-a820-564d9944a3b5"
    },
    "outputs": [
      {
        "name": "stdout",
        "output_type": "stream",
        "text": [
```

```
            "APPLE\n"
          ]
        }
      ],
      "source": [
        "\n",
        "print(result)"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "colab": {
          "base_uri": "https://localhost:8080/"
        },
        "id": "YRwb3_bjpQYq",
        "outputId": "0a6b45e5-60f3-41bc-b555-59660f2a529b"
      },
      "outputs": [
        {
          "name": "stdout",
          "output_type": "stream",
          "text": [
            "{\"items\": [{\"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}]}\n"
          ]
        }
      ],
      "source": [
        "import http.client\n",
        "\n",
        "conn =
http.client.HTTPSConnection(\"calorieninjas.p.rapidapi.com\")\n",
        "\n",
        "headers = {\n",
        "    'X-RapidAPI-Key':
\"e5805fbf62mshf8d7308c0600c2dp197087jsn93407e3cce35\",\n",
        "    'X-RapidAPI-Host': \"calorieninjas.p.rapidapi.com\"\n",
        "    }\n",
        "\n",
        "conn.request(\"GET\", \"/v1/nutrition?query=Apples\",
headers=headers)\n",
        "\n",
        "res = conn.getresponse()\n",
        "data = res.read()\n",
        "\n",
        "print(data.decode(\"utf-8\"))"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
```

```
        "colab": {
          "base_uri": "https://localhost:8080/"
        },
        "id": "mb0ewAgLphrY",
        "outputId": "d4dc8310-ce31-40d9-cf09-778c0f68411f"
      },
      "outputs": [
        {
          "name": "stdout",
          "output_type": "stream",
          "text": [
            "{\"items\": [{\"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}]}\n"
          ]
        }
      ],
      "source": [
        "import requests\n",
        "\n",
        "url = \"https://calorieninjas.p.rapidapi.com/v1/nutrition\"\n",
        "\n",
        "querystring = {\"query\":\"apples\"}\n",
        "\n",
        "headers = {\n",
        "\t\"X-RapidAPI-Key\":
\"e5805fbf62mshf8d7308c0600c2dp197087jsn93407e3cce35\",\n",
        "\t\"X-RapidAPI-Host\": \"calorieninjas.p.rapidapi.com\"\n",
        "}\n",
        "\n",
        "response = requests.request(\"GET\", url, headers=headers,
params=querystring)\n",
        "\n",
        "print(response.text)"
      ]
    },
    {
      "cell_type": "code",
      "execution_count": null,
      "metadata": {
        "colab": {
          "base_uri": "https://localhost:8080/"
        },
        "id": "1eFsAn8Ur3WX",
        "outputId": "ea5e20cb-cfff-47f7-bfa8-b7c9c54718ad"
      },
      "outputs": [
        {
          "name": "stdout",
          "output_type": "stream",
          "text": [
            " * Serving Flask app \"__main__\" (lazy loading)\n",
            " * Environment: production\n",
            "\u001b[31m   WARNING: This is a development server. Do not use
it in a production deployment.\u001b[0m\n",
```

```
          "\u001b[2m   Use a production WSGI server instead.\u001b[0m\n",
          " * Debug mode: off\n"
         ]
        },
        {
         "name": "stderr",
         "output_type": "stream",
         "text": [
          "INFO:werkzeug: * Running on http://127.0.0.1:5000/ (Press CTRL+C
to quit)\n"
         ]
        }
       ],
       "source": [
        "if __name__ == \"__main__\":\n",
        "   # running the app\n",
        "    app.run(debug=False)"
       ]
      },
      {
       "cell_type": "code",
       "execution_count": null,
       "metadata": {},
       "outputs": [],
       "source": []
      }
     ],
     "metadata": {
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       "provenance": []
      },
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       "display_name": "Python 3.10.2 64-bit",
       "language": "python",
       "name": "python3"
      },
      "language_info": {
       "codemirror_mode": {
        "name": "ipython",
        "version": 3
       },
       "file_extension": ".py",
       "mimetype": "text/x-python",
       "name": "python",
       "nbconvert_exporter": "python",
       "pygments_lexer": "ipython3",
       "version": "3.10.2"
      },
      "vscode": {
       "interpreter": {
        "hash":
"2a927cb3675ea0cfba17f79d702c9eca68b3a5a6f37472724236f086f6515551"
       }
      }
     },
     "nbformat": 4,
```

```
  "nbformat_minor": 0
}
```

GITHUB & PROJECT DEMO LINK

https://drive.google.com/file/d/14tREF9cnJnDGI-43kZO5pdWkdpMkXZ-g/view?usp=drivesdk