# Al-powered Nutrition Analyzer for Fitness Enthusiasts

Date	18.11.22
Team ID	PNT2022TMID37915
Project name	AI Powered Nutrition Analyzer for Fitness
	Enthusiasts

#### 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. It is vital part of analytical chemistry that provides information about the chemical composition, processing quality control and contamination of food. Here the user can capture the image will be sent the trained model. The model analyses the image and detect the nutrition based on fruits like (sugar, Protein, Calories, etc.).

#### 1.1 Project Overview

As the world grows more fitness-conscious with passing time, the demand for technological solutions to cater to this burgeoning demand is diversifying. In India, this global trend has had a positive impact on scores of startups and websites catering to this segment. AI and its various subsets have been leveraged by these platforms to identify the calorie intake and also to make food recommendations for a healthy diet. In most cases, what we see is that these platforms act as a data repository where while providing real-time information to its users, it also makes available to numerous clients who work in this field for a determined rate. In this article, we take a look at the top AI-based online platforms which make use of AI and other deep learning technologies to provide a real-time updates about nutrition intake. The main aim of the project is to building a model which is used for classifying the fruit depends on the different characteristics like color, shape.

# 1.2 Purpose

texture etc. Here the user can capture the images of different fruits and then the image will be sent the trained model. The model analyses the image and detect the nutrition based on the fruits like (Sugar, Fibre, Protein, Calories, etc.).

#### 2. LITERATURE SURVEY

#### 2.1 Existing problem

In the short term, poor nutrition can contribute to **stress, tiredness and our capacity to work**, and over time, it can contribute to the risk of developing some illnesses and other health problems such as: being overweight or obese. Tooth decay ,high blood pressure. There are now strong links between low intakes of particular nutrients and the **risk of developing chronic disease including some cancers, heart disease, diabetes, osteoporosis and depression**. During pregnancy, insufficient nutrient intake can have long-term health implications for the health of the child.

#### 2.2 References

- 1. Published on April 8, 2019 From Gynaecology to Data Science: The journey of Dr Nitin Paranjape. Analyticsindiamag.com, Akshaya Asokan.
- 2. Melina cote and Benoit Lamarche, Applied Physiology, Nutrition and Metabolism 15
- 3. Deloitte(2017) the hospital of the future URL www.deloitte.com/us/global-hospital-of-the future (accessed August 9,2019)
- 4. INQA (Ed.)(2015) intelligente technik in der beruflichen pfege.von den chance und Risiken einer Pflege 4.0.
- 5. McCarthy, J., Minsky, M. L., Rochester, N., & Shannon, C. E. (2006). A Proposal for Dartmouth Summer Research Project on Artificial Intelligence. AI Magazine, 27(4), 12-14. https://www.aaai.org/ojs/index.php/aimagazine/article/view/1904/1802.
- 6. Lalwani, P.(2019). The ethics of AI in HR: what does it take to build an ai ethics framework? https://www.hrtechnoologist.com/articles/digital-transformation/the-ethics-of-ai-in-hr/
- 7. Kozan, K.(2017), 3 simple step for improving your candidate engagement, <a href="https://ideal.com/candidate-engagement">https://ideal.com/candidate-engagement</a>.
- 8. Johnson K.W., Torres Soto J., Glicksberg B.S., Shameer K., Miotto R., Ali M., Ashley E., Dudley J.T. Artificial intelligence in cardiology. *J. Am. Coll*.

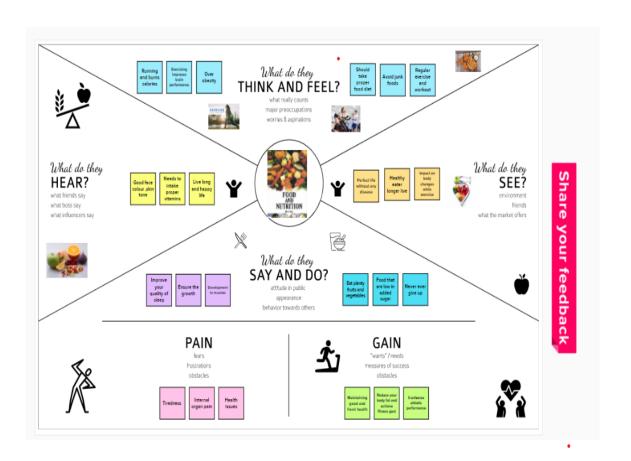
- Cardiol. 2018;71:2668–2679. doi: 10.1016/j.jacc.2018.03.521. [PubMed] [CrossRef] [Google Scholar]
- 9. Hessler G., Baringhaus K.-H. Artificial intelligence in drug design. *Molecules*. 2018;23:2520. doi: 10.3390/molecules23102520. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
- 10. Heydarian H., Adam M.T.P., Burrows T., Collins C.E., Rollo M.E. Assessing eating behaviour using upper limb mounted motion sensors: A systematic review. *Nutrients*. 2019;11:1168. doi: 10.3390/nu11051168. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
- 11. Demirci F., Akan P., Kume T., Sisman A.R., Erbayraktar Z., Sevinc S. Artificial neural network approach in laboratory test reporting: Learning algorithms. *Am. J. Clin. Pathol.* 2016;146:227–237. doi: 10.1093/ajcp/aqw104. [PubMed] [CrossRef] [Google Scholar]

#### 2.3Problem Statement Definition

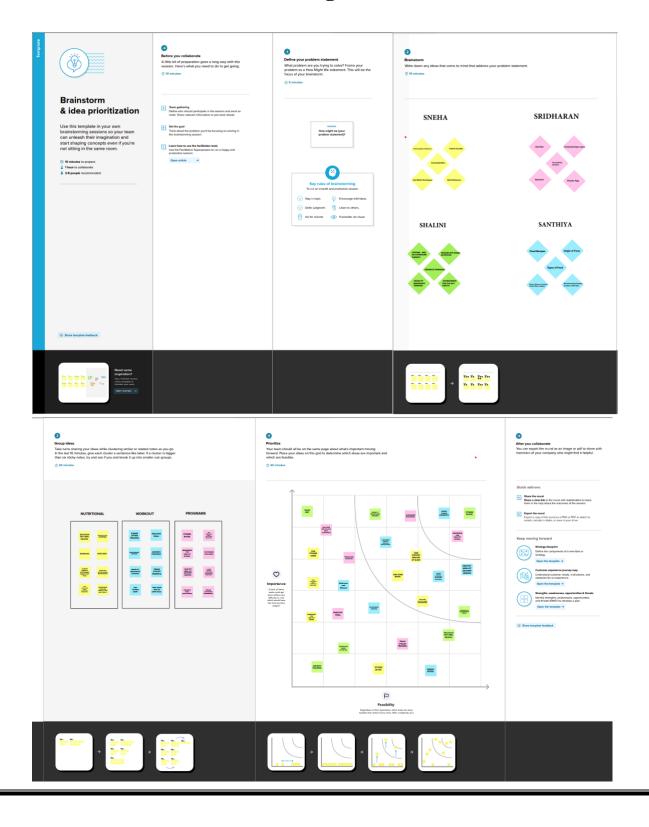
The amount of physical activity you need depends on your individual fitness goals and your current fitness level. It's important to start within your abilities and listen to your body's cues in terms of pain and injury. Obesity is a common health issue that is defined by having a high percentage of body fat. Being overweight or obese increases your chances of dying from hypertension, coronary heart disease, sleep apnea, and endometrial, breast, prostate, and colon cancers. Junk foods are high in calorie but low in nutrition value and lead to an excess metabolic weight leading to obesity. An obese individual is prone to life-threatening diseases which are not only limited to cholesterol or diabetes but also can cause stoke and NCDs. Overtraining may wear down the immune system. It Increases cardiovascular stress. Incorrect workouts may cause sprains, strains, fracture and other painful injury.

# 3. IDEATION & PROPOSED SOLUTION

# 3.1 Empathy Map Canvas



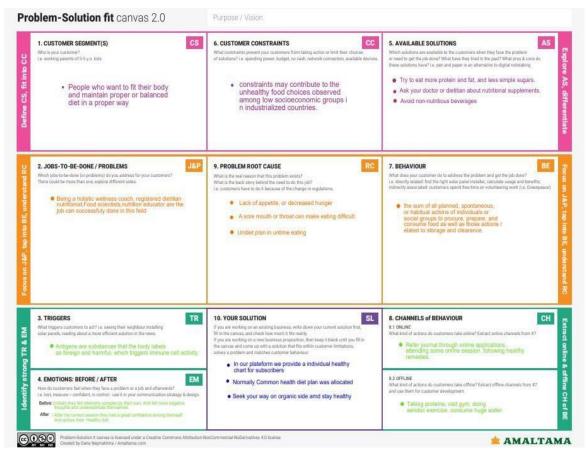
# 3.2 Ideation & Brainstorming



# **3.3 Proposed Solution**

S.NO	PARAMETER	DESCRIPTION
1	Problem Statement	How to intake suitable nutrition with
	(Problem tobe solved)	correct guidance and weight level
		should be manage through tracking ourday
		to day fitness.
2	Idea / Solution Description	To track fitness level and Analyze the
		nutrition level of foods like fruits,
		vegetables . It helps to identify the
		proportion of vitamins.
3	Novelty/Uniqueness	Giving a individual Food/health
		Schedule According to their body
		conditions
4	Social	Low expenditure ,easy to follow
	impact/Cust	without affecting their personal time.
	omerSatisfaction	
5	Business	Free platform for all users. For specific
		guidance users want to pay
	del	
	(Revenue Model)	
6	Scalability of the solution	Notifying motivational quote's to leada
		healthy routine

#### 3.4Problem Solution fit



#### **4.REQUIREMENT ANALYSIS**

# 4.1Functional requirement

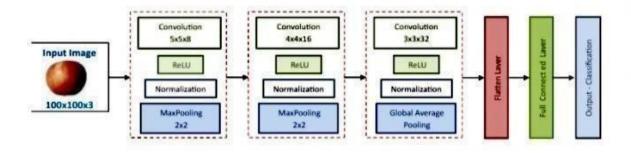
- It will generate the diet plan as well as monitor the user's health to classify the category of the disease and to create the diet plan. It will also reduce the cost of consulting the person nutritionist.
- ➤ The task of food detection/classification is not easy as it seems. All possible options related to the given Image.
- 1. Image classification, object detection, segmentation, face recognition.
- 2. Classification of crystal structure using a convolutional neural network.
  - ➤ Computer-Assisted Nutritional Recognize Food Images In

order to solve this issue, a brand-new Convolutional Neural Network (CNN)- based food picture identification system was created, as described in this study. We utilized our suggested strategy on two sets of actual food picture data.

- ➤ Here the user can capture the images of different fruits and then the image will be sent to the trained model. The model analyzes the image and detects the nutrition based on the fruits like (Sugar, Fiber, Protein, Calories, etc.)
- ➤ The Ultimate Workout at Home Solution This fitness AI software is designed with personalized training regimens for each individual. It began as "gym only software," but has now improved its system to satisfy "at home fitness" expectations.
- ➤ You take a picture, dial in data such as whether you are eating breakfast or lunch and add a quick text label, and the app estimates the calorie content.

This software collaborated with IBM's natural language capability to provide 24-hour assistance and dietary recommendations.

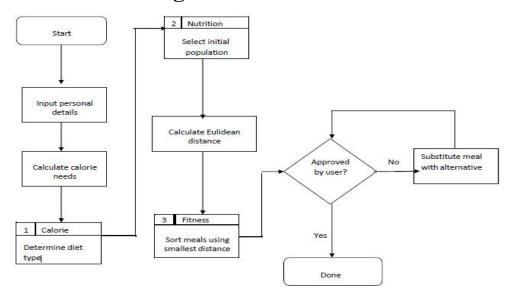
#### For Example:



- ➤ The comparison of the proposed model with the conventional models shows that the results of this model are exceptionally good and promising to use in real-world applications. This sort of higher accuracy and precision will work to boost the machine's general efficiency in fruit recognition more appropriately.
- ➤ A generic model for the dietary protein requirement (as with any nutrient) defines the requirement in terms of the needs of the organism,
- ➤ i.e. metabolic demands, and the dietary amount which will satisfy those needs, i.e. efficiency of utilization, thus: dietary requirement = metabolic demand/efficiency of utilization.

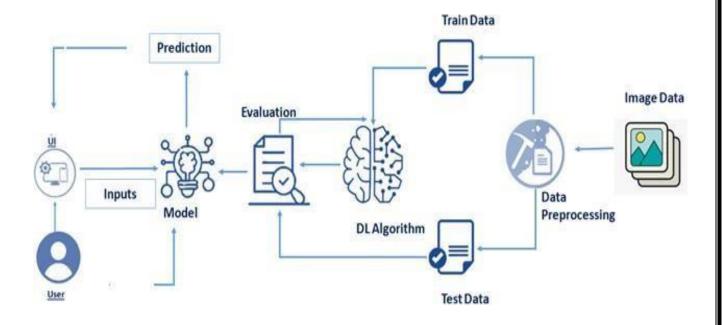
#### **5.PROJECT DESIGN**

#### **5.1 Data Flow Diagrams**



#### 5.2 Solution & Technical Architecture

- Nowadays new dietary assessment and nutrition analysis tools enablemore 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.
- 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.
- Food is essential for human life and has been the concern of manyhealthcare conventions.
- It is a vital part of analytical chemistry that provides information about the chemical composition, processing, quality control and contamination of food.



# 6. PROJECT PLANNING & SCHEDULING

# **6.1Sprint Planning & Estimation**

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planne d)	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	03 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	10 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	17 Nov 2022

# **6.2Sprint Delivery Schedule**

Sprint	Functional	User	User Story / Task	Story	Priority	Team Members
	Requirement	Story		Points		
	(Epic)	Number				
Sprint-1	Data	USN-1	Download Food	2	Medium	SANTHIYA
	Collection		Nutrition Dataset			
Sprint-1	Data	USN-2	Importing The Dataset	1	Low	SHALINI
	Preprocessing		into Workspace			
Sprint-1		USN-3	Handling Missing Data	3	Medium	SNEHA
Sprint-1		USN-4	Feature Scaling	3	Low	SRIDHARAN
Sprint-1		USN-5	Data Visualization	3	Medium	SNEHA
Sprint-1		USN-6	Splitting Data into	4	High	SHALINI
			Train and Test			
Sprint-1		USN-7	Creating A Dataset	4	High	SANTHIYA
			with Sliding Windows			
Sprint-2	Model	USN-8	Importing The Model	1	Medium	SRIDHARAN
	Building		Building Libraries			
Sprint-2		USN-9	Initializing The Model	1	Medium	SHALINI

Sprint-2		USN-10	Adding LSTM Layers	2	High	SNEHA
Sprint-2		USN-11	Adding Output Layers	3	Medium	SANTHIYA
Sprint-2		USN-12	Configure The Learning	4	High	SHALINI
			Process			
Sprint	Functional	User	User Story / Task	Stor	Priority	Team Members
	Requirement (Epic)	Story		у		
		Number		Poin		
				ts		
Sprint-2		USN-13	Train The Model	2	Medium	SHALINI
Sprint-2		USN-14	Model Evaluation	1	Medium	SANTHIYA
Sprint-2		USN-15	Save The Model	2	Medium	SNEHA
Sprint-2		USN-16	Test The Model	3	High	SRIDHARAN
Sprint-3	Application	USN-17	Create An HTML File	4	Medium	SHALINI
	Building					
Sprint-3		USN-18	Build Python Code	4	High	SANTHIYA
Sprint-3		USN-19	Run The App in Local	4	Medium	SNEHA
			Browser			
Sprint-3		USN-20	Showcasing Prediction On UI	4	High	SRIDHARAN
Sprint-4	Train The Model On	USN-21	Register For IBM Cloud	4	Medium	SHALINI
	IBM					
Sprint-4		USN-22	Train The ML Model On IBM	8	High	SNEHA
Sprint-4		USN-23	Integrate Flask with Scoring	8	High	SANTHIYA
			End Point			

# 7.CODING & SOLUTIONING (Explain the features added in the project along with code)

#### **7.1 Feature 1**

```
Data Collection

Download the dataset here

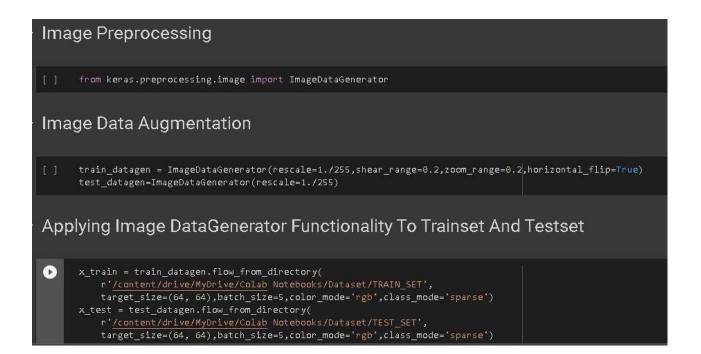
[ ] from google.colab import drive drive.mount('/content/drive')

Mounted at /content/drive

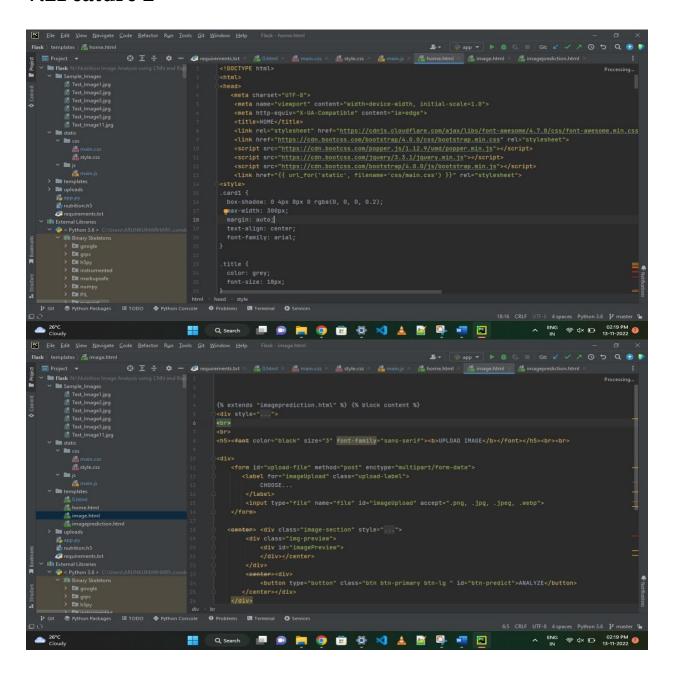
[ ] cd/content/drive/MyDrive/Colab Notebooks

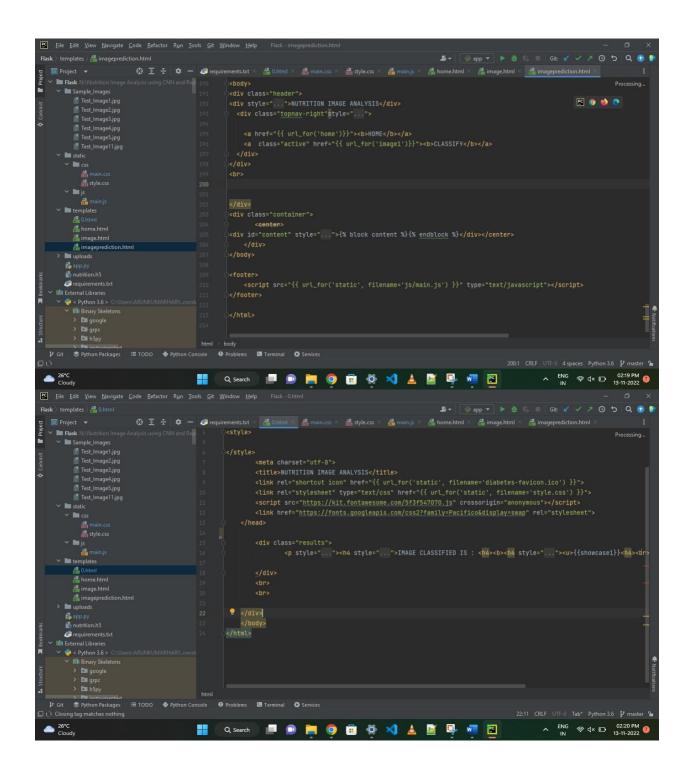
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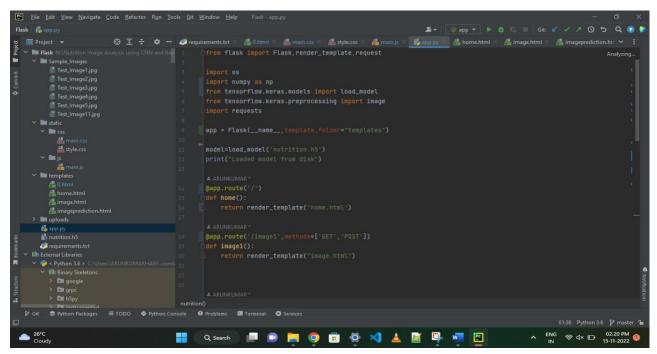
[ ] # Unzipping the dataset lunzip 'Dataset.zip'
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#### 7.2Feature 2



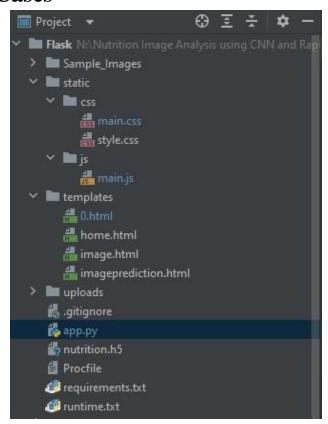




Database Schema (if Applicable)

#### 8.TESTING

#### **8.1Test Cases**



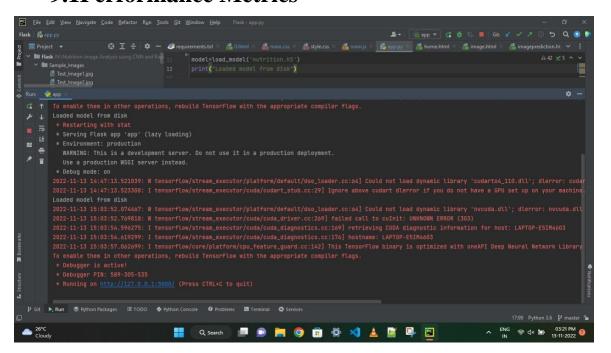


### **8.2User Acceptance Testing**



#### 9.RESULTS

#### 9.1Performance Metrics



#### **10.ADVANTAGES**

Advantages-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.

#### 11.CONCLUSION

Thus powered nutrition analyzer for fitness enthusiasts good nutrition promotes not only better physical healthy and reduced susceptibility to disease, but has also been demonstrated to contribute to cognitive development and academic success. Left to their own devices, children will not automatically select healthy food. A balance diet and appropriate meal timings are important for healthy body and mind. Most countries nowadays implement health Seducation program in schools which include feeding to students, vitamin and mineral supplementation.

#### 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 analyzer we can maintain our diet plans without any help from others and we can lead a happy and healthy life with good wealth.AI can easily track health behaviors and repetitive exercise patterns and use the data to guide you towards your fitness journey and diet plans.

# 13.APPENDIX GitHub & Project Demo Link https://github.com/IBM-EPBL/IBM-Project -41656-1660643818/tree/main