Capstone Project Proposal

Harini Pavithra Elangovan

Business Goals

Project Overview and Goal What is the industry problem you are trying to solve? Why use ML/AI in solving this task? Be as specific as you can when describing how ML/AI can provide value. For example, if you're labeling images, how will this help the business?	In the world of "New Normal" (closed schools, no gyms, zero social events) everyone are busy with their work from home jobs, taking care of their children, other house hold works and activities. The work time and mental pressure of every individual got increased which in return decreases the self-healthcare routines and many people are in need of a nutritionist guidance to take care of their daily eating habits. The project I'm proposing is "Personal Nutritionist with AI" application. The AI will suggest food based on the calories needed, weight, height, medical history of the user, which helps for weight maintaining, loss and gain as well. In case, if the user in a situation to take more calories in a party or an event, then AI will tell you the foods, exercises to burn extra calories or fat. If the user doesn't know the name of the food, then he/she can upload the photo of it. The AI will calculate the calories and suggest food accordingly. The application will have lots of diet and fasting plans as well, example: Keto diet, intermittent fasting etc. This is for all age group people, if the AI suggestion food (fruits or veggies) is allergic or the user doesn't like it, then AI will suggest alternate food. AI (Decision tree algorithm – one of the classification algorithms of machine learning) is used in the application to train different food, calories, diet plans along with various weights and medical records of the people. So, the application can predict accurately, and

	image recognition is also used to identify the calories level the user is taking if he/she is not sure of the name they are having. I strongly believe decision tree algorithm will be very helpful while predicting the perfect food/diet plans for the user and also while predicting the alternative food/diet plans. If the model is well trained with large number of data, then the result will be very accurate.
Business Case Why is this an important problem to solve? Make a case for building this product in terms of its impact on recurring revenue, market share, customer happiness and/or other drivers of business success.	As I already mentioned, the world is moving to the new normal, everyone needs a personal nutritionist in their life to help them with their health care and even to build a strong immune system to fight against diseases. So, developing a personal nutritionist application is very important to solve in today's environment. This will be very helpful for all age people with different medical records. So, impact will be high when it reaches the market and the customers who will be using it also gain lots of benefits from it, which in turn makes more number of users to the application raising the share market value.
Application of ML/AI What precise task will you use ML/AI to accomplish? What business outcome or objective will you achieve?	AI is used here to predict correct food/diet plans for the user and also for image recognition. The objective is to suggest the accurate diet/food plans and also alternate food if the user is allergic or hate specific food.

Success Metrics

Success Metrics What business metrics will you apply to determine the success of your product? Good metrics are clearly defined and easily measurable. Specify how you will establish a baseline value to provide a point of comparison.	The business metrics that I'm applying here is the customer experience and revenue gain. These two metrics can be clearly defined and easily measured. The baseline value is established with the help of the accuracy of the application prediction, compared with the other competitive applications in the market.

Data

Data Acquisition Where will you source your data from? What is the cost to acquire these data? Are there any personally identifying information (PII) or data sensitivity issues you will need to overcome? Will data become available on an ongoing basis, or will you acquire a large batch of data that will need to be refreshed?	The dataset to train the model has to be made with the help of various nutritionists and also there are many datasets that are available online/kaggle. But getting various details along with the test cases for the people with medical records can be done with the help of nutritionists. Always having an expert opinion in health related applications are highly recommended. There are no personally identifying information involved as, the personal data of any individual will not be collected and used. So, there will be no sensitivity issues. Since, we will be consulting few nutritionists for analyzing health plans/diets, calories calculator for various medical records, the estimated cost would be $10,000 (depends upon the nutritionist's consultation fees) approximately. The large batch of data can be acquired from licensed online resources.
Data Source Consider the size and source of your data; what biases are built into the data and how might the data be improved?	The data size would be 700MB to 1GB approximately (Fruit name - 300 images, Veggie name – 300 images, Exercise name – 300 images)

	The bias could be suggesting many food plans/recipes for a particular calorie level, if 2 or more food plans/recipes has user's favourite fruit/veggies. The user may get confused to have which one at that particular time/day. This can be avoided by getting the choice of the user, what he/she is like to have at the day and suggesting food plans/recipes based on that choice.
Choice of Data Labels What labels did you decide to add to your data? And why did you decide on these labels versus any other option?	The labels I'm planning to add is "Fruit name" ,"Veggie name" ,"Exercise name" for identifying the recipe, exercise based on calories the user need or to burn. These labels are used so that the model can easily identify the recipes based on the labels in accordance with the calories needed for the user. The other options are "Less calorie", "High calorie", "Easy exercise", "Hard exercise", but these labels could be confusing to match with the recipes. Since, it has labels, just mentioned as High and Low calories

Model

Model Building How will you resource building the model that you need? Will you outsource model training and/or hosting to an external platform, or will you build the model using an in-house team, and why?	The model can be built using the Google cloud platform, which has lot of features to train the model with high accuracy as well. The trained model can be connected with an application made using flutter and firebase.
Evaluating Results Which model performance metrics are appropriate to measure the success of your model? What level of performance is required?	The success of the model is based on the "Customer Satisfaction". This application is entirely for the people to maintain their health. So, the level of performance should be high, the food plans/recipes, diets that the application suggesting should work out in any case and the user should feel happy about that. The performance metric I would use to assess the performance of the model is accuracy (Precision – the number of instances it predicts correctly. Recall – the

	number of relevant instances that are retrieved), if the model is very accurate, then the customer will be very happy to follow their diet and can lead a healthy life, which makes the model a very successful one. Based on the Precision and Recall, the F1 score is predicted, which defines the model accuracy. The baseline value beyond which the model is considered a success is 95% of accuracy

Minimum Viable Product (MVP)

Design What does your minimum viable product look like? Include sketches of your product.	The product is an application, which has Login/sign up page, then user details page (medical records, purpose of downloading the app, weight, height, age, gender), the next page would be getting the choice and suggesting the food recipes.
Use Cases What persona are you designing for? Can you describe the major epic-level use cases your product addresses? How will users access this product?	The persona I'm designing for is the User persona, the users can be of any age group with any medical records. The major use cases would be addressing different health diets based on medical records like diabetes, pneumonia etc. The users access this product via Android/iphone devices. Diabetes persona – the user with diabetes problem (blood sugar of the user will be too high). The main goal for suggesting health plans/diets for the users with diabetes would be 1) the blood sugar level should be either increased or decreased 2) it should be maintained at the normal level. The main concern or barrier in achieving this goal would be suggesting fruits which sugar level is very minimum naturally. Every fruit contains sugar, so it is very important to suggest very correct diet plan which has the calories needed as well as the less sugar level for the user. The Epic use case of the model would be suggesting health plans for cancer patients. As we all know, cancer

	patients need very rich nutritious diet with more calories, so our model will suggest food plans such as “Nuts, applesauce, yogurt, pre-chopped veggies, and brown rice or other whole grains before starting the treatment and once the treatment is started, the model will suggest diet plan such as Lean meat, chicken, and fish, eggs, beans, nuts, and seeds, cheese, milk, yogurt, 2 1/2 cups of fruits and vegetables a day(dark green and deep yellow veggies, and citrus fruits like oranges and grapefruits) and sports juices.
Roll-out How will this be adopted? What does the go-to-market plan look like?	This will be adopted as a health care product and go-to-market plan is finding the “Angel investors”, developing the product in a unique way and releasing in the app market (App store, Play store). The pricing strategy of the GTM plan will be, launching it as free at the beginning, as the product gets more reach and successful, the price can be slowly increased with respect to the medical records of the user. The distribution strategy would be finding marketing people all over the country to promote the application and also targeting various hospitals and clinics to get more users for the product.

Post-MVP-Deployment

Designing for Longevity How might you improve your product in the long-term? How might real-world data be different from the training data? How will your product learn from new data? How might you employ A/B testing to improve your product?	The Product can be improved by enabling different features such as “Health plans for kids under 5” also providing “Nutritious diet for children under 10”. Chatbot can also be implemented in the application which allows users to interact with Nutritionists online and can ask their doubts. The training data for this product includes real world data with the help of various nutritionists, so the model will be very accurate to predict correct health plans for the user. The A/B testing can be done until we achieve high “Performance metrics” testing against statistically significant sample size and running tests long enough to capture any seasonality effects.
Monitor Bias How do you plan to monitor or mitigate unwanted bias in your model?	The Bias can be monitored by carefully annotating the new training images/datasets , if the user’s medical problem is new to the application i.e the model is not trained with such problem, the user and the developer should be notified about it before suggesting them health plans and diets.