Nutrition Assistant Application

A Project Report

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NUTRITION ASSISTANT APPLICATION

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1.INTRODUCTION

1.1 Overview

Due to the ignorance of healthy food habits, obesity rates are increasing at an alarming speed, and this is reflective of the risks to people's health. People need to control their daily calorie intake by eating healthier foods, which is the most basic method to avoid obesity. However, although food packaging comes with nutrition (and calorie) labels, it's still not very convenient for people to refer to App-based nutrient dashboard systems which can analyze real-time images of a meal and analyze it for nutritional content which can be very handy and improves the dietary habits, and therefore, helps in maintaining a healthy lifestyle.

This project aims at building a web App that automatically estimates food attributes such as ingredients and nutritional value by classifying the input image of food. Our method employs **Clarifai's AI-Driven Food Detection Model** for accurate food identification and Food API's to give the nutritional value of the identified food.

1.2 Purpose

- Nutrition assistants help dieticians with providing proper nutrition at healthcare facilities.
- They determine patient's nutritional needs, assess risk factors, and plan meals and menus.
- They also ensure proper sterilization of plates and utensils.
- Evaluates nutrients, calories by just taking pictures of your meals.
- Discover new healthy recipes and use filters to find the ones that fit your diet such as "Low Carb", "High Protein", "High Fat", "Low FODMAP" and more.
- Saves our time by quick analysis of nutrional content.
- Preventive nutrition services for this population, which include early identification and treatment, can help alleviate malnutrition, growth retardation, frequent infections, dehydration, and other medical consequences.
- This application provides us ease of accessibility.
- Ensure timely mobilisation to take of the user themselves

2.LITERATURE SURVEY

2.1 EXISTING PROBLEM

S. No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	1. This project aims at building a web app that automatically estimates food attributes using clarifo's AI driven food detection model
2.	Idea / Solution description	1. The solution is a responsive Web application that can be used in any PC devices. 2. The website provides a user-friendly interface and accepts multiple samples predicting them simultaneously. 3. A detailed report of the concerned person's health will be generated.
3.	Novelty / Uniqueness	1. Keep a food journal. 2. Our method uses Clarifai's AI- driven food recognition model to accurately identify food suggestions. 3. Water and medicine monitoring 4. Patients to more easily monitor their caloric intake and dietary pattern to aid in weight and disease management.
4.	Social Impact / Customer Satisfaction	1. Calculate the basal metabolic rate, body mass index,ideal weight 2. Nutrition focused food banking & targeted in-depth reporting reviews that paid subscriptions the best.

		3. Evaluated caloric intakes
5.	Business Model (Revenue Model)	1. Revenue is generated on a subscription basis, with big data processing and targeted in-depth reporting reviews that paid subscriptions the best.
6.	Scalability of the Solution	1. Furthermore eminent features can be added to our application. 2. The additional features such that sleep tracking, mensuration tracking can be done.

2.2 References

S. No	Title	Author	Year	Journal	Technology	Drawbacks
1.	Defining Adherence to dietary self-monitoring using a mobile application	Jason E.Payne, Christine A Pellegrini	2018	American Academy of Nutrition and Dietics	Convolutional Neural Network (CNN)	Random Forest model with the mean mistake of 13.12 and informational collection is moderately little

2.	Image Based Food Calories Estimation Using Various Models of Machine Learning	Haoyu Hu; Zihao Zhang; Yulin Song	2020	International Conference on Mechanical, Control and Computer Engineering (ICMCCE)	SSD (Single Shot MultiBox Detector).	For object detection algorithms, training set size is actually not large
3.	Personalised Food Classifier and Nutrition Interpreter Multimedia Tool Using Deep Learning	M. Sundarramurthi, Nihar. M, Anandi Giridharan.	2020	IEEE REGION 10 CONFEREN CE (TENCON) Osaka, Japan	Convolutional Neural Networks (CNN)	Accuracy rate-low(96.6%) and limited dataset.
4.	Food Intake Calorie Prediction using Generalized Regression Neural Network	First Teddy Surya Gunawan, Mira Kartiwi , Noreha Abd Malik , Nanang Ismail.	2018	IEEE 5th International Conference on Smart Instrumentation, Measuremen	Generalized Regression Neural Network	Due to very large variation of the calorie needs to be predicted, GRNN has rather large

				t and Application (ICSIMA)		prediction error

2.3 PROJECT STATEMENT DEFINITION

Create a problem statement to understand your customer's point of view. The Customer Problem Statement template helps you focus on what matters to create experiences people will love. A well-articulated customer problem statement allows you and your team to find the ideal solution for the challenges your customers face. Throughout the process, you'll also be able to empathize with your customers, which helps you better understand how they perceive your product or service.

I am	Describe customer with 3-4 key characteristics - *who are they?*	Describe the customer and their attributes here
I'm trying to	*List their outcome or "job" the care about - what are they trying to achieve?*	List the thing they are trying to achieve here
but	Describe what problems or barriers stand in the way – *what bothers them most?*	Describe the problems or barriers that get in the way here
because	Enter the "root cause" of why the problem or barrier exists – *what needs to be solved?*	Describe the reason the problems or barriers exist
which makes me feel	Describe the emotions from the customer's point of view – *how does it impact them emotionally?*	Describe the emotions the result from experiencing the problems or barriers

Reference: https://miro.com/templates/customer-problem-statement/

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Example:

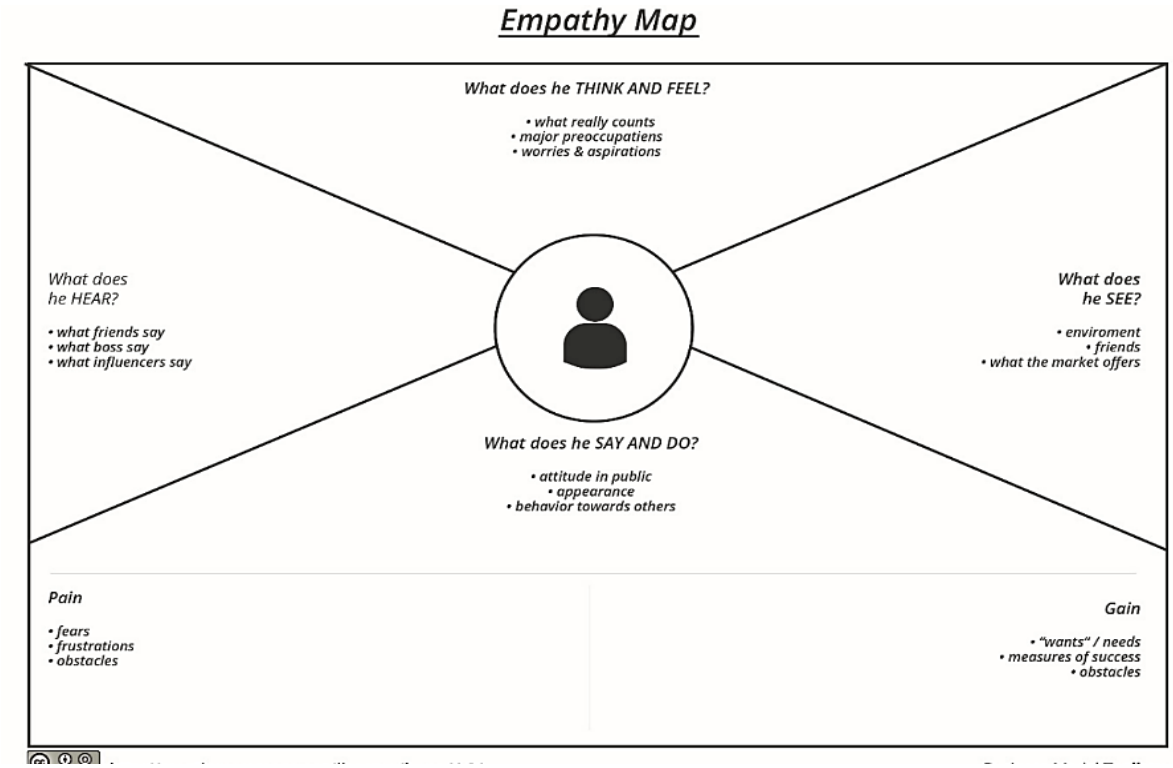
Problem Statement (PS)	**I am (Customer)**	**I'm trying to**	**But**	**Because**	**Which makes me feel**
PS-1	Obese	Lose my unnecessary fats	More Intake of food	Calories of food not know	In-secured
PS-2	Underweight Person	Lose my unnecessary fats	Less amount of food intake	No proper nutritional Advisory	Frusturated
PS-3	Everyone who wants to maintain diet	Lead healthy lifestyle	Intake of unhealthy food	Unaware of nutritional & low calorie food	Upset

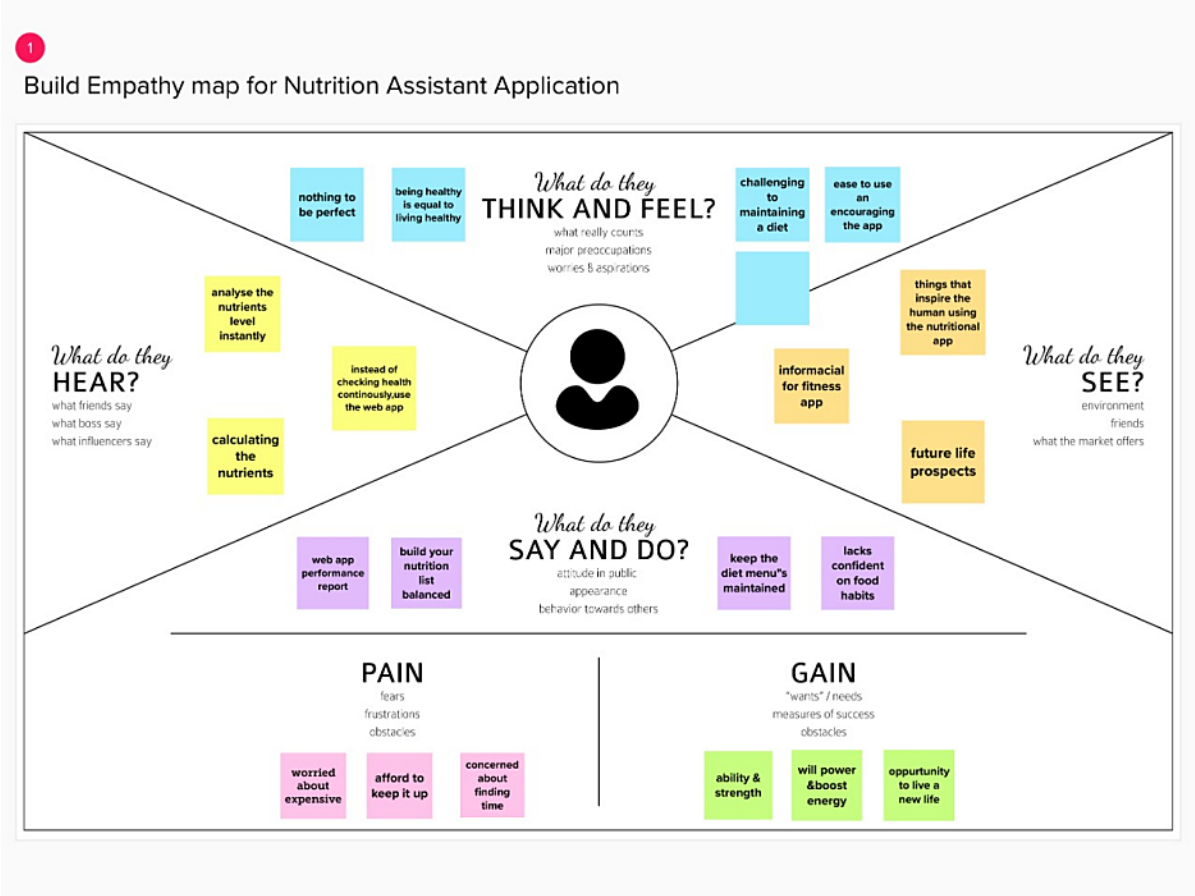
3.IDEATION & PROPOSED SOLUTION

3.1 Empathy map canvas

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviours and attitudes. It is a useful tool to helps teams better understand their users.

Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.





3.2 Ideation and brainstorming

Brainstorming provides a free and open environment that encourages everyone within a team to 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 are encouraged to collaborate, helping each other develop a rich amount of creative solutions.

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

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

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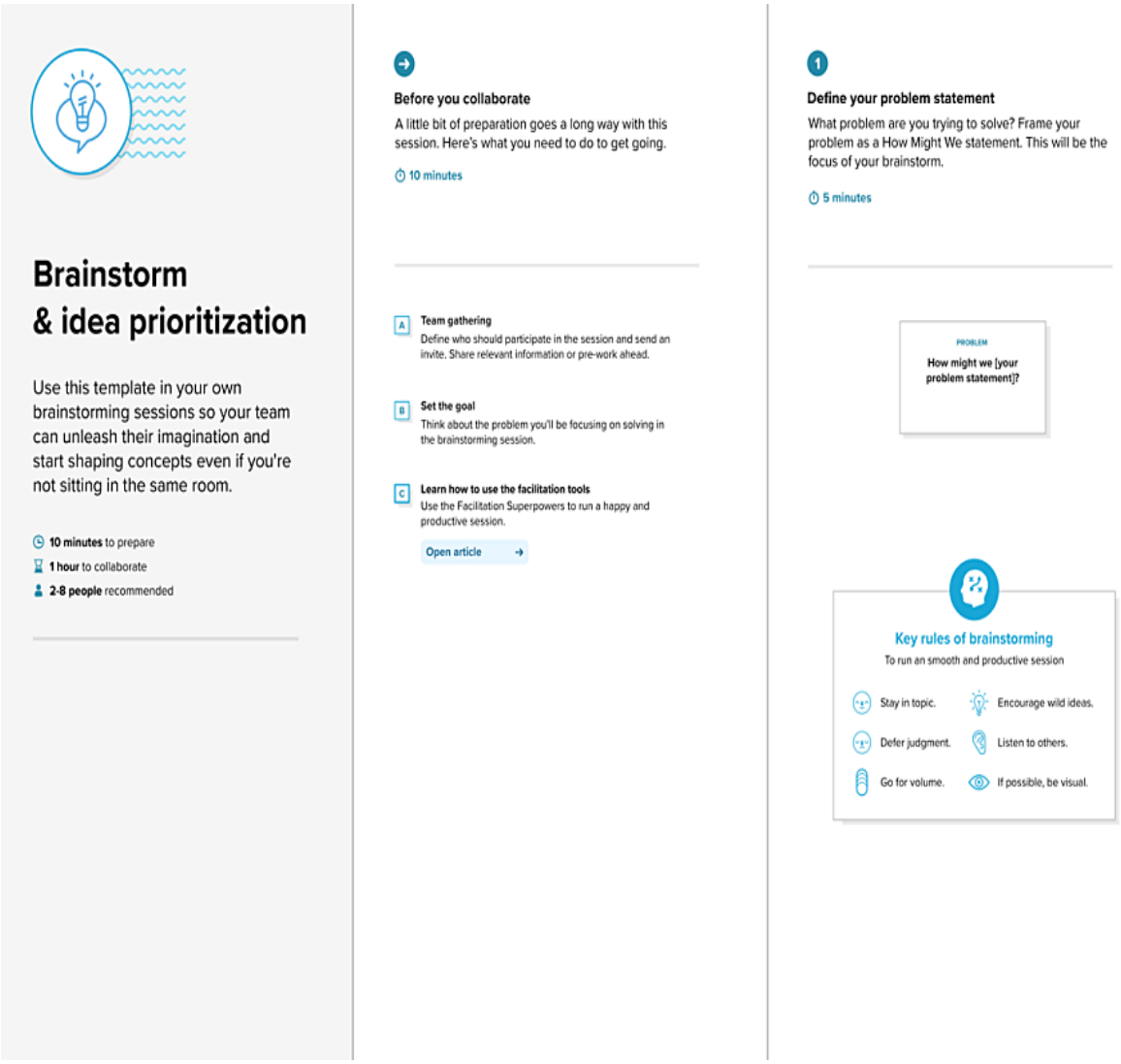

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2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

10 minutes

V.Pavithra

- Impact on balancing a diet
- is the time avail for the physical exercise
- check to that drinking a plenty of water everyday
- having a good food habit everyday

S.Swetha Kumari

- To elevate the value of food
- Helpful for tracking malnutrition
- Intake of low calorie
- Proper intake of protein

B.Subashini

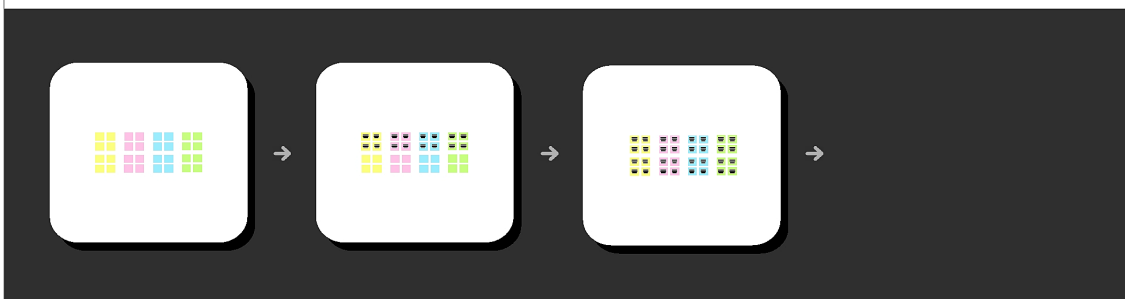
- Healthy intakes
- Monitor dietary patterns
- Sticking to diet plan
- Proper amount of food intake

S.Mahalakshmi

- Improving body metabolisms
- Helps in immunity
- Simple diet tracking
- Limit calorie consumption

P.Pavithra

- Follow specific diet plan
- Helps to reach dieatry goal
- Detailed nutritional analysis
- Helps in food related issues

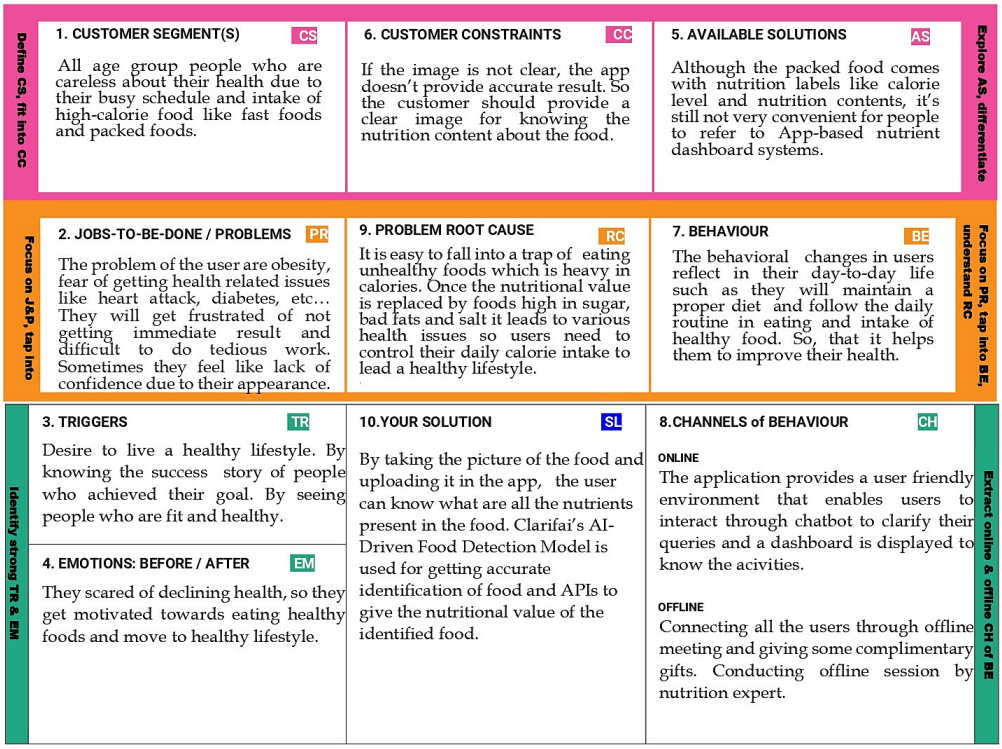


3.3 Proposed Solution

With all the above factors I have included some more services that would be useful to the user, some these are listed below .

- A demo service where the user can just enter the food name and the web app will tell the nutrients. This can be accessed only after the user registration whereas other pages can be accessed only after the user registration.

3.4 Problem Solution fit



4. Requirement Analysis

4.1 Functional Requirements

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Email Registration through LinkedIn
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Track the calories	Track the calories by adding food items into the respective field
FR-4	Make a proper diet chart	Add health details to make a proper diet chart
FR-5	Use recommended food	Recommendations can be in the form of a consulting with chosen specialist
FR-6	Set alert	Get alert for missing of calories

4.2 Non - Functional Requirements

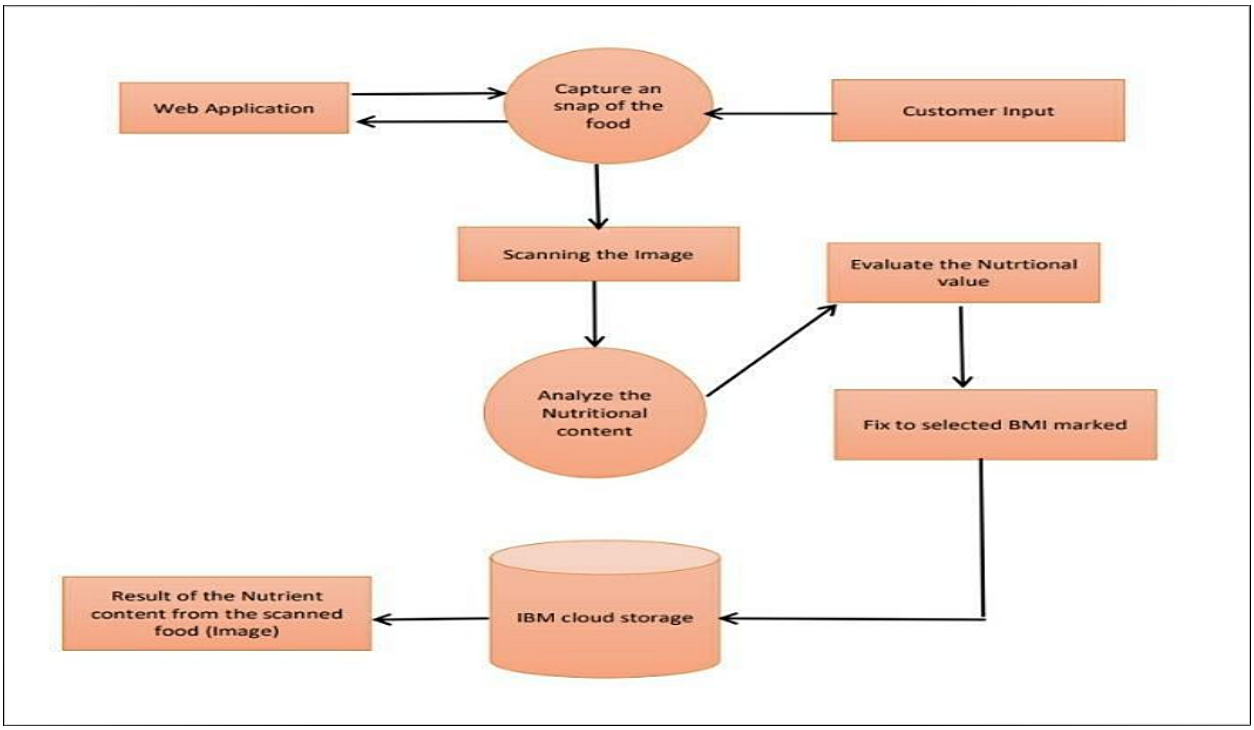
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	This application helps you set goals, monitor your weight trends & track your intake based on the specific diet plan you select.It also offers detailed nutrient information for each ingredient in your food menu & a daily analysis to help keep you on track .
NFR-2	**Security**	This application effectively manages the security of its application systems, protecting information from unauthorized access, modification, or destruction in order to provide integrity, confidentiality & availability.

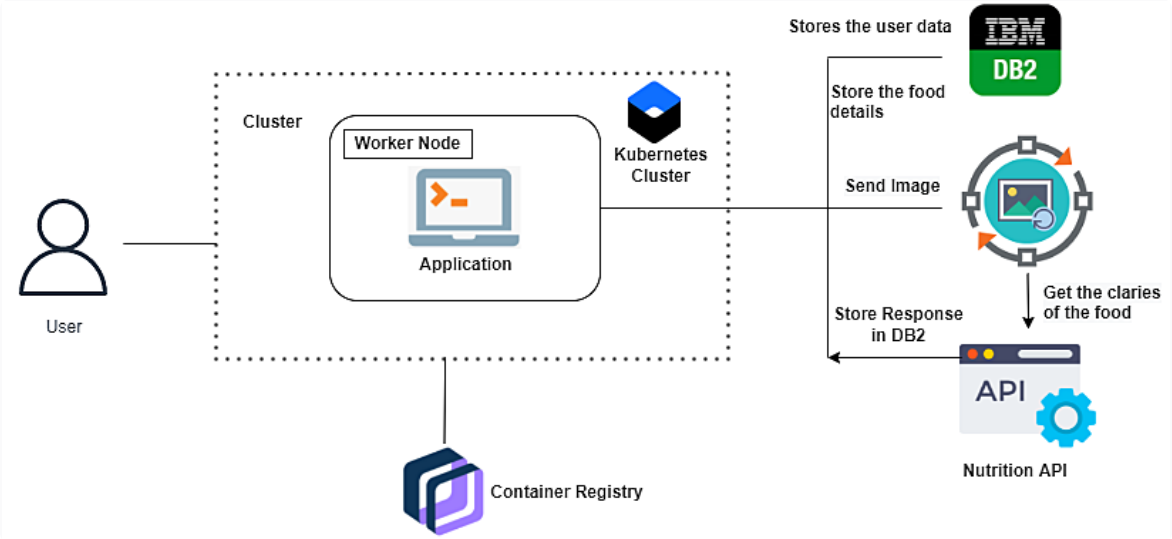
NFR-3	**Reliability**	This application operate without failure while in a specified environment
NFR-4	**Performance**	Enter everything you eat & drink during the day, & then let the application approximate the number of calories & nutrients you're consuming.
NFR-5	**Availability**	Fitness apps are like to one-stop station where you can monitor all your lifestyle parameters like step count, diet, water intake, blood parameters and workout routine. This application have a huge positive impact on your health.
NFR-6	**Scalability**	User's can track their calories by adding food items into the respective fields, so the system can calculate whether they consumed the required number of calories. Observes physical activity. This feature will require an additional gadget similar to Mi band that tracks steps, sleeping activity, heart rate etc.

5. Project Design

5.1 Data Flow Diagram



5.2 Solution & Technical Architecture



5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
User(All common people)	User Registration	USN-1	As a user, I can register for the application by entering my name,email,	I can access my dashboard.	High	Sprint-1

			password.			
	Login	USN-2	As a user, I can login to the application using my given credentials.	I can access my dashboard.	High	Sprint-1
	BMI Calculation	USN-3	As a user, I enter my height and weight details.	I can get to know about my BMI	High	Sprint-1
	Uploading the Image	USN-4	As a user, I will upload the image of food that I want to eat.	I can upload the image to decide whether to eat or not.	High	Sprint-1
	Providing output to user	USN-5	As a user, I will get to know the results of the inputs I've given.	I will get to know if I can eat the food or not.	Medium	Sprint-2
Administrator	Data Analysis	USN-6	As an admin, I will develop algorithms and modules to process the data.	I can store the result in database	High	Sprint-1

	Integrating with Cloud	USN-7	As a admin, I integrate the results in cloud containers.	I can deploy the data in cloud.	High	Sprint-1

6. Project Planning & scheduling

6.1 Sprint Planning

Using the below template to create product backlog and sprint schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Setting up application environment	USN-1	Create a sample flask project	5	High	Pavithra.P, Swetha Kumari.S, Mahalakshmi.S, Pavithra.V,subashini.B
Sprint-1		USN-2	Create IBM cloud account and install IBM cloud	4	High	Pavithra.V, Subashini.B,S

			CLI			wetha kumari.S,Mahalakshmi .S,Pavithra.P
Sprint-1		USN-3	Installation of docker CLI	5	Medium	Pavithra.V, Pavithra.P, Subashini.B,Swetha kumari.S,Mahalaksh mi.S
Sprint-1		USN-4	Create an account in sendgrid and nutritional API	5	High	Pavithra.V,Swetha Kumari.S, Mahalaksh mi .S,Pavithra.P ,Subashini.B
Sprint-2	Register and Login	USN-5	As a user I can register and login into my web application	5	High	Pavithra.P, Subashini .B Pavithra.V
Sprint-2	Upload and prediction	USN-6	As a user I can upload the food item images and also can predict the nutritional content result of the food items	4	Medium	Mahalakshmi.S, Pavithra .V Subashini.B

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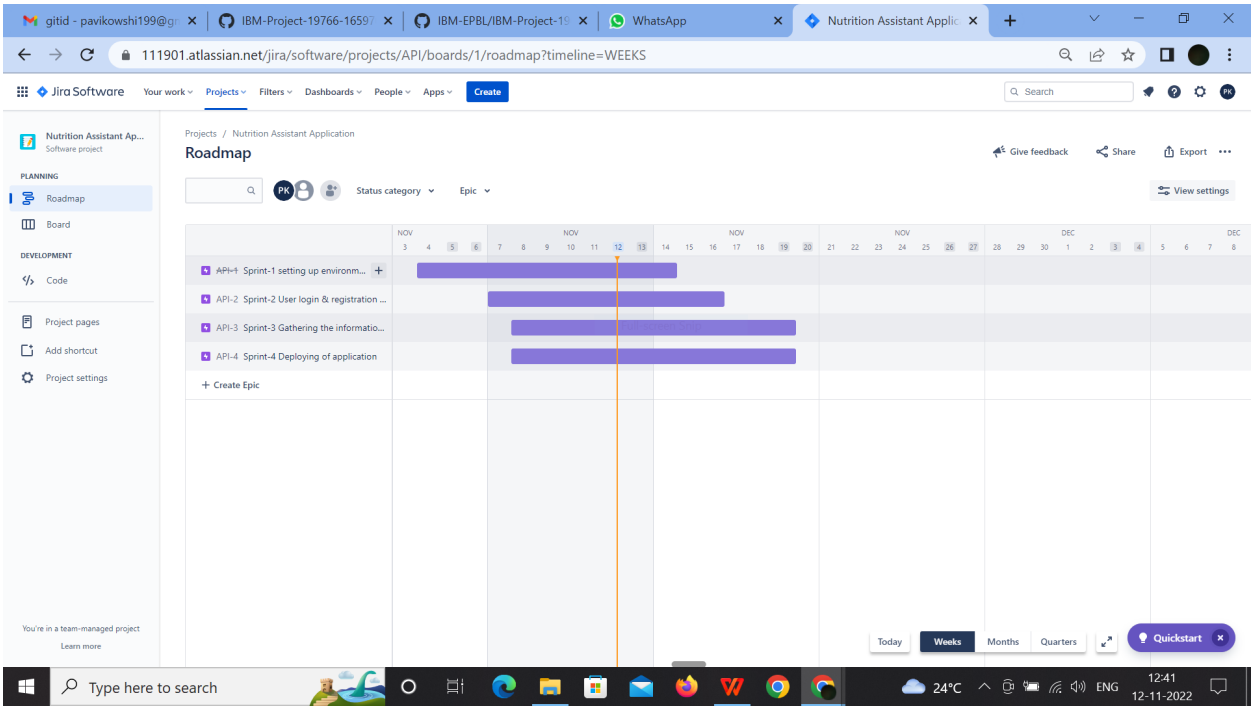
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-2	Database connectivity	USN-7	Create cloud Db2 service and connect with python	3	Low	Subahsini.B, Mahalakshmi. S, Pavithra.P
Sprint-2	Integrate nutrition API	USN-8	Integrate the flask with API call	4	Medium	Pavithra.V,Swetha kumari.S
Sprint-1	Service Request	USN-9	As a user I can request to display nutrition content of food items	5	High	Swetha Kumari.S, Pavithra.V
Sprint-2		USN-10	As a user I can request to suggest a diet plan according to my medical details	4	High	Swetha Kumari.S
Sprint-3	Integrating sendgrid	USN-11	Integrate the sendgrid with python code	4	Medium	Pavithra .V, Pavithra .P
Sprint-3	Notification	USN-12	track the status of diet targets through a dashboard or email services	3	Low	Swetha Kumari.S, Mahalakshmi .S
Sprint-3		USN-13	As a user get an email about revised exercise routines based on recent records.	3	Medium	Pavithra.V, Mahalakshmi .S
Sprint-1		USN-14	A user noticed after successfully achieved the target workout	5	High	Pavithra.P, Swetha Kumari.S

Sprint-4		USN-15	Upload Progress Reports	3	Low	Swetha Kumari. S, Subashini.B
Sprint-4		USN-16	Making UI more interactive	2	Low	Pavithra.P
Sprint-2		USN-17	As a user I give feedback	4	High	Pavithra.V
Sprint-4	Deployable phase of the application	USN-18	Containirize the app and send image to it	4	High	Swetha kumari.S,Subashini.S
Sprint-4		USN-19	Deploy the application in Kuberenetes	5	High	Pavithra.V,Swetha kumari.S,Pavithra.P,Subashini.B,Mahalaksh mi.S

6.2 Sprint Delivery Schedule:

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	25 Oct 2022	30 Oct 2022	20	30 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	04 Nov 2022	20	04 Nov 2022
Sprint-3	20	6 Days	05 Nov 2022	10 Nov 2022	20	10 Nov 2022
Sprint-4	20	6 Days	11 Nov 2022	16 Nov 2022	20	19 Nov 2022

6.3 Reports from Jira:



7.CODING & SOLUTIONING

7.1 Feature 1:

Spoonacular API:

It might be scary to know how many calories or how much sugar is in your favorite Halloween treats, but we decided to add an endpoint that will generate a nutrition label for recipes, grocery products, and menu items anyway!

If you like our recipe taste endpoint, you might be glad to learn that you can now use the parameter "includeTaste" with the endpoints Analyze Recipe and Extract Recipe from Website.

We have also expanded our popular meal planning API endpoints. You can now use our API to create meal plans without using our meal planner on spoonacular.com.

Our new addProductInformation and addMenuItemInformation parameters allow you to get the full product/menu item data right from the search results, making it unnecessary to query the API again for more detailed information.

Ever wonder how much of a certain food you would have to eat to get a certain amout of vitamins, fiber, protein, etc.? Our new Compute Ingredient Amount endpoint can answer these questions for you. Simply provide the ingredient ID, the target nutrient, and the amount of this nutrient you want to reach. The API will do the rest.

This new endpoint allows you to send raw recipe information, such as title, servings, and ingredients, to then see what we compute (badges, diets, nutrition, and all the tasty morsels you expect from our API!) This is useful if you have your own recipe data and want to enrich it with our semantic analysis.

7.2 Feature 2:

Docker file:

1. Faster and Easier configuration:
It is one of the key features of Docker that helps you in configuring the system in a faster and easier manner. Due to this feature, codes can be deployed in less time and with fewer efforts. The infrastructure is not linked with the environment of the application as Docker is used with a wide variety of environments.

2. Application isolation:
Docker provides containers that are used to run applications in an isolated environment. Since each container is independent, Docker can execute any kind of application.

3. Increase in productivity:
It helps in increasing productivity by easing up the technical configuration and rapidly deploying applications. Moreover, it not only provides an isolated environment to execute applications, but it reduces the resources as well.

4. Swarm:
Swarm is a clustering and scheduling tool for Docker containers. At the front end, it uses the Docker API, which helps us to use various tools to control it. It is a self-organizing group of engines that enables pluggable backends.

5. Services:
Services is a list of tasks that specifies the state of a container inside a cluster. Each task in the Services lists one instance of a container that should be running, while Swarm schedules them across the nodes.

6. Better Software Delivery:
Software Delivery with the help of containers is said to be more efficient. Containers are portable, self-contained and include an isolated disk volume. This isolated volume goes along with the container as it develops and is deployed to various environments.

7.3 Database Schema:

Common SQL engine:

A query may be written once and used across products and platforms. Can support all data types: Structured, unstructured, and relational data can all be accessed on one platform. High availability and disaster recovery: Db2 replication functionality allows for safe storage and access.

IBM Db2 is a family of data management products, including the Db2 relational database. The products feature AI-powered capabilities to **help you modernize the management of both structured and unstructured data across on-premises and multicloud environments**.

The name DB/2 **originally referred to IBM's shift from a hierarchical database model to the relational database model**. IBM rebranded the line of database products Db2 in 2017.

It is designed for mid-size to large-size business organizations. platform - linux, unix, and windows. table partitioning high availability disaster recovery (hard) materialized query table (mqts) multidimensional clustering (mdc) connection concentrator pure xml backup compression homogeneous federations.

Database administrators install, develop, test, and maintain databases for companies. They ensure optimal performance by performing backups, data migrations, and load balancing.

Data engineers design and build systems for collecting and analyzing data. They typically use SQL to query relational databases like Db2 to manage the data, as well as provide troubleshooting, recovery, and security management support.

Systems programmers help to install, configure, maintain, and monitor Db2 for an organization’s mainframe operating system. They might be hired on a contract or as-needed basis.

8.TESTING

8.1 & 8.2 Test Cases & User acceptance:

Login/ Registration Tests for Nutri App(Nutrition Assistant Application)

● Initially, after installing the app it shows the homepage.

● It should ask for login details.

● first register the app using email id.

● After successful registration , now login into the app.

Dashboard

● After login successfully it should take to dashboard.

● For unsuccessful login it navigates to homepage.

● In dashboard you can see information about the app

● If you enter food name correctly it shows the details of food

otherwise shows invalid.

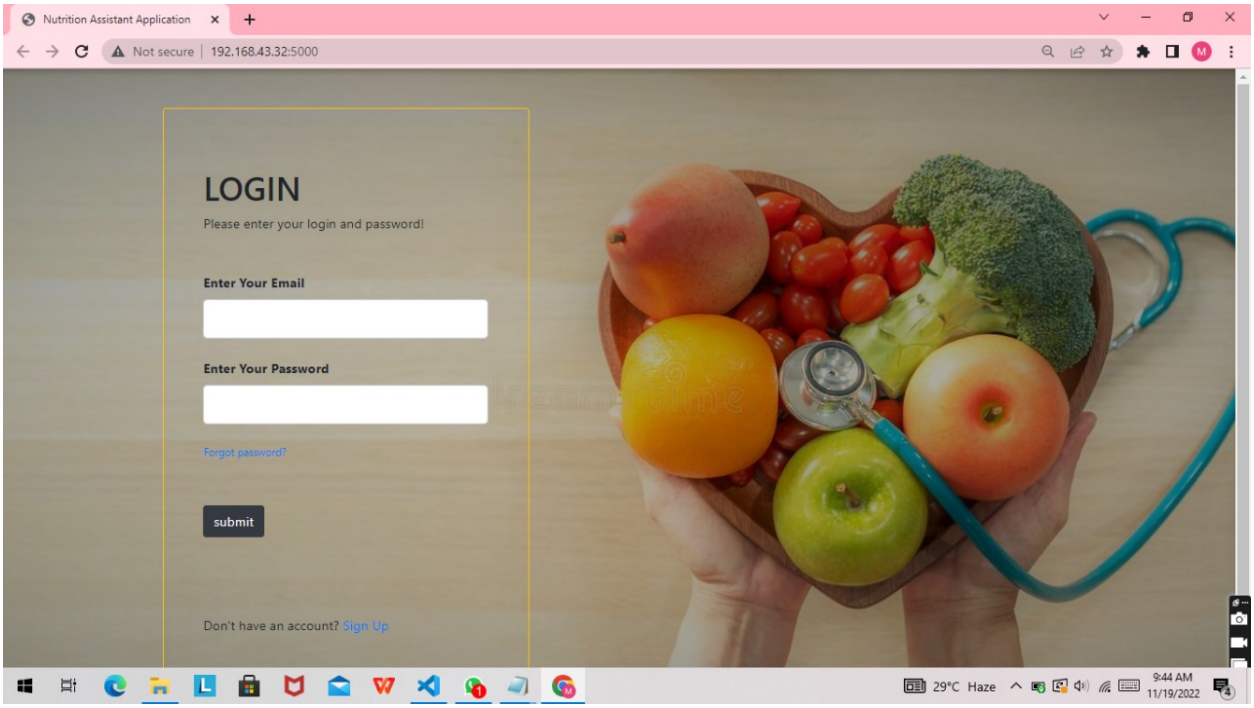
● You can enter correct details to get amount of calories to intake daily

and tips to maintain calories a day.

● Account settings like login and Logout.

9. Result

9.1 Performance metrics:



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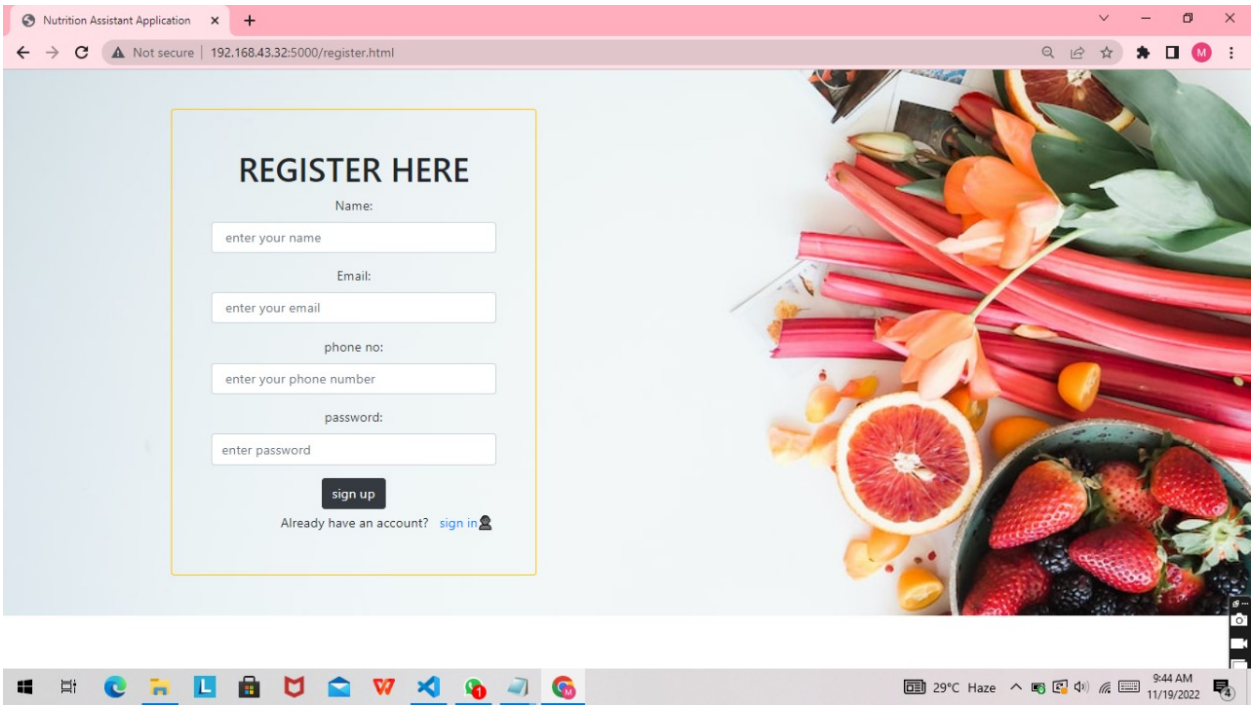

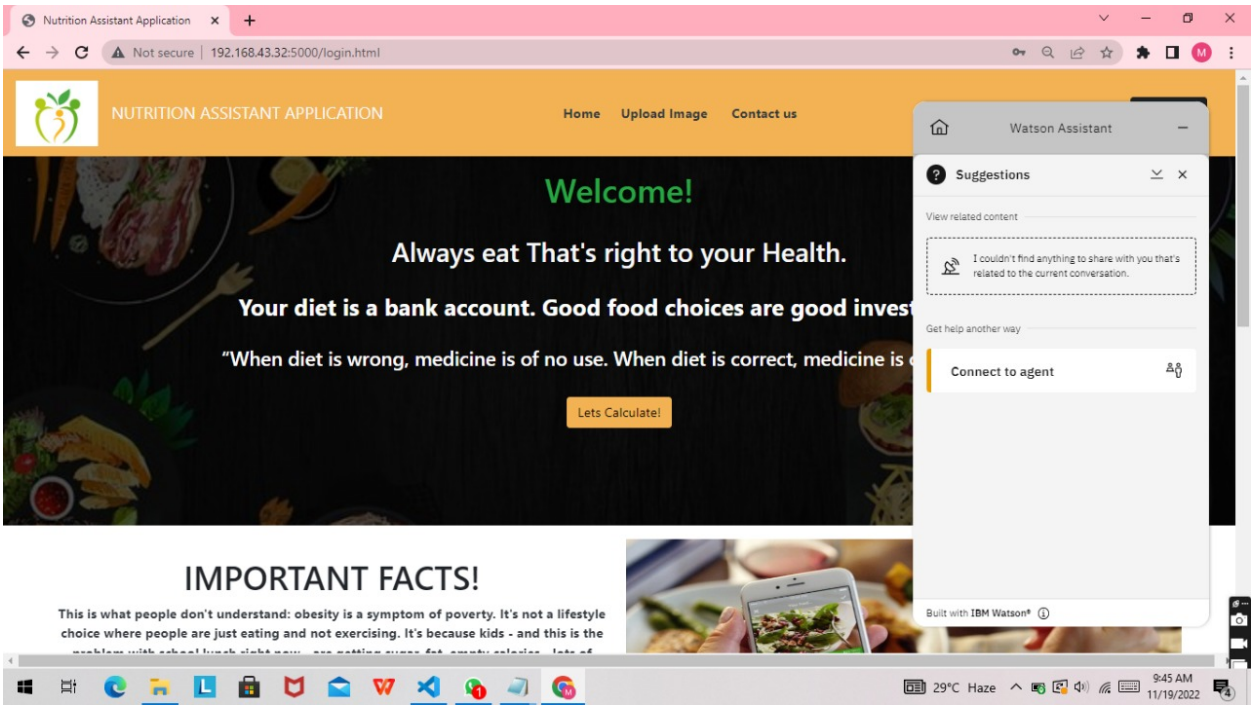

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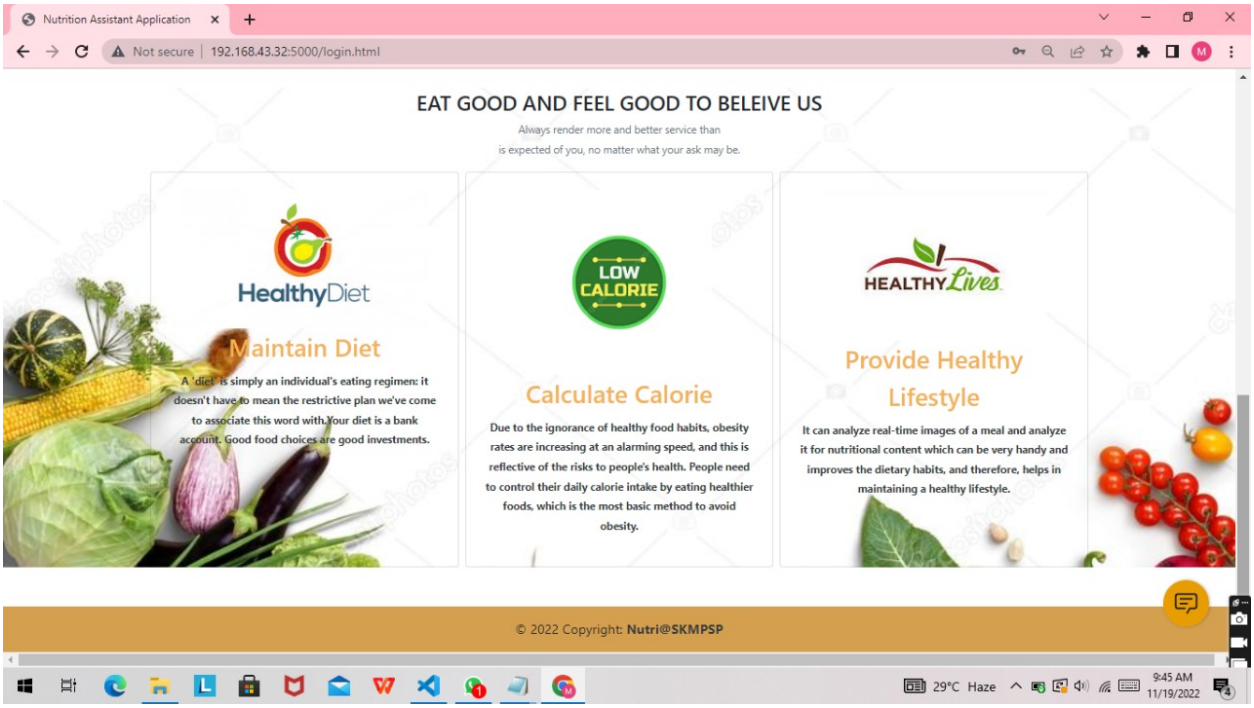

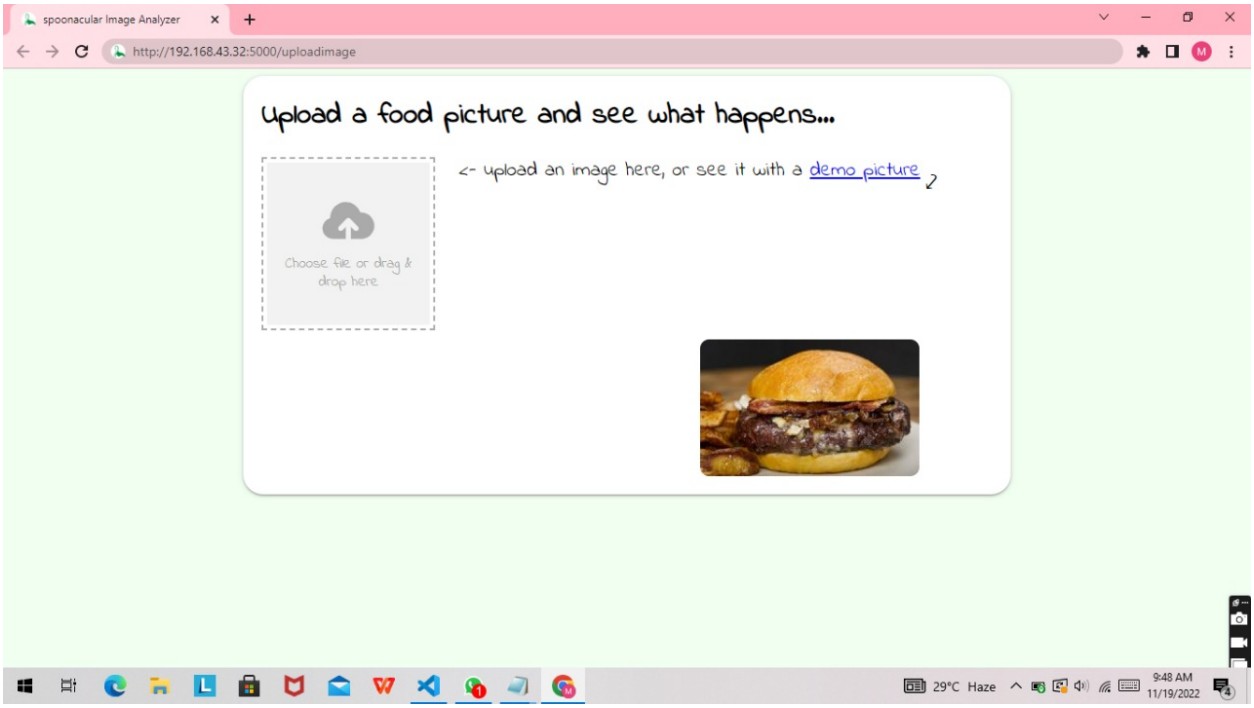

10. Advantages & Disadvantages

Advantages Of Application:

- Make life easier for individuals who need to track their calories intake per day.
- Without having an app that tracks your food intake, you're going to find it increasingly difficult to track this manually. This app will generally make recommendations on what foods you should be looking to get into your diet.
- Gives you healthy tips
- Recipes, that how to prepare a healthy diet food.

Disadvantages of Application:

- Required good internet facility while using the application.

11. Conclusion

• Nutritional support is the provision of adequate nutrients to maintain a healthy body weight and avoid malnutrition.
The continuous delivery of high-quality and cost-effective nutritional care to patients has been shown to be an
increasingly difficult task.
• We developed a cloud based nutrition application which detects the nutrition in food. It clarifies the calories in the
food which affects our health.
• It is observed that dieticians are requested to carry out the nutritional assessment, to manually calculate the
nutritional needs and to design the everyday meal plan for each patient. In

most cases, these time-consuming tasks
are not completed due to lack of time or inadequate number of person.

12. Future Scope

In this application, we have presented nutrients values of food, calorie tracker, recipes and healthy tips, in the future we would like to add features like image uploading, exercise activities, sharing tips to others through chatting and also come with feature like nutritionalist live for suggestion and tips

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