Stakeholder Requirements Specification
for
Food Magic

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1) Introduction

1.1 Stakeholder purpose

Food Magic is a mobile application aimed to promote healthy eating habits using a smart calorie tracker. Our company is interested in breaking into the healthcare industry with our machine learning solutions. We want to help healthcare providers by ensuring that their patients can make healthier decisions without having to painstakingly calculate their calories and possibly introduce calculation errors. Through this food-tracking application, we want the healthcare industry to familiarize with our company.

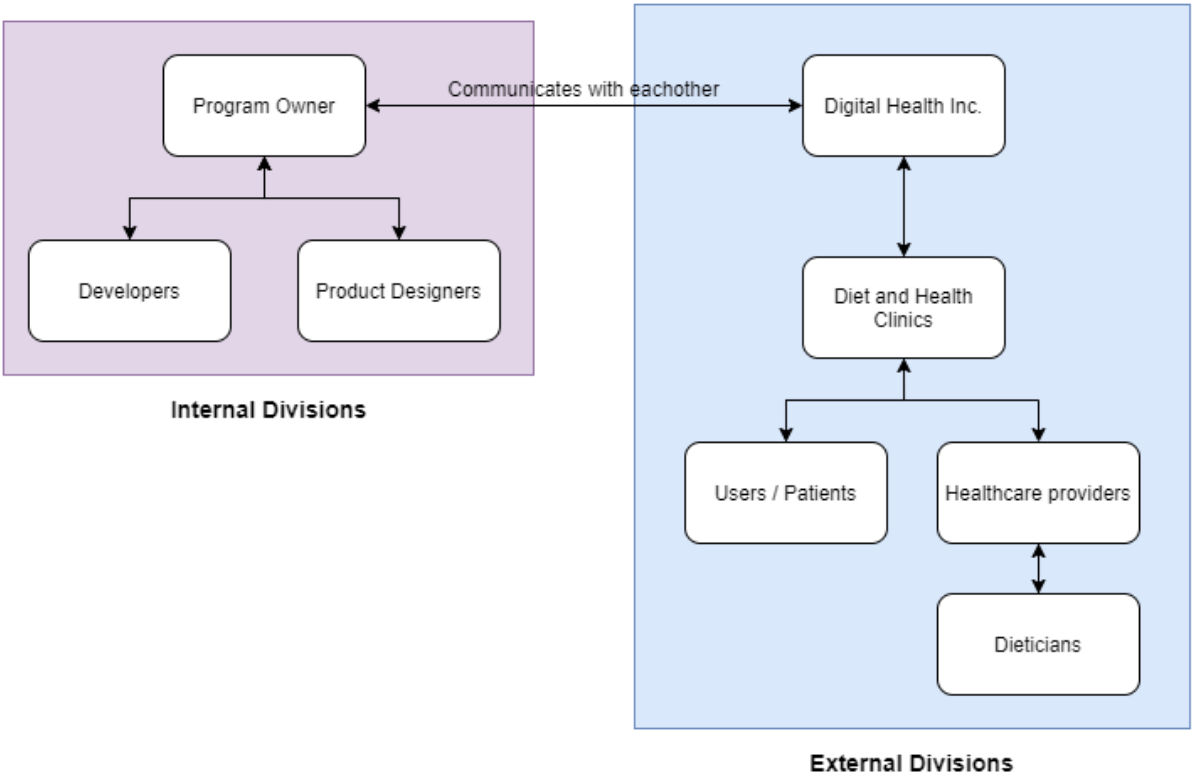
1.2 Stakeholder scope

Food Magic resides in the business domain of online services in healthcare.

Business activities include:

- Distribution to the market:
    - Launching the application on the Android and iOS App Store so that users can download and use the app.
- Creating the product:
    - The internal developers will build the application with advanced machine learning techniques.
- Marketing the product:
    - Encouraging healthcare practitioners to recommend the product to their patients that are struggling to keep up with their dieting.
- Selling the product:
    - Users can subscribe to the premium plans to use the machine learning features.
    - Digital Health Inc. will be invested in the product through their bid.
- Government regulations:
    - Restrictions regarding the storage of private client data through laws and regulations.

1.3 Overview



1.4 Definitions

smart calorie tracker	A smart calorie tracker uses artificial intelligence to determine the number of calories in a meal. The user does not need to manually calculate and log the number of calories in their meal.
freemium	A combination of the words “free” and “premium”. Freemium is a pricing strategy where the basic product is provided free of charge, but a premium is charged for additional features that expand the functionality of the free version of the software [1].

1.5 Stakeholders

1.5.1 Internal stakeholders

Project owner	The project owner will be responsible for overseeing that the project is on track and meeting milestones on time. The program manager will represent the users and manage the product backlog items.

Developers	The developers, under the direction of the project manager, will manage the development and testing of the product.
Product designers	The designers will design the product to be as simple and user-friendly as possible to encourage users to invest into their diet log.

1.5.2 External stakeholders

Dieticians	Dieticians will provide feedback and suggestions on how to improve our dietary suggestions. They will help us gather calorie counts for individual ingredients.
Healthcare providers in diet and health clinics	Employees in healthcare, a customer, will be using our app to provide reports to their patients and help them get on a diet plan easier.
Digital Health Inc.	Digital Health Inc. is our direct customer. They have posted a bid for a “Smartphone Based VBM System” and we will be mainly listening to their suggestions.
Government	Our data will be solely stored in Canada. The product will fall within the Canadian Government regulations on how we handle a user’s medical/dietary data.
Users	Users will interact with the system and use our service for dietary advice. Users can subscribe to Pro plans and become customers.

2) References

[1] "Freemium," Wikipedia, [Online]. Available: https://en.wikipedia.org/wiki/Freemium. [Accessed 27 March 2021].

3) Business management requirements

3.1 Business environment

3.1.1 Internal factors

1. Expertise of the team in producing machine learning solutions. The product may be of a lower quality if we lack AI experts.
2. Adequate funding to complete the project. More importantly, the budget needs to support hiring specialized staff and obtaining the right equipment.

3.1.2 External factors

1. Laws and regulations regarding the storage of a user's dietary data.
2. Market trends on the importance of diet and healthy eating.
3. Market competition of similar applications in this domain. Our product can become obsolete if current calorie-tracking apps implement a similar machine learning approach.
4. Current economic conditions that may prevent or encourage users to subscribe to the product.

3.2 Mission, goals, and objective

We want our users to make well-informed decisions on the meals they prepare. Users will more accurately determine the number of calories in their diet. Our smart calorie tracker will measure the user's food portions and provide detailed reports based solely on images of the user's meal. Unlike the current applications in the diet domain, our calorie tracker is aimed to have above 95% accuracy and do not require the user to have certain objects in the pictures.

The AI calorie tracker will be able to track a meal's ingredients, calories, vitamin count, dimensions and weight. These generated meal details will reduce the amount of time it takes to track a meal. Our app will fill the market gap for calorie tracking software that minimizes the amount of manual input.

3.3 Business model

We will use a subscription-based freemium business model offering two different plans: basic and premium. The basic plan is free of charge; whereas, the premium plan is based on a monthly subscription model.

The basic plan will feature a simple calorie counter that requires manual input. The app takes in the user's age, gender, height and weight to create a customized daily calorie goal.

The premium plan will be desirable for users that either don't want to spend or have the time to count calories in their meals. Users can upgrade to the premium plan from the basic plan at any time. The premium plan includes an AI calorie tracker that takes input from user images, saved meal details, and daily calorie progress tracking. The AI calorie tracker is aimed to have 95% accuracy.

The number of features in the basic plan is significantly less than the premium feature, so users will be tempted to subscribe.

3.4 Information environment

3.4.1 Project portfolio

During the development, the team usually breaks the entire project into different sub-projects. For each of the sub-projects, although they are all going towards the main project, they might be related to different components of the main project, and do not have much relation with each other. Then while development management, it is extremely important to order and prioritize those parallelized projects in order to make our main project reach value-maximum and risk-minimum.

The strategies to prioritize those parallelized projects should consider the following factors.

- Current available resource
    - Human Resource
    - Time Resource
    - Budget Resource
    - Equipment Resource
- Project Value
    - Self-Value
    - Add-on Value
- Project Risk
    - Self-Risk
    - Related Risk

Team will analyze and prioritize each of the sub-project in all those factors above, analyzed project can be divided into 3 groups as below

- High Priority (Project has High value, etc)
- Moderate Priority (Project has High value but lacking some Resource, etc)
- Low Priority (Project has relatively low value and also lacking resource)

3.4.2 Long term system plan

Long Term System Plan

- Constraint
  When the common and shared system infrastructure has been built during the early stage of the development, we need to realize the potential constraints of the existing system structure.

  Example: The object detection technique to help our product(“Food Magic”) to calculate the weight of each ingredient and measure actual dimensions of the food image are supported by the current AI algorithm. If there is a new and more accurate AI algorithm being discovered in the near future, our current AI algorithm will be the constraints of our product.

3.4.3 Database configuration

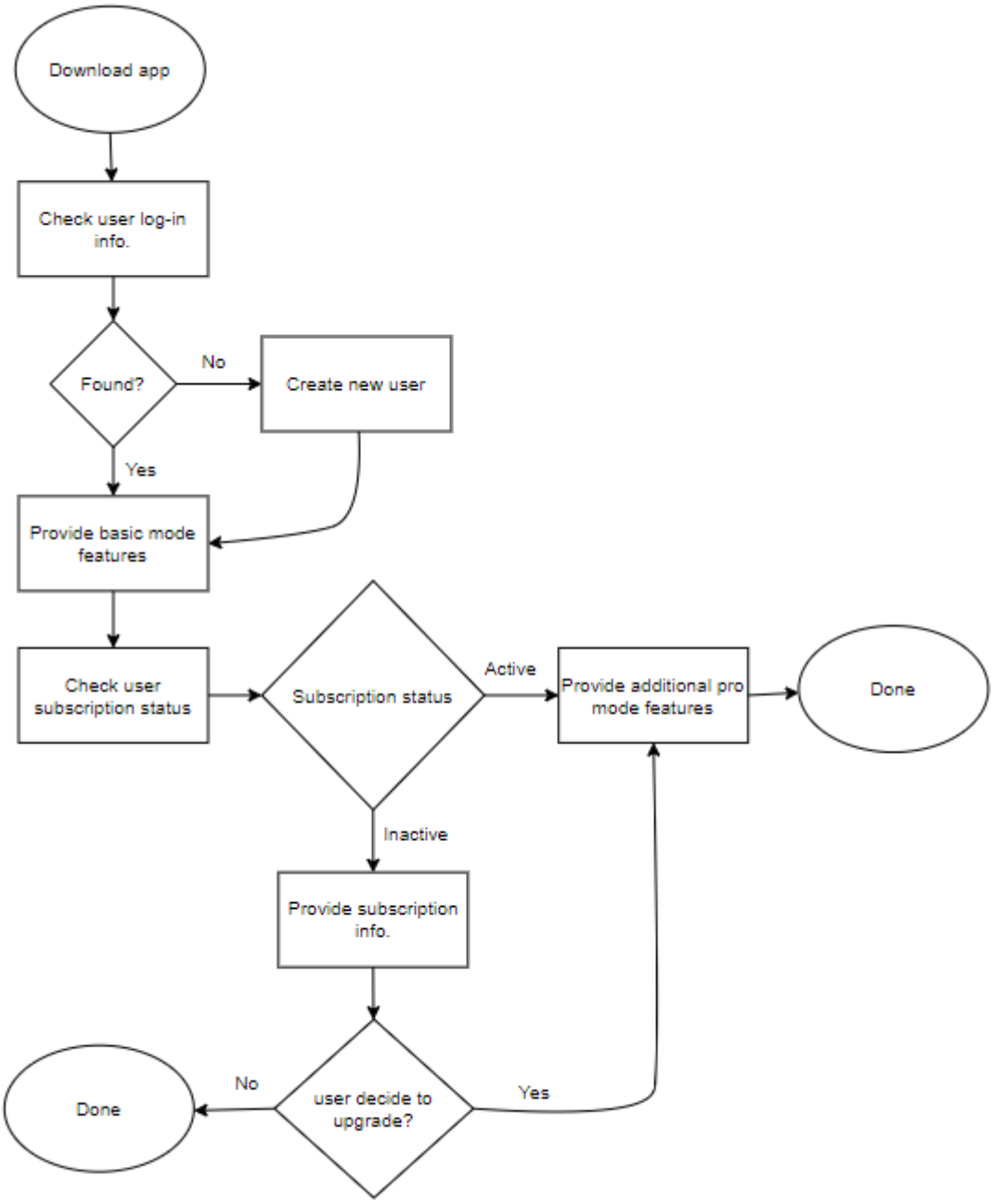
We are planning to have the database located in Canada.

Constraints:

- Accessibility: If we located our database in Canada and our product is sold to somewhere in Asia, then it might have the problem of accessibility

4) System operational requirements

4.1 System processes



4.2 System operational policies and rules

4.2.1 Personnel security

4.2.1.1 Background Investigation
Require suitability background investigations to be completed for personnel assigned to information security positions prior to allowing access to sensitive systems and networks.

4.2.1.2 Rules of Behavior
Require all system users to read, acknowledge, and comply with their roles and responsibilities and security rules of each system. Require that all users sign a “rules of behavior” agreement prior to being granted access to the system.

4.2.1.3 Disciplinary Action
Enforce disciplinary or adverse actions against system users who violate the generic and/or system-specific rules of behaviour.

4.2.1.4 Security Education and Awareness
Ensure that new users receive initial security and awareness education before being granted permanent access to the system.

4.2.1.5 Personnel Separation
Upon termination with an employee or a contractor, or other departure, ensure that all access and privileges to the systems, network, and facilities are immediately revoked.

4.2.2 Equipment Security

4.2.2.1 Workstations
Ensure that security controls are comparable with the sensitivity level of the data and these are maintained on all workstations.

4.2.2.2 Hardware Security
Ensure that hardware products provide dependable, cost-effective security controls and features and preserve the integrity of the security features provided through the system software.

4.2.2.3 Software Security
Implement software security features that are comparable with the sensitivity level of the data. The security controls selected must protect information resources from unauthorized access or modification.

4.3 System operational constraints

No.	Applies To	Rule Specification
1	Log in	All users must have an account created by the registration form from the app to be able to use the app.
2	Registration	All the information provided by the users must be their own real personal information. The email address that the users provide must be from a trustable domain.
3	User information	All the information provided by the user must be kept confidential unless the user chooses to share them.
4	Subscription payment	Users are only allowed to pay with valid Visa or Mastercard.
5	Search feature	Search feature can only be used if the user's device is currently accessed to the internet.
6	Food ingredients identifying accuracy	The accuracy that the AI needs to have for identifying the ingredient in the food picture needs to be above 95%.
7	Food weight measurement accuracy	The accuracy for the food weight measurement needs to be above 95%.
8	Calorie calculation accuracy	The accuracy for the calories calculation needs to be above 95%.
9	Nutrition facts accuracy	The accuracy for the Nutrition facts needs to be above 95%.
10	Storage	Must be store in Amazon cloud service
11	Platform	The application must be runnable in both iOS and Android. For iOS the version must be 9.0 or newer. For Android the version must be 5.0 or newer.
12	Food detection	The application must use AI for food detection. The AI training should be incremental.
13	Food weight measurement	The application must use auto-calibration techniques to measure the weight of the food. It must not use external objects in the image.

4.4 System operational modes and states

4.4.1 Basic mode (free)

4.4.1.1 nutrition information
Provide the nutritions name to the users. The nutritions information can be obtained from the input that the users have uploaded.

4.4.1.2 ingredients identifier
Users will have to manually input the list of ingredients present in the food picture that they have uploaded.

4.4.1.3 tracking
The software will only track users' food intake information for the current date. History information will not be saved and viewable by the users.

4.4.1.4 food weight measurement
Users will have to manually input the weight of the food for the application to be able to calculate the total amount of calories.

4.4.2 Pro mode (pay)

4.4.2.1 nutrition information
Provide the nutrition name, among, and recommendations to the users. The nutritions information can be obtained from the picture of the food that the users have uploaded.

4.4.2.2 ingredients identifier
The food ingredients will be identified from the picture that the users have uploaded, with the help of artificial intelligence (AI). The user will also have the option to manually input the missing ingredients.

4.2.2.3 tracking
The software will track all the information that the users have uploaded.

4.2.2.4 food weight measurement
The application will be using the AI to identify the weight of the food that the users have uploaded. If the result turns out to be inaccurate the users will have an option to manually overwrite it.

5) User requirements

- The system shall allow the user to access their calorie counter history in less than 3 seconds.
- The system shall calculate the total calories of a meal within 2 seconds.

- The system shall identify the ingredients from the user's images within 5 seconds.
- The system shall allow the user to share their diet progress on their social media.
- The system shall remind the user to fill their daily meal logs.
- The system shall notify the user of their daily diet reports.
- The system shall inform the user of their over or under eating habits.
- The system shall allow the user to save their most used ingredients.
- The system shall accurately identify the dimensions of the meal.
- The system shall inform the user of their total calorie intake for the day.
- The system shall allow the user to input ingredients that cannot be detected by the system.
- The system shall indicate the user's daily vitamin and mineral goals.
- The system shall allow the user to sign up for an account.
- The system shall allow the user to save their diet information.
- The system shall suggest the user to input frequently eaten meals or ingredients.

6) Detailed Life-cycle concepts of proposed system

6.1 Operational concept

Food Magic is a downloadable app for any devices that run on iOS or Android. The app allows users to identify the ingredients present in their food and calorie calculation in a very accurate and effortless way. Users will have an option to try some basic features that the app provides without paying. In the free version (Basic mode) of the app, users will not have access to the main features such as ingredients identifier, nutritions intake amount and recommendation, and history tracking. The only accesses that the users will have in this mode are manually uploading their food ingredients, see the total calories and the nutrition's name. Users will have an option to upgrade or cancel to the pro version anytime that they want.

6.2 Operational scenarios

6.2.1 Scenario #1 (assuming user in pro mode)

User Objective: To identify the ingredients in their lunch

Source	Step	Action
user	1	Open the app
program	2	Display main page
user	3	Click on the 'add' button under the lunch box located in the middle of the main page
Program	4	Display camera view and image gallery

user	5	Take picture of the food
Program	6	Identify all the ingredients present in the photo and display them to user

6.2.2 Scenario #2 (assuming user in pro mode)

User objective: To view their total calories and nutrition fact for the current date.

Source	Step	Action
User	1	Open the app
Program	2	Display main page
User	3	Select the ‘Me’ button located in the menu bar at the bottom of the app
Program	4	Display the total calories and the nutritions information regarding the food that the user has intake for the current date.

6.2.3 Scenario #3

User objective: upgrading from basic mode to pro mode

Source	Step	Action
User	1	Open the app
Program	2	Display main page
User	3	Click on the menu bar, located on the top left of the main page
Program	4	Display setting, information, upgrade button
User	5	Click on the upgrade button
Program	6	Display current app status and upgrade/downgrade option
User	7	Click on the upgrade option
Program	8	Display payment method available
User	9	Select suitable payment method for them
Program	10	Charge the user for upgrade cost and unlock all the features available for that upgrade

6.2.4 Scenario #4 (assuming user in pro mode)

User objective: Downgrading from pro mode to basic mode

Source	Step	Action
User	1	Open the app
Program	2	Display main page
User	3	Click on the menu bar, located on the top left of the main page
Program	4	Display setting, information, upgrade button
User	5	Click on the upgrade button
Program	6	Display current app status and upgrade/downgrade option
User	7	Click on the downgrade option
Program	8	Display the end date of the pro version and once reach that date, lock all the features that were only available for the pro version.

6.3 Acquisition concept

For this project, the project owner will represent the whole team to discuss all the requirements in both system and design with the client at the beginning of the project. All the requirements discussed between the project owner and the client will be properly documented for further use such as for reference or definition. All the issues that the developers are facing will be discussed directly with the project owner or reference back to the documentation that was documented during the discussion between project owner and the client to find the appropriate solution for it.

6.4 Deployment concept

Before merging into the main branch of the application, the project owner must review the merging branch and give the approval before the developers of that branch could merge it.

6.5 Support concept

There will be a team assigned to monitor the application once the application has been deployed. The team will mainly be focusing on fixing any issue that was found and reported by the users. The team will also have to continuously do maintenance on the AWS database: No data should be leaking, overflow or missing.

6.6 Retirement concept

The application will be removed from all the app stores in both iOS and Android platforms. All the subscription users will be notified of the cancelation of the application and they will no longer be provided with the pro mode features once their subscription has ended.

7) Project Constraints

7.1 Budget

Type	Cost
Salary	20 people * C$40,000 = C$800,000
Hardware	20 regular computers * C$1000 + 2 high performance computer for AI training * C$30,000 + 5 Android phones * C$1000 + 5 iPhones * C$1000 = C$90,000
Rent	C$80,000
Other equipment	C$50,000
Total	C$1,020,000

7.2 Scope

The app resides in the domain of online services in healthcare. Its main focus will be food identification and calorie calculation. With diet as its main focus, other health-related functionality including fitness logs are out of scope for this application.

The app includes food identification using AI and manual inputs. Users can track their diet progress with the app's calorie goal calculator. The calorie goals can be calculated by the app from the user's age, gender, height and weight.

7.3 Quality

- Accuracy in both food identification and calorie calculation shall be above 95%.
- The User Interface (UI) and User Experience (UX) shall have a rating above 4 stars out of 5 stars in the app store for both iOS and Android platforms.
- The system shall maintain a user's daily commitment to the app for at least 1 month.
- The system shall convert a user on Basic plan to Pro plan within 2 weeks.
- The system shall encrypt user data before storing into the database.

7.4 Resources

- 20 employees (including developers, project owner, and product designer)
- 20 regular computers
- 2 high performance computers for AI training
- 5 Android phones
- 5 iPhones

7.5 Time

- The project shall be completed before December 31, 2021.
- Each major milestone is expected to be reached every 4 weeks.
- Employees are expected to follow the 9 to 5 schedule for 5 days a week with holidays off.