

Business Requirements Specification (BRS)

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1. Introduction

1.1 Business Purpose

1.1.1 Background

Nowadays, we are in an age where people are going to take care of personal health. We need a helpful device that can help us detect our status, and one helpful method is to make calories visible. There are many personal health monitoring apps like MealSnap or Carbs&Cals that can log what food a person is eating on a daily basis. However, the effect of these apps is disappointing. By considering the reason, not automatic and low accuracy contained a lot.

1.1.2 Purpose

Using a better algorithm to calculate food's weight and nutrition

People can calculate the calories anytime easily

The software database should be scalable for Big Data and cloud computing principles.

The software can be trained by previous food datasets and improve its accuracy.

1.2 Business Scope

1.2.1 Business domain: energy and nutrition intake for food

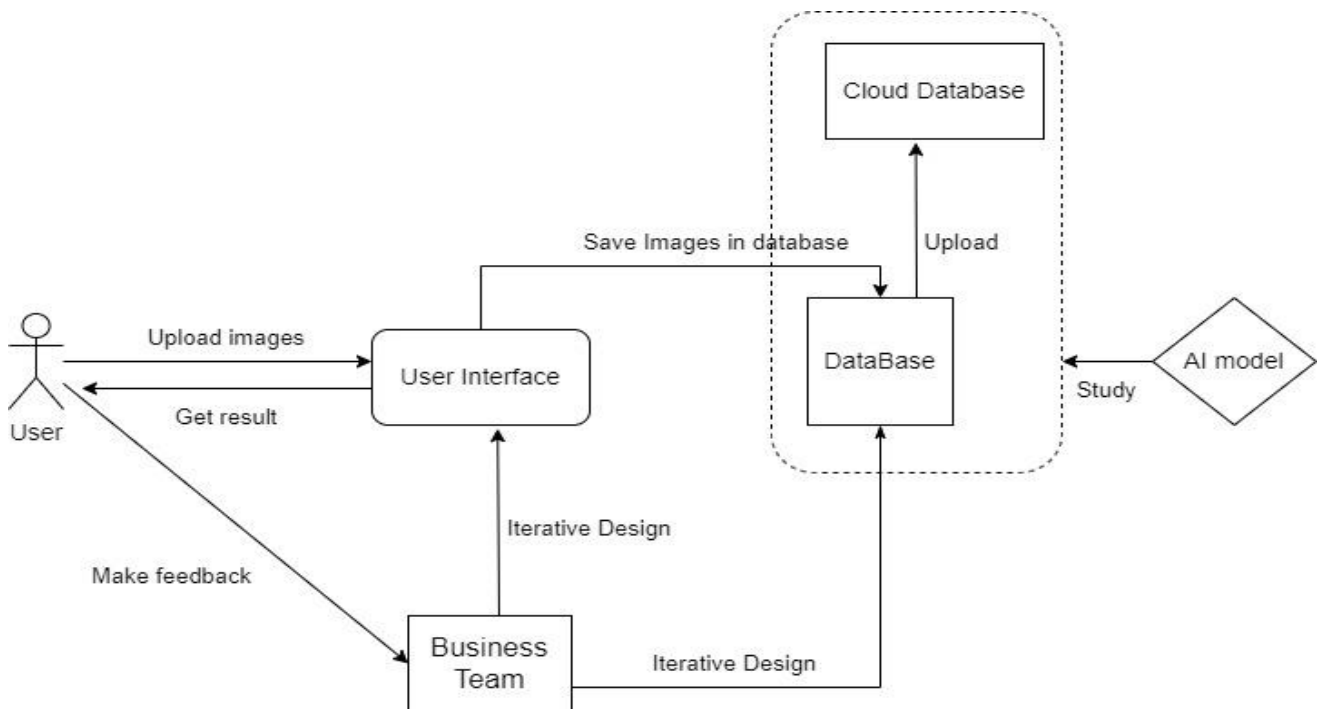
1.2.2 In scope activities:

1. Client can use their phone to log into the software
2. Client can take pictures and send them to the system to calculate the calories
3. Client can send their analysis to the Cloud database for tracking and studying
4. System can analyze the images from a personal device
5. System can distinguish whether the image contains food
6. System uses Artificial Intelligence for food detection and measurement

1.2.3 Out of scope activities

1. The client will use the camera to scan the food
2. The system can distinguish kinds of food

1.3 Business Overview



1.4 Major Stakeholders

1.4.1 Customers

Customers are the primary users of the app, and they are directly connected to the organization's economic profit. The organization can continue conducting the business process because of DAU (daily active users) or MAU (monthly active users), so the organization should consider customers' needs and make the system easy for them to use.

1.4.2 Employees

Employees are the key stakeholders since they can provide goods and services assigned by the organization. They will decide the app's quality, including identification accuracy or user interface design. Furthermore, they are also one part of the organization and share the business profit.

1.4.3 Digital Health Inc

Digital Health Inc provides the request of bids, it is the leading company providing personal health monitoring devices and services and it begins to focus on energy intake. DHI sends the draft to our team to finish, it will get economic benefit from the software. Also, by receiving the data from the software, DHI can do deep research on energy intake and provide advanced services.

2. References

P. Pouladzadeh, S. Shirmohammadi and R. Al-Maghrabi, "Measuring Calorie and Nutrition From Food Image," in *IEEE Transactions on Instrumentation and Measurement*, vol. 63, no. 8, pp. 1947-1956, Aug. 2014, doi: 10.1109/TIM.2014.2303533.

3. Business Management Requirements

3.1 Business environment

3.1.1 External Environmental Factor

Political Factor

The government issued a series of legislation to protect users' private data, such as bank information, customer information, and address, from being leaked to untrusted third parties without notice. Also, the existing infrastructure, Amazon Cloud, should be regulated to prevent any form of disclosure of images and information. Data security is strictly administered, so the organization should follow legislation and consider political factors.

Social/Customer Factor

The app could potentially influence users' daily food choices since it allows them to see the number of calories can get from various food at each meal more intuitively. Then, users are more likely to monitor their health status through energy intake data and adjust eating habits accordingly. On the other hand, with the popularity of social platforms, more and more people are willing to share their daily life, for example, what kinds of food they had for lunch. With the release of our app, users can post their food photos and share their nutritional information. If society could become more aware of healthy eating habits and daily calorie intake, there would be more and more users, thus significantly improving the awareness and popularity of the app in the market.

Economic Factor

The growing economy leads to a low unemployment rate, higher quality of life, and income level. People will no longer only focus on careers but have more time to care about personal health. However, there are not too many applications that provide accurate energy intake tracking, which is the field that Digital Health Inc. excels in and has a significant share of this market. When many potential users need such a product, the organization will be more likely to gain success and financial revenue.

Technological Factor

The growing technology leads to more advanced and convenient solutions to provide more accurate health data to users with the help of AI algorithms. Also, the system is highly scalable and allows to upload millions of food images every day. Moreover, big data and cloud computing principles enable the organization to store, process, and communicate user data effectively at a low cost. These technological factors will help developers implement a high-quality mobile app without worrying about scalability and cost too much.

3.1.2 Internal Environment Factors

Human Resource

Human resources can be a great treasure of an organization. A business has skilled and motivated workers, and they are sure to be the biggest asset of this enterprise. For example, talented software developers will contribute to the project, and their abilities can decide the quality of the product and development time.

Capital Resource

Financial capital is the funds necessary to grow and sustain a business. Once a company has enough budget, it can quickly launch projects, expand its scale and employ specialists to achieve impressive results. For example, Digital Health Inc. has enough budget to invest in this personal health app so that the developer team can gain support on algorithm research and implementation and maintenance.

Business owners and managers

They have a great deal of control over the internal environment of business, which covers day-to-day decisions. They supervised the whole development process and guaranteed that the app could be delivered with promised quality within budget.

3.2 Mission, goals and objectives

Although there are many similar competing products on the market today, it is difficult for them to achieve high accuracy of predicted health data. Thus, this is also a fundamental reason this product cannot be well applied to clinics and professional athletic businesses.

- a) Through series of greatly improved background algorithms to enhance the accuracy, the new system will be not only applied to the daily life of ordinary people but also put into the clinics and professional athletic businesses, thus we aim at improving its market share by 20% and increase its profit by 15% by the end of 2023.

- b) As a pioneer, the organization can explore a solid foundation of energy intake tracking in the emerging market. Through the popularity of this health app, people will pay more attention to the close connection between diet and health so that society will be instilled an idea of a healthy diet.
- c) By releasing this new product, the organization aims to fill the gap in the business market for quantifying calories and energy for expenditure.
- d) Since the new product is consisted of cloud services and artificial intelligence, the release of application can promote the popularization of these services in the market.

3.3 Business Model

3.3.1 Subscription model

Users can use the camera to take pictures for free to identify calories. In order to provide users with more advanced services, we will adopt a subscription membership system. After paying to become our member, users will enjoy the following functions:

- 1) A more detailed analysis of the nutritional content of the food in the photo
- 2) More food can be recorded in history
- 3) Make a personalized meal plan based on the user's diet
- 4) Analyze and report the user's food records
- 5) Provide more powerful AI analysis
- 6) Unlock more personalized recipes

Considering that most of the app's user groups are people who are concerned about eating healthy, the membership system will be very suitable for their needs.

3.4 Information Environment

3.4.1 Project portfolio

To achieve the goals of this project, we need software development, AI analysis, database configuration. The software development part can be done by various departments to solve the basic software requirements. AI models and databases can be chosen from products of Amazon such as Amazon Cloud and Amazon AI to build better web services for analyzing.

3.4.2 Long term system plan

The project is highly dependent on big data recognition and the construction of AI models. This will require a large enough database and strong cloud computing support to keep the project running.

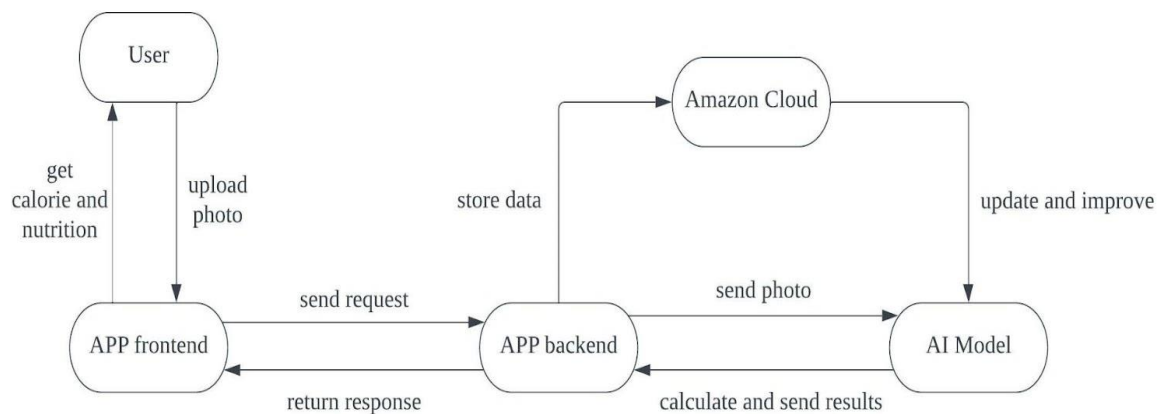
3.4.3 Database configuration

The app is going to upload millions of food images every day. So storage, processing, and communication need to be highly scalable. Amazon Cloud should be used in this project in order to not change the existing infrastructure.

4. Business Operational Requirements

4.1 Business processes

4.1.1 Core business process



4.1.2 Marketing process

1) Pre-launch marketing

When the application is still in the development phase, attracts the attention of the target audience. A catchy application name and description would be helpful.

2) Post-launch marketing

When the application is completely developed and ready to be sent out to customers. Using either free marketing such as application reviews and application store optimization, or paid marketing like paid outreach and social media, to encourage customers to download.

3) Customer engagement and retention

Make sure the customers keep engaging with the application. Analyzing their in-app behavior to make continuous improvements.

4.1.3 Subscription process

- 1) The user pays successfully and sends a subscription request.
- 2) The financial part validates the payment.
- 3) The financial department handles the revenue.
- 4) The system updates the user status and prime functionalities.

4.2 Business operational policies and rules

4.2.1 Core business process

- a) Start condition
The user uploads a picture of the food to calculate the number of calories and nutrition in that food.
- b) Terminate condition
The user gets the result of the calculation.
- c) Judgement criteria
The capacity of the system to process calculations at the same time.
- d) Evaluation formula
Ease of use and pleasantness of the app. Speed and accuracy for food identification and calorie calculation.

4.2.2 Subscription process

- a) Start condition
The user sends a request for a subscription.
- b) Terminate condition
The user successfully makes the subscription and has the privileges.
- c) Judgement criteria
Attractions of the prime functionalities.
- d) Evaluation formula
Waiting time of the payment.

4.2.3 HR management process

a) Start condition

The HR executive makes a job announcement, or the employee submits a resignation request.

b) Terminate condition

A new employee is hired or a employee to resign has completed the resignation procedures.

c) Judgement criteria

Timely replenishment of suitable employees for vacant positions.

d) Evaluation formula

High match between the hired employees with the job positions.

4.3. Business operational constraints

4.3.1 The metric system should monitor and record every event of the operational process.

4.3.2 The customer service should be completed within 15 days of consumer feedback.

4.4. Business operational modes

When the business operation enters an unstable state, there should be an emergency team that has been trained during development to stabilize the product and ensure that the product is in a good state of use so that the losses can be minimized.

4.5. Business operational quality

These processes are listed from **highest** to **lowest priority**

4.5.1 Satisfaction & Security

The product will continue to track customer opinions and make improvements, strictly keep consumer information in accordance with relevant national laws and regulations and keep the information retrieval archives.

4.5.2 Maintainability and portability

The product supports multi-platform operation, including iOS and android, records bugs in the background and makes regular changes to the product.

4.5.3 Effectiveness & Efficiency

This product will provide customers with the most accurate and rapid calorie identification system.

4.6 Business structure

In order to maximize the success of the project, the various departments must work together. Therefore, the new mobile phone app Digital Health Inc. is committed to also needs to be completed through the cooperation of various relevant divisions and departments.

Sales & Marketing Department

The team is responsible for investigating market trends, helping the new app easily integrate into the market, and maximizing influences and brand values.

Research & Development Department

The team consists of talented software developers, AI algorithm engineers, data scientists, UI/UX designers, QA testers. They are mainly responsible for app development and can be identified as the iOS and Android teams. This team provides all technical support.

Finance & Accounting Department

Budget is essential for project development, release, and maintenance. The department is mainly responsible for monitoring funds and ensuring the project will not be terminated due to a lack of funds once it has started.

Geographic Structure

If the organization spans multiple geographic regions, the app needs to be localized to gain better responses. Since the food is different across regions, some raw materials are only available in certain regions. Then, the app should also take this point into account and adjust the displayed result accordingly. In this way, the app can achieve higher accuracy and personalization.

Resource Sharing Structure

Digital Health Inc. provides capital, brand value, requirements, and the other company offers technical support and is responsible for app development and maintenance. Also, the advanced solution of daily energy expenditure can be integrated into the app to provide a complete energy intake/expenditure system to generate more profit in professional fields.

5. Preliminary Operational Concept of Proposed System

5.1 Preliminary operational concept

5.1.1 Operational policies and constraints

Current software is designed to identify food calories to provide users with a detailed nutritional profile of the food. While users are free to take any photo to be identified, recognizing other non-food photos will not return any calorie information.

The software will have the following operational constraints:

- a) When the photos uploaded by the user are blurry or difficult to identify, the data return time will be longer.
- b) The system supports up to 1000 people to upload and identify photos simultaneously. Mealtime will be the peak period of software usage, which may lead to extended user request time.
- c) Recommended operating environment: iOS14 or above or Android 10 or above.

5.1.2 Description of the proposed system

- a) Recommended operating environment: iOS14 or above or Android 10 or above. It is recommended to leave 3G space on the mobile phone. Methods of payment on different OS might be changed.
- b) The major of the system is mainly composed of the software interface and back-end data processing, connecting to the external Amazon cloud for data computing and database storage, as well as AI for data analysis.
- c) The Amazon cloud is used for data computing and data storage. API from Amazon AI.
- d) This product recognizes user-uploaded food photos and calculates the corresponding calories. and supports the provision of personal nutritional advice to improve diet.

5.1.3 Modes of system operation

Operational mode: Users can freely upload images or take photos of their food to calculate calories and enjoy other services about nutrition planning.

Degraded mode: If the backup system and resources are exhausted, in order to avoid data loss due to downtime, the degraded mode will be activated. At this point, the user's data may be temporarily displayed with a temporary value or blocked until the server operation returns to normal.

5.1.4 Support environment

This software is designed to identify food calories to provide users with a detailed nutritional profile of the food. The ability to calculate calories and analyze data is supported by Amazon cloud and Amazon AI. Furthermore, offline publicity and linkage depend on each brand.

Supports for the customer services include email support for news and advertisement about our products, IT service for dealing users' daily problems about the internet, and online conversation channel for solving users' questions.

5.2 Preliminary operational scenarios

The following scenarios describe the use of the product by a user named Sam

1. Sam logs into the Calorie Camera App.
2. Sam takes a picture of an object.
3. Sam is rejected from uploading an invalid food photo.
4. Sam chooses a food photo from the album.
5. Sam gets calorie and nutrition information.
6. Sam wants to view detailed information on ingredients.
7. Sam saves this food into history.
8. Sam wants to modify the previous food record in history.
9. Sam uploads a lot of food photos maliciously, trying to do some bad things.

6. Other Preliminary Life-Cycle Concepts

6.1 Preliminary deployment concept

This software will be deployed at the Amazon cloud for running the server and the clients can be downloaded from Apple Store or Google Play.

6.2 Preliminary support concept

- a) The customer service department can provide support for software services, such as member Q&A and account information.
- b) The IT department provides technical support for software, such as software bugs and data errors.
- c) The marketing department will provide news, consulting, and support on various preferential services. Subscribe to the latest news by email or text message.

6.3 Preliminary retirement concept

Software retirement happens when spending most of the budget on application maintenance, which can deliver significant cost savings. This product will continue to maintain and update more functions related to health and nutrition within five years, and it is initially expected to stop updating more functions after five years.

7. Project Constraints

- a) Initially, project time should be estimated as accurately as possible. Past similar projects can be referenced as precedents. Use their data to understand proper project scheduling. Effective time management is also necessary. At each phase of software development, analyze the current progress and plan for the next stage accordingly. Achieve proper scheduling by considering potential delays, change requests, risks, and other uncertainties. The software will be maintained for two years after public release.
- b) Estimate project cost by conducting an in-depth study of the market prices of the goods. Considering all possible costs such as equipment costs and team member salaries. Adhere to the proposed budget strictly while remaining open to changes that may affect costs.

8. Appendix

AI - Artificial intelligence is the ability of a computer or a robot controlled by a computer to do tasks that are usually done by humans

AWS - Amazon Web Services, provides servers, storage, networking, remote computing, email, mobile development, and security.

iOS - iPhone Operating System, is a Unix-derived operating system powering all of Apple's mobile devices.

Inc. – incorporated, a company's business structure is a legal corporation.