

EEE3035 Engineering Professional Studies

Semester 1 2022/23 - Year 3 Group Project

DATA MANAGEMENT PLAN

PROJECT TITLE: Smart Fridge

Group Letter and Group Members: Group I

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Project Description (5 lines max):

A system of cameras and sensors to automatically detect what items are being placed into and taken from the fridge (alongside possibly collecting other data about the items such as expiration date, weight, etc.). This information is then presented to the user, alongside recommendations such as recipes or shopping lists.

1. DATA COLLECTION

What data will you collect or create?

Data produced from this project will fall into several categories:

1. Inventory list of items currently in fridge
 - Item properties such as weight, quantity, expiration, etc.
2. Database of barcodes and matching items
3. Items from recipes or shopping list APIs
 - This data will not be stored, only generated for the user on demand

How will the data be collected or created?

A camera will be used with computer vision software to identify what item is being placed into the fridge. It will scan for a barcode and store the inventory on a database, the camera will also collect more information such as expiry dates if possible. The weight of the item placed in the fridge will also be recorded. The user will be able to interact with this data via a webpage/app, allowing for correction in the inventory and adding secondary data such as expiration dates.

2. DOCUMENTATION AND METADATA

What documentation and metadata will accompany the data?

The data is stored using PostgreSQL, and all the columns will have titles and associated value types (i.e., quantity will be stored as integers and item IDs as UUID). Each item, barcode and

user will also have a uniquely generated UUID. Information such as when an item or barcode was added will also be stored.

3. ETHICS AND LEGAL COMPLIANCE

How will you manage any ethical issues?

When the camera captures the item as it enters the fridge, the user's hand might be in the frame. This might come under personal data therefore we will process the image locally on the fridge. This means that the computer vision software in the fridge will process the image and scan only for the barcode. Once this is done the barcode information will be sent to the server not the image. The image is then deleted and never sent on to the server. At no point will we have access to this personal data. Also, non-food items such as medicines will not be recorded by the server as we will not add these barcodes to the database (nor allow users to manually add them).

How will you manage copyright and Intellectual Property Rights (IPR) issues?

The API's, datasets and libraries used in the Arduino IDE, OpenCV and the server will be open source therefore we will not encounter any IPR and copyright issues as we are not using other companies' private data.

4. STORAGE AND BACKUP

How will the data be stored and backed up during the research?

Data will be processed locally on raspberry pi and then stored on Supabase's servers (which uses AWS). Supabase backups the data regularly and ensures that the data is secure.

How will you manage access and security?

Supabase's PostgresDB API only gives users access to their own data. This is secured behind an OAuth sign-in provided by Supabase. Currently admin account can view all the data, but hashing can be employed to help protect privacy.

5. SELECTION AND PRESERVATION

Which data are of long-term value and should be retained, shared, and/or preserved?

We do not intend to keep any of the data long term, and it is the responsibility of the user to delete and edit the data from the database via the app/website.

What is the long-term preservation plan for the dataset?

The images will be deleted from the pi as soon as the barcode has been detected. This should feel instantaneous to the user. The barcode and weight data are then sent to the server where the user can then edit their inventory as they please. Given that we are dealing with food, the product will be removed by the user once it has been removed from the fridge or manually by the user. This means that each piece of data collected will be removed within a couple of weeks of it being added to the server. Therefore, individual pieces of data will not be stored long term. Supabase's DB backups will ensure that the data is protected and not lost even if it is stored longer than expected.

6. DATA SHARING

How will you share the data?

We will not share data with other researchers or customers. The data will be processed locally on the device and then sent to the server where the user only has access to it on the app. The data will be sent via the internet from the raspberry pi in the fridge to the server. Once the product is set up logins will need to be considered so that people can access their data.

If the users wish to use third-party API for information such as nutritional facts or recipe suggestions, they will opt into this service, and we will share the data with those API providers after removing the unique user ID from the data.

Are any restrictions on data sharing required?

As mentioned, any data sharing will be fully opt-in from the users. Data such as usernames, passwords and emails will never be shared (and will all remain fictional during this project).

7. RESPONSIBILITIES AND RESOURCES

Who will be responsible for data management?

The Project Group will be responsible for the collection, processing, and delivery of the data to the server. And the third-party cloud provider, Supabase, will be responsible for the security and protection of the data on the server.

What resources will you require to deliver your plan?

Supabase provides limited free cloud hosting using AWS, meaning no additional resources are required. If this cloud hosting runs out, or proves insufficient, resources may be required to host the cloud infrastructure.