Lab 1 – Product Description

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CS411W

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January 24, 2025

Version 1

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1 Introduction

Food waste is a significant global issue, contributing to environmental degradation and food insecurity. According to Earth.org, "One-third of all the food intended for human consumption – valued at roughly US$1 trillion – is wasted or lost each year" (Igini, 2022). Household food waste plays a considerable role in this problem, with many people discarding food that is still edible due to lack of awareness or proper management.

The solution to this issue involves a multi-faceted approach that includes better food management, education, and community support. Our product, LivelyShelfs, is designed to tackle these challenges. By providing a comprehensive food management system that tracks the shelf-life of groceries, offers educational resources, and fosters community engagement, LivelyShelfs aims to reduce household food waste and promote a greener environment. This document will outline the characteristics of LivelyShelfs, its key features, and the approach to demonstrating its effectiveness through prototyping.

2 Product Description

LivelyShelfs is an innovative mobile application designed to help households manage their food inventory, reduce waste, and make greener decisions. The app provides users with tools to track the shelf-life of their groceries, receive recommendations on how to use food before it spoils, and connect with others to share excess food and resources. The primary goal of LivelyShelfs is to minimize food waste, thereby contributing to environmental sustainability and addressing food insecurity.

2.1 Key Product Features and Capabilities

LivelyShelfs offers a range of features designed to address the problem of household food waste. The app generates a Spoil Calendar and List based on the spoilage dates of food items, helping users keep track of what needs to be consumed soon. Users can input groceries through manual entry, scanning receipts, or using the phone camera to recognize items, making the input process quick and easy. Informational Resources are provided to educate users on how to keep groceries fresh, prevent spoilage, and make environmentally friendly decisions. The app also suggests recipes and actions based on the spoilage dates of groceries through its Recommendations feature, encouraging users to use food before it goes bad. Additionally, LivelyShelfs includes a Community Hub that allows users to share food and resources with others in their community, fostering a collaborative effort to reduce waste.

2.2 Major Components (Hardware/Software)

To support its functionalities, LivelyShelfs requires the following hardware and software components. On the hardware side, a smartphone with a camera, internet connectivity, and sufficient storage is necessary. For the software, the application will be developed using a combination of mobile development frameworks such as Flutter or React Native, a backend server for data management, and machine learning algorithms for image recognition and recommendations. The software will be structured based on the CS 410 Major Functional Component Diagram (MFCD), ensuring a modular and scalable architecture. Key

components will include a user interface, a database, an image recognition module, and an algorithm for generating recommendations.

3 Identification of Case Study

LivelyShelfs is being developed for individuals and households looking to reduce food waste and make more informed decisions about their groceries. The case study group will consist of a small group of users who will use the app prototype and provide feedback. This feedback will be crucial for refining the app and ensuring it meets the needs of its users. In the future, LivelyShelfs could be adopted by a broader audience, including environmentally conscious consumers and organizations working to address food insecurity.

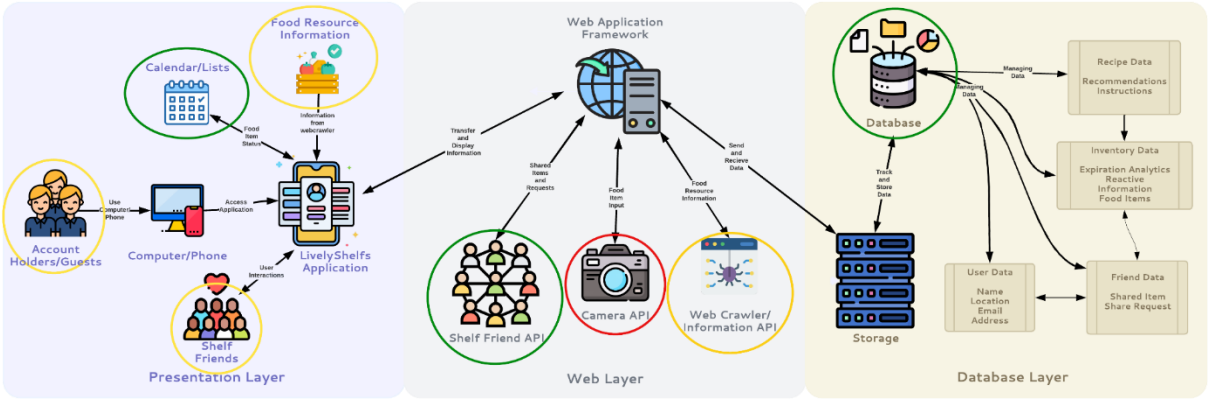
4 Product Prototype Description

The prototype for LivelyShelfs will be developed as part of the CS 411W course, aiming to demonstrate the key features and functionalities of the final product. While some capabilities may be reduced or simulated, the prototype will effectively showcase how LivelyShelfs can help reduce food waste.

4.1 Prototype Architecture (Hardware/Software)

The prototype will be structured to demonstrate the primary features of LivelyShelfs. This will include a user interface for inputting and tracking groceries, a calendar and list for spoilage dates, and basic image recognition capabilities. The Prototype MFCD will outline the architecture and components of the prototype.

Figure 1 *LivelyShelfs Major Functional Component Diagram*



4.2 Prototype Features and Capabilities

The prototype will demonstrate several key features, including a Spoil Calendar and List that allows users to see upcoming spoilage dates for their groceries, Quick and Easy Input that enables manual entry and receipt scanning for groceries, and Informational Resources that provide educational content on preventing spoilage and making greener decisions. This is significant as it shows how LivelyShelfs addresses the problem of food waste by providing users with the tools they need to manage their food effectively. Success will be demonstrated through user feedback and the ability to track and reduce food waste.

Figure 1

Table of Comparison Between RWP and Prototype

Category	Features	Real World Product	Prototype	Reasoning
Account Management	Login/ Authenticate	Fully Functional	Partially Implemented	Limited time will not be dedicated to basic functionalities
	Location Usage	Fully Functional	Partially Implemented	Limited time will not be dedicated to basic functionalities
	Account Creation / Deletion	Fully Functional	Partially Implemented	Limited time will not be dedicated to basic functionalities
	Add / Remove Friend	Fully Functional	Fully Functional	
	Add / Remove Member	Fully Functional	Eliminated	Limited time will not be dedicated to basic functionalities
Inventory Management	Add / Remove Item	Fully Functional	Partially Implemented	Implement manual input, implement camera if we have time
	Track Item Expiration	Fully Functional	Fully Functional	
	Mark Items Shareable	Fully Functional	Fully Functional	
	Quantity Viewing	Fully Functional	Fully Functional	
	Purchase History	Fully Functional	Eliminated	Limited time and not an innovated feature
	Inventory History	Fully Functional	Eliminated	Limited time and not an innovated feature
Proactive Waste Management	Predictive Waste Analysis	Fully Functional	Fully Functional	Limited test data
	Shelf Friends Sharing	Fully Functional	Fully Functional	
	Recipe Recommendations	Fully Functional	Partially Implemented	Limited time will not be dedicated to web crawler functionalities
	Incentives	Fully Functional	Partially Implemented	Limited time will not allow for full reward
	Data Visualization	Fully Functional	Partially Implemented	Limited test data
	Sharing Analytics	Fully Functional	Partially Implemented	Limited test data

This table displays all features completed for prototype

4.3 Prototype Development Challenges

Developing the prototype will present several challenges, including addressing knowledge gaps to ensure the team has the necessary skills in mobile development and machine learning, simulating advanced features like image recognition within the constraints of the prototype, and integrating various technologies to ensure they work seamlessly together. Despite these challenges, the prototype will provide a valuable demonstration of LivelyShelfs' potential to reduce food waste and promote greener living.

5 Glossary

Community Hub: A feature within the LivelyShelfs app that allows users to share food and resources with others in their community, fostering collaboration to reduce waste.

Environmental Sustainability: The responsible management of resources to meet current needs without compromising the ability of future generations to meet their needs.

Food Insecurity: A condition where individuals or households do not have reliable access to a sufficient quantity of affordable, nutritious food.

Informational Resources: Educational content provided within the LivelyShelfs app to help users keep groceries fresh, prevent spoilage, and make environmentally friendly decisions.

Machine Learning: A branch of artificial intelligence that involves the use of algorithms and statistical models to enable computers to improve their performance on a task through experience.

Major Functional Component Diagram (MFCD): A diagram that outlines the main components and structure of a software application, ensuring a modular and scalable architecture.

Prototype: An initial version of a product used to demonstrate its key features and functionalities, often used for testing and feedback purposes.

6 References

Delgado, S. (2024, May 4). How the world wastes hundreds of billions of meals in a year, in three charts. *Vox*. Retrieved from https://www.vox.com/future-perfect/2024/5/4/24147350/billions-of-meals-wasted-unep-study-food

Igini, M. (2022, November 23). 10 food waste statistics in America. *Earth.org*. Retrieved from https://earth.org/food-waste-in-america/