Lab 2 – LivelyShelfs Product Specification

Jaylen Wheeler

Old Dominion University

CS411W

Dr. Sarah Hosni

March 28, 2025

Version 2

Table of Contents

1 Introduction 3

1.1 Purpose 3

1.2 Scope 3

1.3 Definitions, Acronyms, and Abbreviations 5

1.4 References 7

1.5 Overview 9

2 Overall Description 9

2.1 Product Perspective 9

2.2 Product Functions 10

2.3 User Characteristics 13

2.4 Constraints 14

2.5 Assumptions and Dependencies 14

List of Figures

Figure 1: Major Functional Components Diagram 9

List of Tables

Table 1: LivelyShelfs RWP vs. Prototype Table for Account Management 11

Table 2: LivelyShelfs RWP vs. Prototype Table for Inventory Management 12

Table 3: LivelyShelfs RWP vs. Prototype Table for Proactive Waste Management 13

1 Introduction

1.1 Purpose

The purpose of this document is to provide detailed requirements pertaining to the application LivelyShelfs. It will explain the application's purpose, features, interface, and other attributes. This document is written for developers of LivelyShelfs and serves as a technical reference for implementation and submission to the Old Dominion University Computer Science Department.

1.2 Scope

The LivelyShelfs application will help households by proactively managing their food waste. To accomplish this, many driven features will be required.

The application will allow households to easily manage their inventory of food by utilizing inventory additions through either manual or camera input along with tracking food spoilage through a time-based expiration date or manual removals. Households will also be able to view visualized data of their analyzed food trends based upon previous food usage or spoilage. The application will also include the addition and removal of Shelf Friend users who can exchange food items between inventories. These features will demonstrate a beneficial tool for reducing food waste.

While the LivelyShelfs application is useful in managing household food and preventing waste, it is not a grocery store application, meaning that groceries will not be able to be purchased through the application. Although the application encourages sharing food with Shelf Friends, LivelyShelfs does not collect or redistribute food directly. The application offers

information on how users can distribute food among their Shelf Friends and connects users to third parties such as Olio to facilitate the donation and distribution of food.

1.3 Definitions, Acronyms, and Abbreviations

API: Also known as "Application Programming Interface" it is a protocol that allows for different software applications to communicate with one another.

Community Hub: A part of LivelyShelfs that helps bring the community together and allows user interaction to share sustainable habits and tips.

Database: An organized collection of information stored electronically.

Food Insecurity: Not having access to enough food to meet ones needs or not being able to access quality food to meet ones needs.

Food Waste: Food that isn't used for its intended purpose or is not used before spoiling.

GitHub: A service that allows developers to collaborate on the development of projects and provides version control.

GitHub: A service that allows developers to collaborate on the development of projects and provides version control.

JUnit: A testing framework for Java.

Landfills: A site where waste is disposed of, typically the waste is covered by soil.

Spoilage Calendar: An efficient and intuitive calendar provide by LivelyShelfs that notifies users of when their food is going bad

Landfills: A site where waste is disposed of, typically the waste is covered by soil.

Spoilage Calendar: An efficient and intuitive calendar provide by LivelyShelfs that notifies users of when their food is going bad

Sustainability: A goal to avoid actions that harm the environment or deplete natural resources while still meeting ones needs.

Trello: A service that helps with project management and planning.

VS Code: Also known as "Visual Studio Code" it is a development environment used by the team that is compatible with many different languages.

Web Application Framework: Software platform intended to help developers in building web applications, providing access to pre-built tools and libraries.

1.4 References

[1] J. Wheeler, Lab 1 - LivelyShelfs Product Description,

[2] “Remy - the UK’s newest recipe recommendation app,” Remy: Digital Kitchen, https://kitche.co/the-app/ (accessed Mar. 7, 2025).

[3] “Save Good Food from going to waste: Too good to go,” Save Good Food From Going To Waste | Too Good To Go, http://www.toogoodtogo.com/en-us (accessed Oct. 10, 2024).

[4] “The environmental impact of Food Waste,” Move For Hunger, https://moveforhunger.org/the-environmental-impact-of-food-waste (accessed Oct. 3, 2024).

[5] Shapiroe.com, “The economic impact of Food Waste,” Shapiro, https://shapiroe.com/blog/economic-impact-of-food-waste-effects/ (accessed Oct. 3, 2024).

[6] “Sharewaste,” ShareWaste, https://sharewaste.com/ (accessed Oct. 10, 2024).

[7] S. Oliver, C. Johnson, L. Smith, and V. Green, “Your local sharing app,” Olio, https://olioapp.com/en/ (accessed Sep. 26, 2024).

[8] “Food security in the U.S. - key statistics & graphics,” Food Security in the U.S. - Key Statistics & Graphics | Economic Research Service, https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/key-statistics-graphics (accessed Nov. 8, 2024).

[9] J. Lewis, “How does food waste affect the environment?,” Earth.Org, https://earth.org/how-does-food-waste-affect-the-environment/ (accessed Oct. 3, 2024).

[10] “The financial cost of food waste,” Brown Advisory, http://www.brownadvisory.com/us/insights/financial-cost-food-waste (accessed Oct. 16, 2024).

[11] M. Igini, “10 Food Waste Statistics in America,” Earth.Org, https://earth.org/food-waste-in-america/ (accessed Sep. 14, 2024).

[12] M. Idriss, “Foodshiner,” Prevent food waste, save the earth, https://foodshiner.app/en/ (accessed Oct. 10, 2024).

[13] “Hunger numbers stubbornly high for three consecutive years as global crises deepen: UN report,” World Health Organization, https://www.who.int/news/item/24-07-2024-hunger-numbers-stubbornly-high-for-three-consecutive-years-as-global-crises-deepen--un-report#:~:text=The%20report%20highlights%20that%20access,amid%20the%20COVID%2D19%20pandemic. (accessed Oct. 8, 2024).

[14] “Home,” NoWaste, http://www.nowasteapp.com/ (accessed Oct. 10, 2024).

[15] “Expiry tracking fridge, pantry and Recipes manager app, Grocery Shopping List • Cozzo smart kitchen app,” CozZo Smart Kitchen App, https://cozzo.app/ (accessed Oct. 10, 2024).

[16] J. Ehlert, “Food expiration date tracker,” Fridgely, https://www.fridgelyapp.com/ (accessed Sep. 26, 2024).

[17] “Save on groceries and fight Food Waste,” FoodHero, http://www.foodhero.com/ (accessed Sep. 26, 2024).

[18] A. Berard, “Study calculates true cost of food waste in America,” William & Mary, https://www.wm.edu/news/stories/2020/study-calculates-true-cost-of-food-waste-in-america.php (accessed Oct. 3, 2024).

[19] “About Kitche: Kitche Food Waste App: Kitche App,” Kitche Waste Waste App, https://kitche.co/the-app/ (accessed Oct. 10, 2024).

[20] Assistant Secretary for Public Affairs (ASPA), “Foodkeeper app,” FoodSafety.gov, http://www.foodsafety.gov/keep-food-safe/foodkeeper-app (accessed Sep. 26, 2024).

1.5 Overview

This document provides an in-detail description of aspects within the LivelyShelfs application. Section 1 entails the purpose, scope, terminology, reference sources, and format regarding this document. Section 2 contains the product perspective, product functions, user characteristics, constraints, and assumptions and dependencies. Section 3 is comprised of specific requirements pertaining to the application.

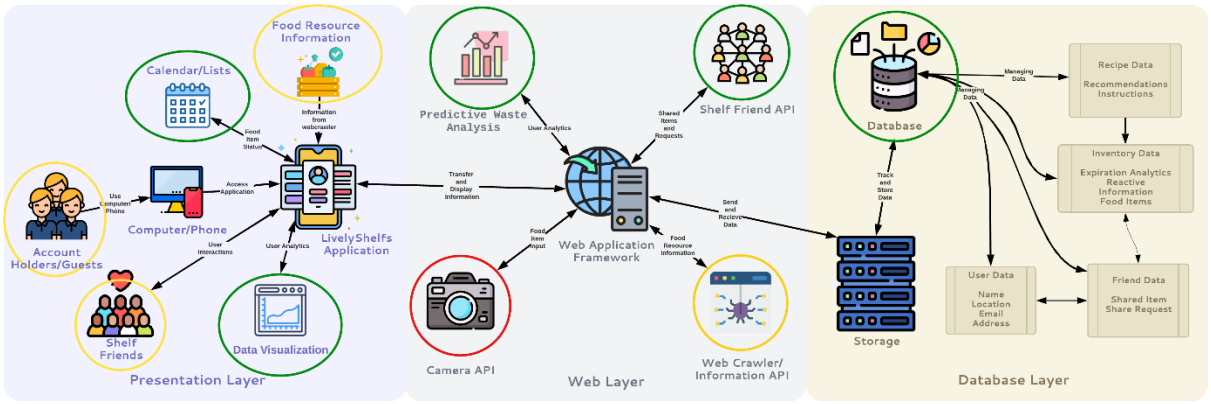
2 Overall Description

2.1 Product Perspective

LivelyShelfs makes use of a three-tiered system architecture to appropriately manage the relationships between the hardware and software aspects. The Major Functional Components Diagram, depicted in Figure 1, displays the contents of the presentation, web, and database layers.

Figure 1

Major Functional Components Diagram



The presentation layer will be developed using React with Vite to implement user interfaces for households. The main languages used for this development will be JavaScript with

Node.js, HTML, and CSS. Data from sources such as Shelf Friends and the calendar have a bidirectional flow, allowing the data to stay up to date. The database layer involves development of the MySQL database that stores data pertaining to users, external recipes, Shelf Friends, and inventories. The stored data also has some bidirectional relationships, as certain portions of each data structure depend upon each other. The web layer bridges the presentation and database layers through providing a web application framework that encompasses the selected APIs while utilizing the information from the two adjacent layers. JavaScript with Node.js will be the main language utilized in this layer.

2.2 Product Functions

Nearly all real world product features regarding account management will be included in the prototype. As can be seen in Table 1, the only fully functional feature for account management will be the addition and removal of Shelf Friends. Lesser features such as authenticated logins, location usage, and account creation and deletion will be partially implemented. Household member addition and removal will be eliminated.

Table 1

LivelyShelfs RWP vs. Prototype Table for Account Management

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

For inventory management, most of the real world product features displayed in Table 2 will be fully functional in the prototype. The fully functional features include tracking expiration of food items, the ability to mark food items as shareable, and viewing stored quantity amounts. Item addition and removal will be partially implemented, and purchase history will be eliminated.

Table 2

LivelyShelfs RWP vs. Prototype Table for Inventory Management

Category	Features	Real World Product	Prototype	Reasoning
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 innovative feature

All the proactive waste management features will be implemented in some manner, as shown in Table 3. Both the predictive waste analysis and Shelf Friends features will be fully functional. Recipe recommendations, incentives, and data visualization will all be partially implemented.

Table 3

LivelyShelfs RWP vs. Prototype Table for Proactive Waste Management

Category	Features	Real World Product	Prototype	Reasoning
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

2.3 User Characteristics

The nature of this application means that the primary group for this product are heads of households and household members who struggle to properly manage their food waste, causing them to lose money and face food insecurity.

These users do not have a large area of expertise in the field of proactively preventing food waste. Their expertise level is relatively average. The application can currently be run by utilizing node scripts in the frontend and backend. (npm run dev and npm start, respectively.) These users are slightly more competent than average when operating computers and accompanying software.

2.4 Constraints

The system will be implemented in latest version of Vite + React as of January 16, 2025, and the application will be delivered to a host URL.

2.5 Assumptions and Dependencies

Required software includes Mocha, Express, and MySQL Workbench.