Lab 2 – LivelyShelfs Product Specification

Asia Gillispie

Old Dominion University

CS411W

Dr. Sarah Hosni

March 28, 2025

Version 2

Table of Contents

List of Figures

List of Tables

1 Introduction

1.1 Purpose

The purpose of this document is to be a technical reference for LivelyShelf's system implementation. This document will provide an overview of the products goals and benefits. It will explain terms needed for the reader to understand the document and provide references to the information utilized. The document will provide descriptions and explanations on various elements regarding LivelyShelfs. This document is intended for the developers of LivelyShelfs.

1.2 Scope

The goal of LivelyShelfs is to reduce the creation of household food waste and reduce food insecurity. By helping busy households and other users manage their food and provide information to help the user make informed decisions when purchasing and using their food, the creation of food waste created within households would be reduce. By encouraging and helping users share food between other users, food insecurity and food waste would be reduced. In turn, these benefit the users financially, environmentally, and socially. The prototype will provide users with functional inventory management features, but it will not provide purchase and inventory history. The user will be able to login, sign in, and manage their account, but with some limited functionality. The users will not be able to add and remove members, since member functionality will not be implemented in the prototype. In the prototype, the user will be able to see their analytics and will be notified when logging food items that tend to spoil. The user will be able to notify Shelf Friends when they want to share food. The user will also be provided with recommendations, incentives, data visualizations, and analytics using mock data in the prototype. The most innovative features will be available in the prototype, and some features will be partially implemented and a few eliminated.

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 it's 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.

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.

VSCode: 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] Assistant Secretary for Public Affairs (ASPA), "FoodKeeper App," FoodSafety.gov, Apr. 26, 2019. https://www.foodsafety.gov/keep-food-safe/foodkeeper-app (accessed Jan. 24, 2025).

[2] "About Kitche | Kitche Food Waste App | Kitche App," Food Waste App | Save Money On Food | Kitche App, Jun. 26, 2023. https://kitche.co/the-app/ (accessed Jan. 24, 2025).

[3] A. Berard, "Study calculates true cost of food waste in America," William & Mary, Apr. 20, 2020. https://www.wm.edu/news/stories/2020/study-calculates-true-cost-of-food-waste-in-america.php (accessed Jan. 24, 2025).

[4] J. Defoy, "Save on groceries and fight food waste | FoodHero," www.foodhero.com, 2019. https://www.foodhero.com/ (accessed Jan. 24, 2025).

[5] J. Ehlert, "Fridgely | Food Expiration Date Tracker," Fridgely. https://fridgelyapp.com/ (accessed Jan. 24, 2025).

[6] EPA, "2019 Wasted Food Report." https://www.epa.gov/system/files/documents/2023-03/2019%20Wasted%20Food%20Report_508_opt_ec.pdf (accessed Jan. 24, 2025).

[7] "Expiry Tracking Fridge, Pantry and Recipes Manager App, Grocery Shopping List • Cozzo Smart Kitchen App," CozZo Smart Kitchen App, Jan. 06, 2023. https://cozzo.app/ (accessed Jan. 24, 2025).

[8] "Home," NoWaste, 2017. https://www.nowasteapp.com/ (accessed Jan. 24, 2025).

[9] World Health Organization, "Hunger numbers stubbornly high for three consecutive years as global crises deepen: UN report," World Health Organization, Jul. 24, 2024. https://www.who.int/news/item/24-07-2024-hunger-numbers-stubbornly-high-for-three-consecutive-years-as-global-crises-deepen--un-report (accessed Jan. 24, 2025).

[10] M. Idriss, “FoodShiner - Prevent food waste, save the earth,” FoodShiner, May 2020. https://foodshiner.app/en/ (accessed Jan. 24, 2025).

[11] M. Igini, “10 Food Waste Statistics in America,” Earth.org, Nov. 23, 2022. https://earth.org/food-waste-in-america/ (accessed Jan. 24, 2025).

[12] UNEP, “World squanders over 1 billion meals a day - UN report,” UN Environment, Mar. 27, 2024. https://www.unep.org/news-and-stories/press-release/world-squanders-over-1-billion-meals-day-un-report (accessed Jan. 24, 2025).

[13] USDA, “Food Security in the U.S. - Key Statistics & Graphics ,” Usda.gov. https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/key-statistics-graphics#verylow (accessed Jan. 24, 2025).

[14] K. Kroll, “The Financial Cost of Food Waste | Brown Advisory,” www.brownadvisory.com, Jul. 27, 2018. https://www.brownadvisory.com/us/insights/financial-cost-food-waste (accessed Jan. 24, 2025).

[15] J. Lewis, “How Does Food Waste Affect the Environment,” Earth.org, Oct. 12, 2022. https://earth.org/how-does-food-waste-affect-the-environment/ (accessed Jan. 24, 2025).

[16]Olio, “Olio - Your Local Sharing App,” Olio. https://olioapp.com/en/ (accessed Jan. 24, 2025).

[17] “Sharewaste,” ShareWaste. https://sharewaste.com/ (accessed Jan. 24, 2025).

[18] Shapiro, “The Economic Impact of Food Waste,” Shapiro, Jan. 23, 2024. https://shapiroe.com/blog/economic-impact-of-food-waste-effects/ (accessed Jan. 24, 2025).

[19] Move For Hunger, “The Environmental Impact of Food Waste,” Moveforhunger.org. https://moveforhunger.org/the-environmental-impact-of-food-waste (accessed Jan. 24, 2025).

[20] Too Good To Go, “Save Good Food From Going To Waste,” www.toogoodtogo.com. https://www.toogoodtogo.com/en-us (accessed Jan. 24, 2025).

[21] A. Gillispie, “Lab 1 - LivelyShelfs Product Description,” Old Dominion University, 2025.

1.5 Overview

This document will introduce the LivelyShelfs product and related information, provide an overall description, describe specific requirements, and provide supporting information for the LivelyShelfs system. The overall description will explain the systems architecture and functionality of the prototype. It will also explain the user roles for this application and will also define the constraints, assumptions, and dependencies of the application. Specific requirements include descriptions of all input, output, functions, database requirements, security, and any other features and inner workings on the application. Supporting information will include the index and appendixes.

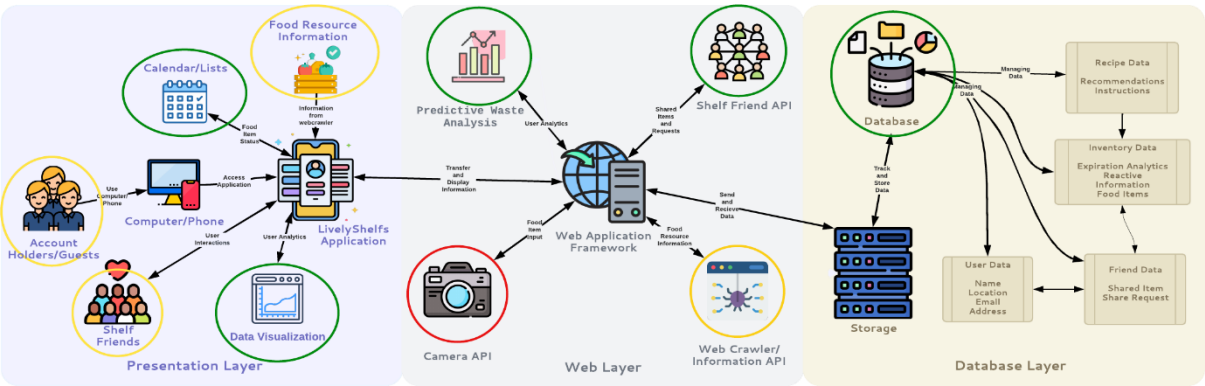
2 Overall Description

2.1 Product Perspective

The LivelyShelfs prototype is being developed as a web application with the database currently being hosted locally. The full product would have supported both web application and mobile application. The most innovative functionalities will be functional within the prototype. Other functionalities will be partially implemented, and some have been eliminated within the prototype. The prototype system's architecture is separated into three layers: presentation, web, and database. This architecture is show in **Figure 1**.

Figure 1

LivelyShelfs Prototype Major Functional Components Diagram



The presentation layer shows sections of the front-end and interaction between parts of the application for this layer. Front-end is implemented using React-Vite, which is styled using various libraries and languages such as CSS, HTML, and JavaScript. Account holders access the application though their computers, allowing them to interact with the other parts of the user interface. Food resource Information that is displayed comes from the web crawler. The Calendar and Lists, Shelf Friends, and Data visualization are based on Account holder interactions, affecting what is presented to the user. The web layer shows sections of the web application framework, which is what is being sent to the presentation layer and being queried from the database. The application is currently using Express.js as the web application framework. Based on the user's interaction in the presentation layer, the APIs process and provide certain information to the presentation layer. The database layer shows how information is structured and stored within the database. The application is currently using MySQL for the database. Information in the database is stored and queried, and that data is given to the web layer and presentation layer.

2.2 Product Functions

Most features will be in the prototype, but mostly partially implemented as show in Table 1.

Most of the account management features are partially implemented. User login and authentication is partially implemented in the prototype. The user will be able to login and be authenticated but it may not be as secure as the final product. Location usage is partially implemented, by only displaying the Shelf Friend's location given as mock data to the user. Account creation and deletion is partially implemented. Only a general account can be created; specialized accounts such as for members will not be implemented. Shelf Friends adding and removal will be fully implemented allowing the user to add another user to their Shelf Friends list and remove them. The adding and removing members feature is eliminated as members are not being implemented due to limited time.

Table 1

LivelyShelfs Feature Description and Prototype Description

Category	Feature	RWP	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 Sharable	Fully Functional	Fully Functional	
	Quantity viewing	Fully Functional	Fully Functional	
	Purchase History	Fully Functional	Eliminated	Limited time and not an innovative feature
	Inventory History	Fully Functional	Eliminated	Limited time and not an innovative feature
Proactive Waste Management	**Predicative 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 basic 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

Most of the inventory management features are implemented since it is a main component to the LivelyShelfs application and needed for the proactive waste management feature. Adding and removing items to the inventory is partially implemented due to only manual input being implemented. If time permits, the Camera API may be used to be able to scan food item bar codes as images to retrieve information. Three main features within the calendar and list feature are fully implemented and will be displayed to the user: Tracking Item Expiration, Marking Items as Sharable, and Quantity Viewing. The Purchase History and Inventory History will be eliminated due not being an innovative feature and will not be added to the UI, but inventory history will be stored within the database.

All proactive waste management features will be implemented, both fully and partially. Most of the innovative features are in this category, such as ShelfFriends Sharing and the Predictive Waste Analysis, which is why they are going to be implemented within the prototype. The Predictive waste analysis feature is fully implemented, but mock data will be utilized due to limited time to acquire user interaction data within a timely manner. It will notify the user based on the user's trends when the user inputs a food item into their inventory. The ShelfFriends Sharing feature will be fully implemented, allowing the user to notify and message other ShelfFriends when they want to share food items. The Recipe Recommendation feature is partially implemented due to mock data being used and shown in the protype without utilization of the WebCrawler API. The Incentives feature is partially implemented due to it being timed. An extremely shorter time frame will be used as a check for when to display the incentive and is also not redeemable within the prototype. The data visualization feature is partially implemented mainly due to mock data, but the user's trends will still be shown to the user on their dashboard.

The sharing analytics feature will also be partially implemented due to using mock data but will have a display for the user.

2.3 User Characteristics

The user would require at a minimum the ability to read English at a high school level and basic computer experience, understanding, and access (which also includes internet access). One reason to why the user requires this expertise level is due to most of the application's text being in English. Based on the application's main usage, it would be more of use to the user if they are able to purchase or log food items that they already have as that is one of the main features of the app.

2.4 Constraints

Due to the limited time for creation of the application, the prototype focuses on the more innovative features. Extremely basic account safety measures will be utilized such as input validation and password hashing. Due to the information that is saved and limited time, the prototype will not hold the highest measures of security the full product would have had.

2.5 Assumption and Dependencies

The application utilizes Express and Mocha as frameworks. MySQL is utilized as the database for the application. The dependencies for the application include react, react-dom, react-icons, react-router-dom, axios, tailwind, nodemon, fullCalendar core, fullCalendar daygrid, fullCalendar interaction, fullCalendar list, and fullCalendar react.