LAB 1 - LIVELYSHELFS PRODUCT DESCRIPTION

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1 Introduction

In a constantly changing world where most daily activities have been innovated such as using phones to converse with family or driving cars for transportation, there lies a consistent habit that never changes: eating food. Something that is so basic yet overlooked: we need to eat nutritious food every day to survive and sustain our delicate ecosystem of a body. Even though people are taught the importance of nourishment and know how crucial cooking habits are to make sure everyone can eat, we have a continuing issue of food waste.

There is a multitude of reasons people throw away food, like products being expired, moldy, forgotten, or just subjectively distasteful. Either way, there are negative impacts when we discard unused food. 1.3 tons of the ones we threw away costed us $940 billion alone in 2022 (Kitchen Waste App, 2023). Individual products being thrown away every now and then is usually not noticeable, but adds up to a heavy cost when accounted for. If nothing changes, this will only add to the burden of family savings, as financial liberty is limited for many across the world. Another type of cost would be societal, as developed countries like the US battle with obesity. Meanwhile, in the developing world are combatting malnutrition and just making sure there's enough food to get by. The disparity of 783 million people affected by hunger in 2022 is eye opening and of great concern, but there are people in other countries that throw away bread because they forgot to eat it for couple days (UN Environment). Another lens to look through is how much we destroy the environment just to grow the food we eat every day. Growing vegetables and cattle herding takes up a lot of land and local water sources to maintain and harvest these products yearly. Farmers have to cut down trees, dig up soil, and clear any animals to shape the area to be suitable for use which devastates the delicate ecosystem and disrupts the life cycle processes severely. During the harvest process, some harvests are discarded if it

doesn't look pretty enough to be sold or not to a certain standard, even if its edible causing food waste.

Other than discarding perfectly edible food, food insecurity could be caused by lack of affordability or inefficient usage of current food stocks owned by families. The core root is not having easy access to food, which affected 2.8 billion people worldwide in 2023 (William & Mary). Not using what's available usually causes food to expire and be thrown away, needlessly contributing to the overall cost of waste which should be addressed.

There is a way to tackle this ongoing issue that can lift a burden suffered by millions of people every year. A solution that can effectively combat household good waste, it must be efficient, automated, user-friendly, accessible and affordable. Introducing LivelyShelf as a software solution meant to tackle the problems of food waste within the household, offering a way to reduce cost, keep track of personal stock, and save money for use elsewhere. It gets very hard if a person has to list every food they own from the top of their head and remember their expiration date. Some of the benefits of LivelyShelf are keeping track of the food stock and a calendar to know when it expires. A logistical app that allows the household to have better grasp of their food can keep them from buying excess amounts or inform user recommendations on when to use up the food without letting it go to waste. These habit helping features would reduce financial cost as they become more efficient and informative of their actions, benefiting the people as a whole.

2 LivelyShelfs Product Description

LivelyShelfs is a cross-platform food tracking app that assists the user in reducing food excess or wastage to help lift some burdens of the household. This software is designed to be accessible on android, IOS and website to allow great flexibility in user interaction.

2.1 Key Product Features and Capabilities

Our software can keep track of food expiration dates, inventory stock, community connections, recipe recommendations, and informational resources on the tracked food items. There's a personal calendar that would be used to visualize the tracked food items to limit any clutter of texts. LivleyShelf's user friendly interface keeps the app simple to interact with so there's no confusion.

The user takes a picture of the barcode of the food or receipt to log the food onto the calendar with their expiration dates and total count of the item as a base for the tracking system. The groceries can also be inputted manually if there's no barcode available to multiple methods of input. The front-end display visualization is be through a calendar for each user so they can have easy access to know when the food will spoil and how much is left.

Our WebCrawler would scrape the internet for the selected food and display possible recipes that the user can create with their current inventory. The user would know how much is needed for the recipe, and when they decide on a meal the app keeps track of the inventory usage. This is one method generating possible ideas to use up the items before they are wasted.

Expanding on the information resources, the app would analyze current inventory and rate of usage to give the user options on their food stock. This guides on possible choices that impact conservation behavior, such as buying fewer of certain items that aren't consumed as often. Behavioral efficiency allows for habit control and assists in prevention of food waste. This helps the user in understanding what needs are to be met and narrows the focus so users aren't overwhelmed by large amounts of information.

When there is food the user doesn't want to eat anymore, but also doesn't want to let go to waste, there's a feature where they're able to offer the item to the local community. Users can

connect with local friends or guests so when an individual has extra inventory of certain food items, they can put it up within the community tab for others. This gives an alternative to throwing it away or letting it spoil within the household.

2.2 Major Components (Hardware/Software)

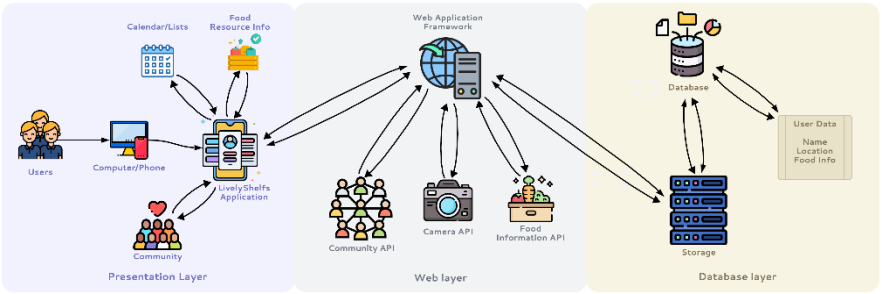

Figure 1: Major Functional Components Diagram

The hardware aspect would be the user accessing the application through a smartphone or computer. Photos can be taken on a food or inputted manually on the user's device. The data would be stored on a dedicated server to keep track of all inventories and the calendars. The software aspect would be the development tools such as Java, Python, NumPy, Apache and Time with the first 2 being the languages for the backend while the rest are libraries. The framework would be utilizing Django and Junit, the database would be constructed in MySql and the front-end for user interface would be JavaScript, HTML, and CSS.

The three-tier architecture within our design are the presentation, web, and the database layers of our software. The presentation layer as shown in Figure 1 is what the user will interact with for the application. The web layer would handle the process and connections between the presentation and the database in information handling. The database layer would handle the data storage and queries for the user inputs.

The development tools utilized in the construction of our front-end of the application consist of JavaScript, HTML, and CSS. JavaScript would allow for us to create functional buttons that the user can click or tap that leads to its designated purpose like inputting groceries button. HTML would allow for the framework of the user interface itself with a consistent format that can be displayed on cross-platform. CSS would handle the visual design to make sure that the display is well developed and aesthetically pleasing for the user experience.

The Web Layer would utilize the development tools Java and Python for the back end to retrieve and process user input. Implementation of Camera API and Web Crawler/Information API would allow for retrieval of data and accessing the web to give the most accurate information on the food item given. LivelyShelfs would also have a recommendations algorithm where the tracked food can be analyzed, and the Web Crawler would search for recipes or the best options to handle the current food items.

The database layer would be handled my MySQL for data storage and retrieval based on the needed data at the moment. If the user wants to check what is currently in their inventory, or if the recommendations algorithm wants to know to look for recipes on the web, it will interact with the database to find out. This would handle the user accounts, inventories, recipes, and information resources within the designated server for analyses and later usage.

3 Identification of Case Study

The case study for LivelyShelfs would target and provide insight on the Customers, User, and Stakeholders. These are the target audience that would have weight in the understanding and investment of our app.

The customer audience that would benefit most from our app would be the head of the households or those within that handle or cook the food. These individuals would already be

weighed down by the stress of important responsibilities like paying the bills, taxes, insurance and other management tasks that may leave them little time to handle the food within their homes. LivelyShelfs will try to ease a part of their burdens so that they don't have to focus too much on food management and waste.

The user would be those that interact with our software application as some people may have difficulties keeping track of their food or forget how much they have of certain items and may accidently buy excess. The application would be able to handle the tracking and management of food items so the user doesn't have to worry about over buying food or accidently leaving some out to spoil.

The groups that would have some stakes within relation to our app would be local communities, business/retailers, and environmental organizations. Like minded neighbors that wouldn't want their food to go to waste can connect with our app to facilitate the process of giving to one another with ease of communications. This builds a stronger local group that would strive for reduce waste and reduce the impact on the environment. Those that are in the restaurant or whole foods business may lack the knowledge themselves or have too many responsibilities to keep track of all the food items. This would help with tracking and organization to minimize their waste that are thrown out frequently. Environmental organizations that push for limiting human impact on the environment would morally align with our goals. It has been shown that harvesting crops take up a lot of land and natural resources within the local ecosystem so this software would help induvial behavior changes to help against that on the consumer end.

4 Glossary

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 one's needs or not being able to access quality food to meet one's 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.

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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

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Sustainability: A goal to avoid actions that harm the environment or deplete natural resources while still meeting one's 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.

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