CS 410 Lab 1

Template and Formatting

Team Bronze

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Lab 1: LivelyShelfs Team Bronze 1

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1 Introduction

Do you ever think how much food you have wasted over the years? You could along with your entire household could be wasting hundreds of pounds of food every year. Food waste is a problem that tends goes overlooked a lot in society because of other issues being deemed more important.

1.1 Problem Description

Food waste is an ongoing global issue. There are many costs of food waste to our society, environment, and economy. Food waste also heavily impacts the effects of food insecurity as well.

1.1.1 Economic Cost of Food Waste

The United States loses approximately $161-$218 billion due to food waste, household in the United States loses about $1,500 for the same reason (Igini, 2024). This money that is wasted every year could be spend on other things that could help to benefit the families or the economy in other ways.

1.1.2 Societal Cost of Food Waste

The cost that cost waste has on society manifest itself in food insecurity, malnutrition, and hunger in vulnerable communities. Due to the production of food consuming resources to be produce such as water and energy there is less that can be diverted to helping improve conditions for vulnerable communities.

1.1.3 Environmental Cost of Food Waste

There is a lot of resources that go into making food; by wasting food we are indirectly wasting valuable resources. Agriculture accounts for 70% of water used worldwide (Lewis, 2024). Every

time food that needs water to be produced, we are wasting the limited amount of fresh water that we have available to us. Food waste is also a contributing factor in harming the worlds biodiversity, due to the increased demand for more food production, more land is needed to produce more food (Lewis, 2024). Food waste also contributes to harming the atmosphere, food waste is sent to landfills and these landfills contribute to greenhouse gas emissions. Landfills create around 8% of the world's greenhouse gas emissions, they are responsible for creating carbon dioxide and methane gases (The Environmental Impact of Food Waste).

1.1.4 Food Insecurity

There were 2.3 billion people who faced insecurity in 2023, and approximately 713 to 757 million people were undernourished (Hunger Numbers Stubbornly High for Three Consecutive Years as Global Crises Deepen). A lot of food insecurity caused in the world is due to the inequality of affordable food. If were are better able to utilize our food, some food that does not need to be wasted could be redirected to those who are facing food insecurity.

1.2 Solution Description

Our solution to the economic, environmental, and social effects of food waste is to develop an application to help busy individuals and households mitigate food waste that they could create by giving them the knowledge and tools to stop food waste from being created.

1.2.1 LivelyShelfs Application

The LivelyShelfs application will provide users with a way of tracking the groceries that they have on hand and when they will expire. The application will also give users suggestions on what meals they can cook given the ingredients that they have on hand. It will also serve a hub

1.2.2 Solution Benefits

Our app hopes to bring benefit to the economic, financial, and community impacts of food waste. Our application will help to reduce the amount of food wasted and this will help to lessen the impact on the environment by reducing the amount of food being sent to landfills and exact land need to produce more food. It will help with people money by allowing them to get not through out money by letting them utilize all of there purchase food. It will help to support food stability through our community feature allowing those in the community to share food with each other. We will also raise awareness of food waste, by raising the customers conciseness about the food that they will be wasting and how it will effect those around them and the environment.

1.3 Risks

There are always going to be risks when using or creating a product. There could potentially be risks that may occur on the customer, business, and technical side of the product. But we have a plan to hopefully mitigate those risks form happening.

1.3.1 Customer

Some risk that customers could face when using our product is that other customers that they want to use the app with are too far away from them. A way we plan on mitigating this problem is that we limit the size of the community that the costumer can interact with. Another risk could be that the customer could be that manufactures can make an error putting information on food. As a mitigation for the risk, is that we would advise the customer to use the incorrectly labeled for as compost. Another risk is that users ignore the spoilage calendar. For this risk we send have multiple reminders to the customer about the spoilage date.

1.3.2 Business

Some risks that we could encounter with the business side of the product is a lack of community engagement with the product. A solution we have for the lack of community engagement is that we will partner with companies with green initiatives to give us some financial backing until our application becomes more profitable and self-sufficient. There is also the risk that we do not adapt to the competition of other applications that are similar to ours. We plan to mitigate this risk by having the customers give us feedback and making the appropriate updates to the application to help us combat the changing competition landscape. Another risk that we have to take into consideration that is very important is comply with privacy laws, the way we intend to not run into this risk is by updating our privacy agreement in accordance to laws that come out about privacy.

1.3.3 Technical

Some technical risks that could occur with our application could be that our WebCrawler could give an incorrect output. A way we can mitigate that is by reviewing all information that will be upload to the app. Another risk that could occur is that could occur is that we could have potential data leaks due to buffer over flows through the API, we will attempt to mitigate that risk by including protection against entering values that could cause buffer overflows. We could also run the risk of our integration of the API becoming overly intricate, we plan to study similar API's as well as using existing platforms that help with API integration.

2 LivelyShelfs Product Description

Our Product will be an application that will allow our users to share food with their friends, manage food within their household through guest accounts. Our application will be able to

give users resources to users to help educate them on methods to prevent food waste. The product will track the expiration statues of

2.1 Key Product Features and Capabilities

Key features that we want the application to have is Grocery Spoilage tracking, provide informational resources, food recommendations for the users.

2.1.1 Grocery Spoilage Tracking

By using information that the uses have inputted into the applications inventory the application will track how fresh item is. The

2.1.2 Informational Resources

We will user a web crawler to gather information online and will be stored in our database to be used for our application. The information gathered will be available to the user to explore their options on how to better manage their food so that it does not get wasted.

2.1.3 Recommendations

Our product recommendation on what to do with the groceries that the user has in their inventory. Will base our recommendations based on statistics that we have gathered on the user themselves and the data that we have stored on other members of their community. From there we will recommend whether the user should consider sharing their food and what they can do to not waste their food. The application will also make recipe recommendations based on the items that the users have in there inventory.

2.2 Major Components (Hardware/Software)

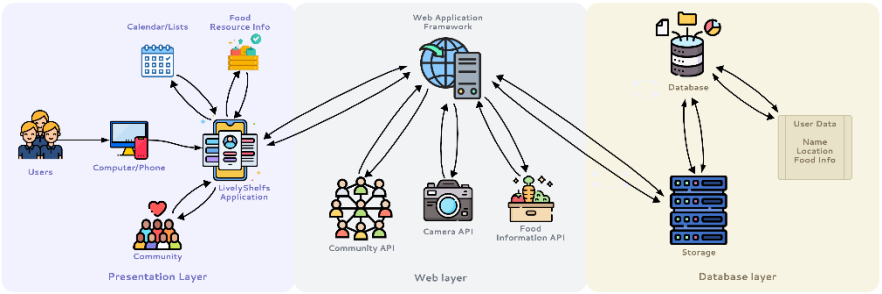

Figure 1: Major Functional Components Diagram

2.2.1 Three-tier Architecture

We have will have three main layers we will have a presentation layer, the Web layer, and the database layer.

2.2.1.1 Presentation Layer

This will be where the users are able to interact with the application. The users will user this layer to look their inventory and recommendations that are given to them by our programs.

2.2.1.2 Web Layer

This layer will be where all the different components of our product will interact with each other. The information that is inputted by the users in the presentation lay will be sent to the Web layer and the information will be sent to the appropriate API's to be analyzed and then sent back to the web layer to be sent to the database layer for storage. The web layer will also be where data from the database layer will be sent for our analysis API's to then send to the users on the presentation layer to keep them informed, so that they better understand there food use.

2.2.1.3 Database Layer

This layer contains where all data will be stored and hold the information for our database schema. This layer will interact with wed layer so the API's will have the appropriate data to make calculation on the data of the users.

3 Identification of Case Study

The application is made for the customers, the users, and the stakeholders that would like to manage food waste. The customers would be those who would do the cooking households so that they can keep track of the food that have so that they reduce the amount of food that gets wasted. The Users will be those that use our product, they are people who struggle to keep track of when their food will stay good so that they can ensure that they can save money on excess food. Lastly the group that final group our product is the stakeholders who are motivated to decrease food waste to help with protecting our environment from the negative effects of food waste.

4 LivelyShelfs Product Prototype Description

Our protype that we will use to demonstrate the ability to make friends that you can share food with. Some other features that we would like to demonstrate would be the ability to store the inputted food in the food list and have the food show up on the spoil calendar. However, some things that we do not have planned for the prototype that we would like to in our final product is Food handling advice and spoilage information. The final product will also be able for download as an application for both iOS and Android.

5 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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