Spring 2024

Project Proposal

THE UNIVERSITY OF ARIZONA
Computer Science

Kitchen Inventory Application

Team Number: #1

Team Name: Agile Cheetahs

Team Members: James Johnson, Sadaf Raoufi, Daniel Bazmandeh, Devesh Sawant

Introduction

Our project introduces a cutting-edge Kitchen Inventory Web Application, designed to revolutionize the way individuals manage their kitchen. This web application is not just a digital list; it's a smart assistant that tracks, organizes, and utilizes your kitchen inventory to its fullest potential. Motivated by the desire to streamline the process of kitchen management, our app addresses common issues such as forgotten grocery items, unused food expiring, and the daily dilemma of what to cook. What sets our web application apart is its ability to suggest recipes based on what you already have, coupled with a smart grocery list feature that reminds you exactly what you need to buy. This web application goes beyond traditional inventory systems by incorporating features like a barcode scanner for easy item logging, tracking expiration dates, and providing insights into your cooking habits.

Our goal is to make cooking and grocery shopping a seamless, efficient, and enjoyable experience, reducing food waste and saving time for what truly matters. As we dive deeper into the project, we'll explore how technology can transform the kitchen into a smart, organized space that supports your lifestyle and dietary preferences.

The technology will be new to the team. A challenge for the team will be the difference between team member’s backgrounds. We will address our experience by sharing information with the team and using various web resources such as Stack Overflow and YouTube.

Another challenge may be a scope increase that may be too large to finish within the time frame. Using Scrum can help us to address the challenge of scope increase.

Finally, the last challenge is a lack of UX design experience in the team. We plan to address the challenge by using UI toolkits like Bootstrap, Ionic, material design etc and constant user feedback through meetings.

Significant Project Decision Record

Date	Decisions	Events	Changes
2/9/2024	Software Tools	Project Proposal Meeting	None
2/10/2024	Name of the application, we chose to build a web application.	Project Proposal Meeting	None
2/12/2024	Product Owner and Scrum Master roles were assigned.	Presentation/Proposal Meeting	None

Table 1. A record of the team's software decisions.

Requirements

Our Kitchen Inventory Web Application project is centered around meeting the needs of our primary external customer, Dionne. Another potential external stakeholder would be a grocery store that Dionne visits while using our application to help with her shopping. We will interact with Dionne by having meetings with her and refining her requirements for the application. We will not be meeting with the grocery stores.

Our stakeholder desires an application that not only tracks what's in their pantry but also monitors expiration dates, suggests recipes from available ingredients, and compiles shopping lists to prevent unnecessary trips to the grocery store. The driving force behind these needs is a desire to save time, minimize food waste, and make the cooking process easier.

User Requirements

- As a user, I want the application to track my kitchen inventory so that I can easily see what items I have and their quantities.
- As a user, I want to be alerted about expiring items so that I can use them before they go bad, reducing waste.
- As a user, I want to receive recipe suggestions based on my current inventory so that I can prepare meals without needing to shop for additional ingredients.

- As a user, I want to be able to add items from a list of items or a custom item so that I can store and track any item in my inventory as per my need.
- As a user, I want to be able to add items to a shopping list so that I can stock up my kitchen inventory.
- As a user, I want to see a report of my inventory usage so that I can make choices on what to add to my kitchen.

Acceptance Tests

- Given that I have entered items into the inventory, when I view the inventory page, then I should see a list of all items with quantities and expiration dates.
- Given an item is about to expire, when I open the application, then I should receive a notification about the expiring item.
- Given I have items in my inventory, when I request recipe suggestions, then I should see a list of recipes that use those items.
- Given a list of available items, when I request particular items, then I should be able to add the item to my inventory list.
- Given a list of available items, when I add an item to my shopping list, then my shopping list should be updated with the item I added.
- Given my inventory usage, when I request to see my inventory usage report, then I should see a report of my inventory usage.

Problem Definition (Project Goals)

Our project is dedicated to solving the prevalent customer problem of effectively managing kitchen inventory specifically, the challenge of keeping track of what's in stock, identifying items nearing expiration, and deciding what can be cooked with available ingredients. By addressing these issues, our system aims to deliver significant benefits, including reducing food waste, enabling savings on groceries, and simplifying the meal planning process. These benefits directly contribute to the customer's overarching desire for a streamlined, stress-free kitchen management experience, making daily cooking routines more enjoyable and less wasteful.

To ensure these benefits are realized, we plan to engage in a continuous feedback loop with our customer, Dionne. Through iterative demonstrations of our application's progress, we will solicit direct feedback to assess whether the application meets her specific needs. Observational studies of the customer interacting with the application will further guide our understanding of further requirements and any adjustments needed. Our customer-centric measures of success are firmly rooted in tangible outcomes: a noticeable

reduction in food waste, a decrease in unplanned grocery trips, and an overall increase in Dionne's satisfaction with her meal preparation process.

Significant Project Design Decisions

The Kitchen Inventory Application is designed to address challenges such as tracking inventory, managing expiration dates, and suggesting recipes. Significant design decisions include implementing a barcode scanner for easy item entry, utilizing a database to store inventory and recipe information, and developing recommendation algorithms for suggesting recipes and generating shopping lists. The motivation for using a barcode scanner was to make adding items to the Kitchen Inventory Application easier for the customer. The consequence may be the difficulty in getting the right data from the barcode scanner. The motivation for utilizing a database for storing the inventory and recipe information is that the information stored for the user will be dynamic. As a resulting consequence, the database could grow and shrink with the customer needs.

Challenges may include the need for accurate data sources for products and recipes, and ensuring user privacy and data security. The motivation behind suggesting recipes and generating a shopping list using recommendation algorithms was to make it easier for our stakeholders to find new recipes using the items that are already available. As a consequence of adding this feature, it could increase the complexity of using the application.

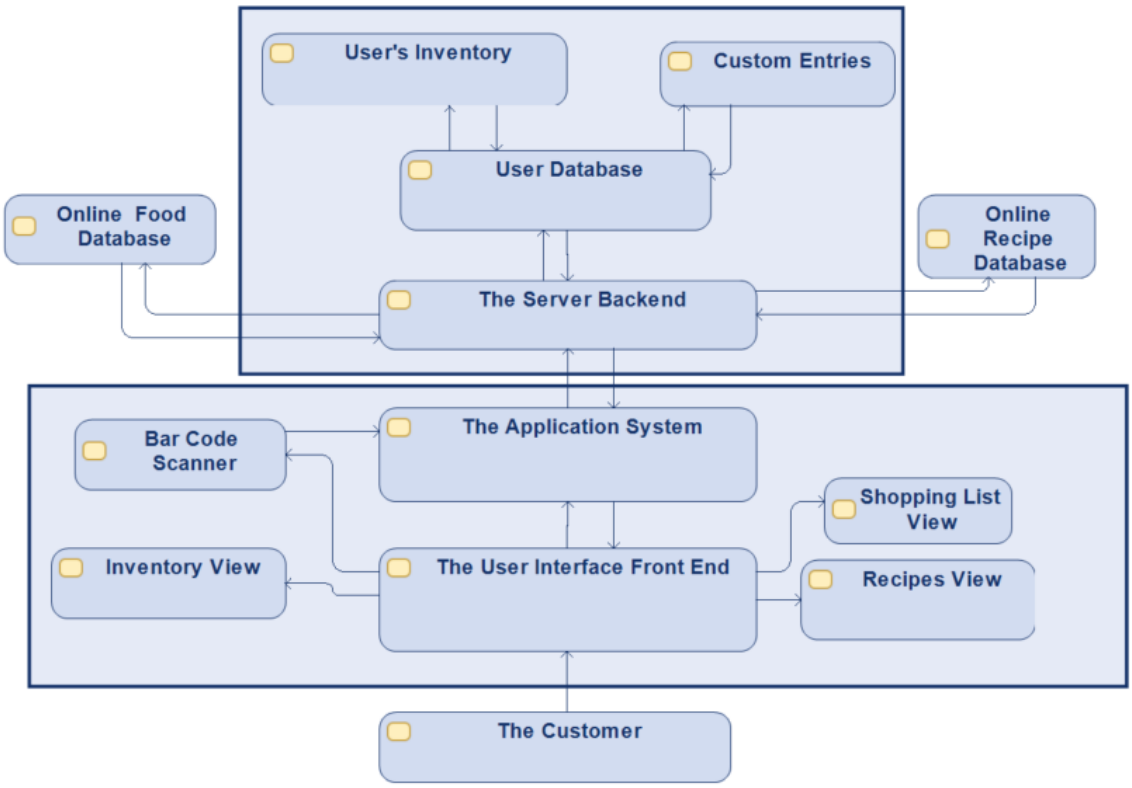

Figure 1. The overall system design of the project shows the front-end, back-end, and the communication happening between the other objects in the system.

The customer will use the user interface to interact with the application system. The application system will take the user's input to allow the user to use the barcode scanner, add and remove items from the shopping list from the shopping list, view the inventory, and view recipes. User input will go to the application system and then to the server to grab information from the user database, the online recipe database, or the online food database. The user database will contain information on the user's inventory and any custom entries. Boundaries were drawn around the server end and the client application end.

Project Management

For the upcoming iteration, with the first deadline on 03/12, we plan to build a minimal viable product (MVP) of our Kitchen Inventory Web Application by that time. This MVP will be a web application that allows users to maintain a virtual inventory of their kitchen items. Key functionalities will include the ability to add and remove items, alongside the capability for users to enter details about each item, such as quantity, purchase date, and estimated expiration. Additionally, the app will provide basic functionality for users to manage a collection of recipes, which they can add to or remove from the inventory based on the ingredients they have available.

The wish list of features includes advanced recipe suggestions considering dietary preferences. Users can get the expiration dates and information about the items just by scanning the barcode. The users should be

notified about the updates of their consumption of items. We should have a comprehensive report that can show the most important statistical information such as daily, weekly, and monthly consumption and expiration dates.

Teamwork

In the Teamwork section for our Kitchen Inventory Web Application project, we will adopt the Scrum framework to guide our development process, ensuring an agile and iterative approach to product creation and enhancement. Our work will be coordinated using Trello, where we'll create, refine, and prioritize tasks, allowing for clear visibility and accountability. Each sprint will see tasks assigned to team members based on their skills and current workload, with progress and tickets managed via GitHub. Our team commits to bi-weekly meetings via Google Meet to maintain regular communication.

During these meetings, each team member will provide updates on their progress since the last meeting, outline their objectives for the upcoming period, and highlight any obstacles they're facing. This will not only keep the team aligned but also facilitate the early identification and resolution of potential issues. Additionally, we will utilize these meetings for sprint review and planning sessions, where we'll assess completed work, refine our task backlog, and select new tasks for the upcoming sprint, ensuring continuous advancement toward our project goals.

Team

Our team is composed of a diverse group with a variety of work experiences in the field of Computer Science and Engineering. James Johnson brings a wealth of knowledge pursuing a Master's in Computer Science with dual Bachelor's degrees in Computer Engineering and Systems Engineering, supplemented by minors in Mathematics, Computer Science, and Electrical Engineering. Devesh Sawant, currently pursuing a Master's in Computer Science and holding a Bachelor’s degree in Information Technology. Sadaf Raoufi is in her second year of a Master’s program in Computer Science and has dedicated three years to machine learning applications. Daniel Bazmandeh, with a Bachelor's in Computer Engineering, is advancing his expertise as a first-year Ph.D. student in Computer Science.

In terms of related work experience, James Johnson is a seasoned professional with 19 years in software development, having worked on various platforms including legacy mobile systems, web, and desktop applications. Daniel Bazmandeh has spent two years as a back-end developer, specializing in Python and the Django framework. Devesh Sawant brings four years of full-stack web development experience, focusing on the front-end, skilled in JavaScript and Java. None of the team members have previously built an application like the Kitchen Inventory Application.

Team Roles

- *Scrum*
    - Product Owner: James Johnson
    - Scrum Master: Daniel Bazmandeh
- *Project Roles*
    - Front-end Developers: James Johnson, Devesh Anil Sawant
    - Back-end Developers: Daniel Bazmandeh, Sadaf Raoufi