Your Meal Prep Assistant

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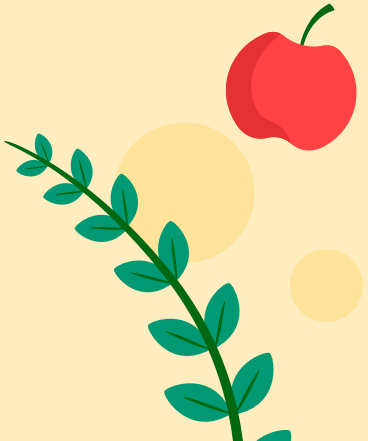


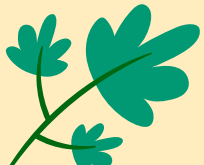
Introducing

our innovative smart fridge, designed to revolutionize meal preparation for college students

Motivation

“Empower college students with busy schedule and limited time to live a healthier, more organized lifestyles by simplifying meal preparation, offering personalized recipe suggestions, and optimizing ingredient management through innovative IoT technology.”

Study Overview

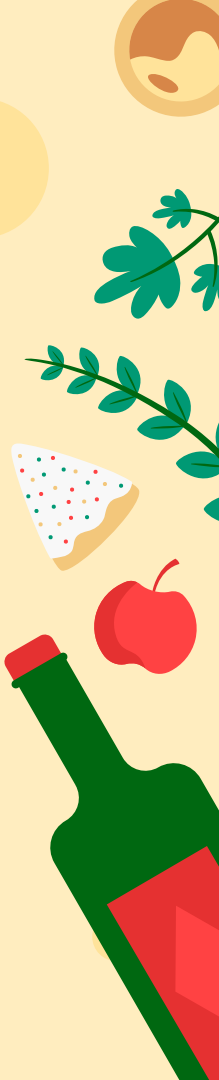


Research Questions

“

How can we utilize IoT technology in meal planning to effectively address the time constraints for college students, considering factors such as dietary plans, health conditions, personal preferences, ingredients availability at home, and connection with class schedules?

- What is the meal planning process for a college student?
- What are some frustrations/pain points associated with the meal planning process?
- What additional resources do students use to help with their meal planning?
- What are some devices/systems that students use to plan meals or maintain their diet?
- On average, how long does it take for students to plan a meal?
- What are some situations in which the students would skip a meal?
    - Why?



Study Overview

Milestone 1

- Brainstorm and ideate
- Contextual Inquiry

Milestone 2

- Diary & Survey Study
- Gather and analyze data

Milestone 3

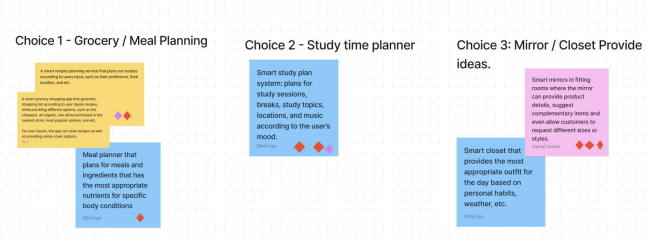
- Refine and finalize the system concept
- Create a demo plan

Milestone 4

- Create physical/digital prototypes
- Demo

Ideation

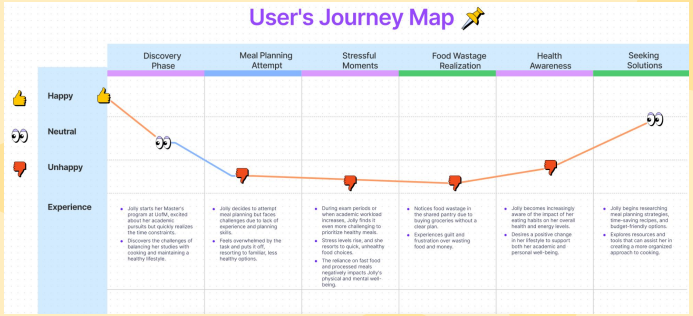
- 10 X 10 Matrix
- Down to 3 ideas
  - Smart Meal Planner
  - Smart Closet Mirror
  - Smart Study Plan Builder
- Contextual Inquiry

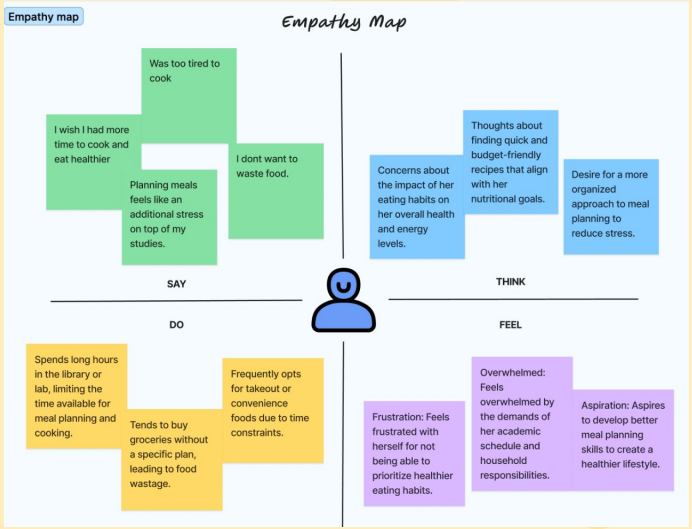


1. Smart alarm that can detect body motions to make sure that you actually wakes up, not simply shut off the alarm
2. Smart closet that provides the most appropriate outfit for the day based on personal habits, weather, etc.
3. Self-driving car that drives the student to school
4. Smart parking finder that connects to the class schedule to locate the nearest parking spot to the building.
5. Smart public transportation systems that connects to the class schedule to find the most appropriate time and alerts the student
6. Building detector/finder, which can be an AR implementation in to glasses to people don't have to hold the phone in a cold weather.
7. Smart fitness center planner that can plan a work out schedule and activities according to your body conditions
8. Health detection watch/wearable device to detect any sickness or abnormal body conditions and gives out advice.
9. Meal planner that plans for meals and ingredients that has the most appropriate nutrients for specific body conditions
10. Smart cooking system, simply tells the user what to put, and cooks the meal itself.
11. Smart window blinds/curtains, voice detection or automatically detects the outside to open or close
12. Smart lighting system that detects what the user is doing and provides the appropriate lighting: brightness, color, etc.
13. Movie finder based on personal interest, watching habits, etc.
14. Find a local restaurant that recommend a restaurant if the student doesn't want to cook, based on personal interests, etc.
15. Smart AC that detects body and room temperature to adjust the AC
16. Smart sleep-aid pillow that detects the sleeping habits, postures, and adjust its softness. Also keep tracks of sleep quality.
17. Smart study place finder, automatically finds a study place in the library based on personal habit and reserves it.
18. Smart posture detector, a wearable device that detect the body posture and reminds the user for adjustments
19. Smart study time system: timer/music/mood that plans for study sessions, breaks, study topics, and music according to the user's mood.
20. Smart language learner, automatically records any grammar errors, inappropriate wording, in everyday conversation and provide better options.

Research

- **Diary Study**
  - Google form
  - 3 Entries/day, 8 days
  - Record meal planning process
  - Behaviors, pain points, experience
- **Survey**
  - Google form
  - 49 participants
- User Enactment given scenarios

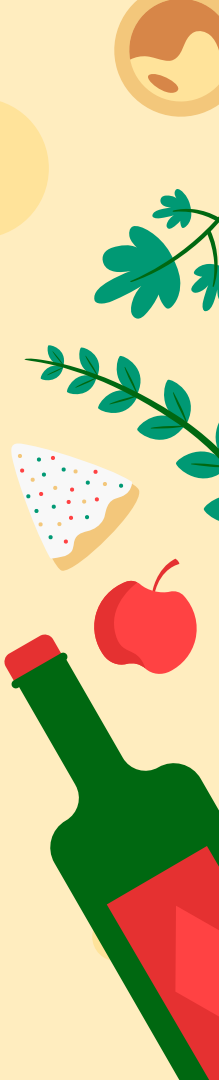




Study Results

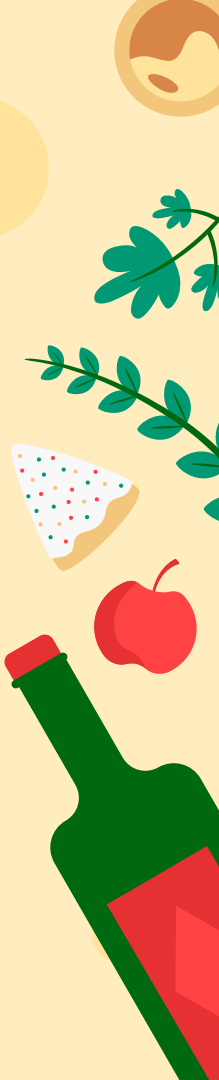
Main Paint Points

- These dimensions were chosen based on the prominence in users' decision-making regarding meal preparation, as made evident by our diary study and survey data.
  - Sustainability,
  - Convenience,
  - Budget.

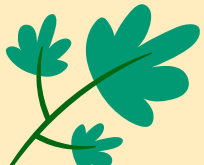


Criteria

- **User Satisfaction:** Prioritizing features that enhance user satisfaction and overall experience.
  - Engaging and user-friendly interface: Focusing on intuitive, user-friendly interface design that facilitates seamless interaction with the smart fridge prototype.
    - Easy to Use: The interface is easy to understand, explore, and navigate without extensive guidelines or instructions.
    - Clear Communication: Users should be able to quickly understand the goal of the product and what problems are the product aiming to solve
    - Responsiveness and Accessibility: The interface is accessible to all users and different screen sizes.
    - Help and Error: When users encounter errors and problems, the interface should guide the user to the help page and help users to troubleshoot issues efficiently.
- **Efficiency and Convenience:** Emphasizing features that improve efficiency in meal preparation tasks and enhance convenience for users.
  - Self-explanatory and efficient design: We aim to create features which can help users to easily grasp information when needed. The interface should provide user immediate feedback to user actions. Users should be able to have features which can show them all the possible recipes or cooking ideas at a first glance.
- **Feasibility:** Considering the feasibility of implementing proposed features within the constraints of technology and resources.



Design

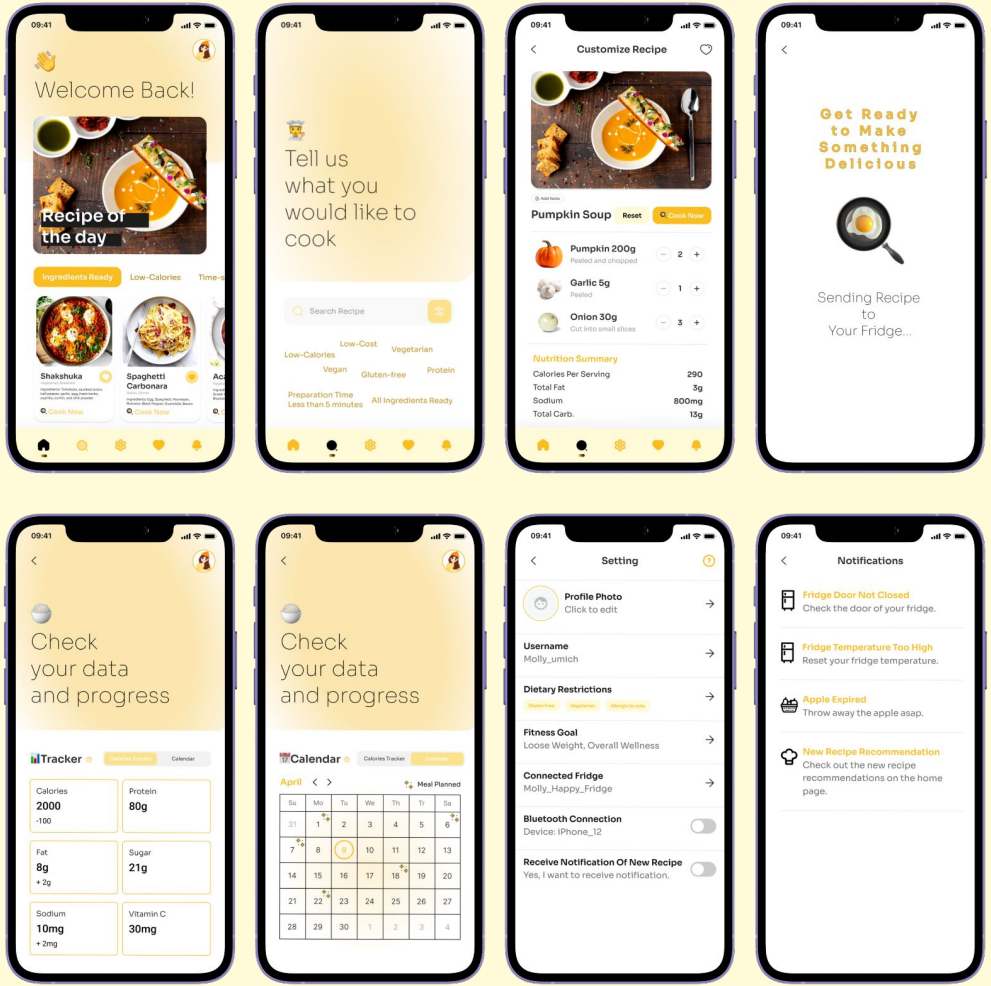


Key Features Mobile

Recipe Recommendation

Meal Planning and Customization based on user preferences and fitness goals

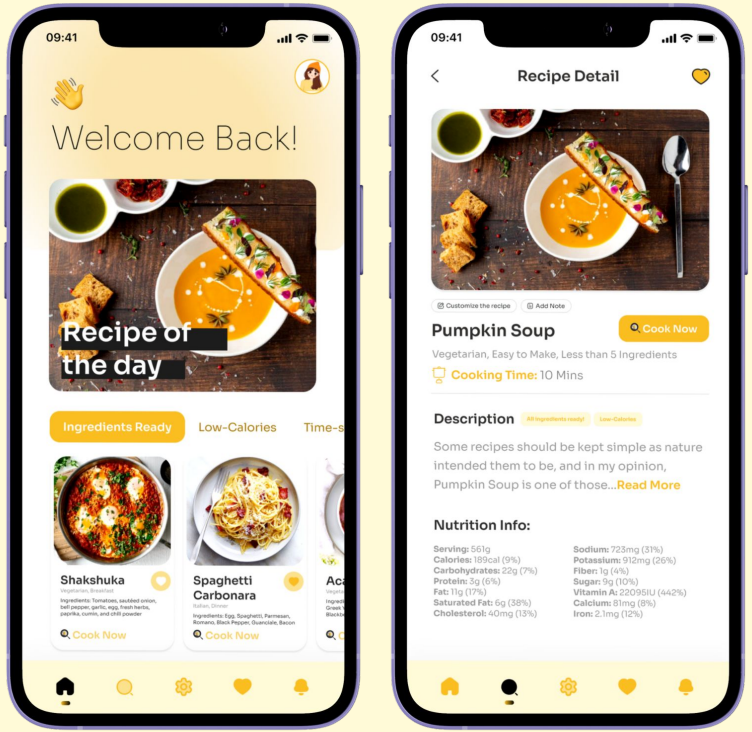
Setting and Notification



Key Features Mobile

Recipe Recommendation

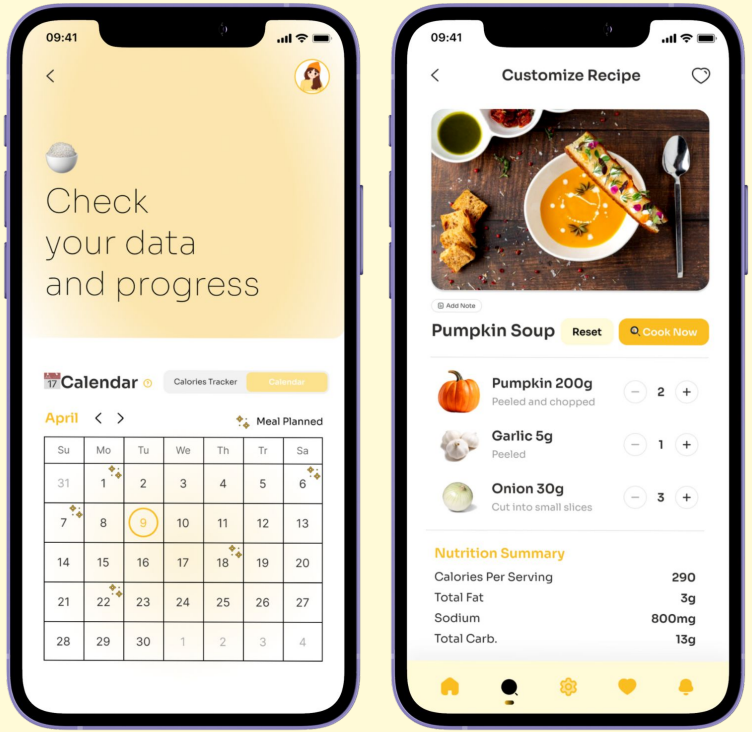
- Explore a variety of recipes based your dietary preferences and goals.
- Discover new meal ideas based on your ingredients or dietary preferences.



Key Features Mobile

Meal Planning and Customization

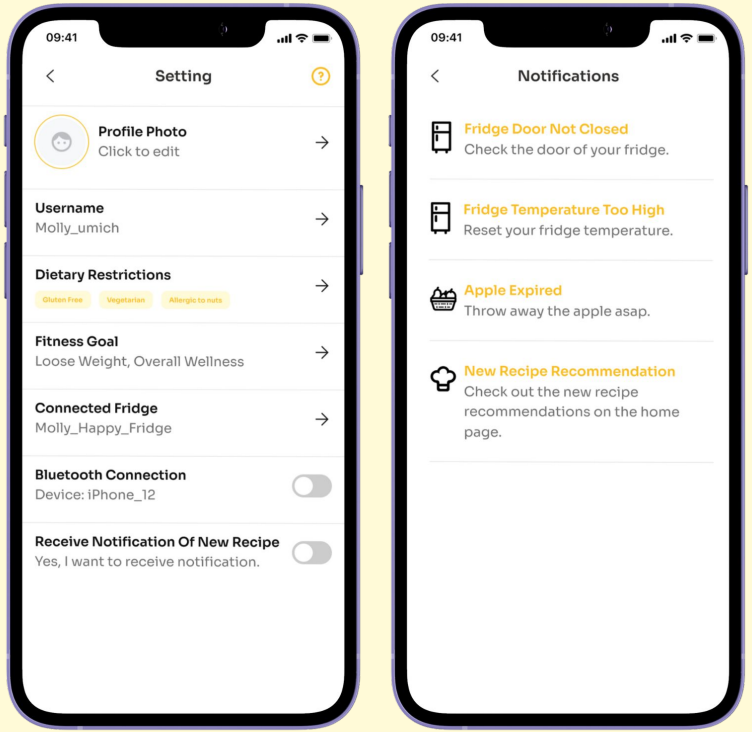
- Plan your meals for the week with ease.
- Customize recipes to fit your dietary restrictions, such as gluten-free, vegan, or low-carb options.
- Adjust portion sizes and servings to meet your calorie goals.



Key Features Mobile

Setting and Notification

- Set your dietary requirements and fitness goals
- Receive notifications for expired ingredients, disconnected devices or abnormal temperature.
- Stay informed with real-time alerts for any issues or incidents



Key Features Fridge

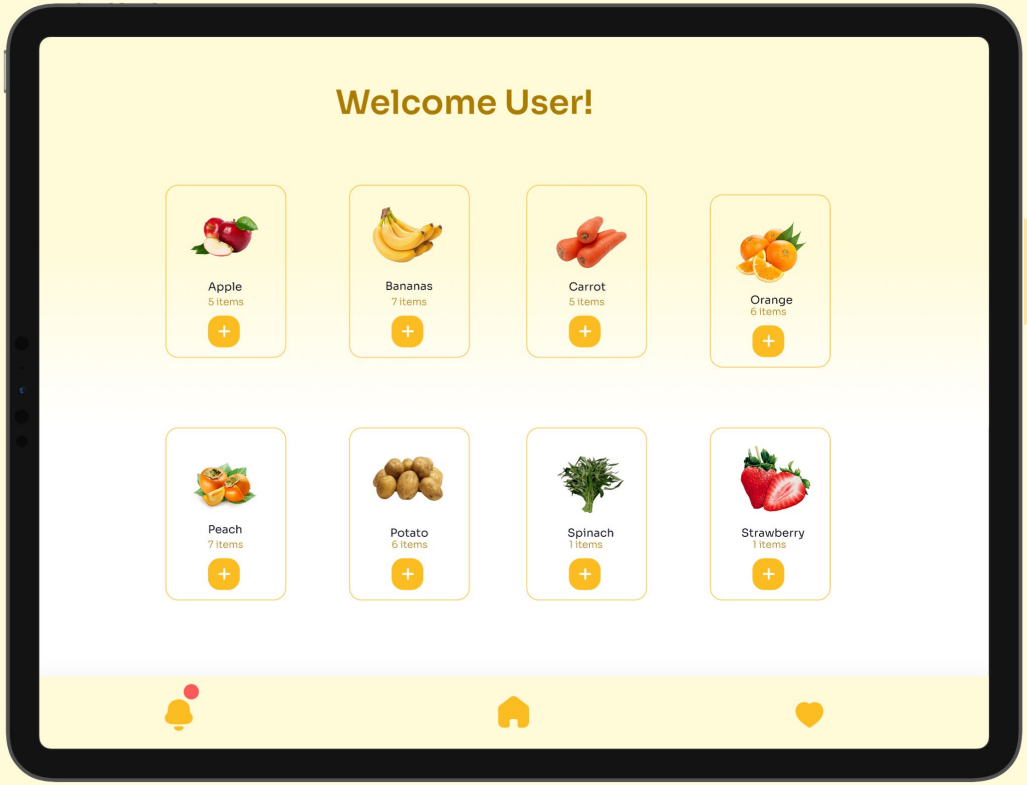
- **Camera Module with Object Recognition**
  - Identify and track inventory in real-time.
- **Monitor on the fridge**
  - Display inventory updates, recipes, meal-prep steps
- **Auditory Feedback System**
  - Provides audible alerts for successful item scans
- **Mobile Application Integration**
  - Offers remote inventory management and recipe access

IoT

Controlled by Particle mobile app

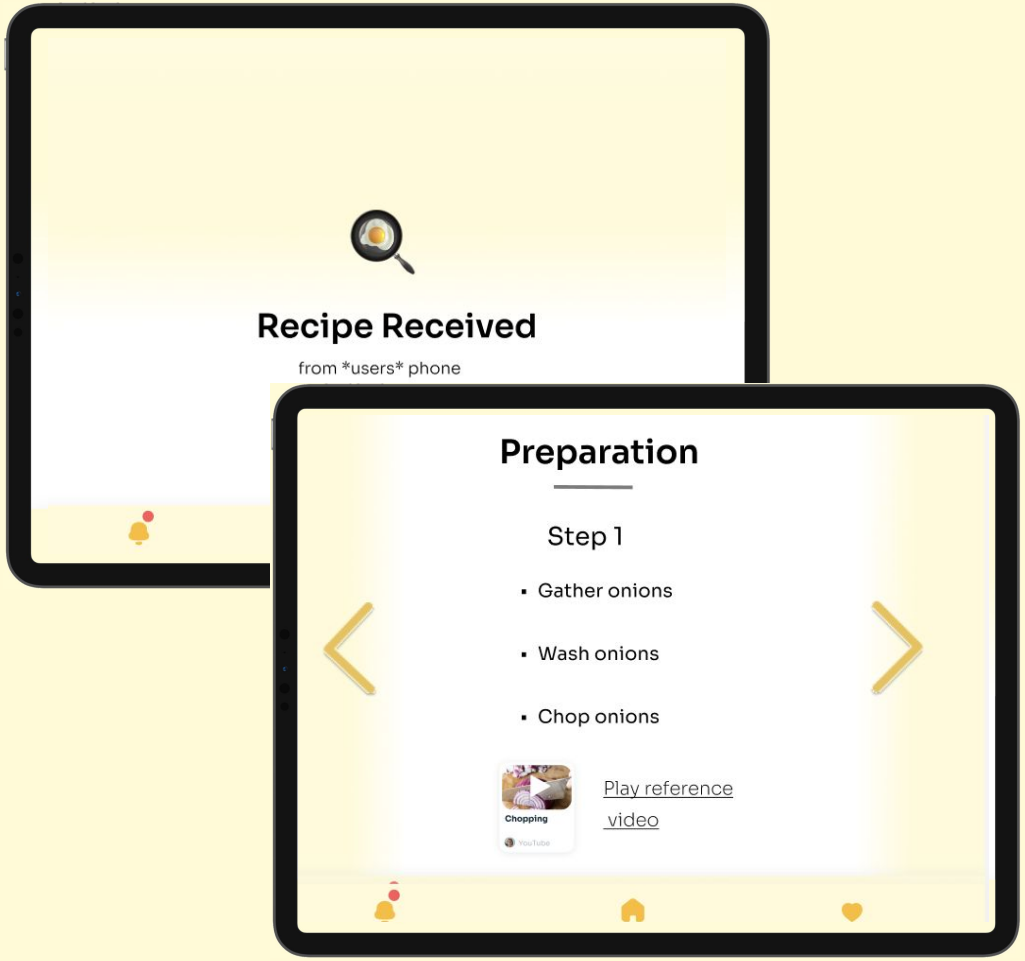
- **Digital Monitor**
  - Brief messages
  - System status
- **RGB LED**
  - Red for in the process of scanning
  - Green for ready to scan/Done updating

Key Features - Fridge Screen



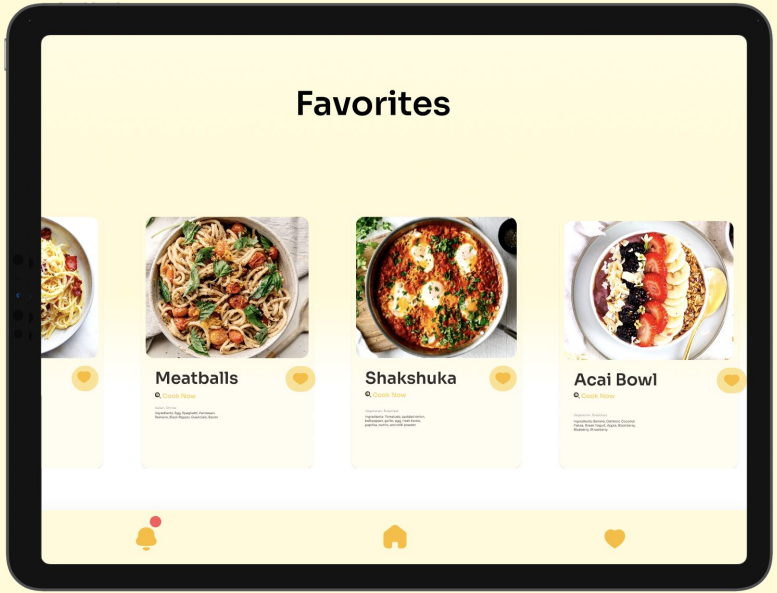
Key Features - Fridge Screen

- Seamless accessibility across multiple platforms
- **Efficiency and Convenience** - user have access to the mobile app 24/7

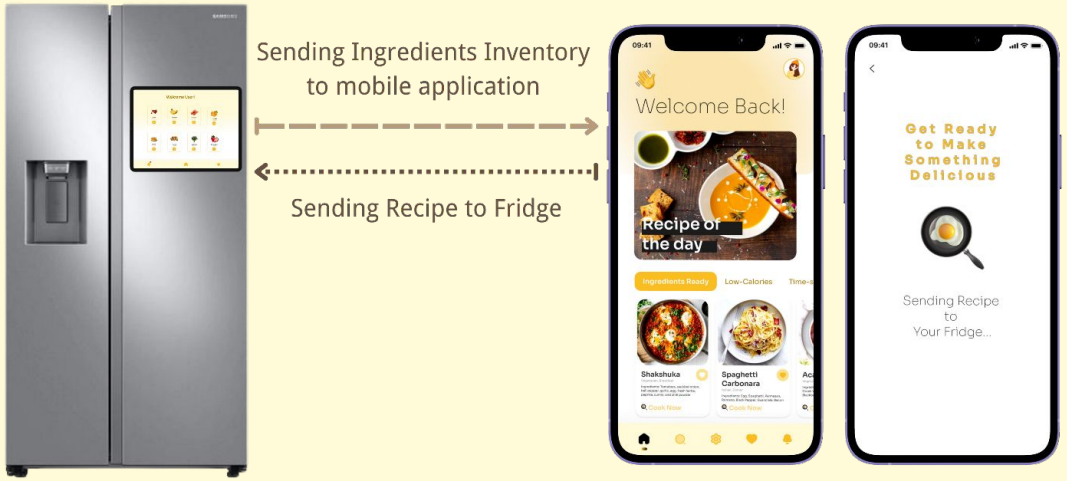


Key Features - Fridge

- Quick Action - Add recipes to favorites for easy and quick access
- Responsive and clear user interactions
- Overall accessibility



High Level Architecture

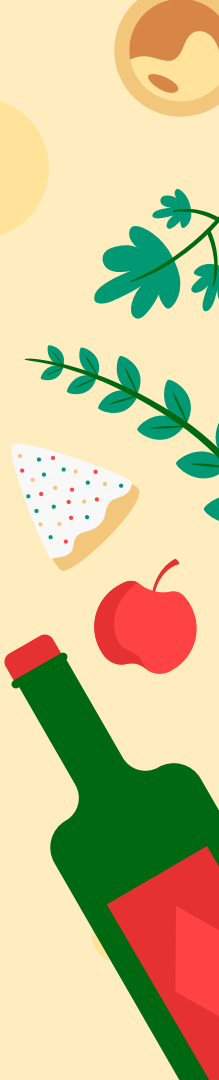


- Monitor ingredient inventory levels and expiration dates
- Alert users of any incidents, such as expired ingredients, disconnected fridge, abnormal temperatures, and more.
- Guide user on how to prep and cook meals

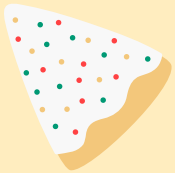
- Recommend meals and recipes
- Explore a variety of recipes tailored to your dietary preferences and goals.
- Keep track of your fitness goal and calories intake
- Stay informed with real-time alerts for any issues or incidents related to your meal prep and storage
- Adjust portion sizes and servings to meet your calorie goals.

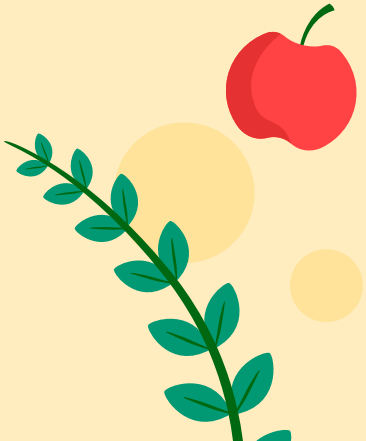
Assumptions

- Given this is a design being implemented 10 years in the future
- Access to phone, internet
- Home screen displays current inventory
- Camera detects everything in the fridge
- There is different sensor that detect the humidity and temperature of the fridge to notify expiration dates(along with time and camera module)
- Recipes can be generated with ingredients available in the fridge or any recipe you would like



Demo Time!





Demo Links

Fridge Interface

Mobile Interface