

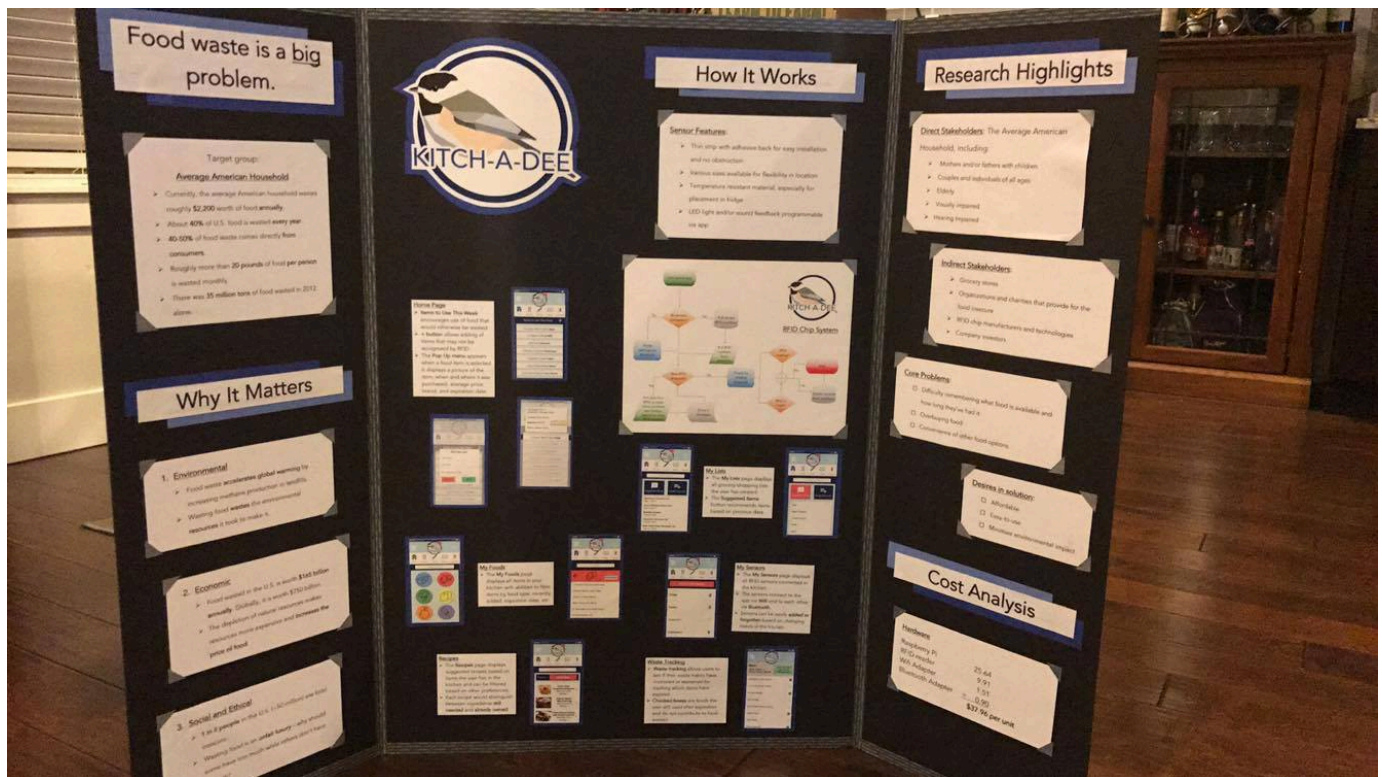
FINAL PROJECT PROTOTYPE

GROUP BB3

FOOD WASTE

GROUP MEMBERS

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Overview:

In order to solve the problem of food waste at home, we've decided to create a system which allows users to get accurate real time data describing what they have in their kitchens. The system relies on a variety of RFID chip technologies and a convenient mobile app which displays the items users have in their home kitchens. The app sends notifications when food is about to expire, has a suggested customizable grocery list, and even recommends recipes based on the ingredients in your kitchen.

The system comes with multiple RFID chip sensors which can be placed throughout your kitchen which are synced together via Bluetooth. We were inspired by the new Seattle based Amazon Grocery Store, and are working under the assumption that traditional barcoded products will be a thing of the past.

The Problem: Food Waste

- Currently, the average American household wastes roughly **\$2,200** worth of food **annually**.
- About **40%** of U.S. food is wasted **every year**.
- **40-50%** of food waste comes directly **from consumers**.
- Roughly more than **20 pounds** of food **per person** is wasted monthly.
- There was **35 million tons** of food wasted in 2012 alone.



Why Does It Matter?

- 1. Environmental**
 - Food waste accelerates global warming by increasing methane production in landfills.
 - Wasting food wastes the environmental resources it took to make it.
 - 2. Economic**
 - Food wasted in the U.S. is worth \$165 billion annually. Globally, it is worth \$750 billion.
 - The depletion of natural resources makes resources more expensive and increases the price of food.
 - 3. Social and Ethical**
 - 1 in 6 people in the U.S. (~50 million) are food insecure.
 - Wasting food is an unfair luxury – why should some have too much while others don't have enough
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Research Highlights:

Direct Stakeholders: The Average American Household, including:

- Mothers and/or fathers with children
- Couples and individuals of all ages
- Elderly
- Visually impaired
- Hearing Impaired



Indirect Stakeholders:

- Grocery stores
- Organizations and charities that provide for the food insecure
- RFID chip manufacturers and technologies
- Company investors

Sensor Features:

- Thin strip with adhesive back for easy installation and no obstruction
- Various sizes available for flexibility in location
- Temperature resistant material, especially for placement in fridge
- LED light and/or sound feedback programmable via app



Core Problems:

- ☐ Difficulty remembering what food is available and how long they've had it
- ☐ Overbuying food
- ☐ Convenience of other food options

Desires in solution:

- ☐ Affordable
- ☐ Easy-to-use
- ☐ Minimize environmental impact



Cost Analysis:

Hardware (assuming bought in bulk)

Raspberry Pi 25.64

RFID reader 9.91

Wifi Adapter 1.51

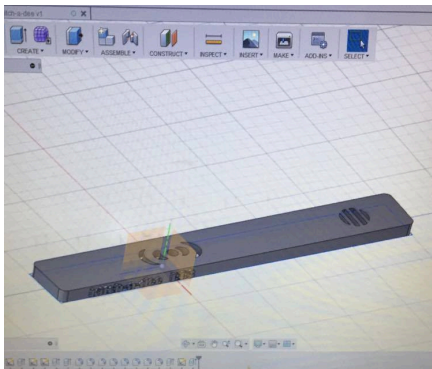
Bluetooth Adapter + 0.90

\$37.96 per unit

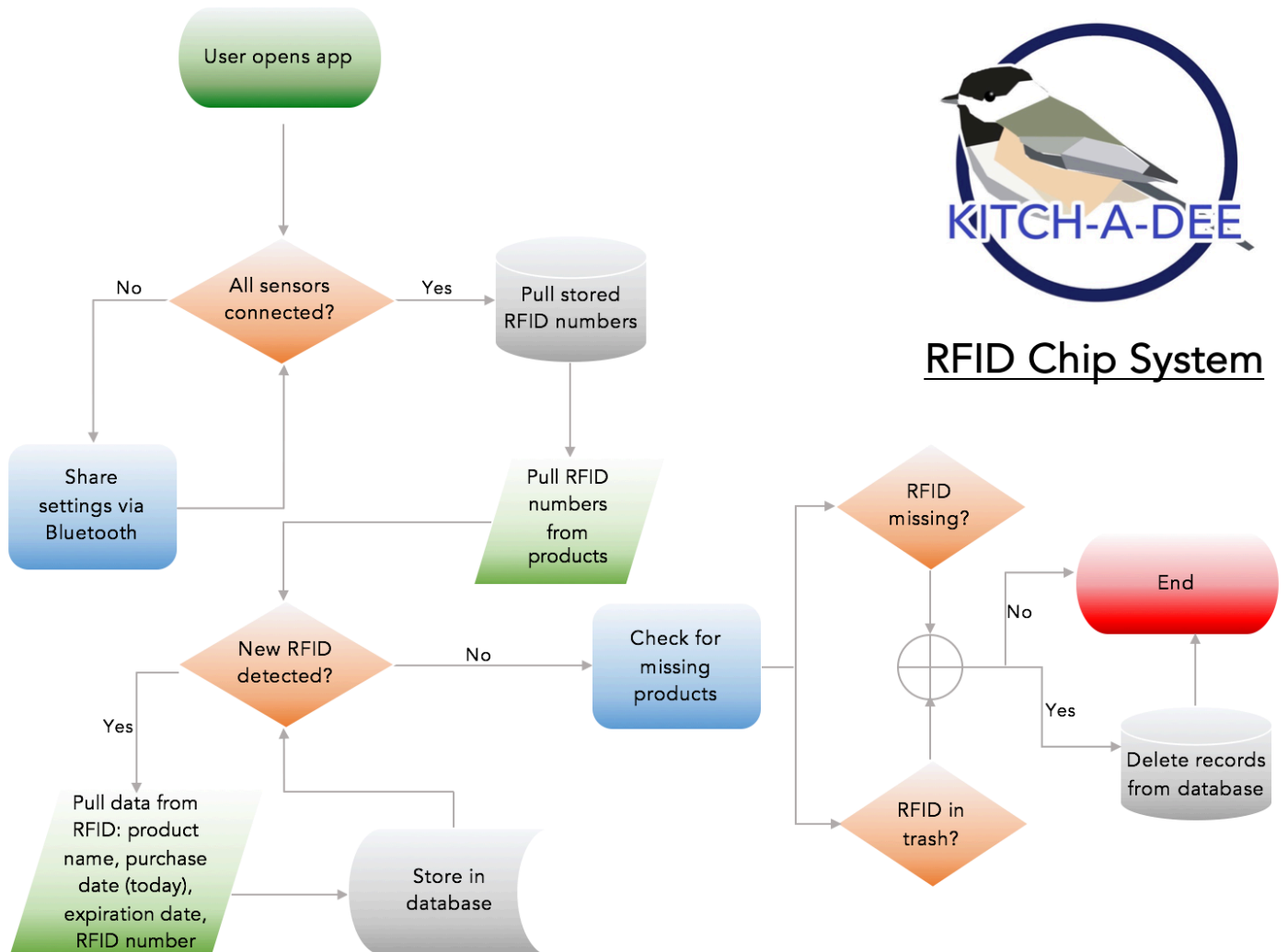


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How Does It Work?



The App:

Our Kitch-A-Dee App prototype was created with Proto.io. The link to our interactive prototype can be found below. Unfortunately, our free trial ends on **March 19th** so after that time our interactive app will no longer be available for viewing.

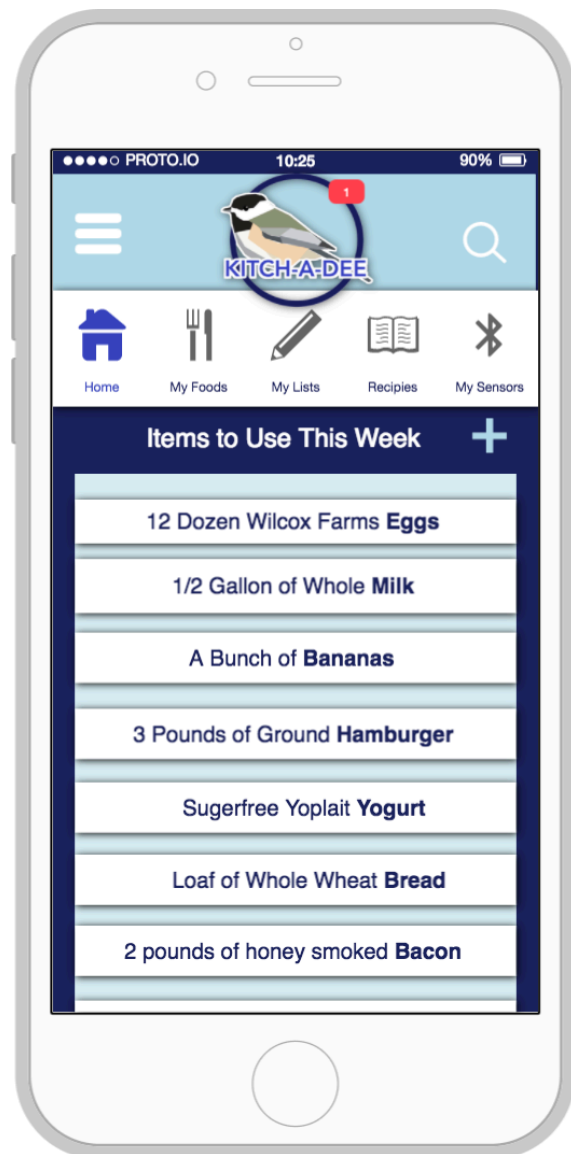
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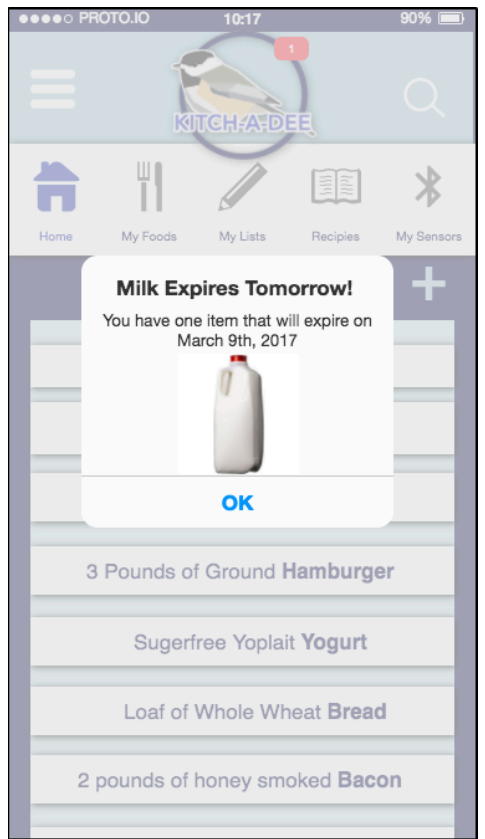
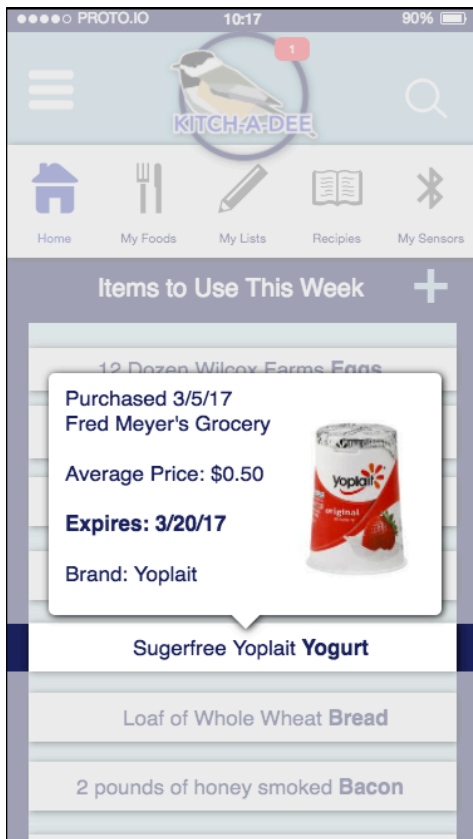
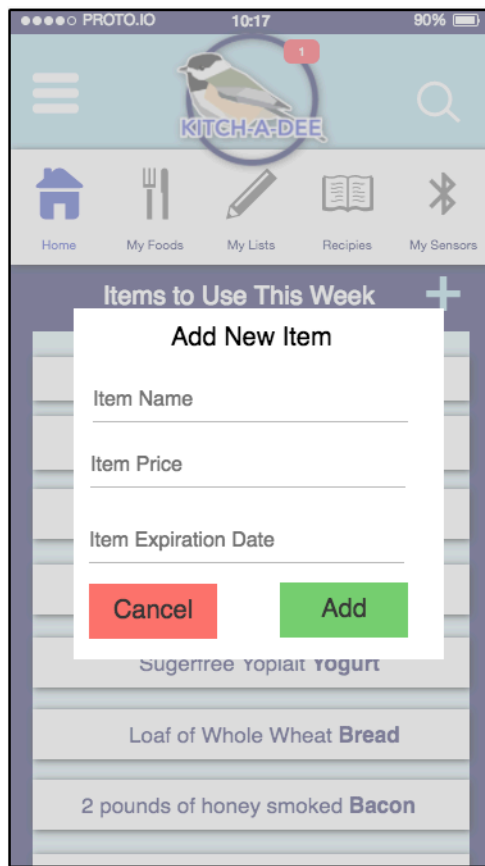


App Features:

Home Page

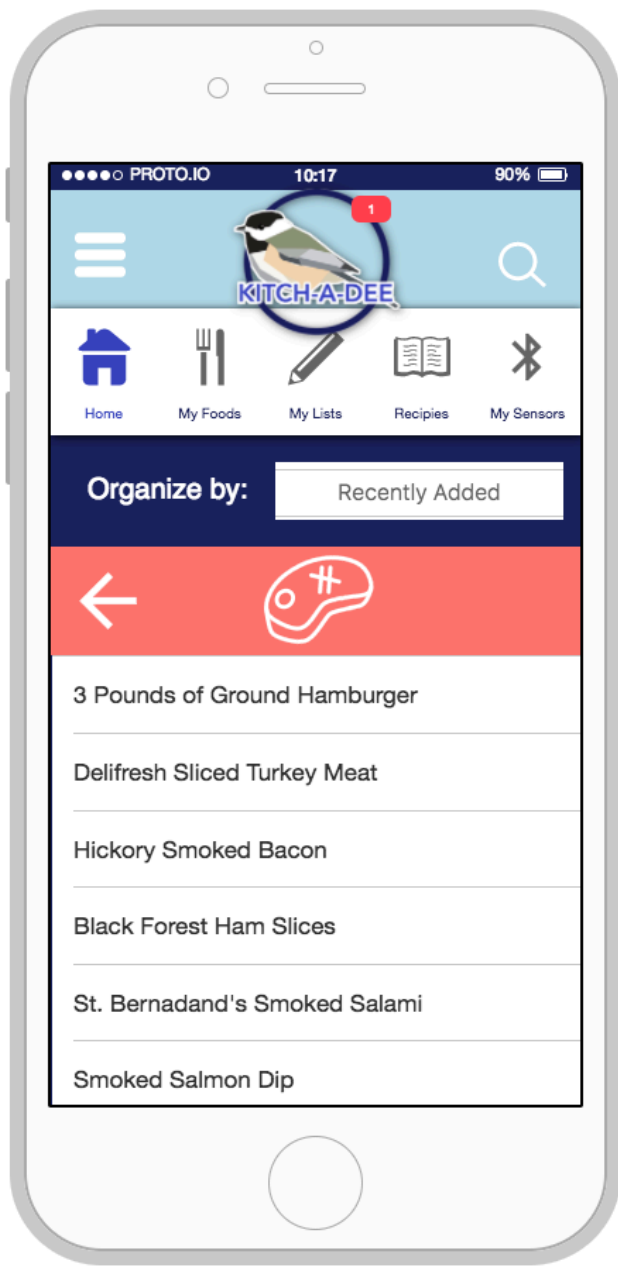
- **Items to Use This Week** encourages use of food that would otherwise be wasted.
- **+ button** allows adding of items that may not be recognized by RFID.
- The **Pop Up menu** appears when a food item is selected. It displays a picture of the item, when and where it was purchased, average price, brand, and expiration date.





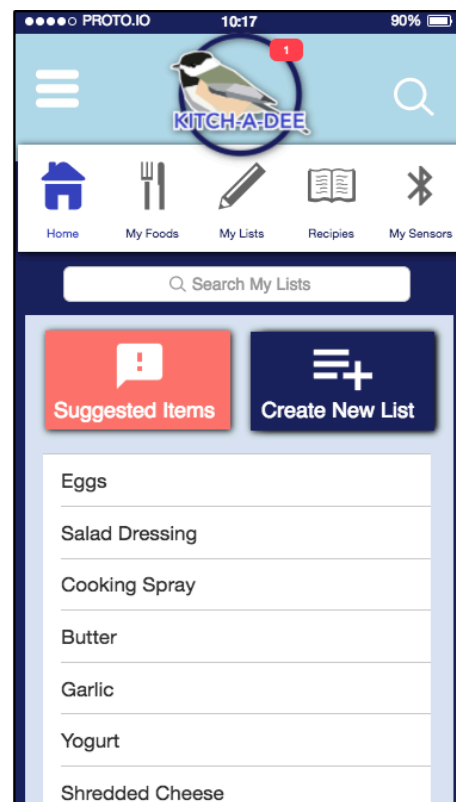
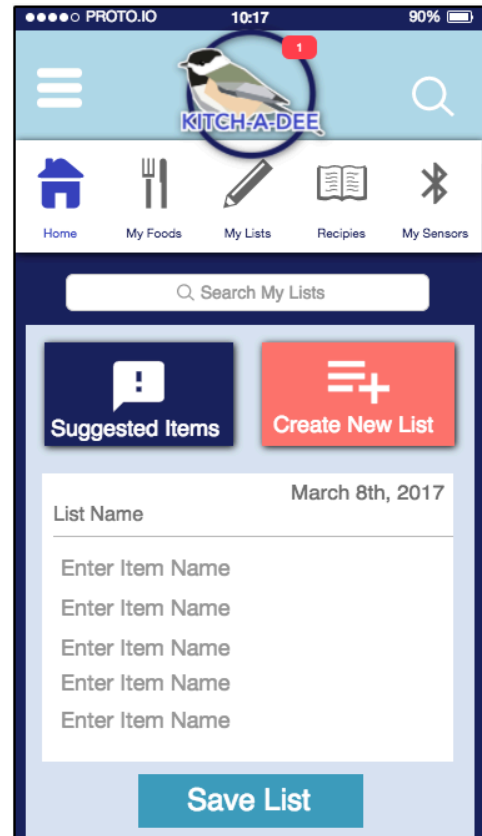
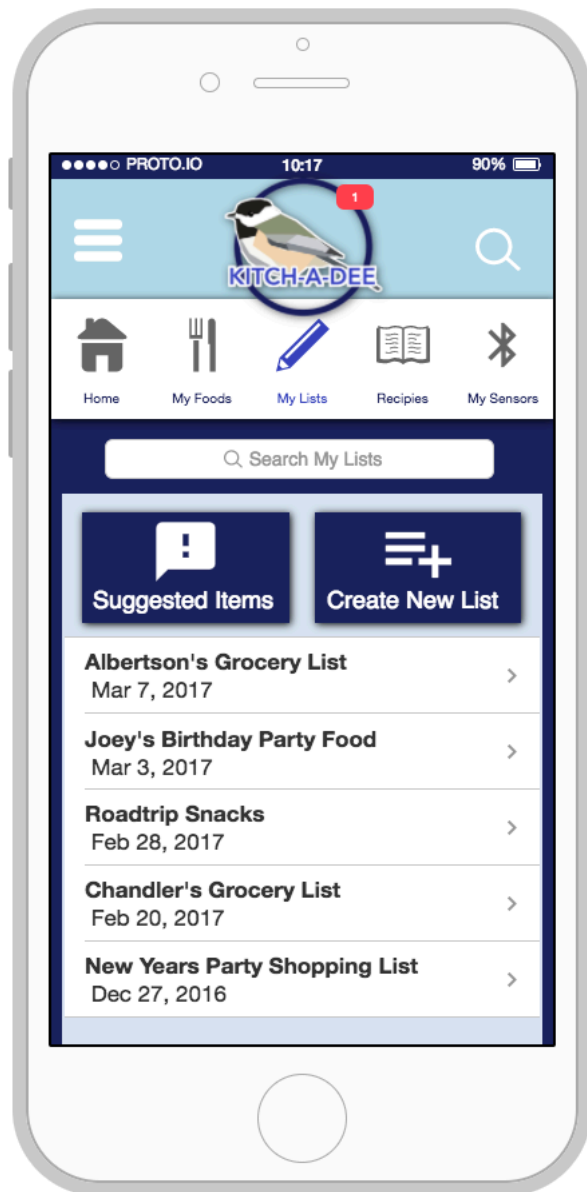
My Foods

- The **My Foods** page displays all items in your kitchen with abilities to filter items by food type, recently added, expiration date, etc.



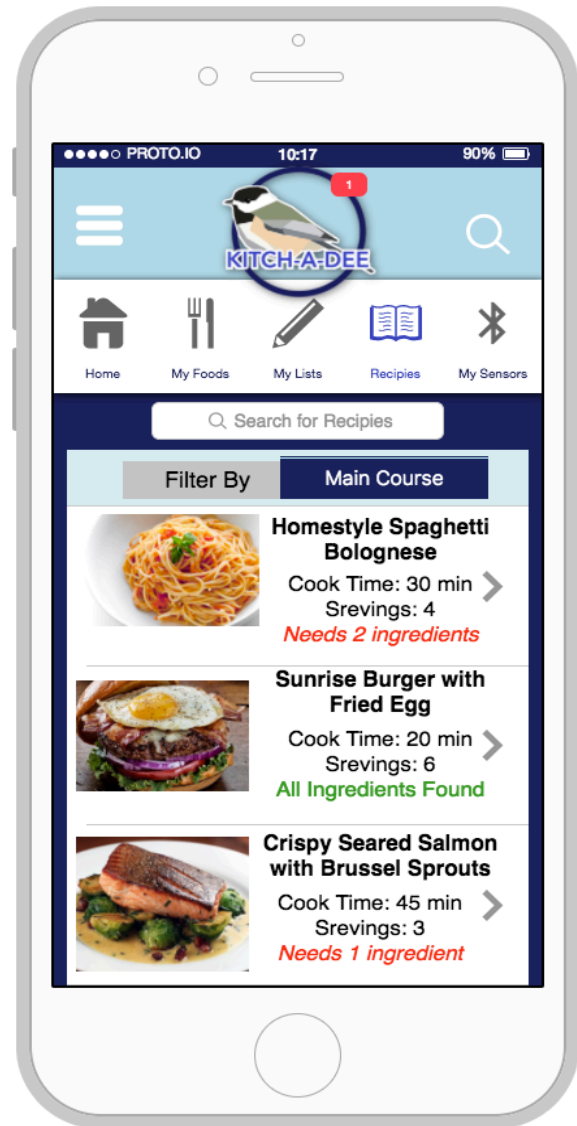
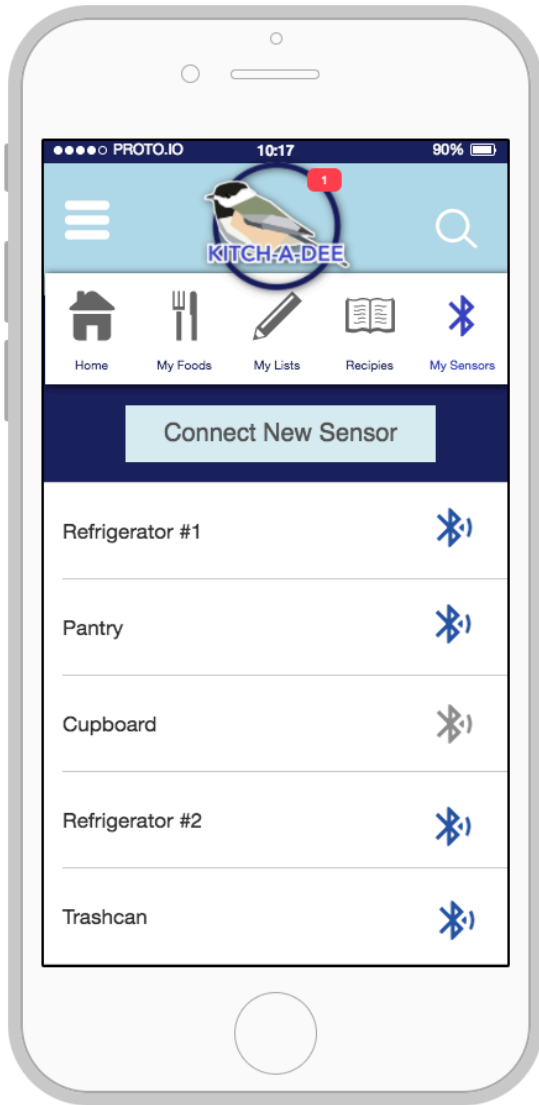
My Lists

- The **My Lists** page displays all grocery/shopping lists the user has created.
- The **Suggested Items** button recommends items based on previous data.



Recipes

- The **Recipes** page displays suggested recipes based on items the user has in the kitchen and can be filtered based on other preferences.
- Each recipe would distinguish between ingredients **still needed** and **already owned**.

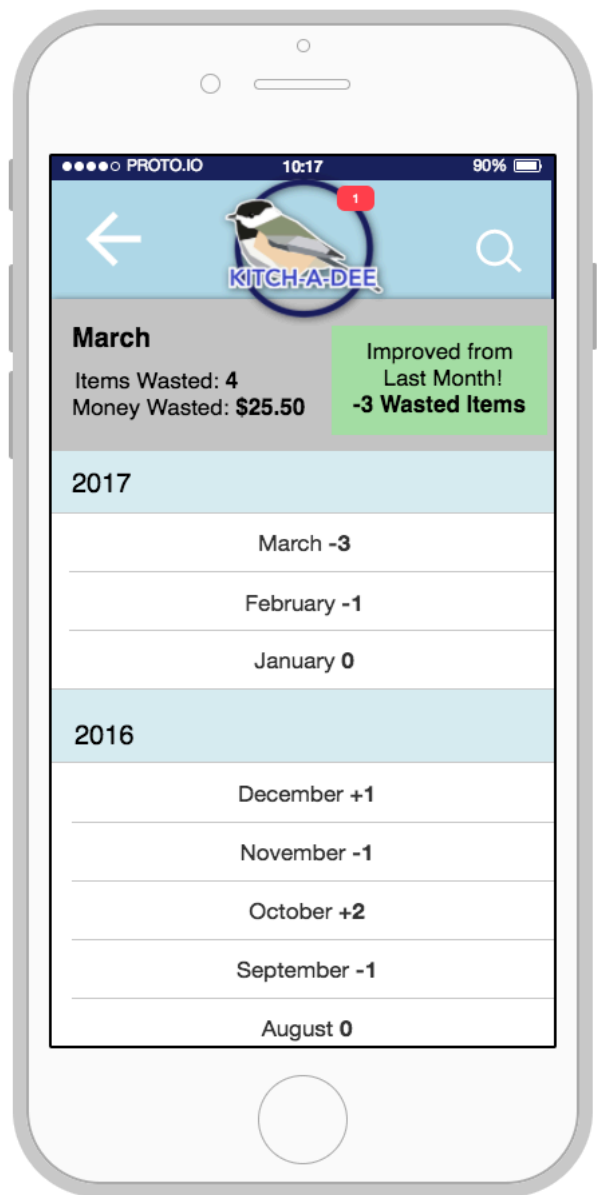
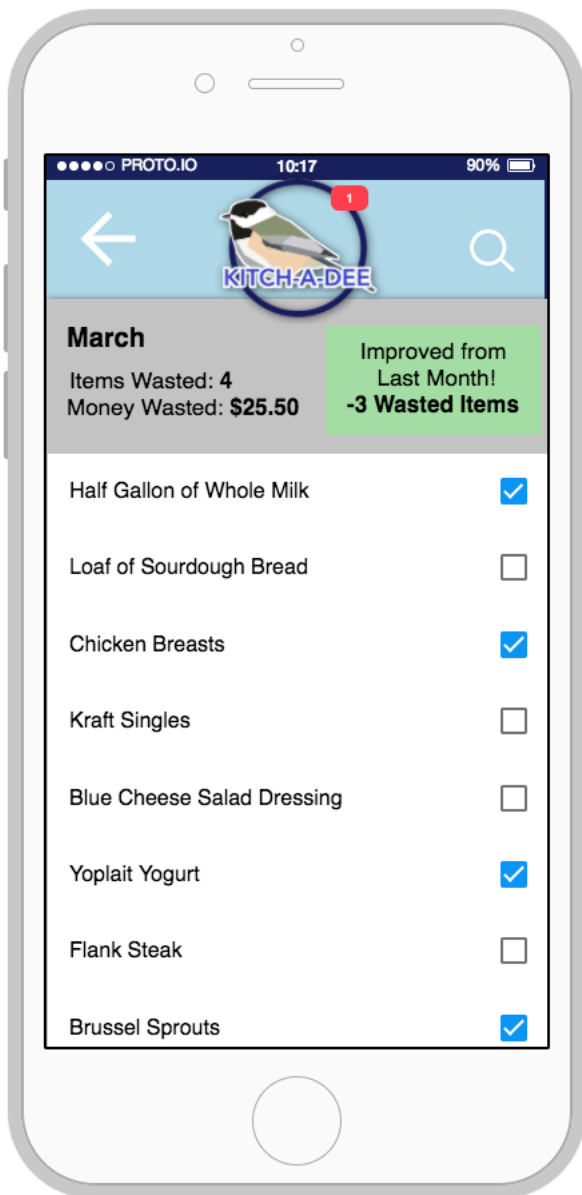


My Sensors

- The **My Sensors** page displays all RFID sensors connected in the kitchen.
- The sensors connect to the app via **Wifi** and to each other via **Bluetooth**.
- Sensors can be easily **added or forgotten** based on changing needs in the kitchen.

Waste Tracking

- **Waste Tracking** allows users to see if their waste habits have improved or worsened by tracking which items have expired.
- **Checked boxes** are foods the user still used after expiration and do not contribute to food wasted.



Conclusion:

Although part of Kitch-A-Dee is just an app, it'll do wonders in the average American household. Giving people access to their kitchen inventories literally at their fingertips mitigates the first problem of them forgetting what's in the kitchen. The notifications help them actively remember what needs to be used when so that nothing is wasted. Also, the inventories, in combination with a really convenient place to keep shopping/grocery lists, make it so that people won't overbuy food they don't need, saving them time, money, and waste. Meanwhile, the suggested recipes ease the process of making a home-cooked meal by giving ideas based on what is already in the kitchen, and perhaps what needs to be bought. As a result, users will hopefully spend less money on other food options and get their families together to make dinner; not only does this waste less food, but it gives them quality time that many people don't have in today's chaotic world. Finally, the waste tracking feature lets people actually see if they've wasted more or less food in a given period of time, and by noting the amount of both food and money wasted, it will guide users as to what direction they should go. Of course, the hope is that overtime, the food wasted will go down in conjunction with money wasted.

Now, in terms of the actual sensor itself, it's easy to install with its adhesive back and relatively compact size. Even those with some sort of disability could do it, or at least ask a friend to stick it in their kitchens for them. The programmable feedback of either lights or sound (or both) will be especially helpful for the hearing or visually impaired, and let them know that their Kitch-A-Dee system is in fact working. Although our official cost analysis only included hardware, it came to \$37.96, which is fairly affordable for people. Lastly, in creating this system, impact on the environment will inevitably be reduced when people stop wasting food. All in all, we managed to alleviate all the main problems and meet the needs and desires of the average American household in a solution to this problem - and this is something we're all extremely proud of.

To summarize, Kitch-A-Dee is an organizational information system that has the potential to successfully encourage families to save both food and money while at home in their own kitchens. Not only is Kitch-A-Dee extremely helpful economically and environmentally, it also makes shopping, cooking, and planning your weekly meals extremely convenient for the average American household. Kitch-A-Dee is the future of in home food storage.

