IMAGINE IOT
PROTOTYPE CHALLENGE

INTELLIGENT CUPBOARD

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Story

Summary

Managing food inventory within your home can be difficult. It is easy to forget or overlook key ingredients when planning a meal or purchasing a product in excess. The ‘Intelligent Cupboard’ system has been designed to track and manage food inventory with minimal disruption to the user.

Storyline

A home owner needs to track the amount of food in their home. Knowing the quantity, type and location of all items can make food planning and preparation faster and easier as well as simplify food purchasing.

Goals

This system tracks food inventory in real-time, as well makes it available to the user online. It provides notifications to the user when certain food products are low quantity or out of stock. This system can be retrofitted into an existing cupboard and is scalable to the needs. Finally, the solution must be easy to use, and as low effort and unobtrusive. There should be minimal impact on the user’s usual process and behaviors.
Persona Template – Dave

Dave
Working Parent

My life is hectic, I have a job, a family and a lot of responsibilities. I need tools and solutions to simplify my life and duties.

About
• 35, married with 3 young children
• Software developer for a small startup company.
• Very busy, the nature of a startup means a diverse role with lots of long hours.
• Provides care and support 3 children, including meal preparation, homework help, driving to school and extracurricular activities.

Responsibilities
• I am a software developer, part of a product development team.
• I am always connected and need to be available to support our products and customers.
• I drop my kids off at daycare and school, and need to pick them up at the end of the day.
• I have to prepare meals for my family including breakfasts and lunches.
• I help my kids with homework, and make sure they go to bed at a reasonable time

Needs
• Need a way to make food preparation and prepare easier and faster.
• Need to make an up to date grocery list without having to manually inventory my cupboards every time.
• Need to be able to enter and update food inventory without a lot of data entry

Main Goals
• Maintain a work life balance, so I don’t get absorbed by work and have time for my family and myself.
• Prepare healthy meals for my family, despite having little time at the end of the day.
• Find efficient solutions to minimize the time I spend on my chores and responsibilities.
• I want to spend time with my kids, so I can watch them grow up.

Pain Points
• Don’t have time to make an accurate or complete shopping list.
• I often forget important things at the grocery store, or buy extra of things I already have
• A system has to fit into my existing kitchen without costly renovation or customizations
Point of View

As a Working Parent

I need a way to easily and quickly manage and update my family’s food inventory.

so that I can plan and prepare healthy meals quickly and efficiently, even on days when I’m short on time.
### User Experience Journey: Make Dinner for the family

<table>
<thead>
<tr>
<th>ACTIONS</th>
<th>MINDSET</th>
<th>FEELING</th>
<th>TOUCH POINTS</th>
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</thead>
</table>
| - Get home from work  
- Enter the kitchen  
- Assess food inventory | - Ugh, again?  
- How much time do I have?  
- What’s in the fridge/cupboard? | 😊 | - Fridge  
- Cupboard/Pantry |
| - Select a Meal  
- Gather ingredients  
- Pull ingredients out of the fridge/cupboard | - What am I going to make?  
- Will the kids eat it?  
- Will it be done in time?  
- Do I have enough of this?  
- Can I use butter instead? | 😐 | - Recipe Website or Cookbook  
- Fridge  
- Cupboard/Pantry |
| - Begin preparing meal  
- Pull out dishes/tools  
- Preheat oven/stovetop | - Preheat it to 450°F, no wait, it says 400°F  
- Measure this and that  
- Mix it in with what? | 😨 | - Oven  
- Measuring tools  
- Bowls/Pans/Pots  
- Cutlery |
| - Cooking the meal  
- Setting the table  
- Wrangling the kids | - Is it done yet?  
- Better set the table  
- “Dinner’s ready!” | 😊 | - Oven  
- Cutlery  
- Plates, glasses  
- Beverages  
- Fridge for beverages |
| - Serve the kids  
- Sit down at the table  
- Eat | - *om nom nom*  
- delicious | 😊 | - Cutlery  
- Plates, glasses  
- Beverages  
- Finished food  
- Fridge/Pantry |
| - Clean up  
- Put away dishes  
- Put away left over food  
- Put away unused ingredients | - How did that get onto the wall? My kids are so messy.  
- I don’t know what I’d do without my dishwasher  
- Better not forget to get more of this ingredient. | 😞 | - Cutlery, Plates, glasses  
- Left overs/Beverages  
- Dishwasher  
- Ingredients  
- Fridge/Pantry |
Intelligent Cupboard Hardware Mockup

**Idea #1 - Intelligent Shelf w/Cap Sensor**

- **Camera Module**: Built into the base of the shelf, the camera module is used to scan barcodes from food products. Barcode information is sent to the App and checked against a food barcode database.
- **Load Sensors**: Either built into the shelf or the shelf pegs that support the shelf, the load sensors monitor the weight of each scanned food item as it is added or removed to the shelf. Food weight is paired with the scanned barcode and relayed to the App.
- **Capacitive Sensors**: Built into the intelligent shelf (Idea#1), the cap sensor creates specific zones for more accurate food location.

**Concept**
The Intelligent Cupboard uses several integrated sensor technologies, all Wifi or Bluetooth enabled.

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**Load Sensors**: Either built into the shelf or the shelf pegs that support the shelf, the load sensors monitor the weight of each scanned food item as it is added or removed to the shelf. Food weight is paired with the scanned barcode and relayed to the App.

**Capacitive Sensors** (*optional*): Built into the intelligent shelf (Idea#1), the cap sensor creates specific zones for more accurate food location.

Intelligent Cupboard Process Mockup – Filling the Cupboard

Dave buys a box (or bag) of food.

When Dave puts it in the cupboard, he uses the camera to scan the barcode.

The camera reads the barcode and registers it.

Dave puts the food on the shelf. The Intelligent shelf peg registers the weight of the box.

The Intelligent cupboard now knows:
- What food has been put in the cupboard
- Where it is stored
- The quantity of the food

The cupboard updates the app, and Dave now has a real-time inventory of his food.
Intelligent Cupboard Process Mockup – Modifying the Inventory

Dave is cooking, he needs the box of food.
When he takes the food out, he scans it on the camera module.
The Intelligent cupboard updates the inventory with the new quantity.
When Dave is done, he returns the food to the shelf. The new quantity is updated in the app.

If the Quantity remains at zero, the app moves the food onto the grocery list, and/or sends notification to Dave for him to buy more next time he is shopping.

Intelligent Cupboard App Mockup

Penne Pasta
Brand
Description
Current Quantity
Penne Pasta
Brand
Description
Current Quantity
Tomato Sauce
Brand
Description
Current Quantity
Settings
Shelf 1
Configure Shelf
 calibrated
Shelf 2
Configure Shelf
 calibrated
Shelf 3
Configure Shelf
 calibrated
Notifications
Notify by:  
EMAIL:Example@Example.com  
PHONE: 555-555-4321
Send Notifications:  
Every 1 Week
Weekly
Every 4 Weeks
Monthly
Notify me when:  
Favorite item has 0 quantity
Any item has 0 quantity
Automatically add favorite items to grocery list