



CS410 Team Bronze

Fall 2025

Design

Spoiler Alert

‘No Surprises at the Table’



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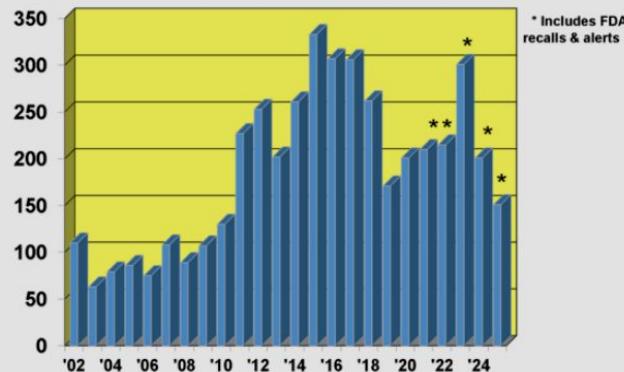


Mark Stoegbauer
Webmaster

FSIS Issues Public Health Alert For Ready-To-Eat Meals Containing Pasta That May Be Contaminated with Listeria

Food recalls happen all around us...

U.S. FDA Food Allergen Recall Incidents
2002-2025



- Foodborne Illnesses such as Listeria and Salmonella. Allergen Contamination. Foreign Materials, including heavy metals.
- These are all dangerous, especially for the most vulnerable among us.
- These can all be life threatening for the elderly, pregnant, allergic, and immunocompromised.

And they're still happening.

- The FDA has reported almost 300 recalls in the last year.
- This comes out to millions of pounds of food.
- Almost 60 million pounds of Hillshire Brands corn dogs were recalled late this September.

58 million pounds of corn dogs recalled over possible wood in the batter

 nbcnews.com | 1 day ago

Jimmy Dean and State Fair are included in the recalled brand list.



News report on the huge corn dog recall.



Listeria Outbreak Linked to Prepared Pasta Meals

FAST FACTS

- **Cases:** 20 (3 new)
- **Hospitalizations:** 19 (3 new)
- **Deaths:** 4 (1 new)
- **States:** 15 (2 new)

CDC report about an ongoing recall involving Trader Joes and Albertsons Pasta

Yet, many don't hear about recalls.



TASTE OF HOME. GETTY IMAGES

Two potential issues are ignorance and incentive. Some people just don't think they could get sick from the chance of encountering a recalled good, or just don't think about it.

The average person does not see many FDA or CDC reports.

According to Dr. William Hallman during the 2025 Food Safety Summit:

- 13% of Americans visit government sites for recall information.
- Only 3% are subscribed for automatic reports on recalls.

This can even affect the companies terribly. With some infected food lawsuits involving millions of dollars.

Such as when Conagra paid over \$40 million in civil lawsuits over salmonella in peanut butter.

The Problem

Food recalls happen all the time, however, there isn't an adequate reporting system overall. It is vital that everybody receives topical recall reports promptly, yet many do not. This is a major safety concern for consumers, as companies don't take proper precautions.

Despite official resources being a thing, their own notifications are restricted to email, not an optimal form in the age of the smartphone. Existing apps also fall short, not being personalized or appealing enough to the average user to be noteworthy.





Who is Affected

Users

Everyday consumers:

Anyone who buys, cooks, or consumes food can benefit.

Health-conscious individuals:

People with dietary restrictions, chronic illnesses, or vulnerable immune systems.

Families and caregivers:

They need immediate alerts about recalls to protect their children, elderly, or others at higher risk.

Stakeholders

Farmers: Faster reporting helps them protect their reputation and respond quickly.

Stores: Timely alerts allow them to pull unsafe products from shelves before customers are harmed.

Restaurants: Food service providers who could unknowingly serve recalled items.

Regulatory agencies: Improves public safety by ensuring information reaches more people faster

Problem Characteristics

- Cause
- Effect

Awareness Gap:

- Food recalls announced by the FDA/USDA spread slowly and unevenly.
- Consumers aren't aware of unsafe conditions that may cause harm

Customization Gap:

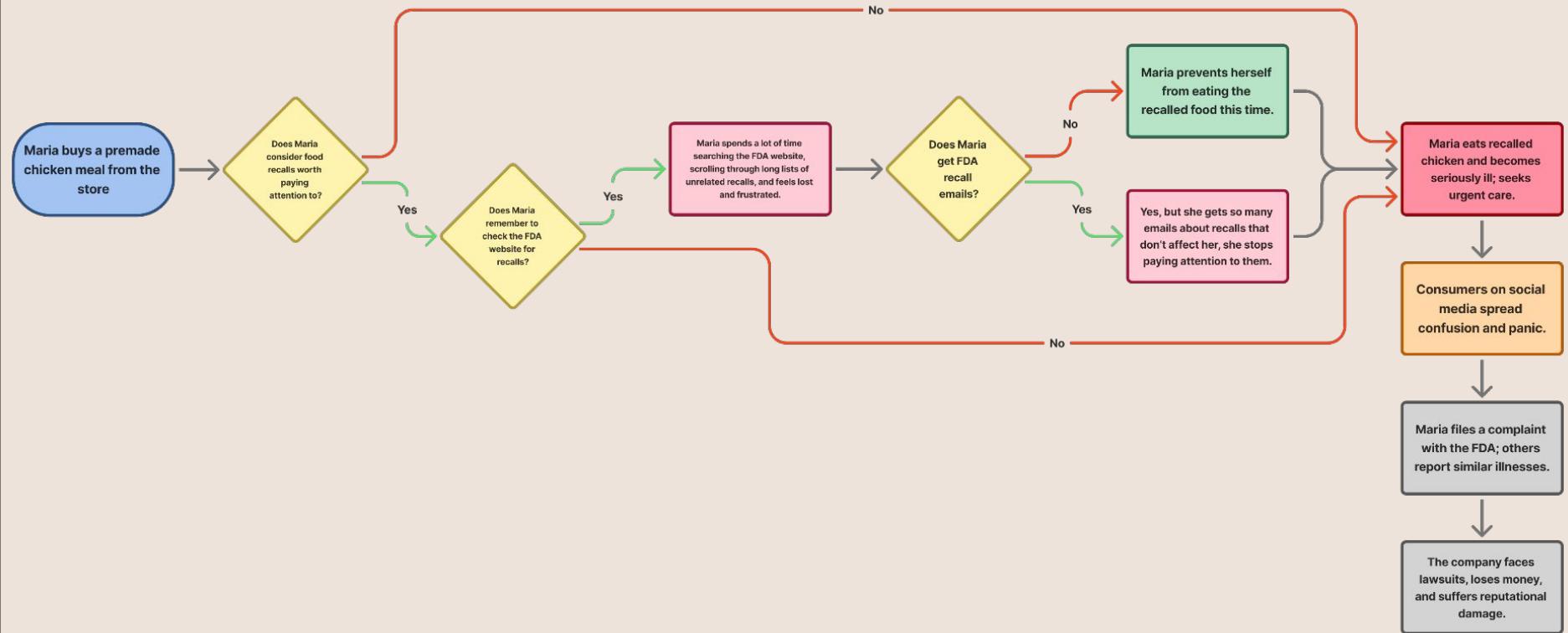
- Other apps do not allow you to customize what medium you are notified by, rather only having one method of notification
- User experience suffers at the cost of mediocre interfaces

Engagement Gap:

- Many consumers don't view recalls as something that requires urgent attention
- This causes consumers to be uninformed for prolonged periods of time, causing risk.

Urgency Gap:

- There are no direct, reliable channels to consistently reach users with information regarding recalls
- Misinforms people with allergies to be put at risk



Current Process Flow



Solution Statement

Spoiler Alert: An innovative web & mobile application that delivers personalized, immediate, and trustworthy food recall alerts.



- ★ **Speed & Urgency** → Instant notifications (push, email).
- ★ **Clarity** → Simple, consumer-friendly language for critical information.
- ★ **Personalization** → Allergy filters, barcode/receipt scanning, custom channels.
- ★ **Trust** → Direct FDA/USDA data in one reliable platform.

Result: Families, caregivers, and vulnerable individuals stay safe – no surprises at the table.

Solution Characteristics

Centralized Recall Awareness

A single platform where recall information is collected and delivered consistently so consumers don't miss important updates on recalled products. Information is conveyed in a clear and concise manner to make recall information easy for consumers to understand.

Personalized Notifications

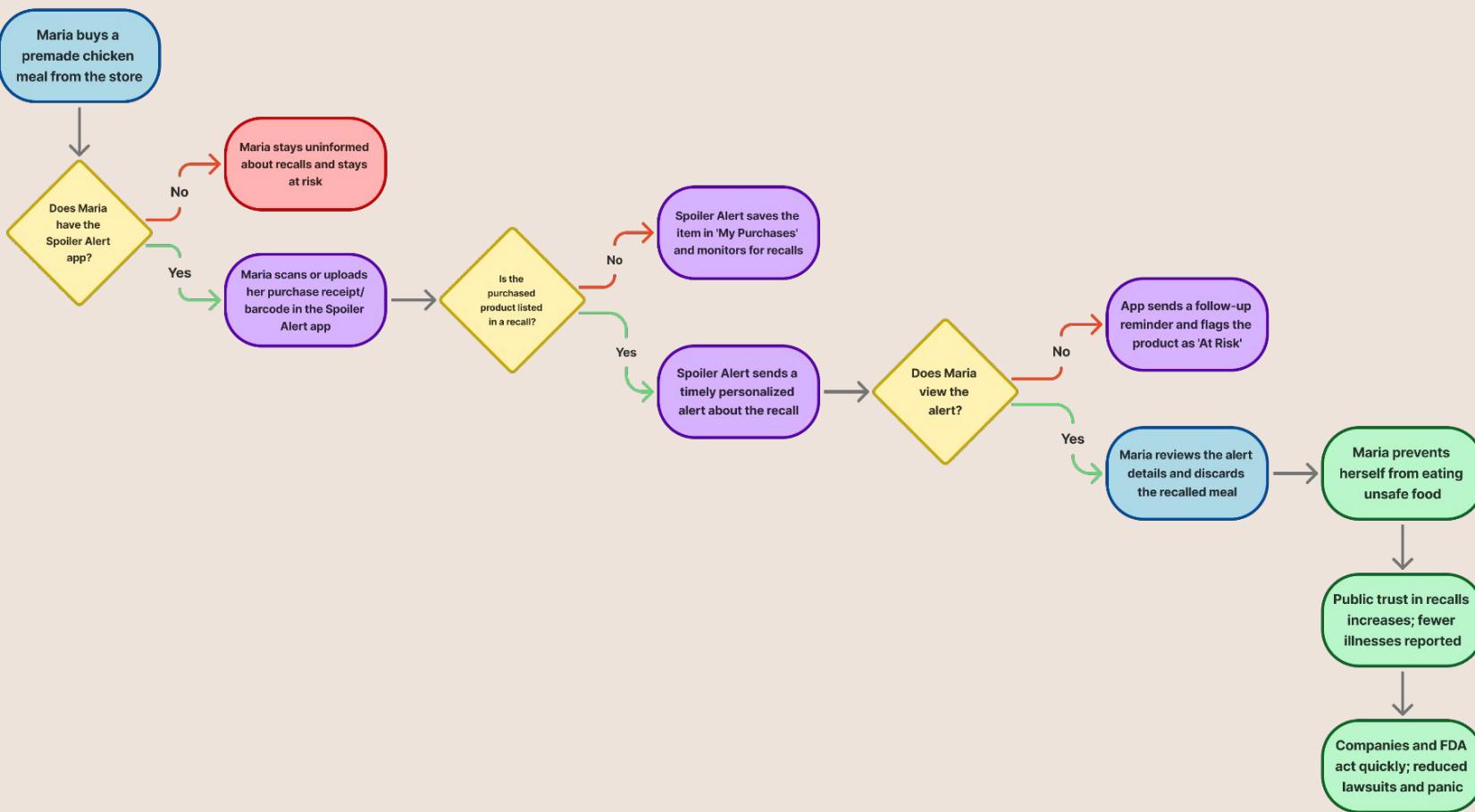
Users are given flexible options on how they wish to be notified of recalls. The consumer has the customizability to make their choice of app notifications, text messages, or emails to fit best into their daily life.

Consumer Motivation

Notifications highlight the immediate importance of recalls. Users will be able to get relevant recall information based on their individual preferences, keeping them motivated to stay informed.

Immediate and Reliable Alerts

The use of dependable and customizable delivery of notifications ensures recall information reach users without delay. Users that have specific allergies or conditions can have alerts marked as critical.



Solution Process Flow

Basically, what will it do?



- Provide the user with **notifications** on recalls for **food, home goods, cosmetics, and pharmaceuticals**
- Allow the user to choose the form of notifications they get such as **email or in-app notifications**
- The user will have a limited number of scans per week to **read barcodes on specific products** and save it to their inventory in order to be later notified for future recalls
- Provide up-to-date **FDA notifications** on recalls
- The user will be able to search **keywords** such as “chicken” or “bread” to search for recalls from **any company**, as well as searching for the company itself
- Allow the user to add specific **allergies** in order to get future notifications on recalls involving cross contamination or previously unlisted allergens in products
- Allow the user to keep track of their purchase history through an **inventory**



What will it do when you go premium?



- The user will have an unlimited number of scans to **read barcodes on specific products** and save it to their inventory in order to be later notified for future recalls
- Allow the user to **scan receipts** from recent purchases to add all items from the receipt to their inventory in order to be notified for future recalls



What it doesn't do:



- The app will not **crowdsource information** on recalls in any way.
- Provide information for recent recalls on **automobile or watercraft** products
- Allow the user to take a picture of a product **outside of its container** to find recall information on it
- Guarantee **legal/medical advice** or substitute official government recall sources
- Track recalls **outside the U.S.**
- Act as a **universal scanner** for every product type on the market
- **Automatically refund or replace** recalled products
- Detect **counterfeit goods** or **verify authenticity** of products
- Work without **internet access**

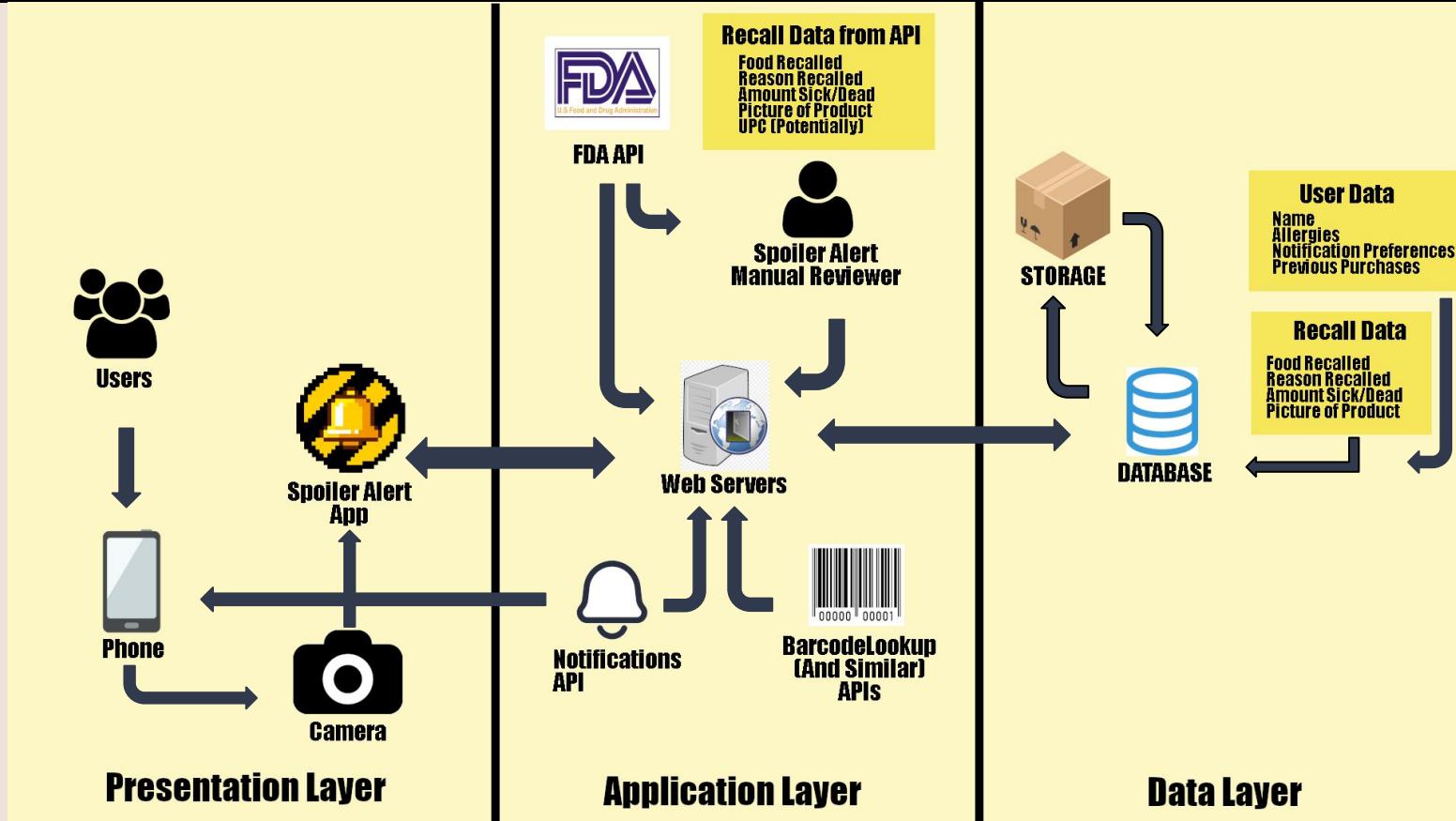


Competition Matrix



	Spoiler Alert	Food Recalls & Alerts	Target	USA Recalls
Food Recall Reports	✓	✓	✓	✓
User-Friendly Interface	✓	✓	⚠ Too complicated	✓
Notification Customization	✓ Email, Push-notifications	⚠ Push-notifications	✗	⚠ Email, Push-notifications
Barcode Scanner (Free)	✓	✗	✗	✓
Subscription for Premium Features	✓	✓	✗	✓
Scan Receipt (Premium)	✓	✗	✗	✗
Customized Allergens Alerts (Premium)	✓	✗	✗	✗
Keyword Recall Search	✓	✓	✓	✓

Major Functional Components





Development Tools

Communication	Discord
Version Control	Git / GitHub
IDE	VSCode
Collaboration	ClickUp
Front End	Swift
Back End	Python (Flask Library)



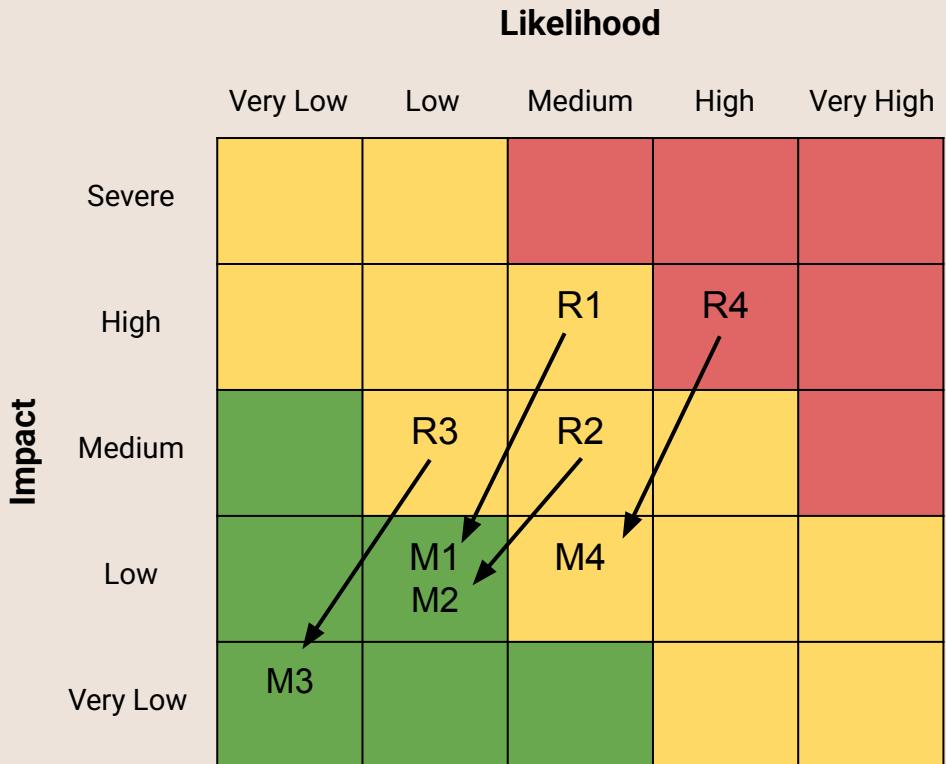
User Risks

Risk Factors:

- R1:** Users may suffer from alert fatigue, from recalls concerning products not relevant to the user.
- R2:** Users may forget to turn push notifications on, causing a delay in information.
- R3:** Regional differences may cause misinformation.
- R4:** Users may not want to share their personal medical information with the app.

Mitigations:

- M1:** Spoiler Alert customizes reports, so the user only gets notified of the reports that are relevant to them.
- M2:** Spoiler Alert will alert users that their notifications are off whenever they open the app.
- M3:** Spoiler Alert will ensure that the regions affected will be one of the first things users see when looking at a recall.
- M4:** Spoiler Alert will ensure users that the app will encrypt and responsibly store the data. Users may also continue to use the app without entering this data at all.





Technical Risks

Risk Factors:

R1: Certain stores may have unique product code formats on their receipts that the app will have trouble looking up.

R2: Low user camera quality can result in unreadable scanning

R3: APIs may have downtime or contain broken data, slowing down or stopping Spoiler Alert's ability to report.

R4: Most recall APIs (FDA, USDA, CPSC) do not include UPCs in their metadata, making it difficult for Spoiler Alert to match scanned product barcodes to active recalls.

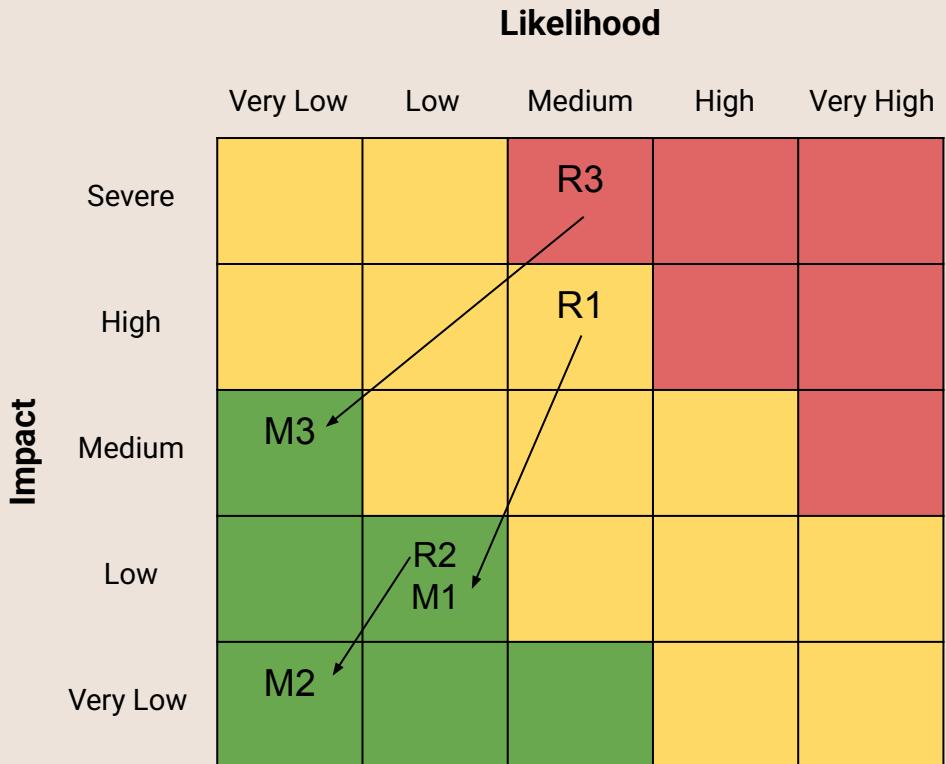
Mitigations:

M1: Spoiler Alert will work with the bigger stores to make those product codes searchable for recall logging.

M2: In the case camera quality makes the receipt unreadable, the user can manually input the product code.

M3: If APIs for any reason are unreadable, the servers will attempt to read from the API a few more times. If this still fails, sources will be manually reviewed by staff until the API works once more.

M4: Spoiler Alert will maintain its own UPC database from manufacturer sites, official recall web pages, and product catalogs when the real APIs don't include it.





Legal/Security Risks

Risk Factors:

R1: Personal information, such as medical and payment information, can be subject to data leaks.

R2: Relying on companies relaying information to Spoiler Alert may cause misinformation and conflict with FDA announcements.

R3: Companies may try to litigate Spoiler Alert for reports that damage their image.

R4: The app may collect sensitive personal and medical information without consent.

R5: User purchases a product that gets recalled later on. SpoilerAlert may not connect the purchase to the recall and will fail to inform the user.

Mitigations:

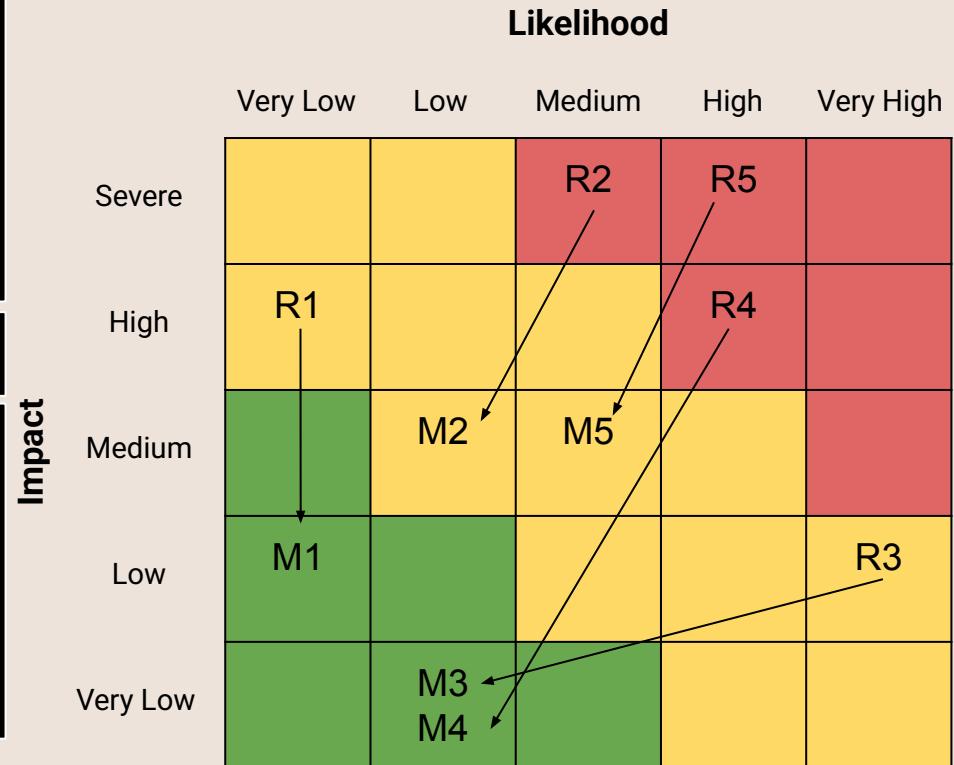
M1: SpoilerAlert uses up-to-date security protocol to assure against data attacks.

M2: Spoiler Alert will cite sources and allow the user to authenticate the information they are receiving is true.

M3: Companies should be held accountable for harm regardless of litigation.

M4: App informs and gets users consent with terms of service and privacy policy agreement upon account creation.

M5: Popup disclaimer and user agreement to warn about possible missed recalls and limit SpoilerAlert's liability.



Our Conclusion

Spoiler Alert is important because it is the next frontier in user safety and awareness!

Many of those who may not get quick, consistent communication are at risk of food poisoning and contaminated food. Awareness could save millions of lives!

With multiple channels of notification, Spoiler Alert is fills the gap for obtaining recall information, combining all the utilities of existing solutions and more.



Spoiler Alert
'No Surprises at the Table'



User Roles

Free User:

Free users get the baseline functionality of Spoiler Alert, which includes:

- Recall Notifications
- Keyword Searching
- Inventory & Limited Barcode scanning

Premium User:

Premium users get extended functionality from Spoiler Alert, including:

- Everything Free users have access to
- Receipt scanning
- Unlimited scanning
- Apply advanced filters by allergen or brand.

Recall Reviewer:

RRs are in charge of manually updating recall information the API doesn't, including:

- Review and verify recall data.
- Link missing UPCs to recalls
- Edit or import recall info if API fails
- Notify users after updates are approved.

Administrator:

Admin's goals are to ensure quality control and consistency across the app.

- Manage and delete user accounts.
- Approve or reject RR edits.
- Oversee system activity via Dashboard Statistics.
- Ensure data accuracy, privacy, and compliance.



User Stories

As a general user, I would like to receive notifications through email or in-app notifications so I can be alerted of recalls no matter where I am.

As a general user, I would like the app to tell me if an item I am scanning the barcode of has been recalled, so that I can inform the store promptly.

As a general user, I would like to view a list of recent recalls on the home page, so I can stay informed even if I miss an alert.

As a general user, I would like to be informed of relevant recall news on the app's homepage.

As a general user, I would like to search and filter recalls by food type or brand, so I can quickly find products I use.

As a general user, I would like to view recall details, such as the cause, affected regions, and affected people so I can decide whether I need to take action.

As a general user, I would like to create an account that saves my preferences, so I don't need to reselect them every visit.

As a general user, I would like to view my inventory of previously purchased items.

As a general user, I would like to remove items from my inventory of purchased items.

As a general user, I would like to filter include non-food items, like cosmetics or medication, so I have a complete safety overview.

As a general user, I would like to be notified if a scanned product is not yet in the database and receive a follow up notification once it's been researched, so I know whether it's safe or recalled.



User Stories

As a new user, I would like to sign up for Spoiler Alert, so I can be notified immediately when a food recall affects me.

As a new user, I would like to use my facebook or google account to sign up for Spoiler Alert faster.

As a free user, I would like to use my limited barcode scanning to get recall notifications on products I have purchased.

As a free user, I would like to be able to manually log purchased items to add to my inventory if I am unable to scan them.

As a premium user, I would like to set up advanced filters, so I only see the recalls most relevant to my household.

As a premium user, I would like to choose specific allergens to receive alerts only for recalls involving those ingredients.

As a premium user, I would like to scan receipts, so I can save all purchased items to my inventory without scanning each barcode individually.

As a premium user I want to have unlimited barcode scanning to get recall notifications on all products I have purchased without worry of running out of scans.



User Stories

As a recall reviewer at Spoiler Alert, I would like to be able to link an unlisted UPC I found to an ongoing recall in the app.

As a recall reviewer, I would like to be alerted if our server is unable to find the product being recalled, so I may manually find it.

As a recall reviewer, I would like to manually update missing information if the API fails to import all recall data properly.

As a recall reviewer I would like to notify users once the new UPC has been verified and added, so they know the system has been updated.

As an Admin for Spoiler Alert, I would like the ability to upgrade an account to premium.

As an Admin for Spoiler Alert, I would like the ability to degrade an account to general user.

As an Admin for Spoiler Alert, I would like the ability to delete an account.

As an Admin for Spoiler Alert, I would like to create accounts for other employees of Spoiler Alert.

Category	Feature	Free User	Premium User	Recall Reviewer	Admin
Account Creation	Account Registration with Email	✓	✓		
	Account Signup with Facebook or Google	✓	✓		
	Employee Account Creation				✓
Home Page	Recall Timeline	✓	✓	✓	
	Newsfeed	✓	✓		
Filtering	Basic Search & Filter	✓	✓		
	Advanced Filtering		✓		
	Allergen Filter		✓		

Feature Table



Category	Feature	Free User	Premium User	Recall Reviewer	Admin
Item Tracking	Inventory Viewing	✓	✓		
	Inventory Item Removal	✓	✓		
	Barcode Scanning	⚠	✓		
	Receipt Scanning		✓		
Searching	Manual Product Entry	✓	✓	✓	
	Keyword Recall Search	✓	✓	✓	
Notifications	Push Notifications	✓	✓	✓	
	Email Alerts	✓	✓	✓	
	Missing a UPC Notification	✓	✓	✓	✓
History	Recall History View	✓	✓	✓	

Feature Table

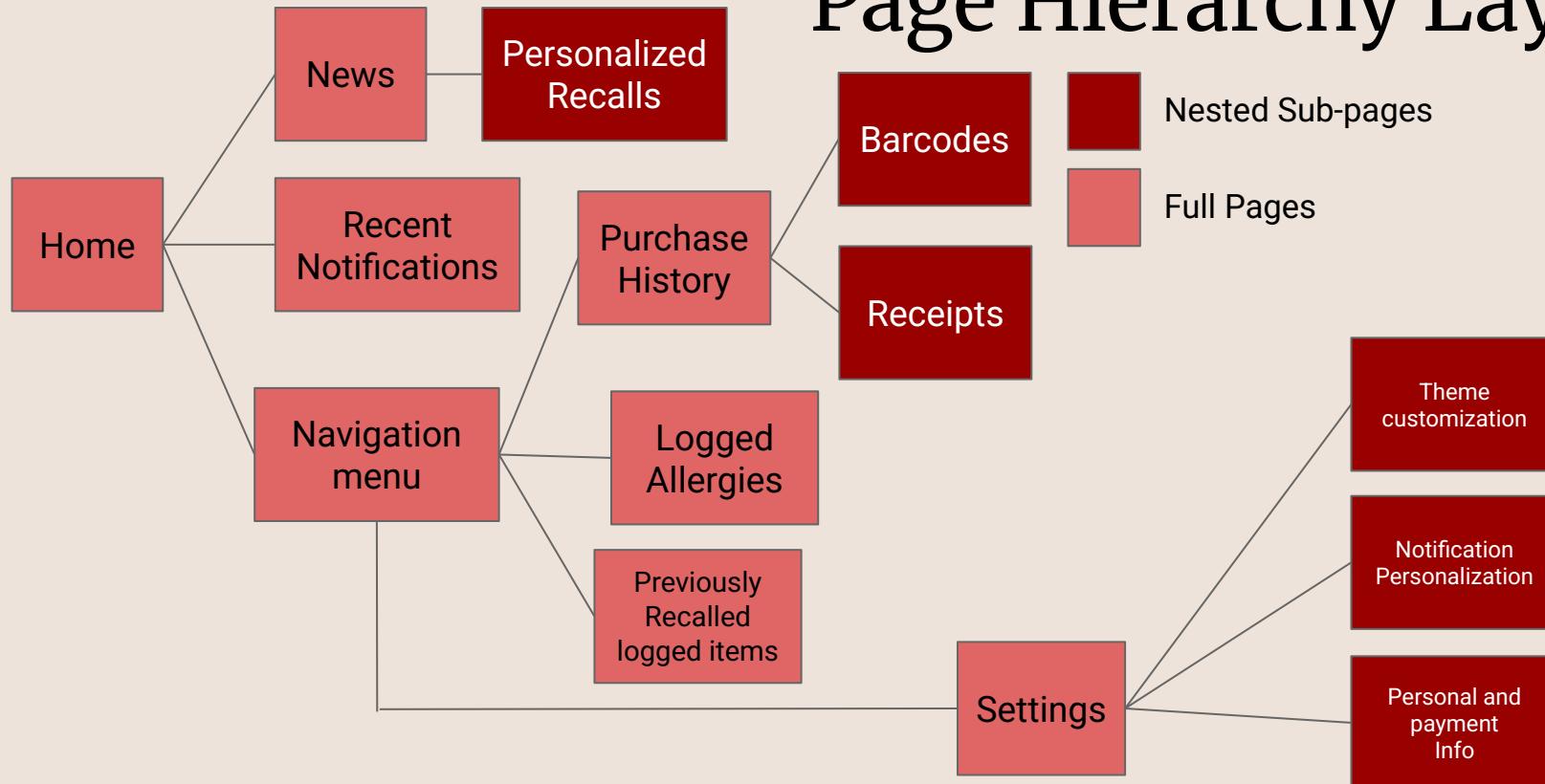


Category	Feature	Free User	Premium User	Recall Reviewer	Admin
Recall Feed	Recent Recalls List	✓	✓		
	Recall Details	✓	✓		
Recall Reviewer Dashboard	Recall UPC Linking			✓	
	Manual Recall Editing			✓	
	Notify Users on New UPCs	✓	✓	✓	
Administrator Dashboard	User Account Upgrading				✓
	User Account Degrading				✓
	User Account Deleting				✓
Analytics	Dashboard Statistics			✓	✓

Feature Table



Page Hierarchy Layout



User Interface Mockups



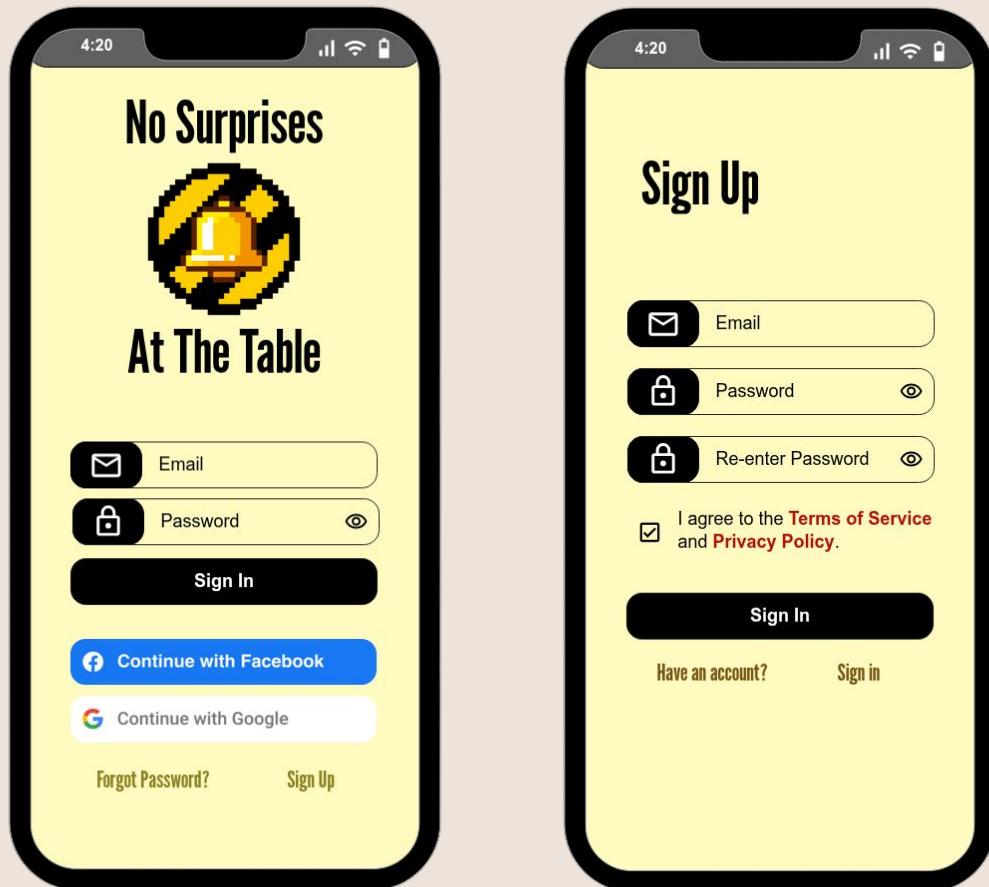
Sign in/Sign up pages

Sign in

- The option to sign in manually with an email or use Google or Facebook
- User can tap the eye icon in password to reveal what they've typed
- Allows user to sign up or reset password

Sign up

- Asks user to create a password and retype it
- Requires user to agree to Terms of Service and Privacy Policy

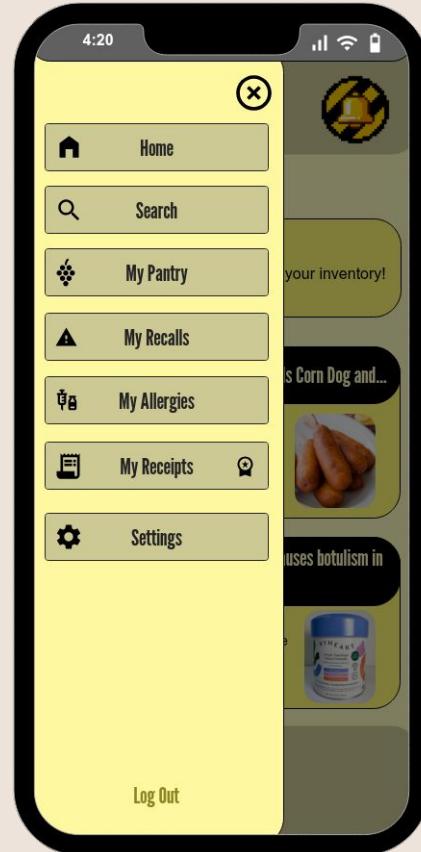


User Interface Mockups



Home Page

- Includes a button to automatically open the camera for quick receipt/barcode scanning
- Recent news articles about recalls
- An expandible hamburger menu in the corner to access other pages in the app such as settings and logged inventory
- important notifications and reports related to user (if any)

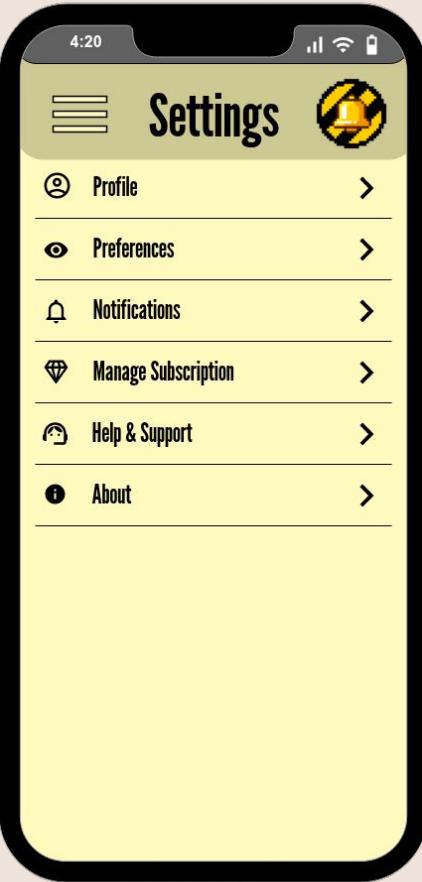


User Interface Mockups



Settings

- Dark or light mode option
- Option to change important information when necessary such as password, email, name, or notification preferences
- Option to manage subscription (switch to or cancel premium)
- Edit payment method for premium



Camera

- Allows the user to scan barcodes or receipts using the camera on their phone

User Interface Mockups



My Pantry

- Includes a personalized inventory list for each logged item from the user

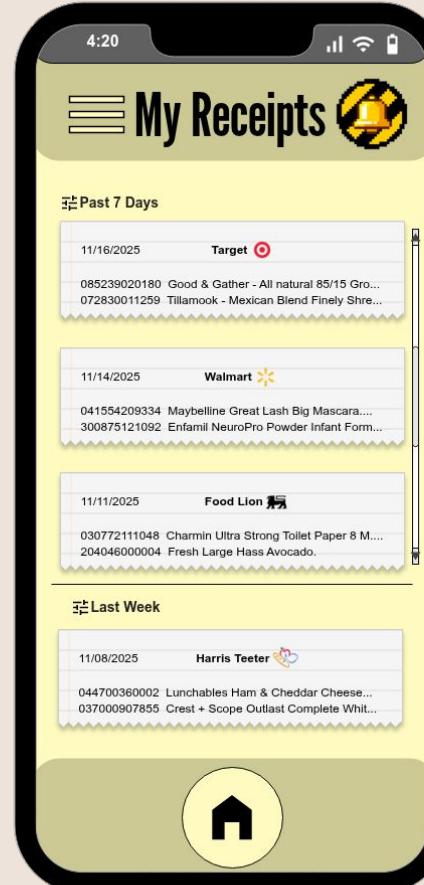


User Interface Mockups



My Recalls

- Shows a list of all recalls pertaining to the user



My Receipts

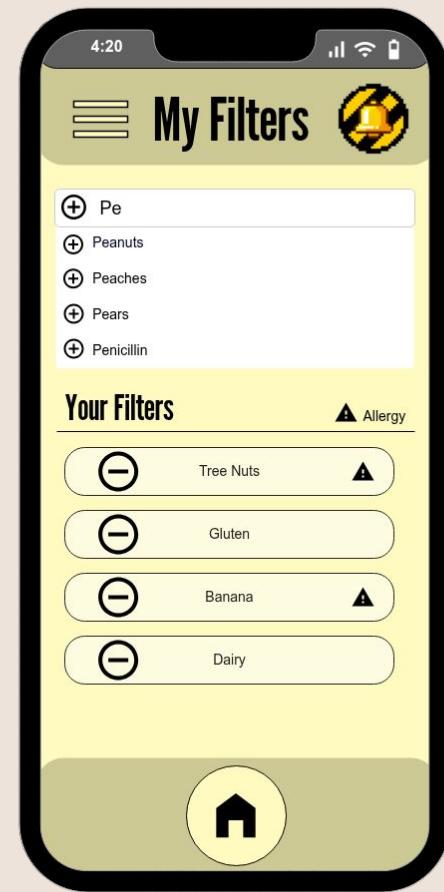
- Shows a collection of receipts that have been scanned into the app

User Interface Mockups



My Filters

- Shows all allergens the user has logged to be sure to check logged products for them



User Interface Mockups



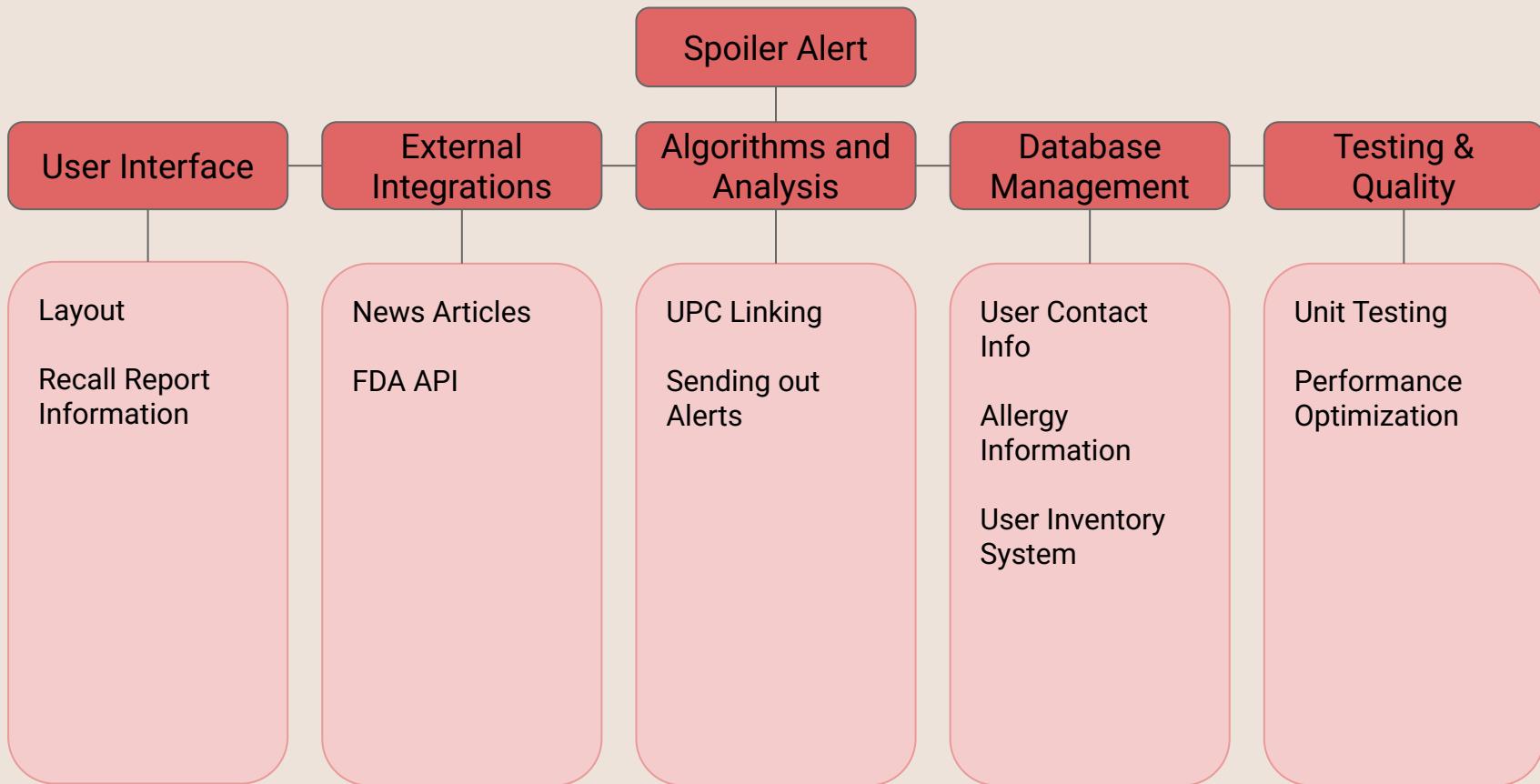
Search for Recalls

- The user can search for specific products or recalls



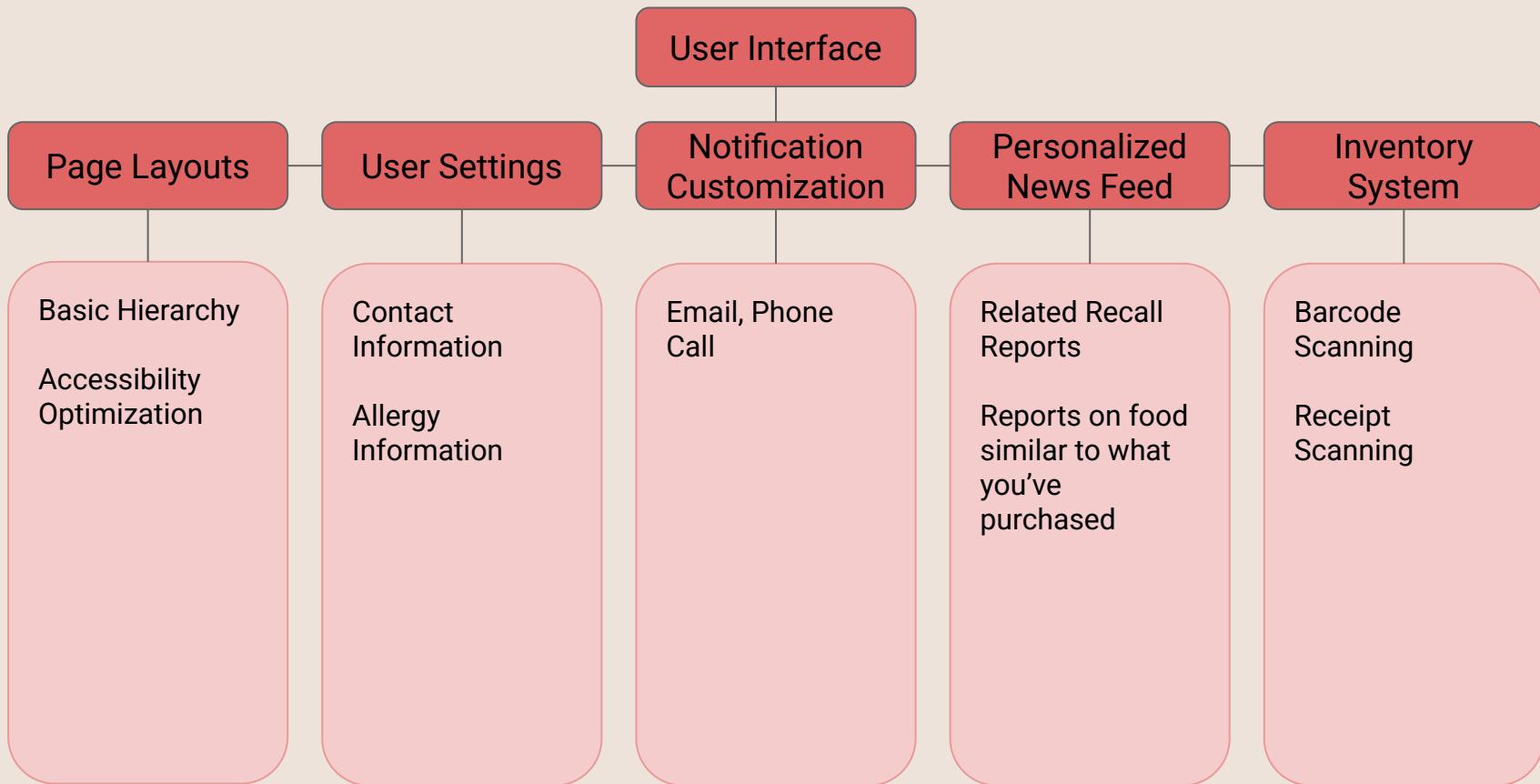
User Interface Mockups





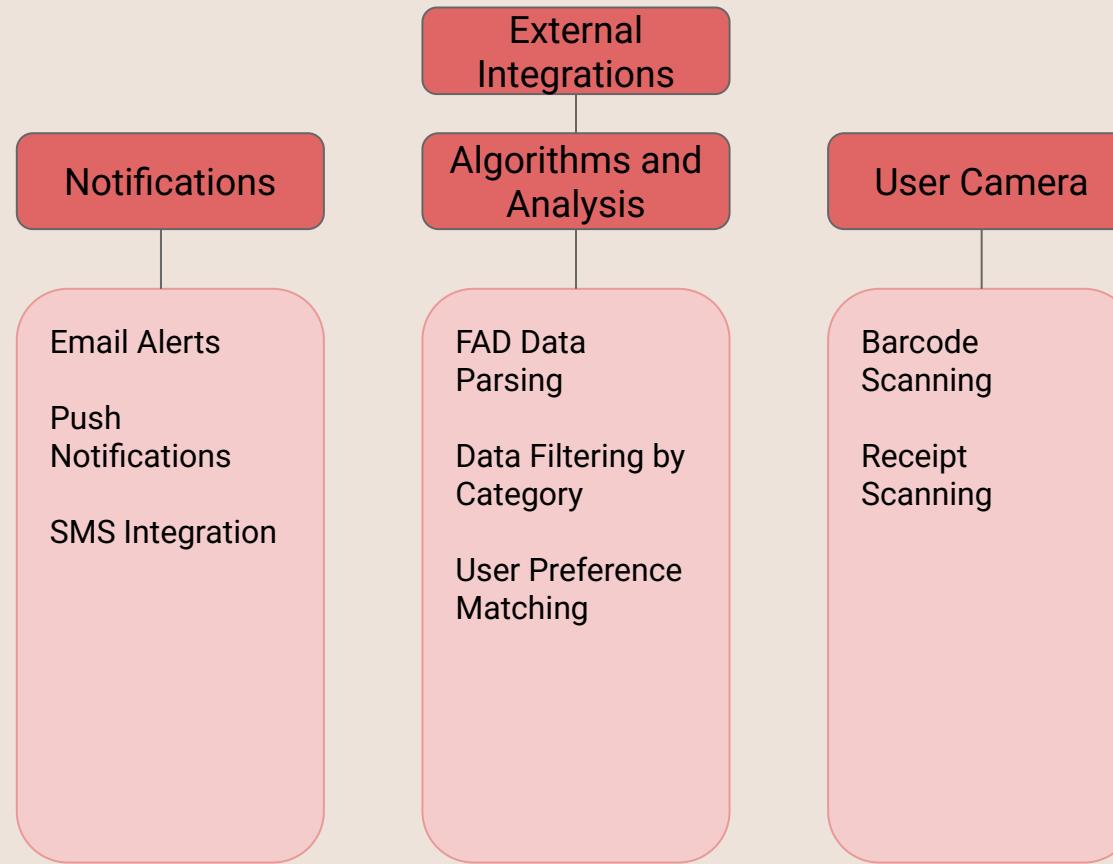
Work Breakdown Structure





Work Breakdown Structure

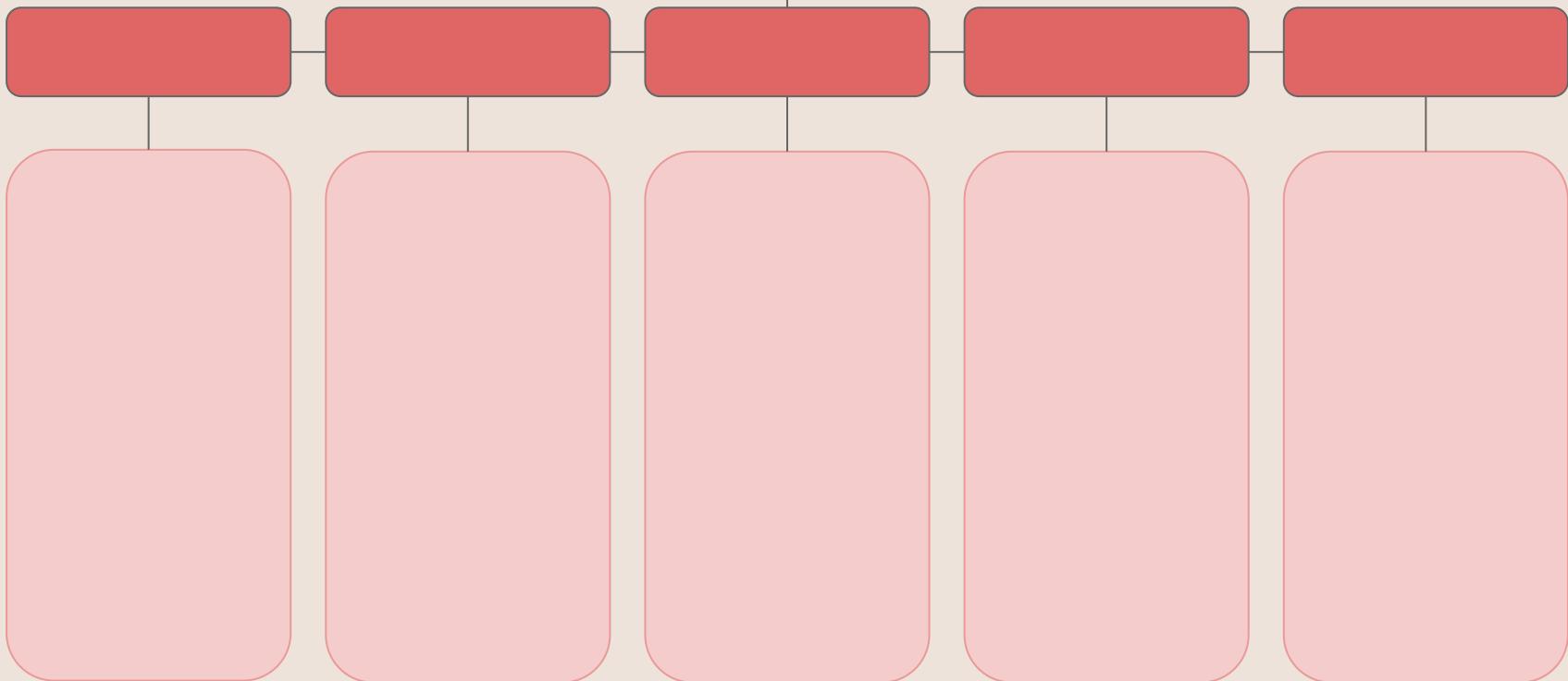




Work Breakdown Structure

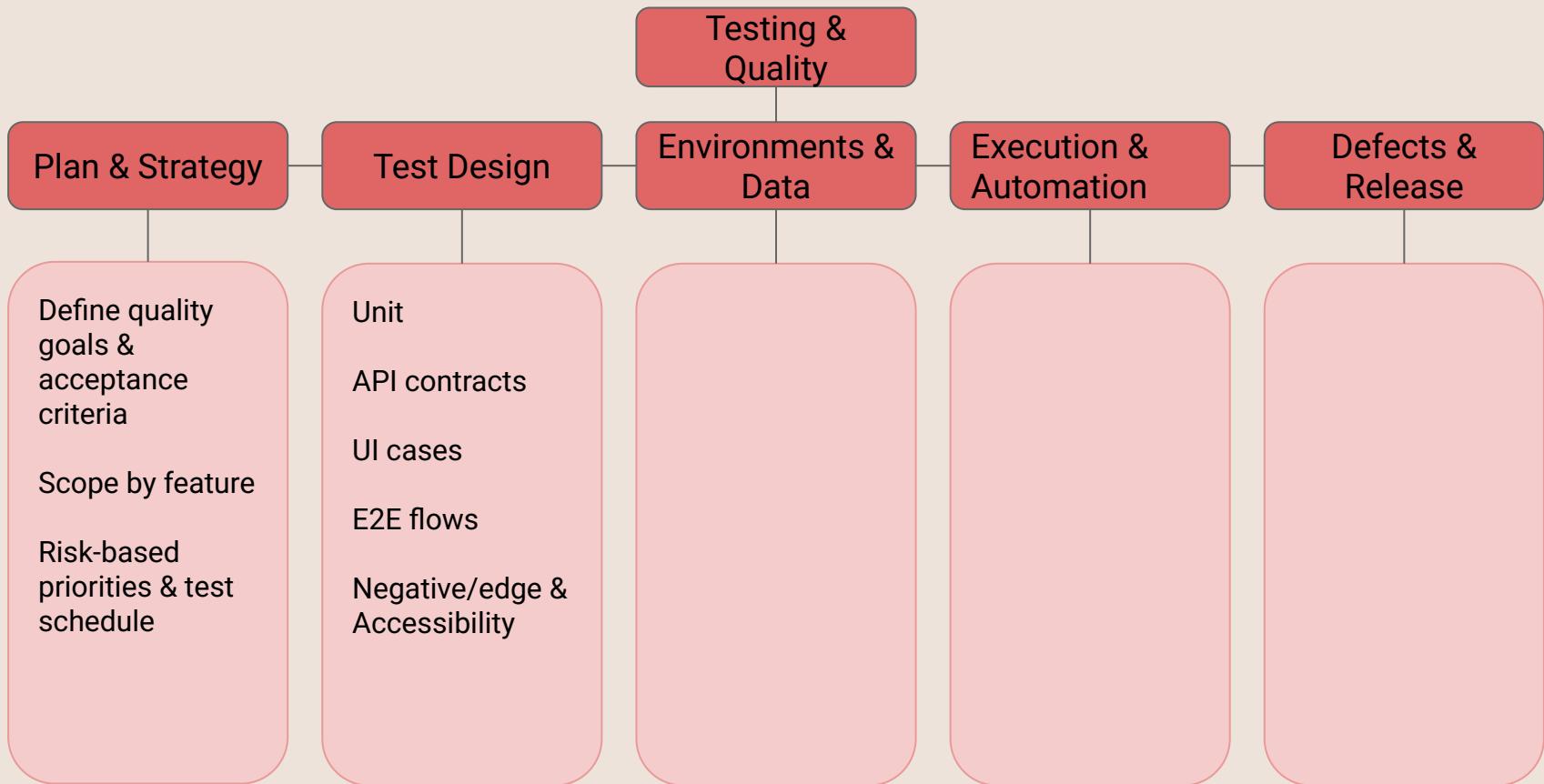


Algorithms and Analysis



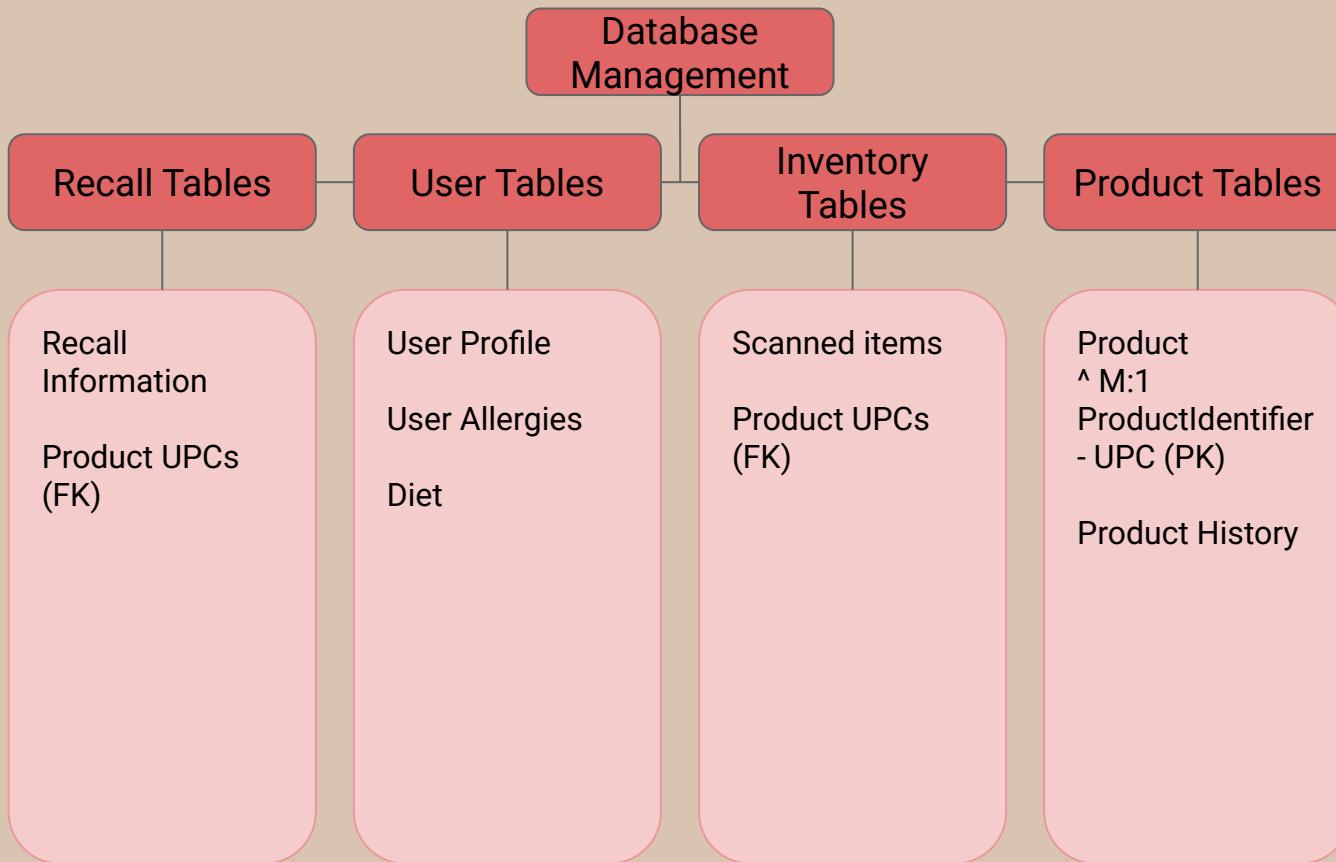
Work Breakdown Structure





Work Breakdown Structure





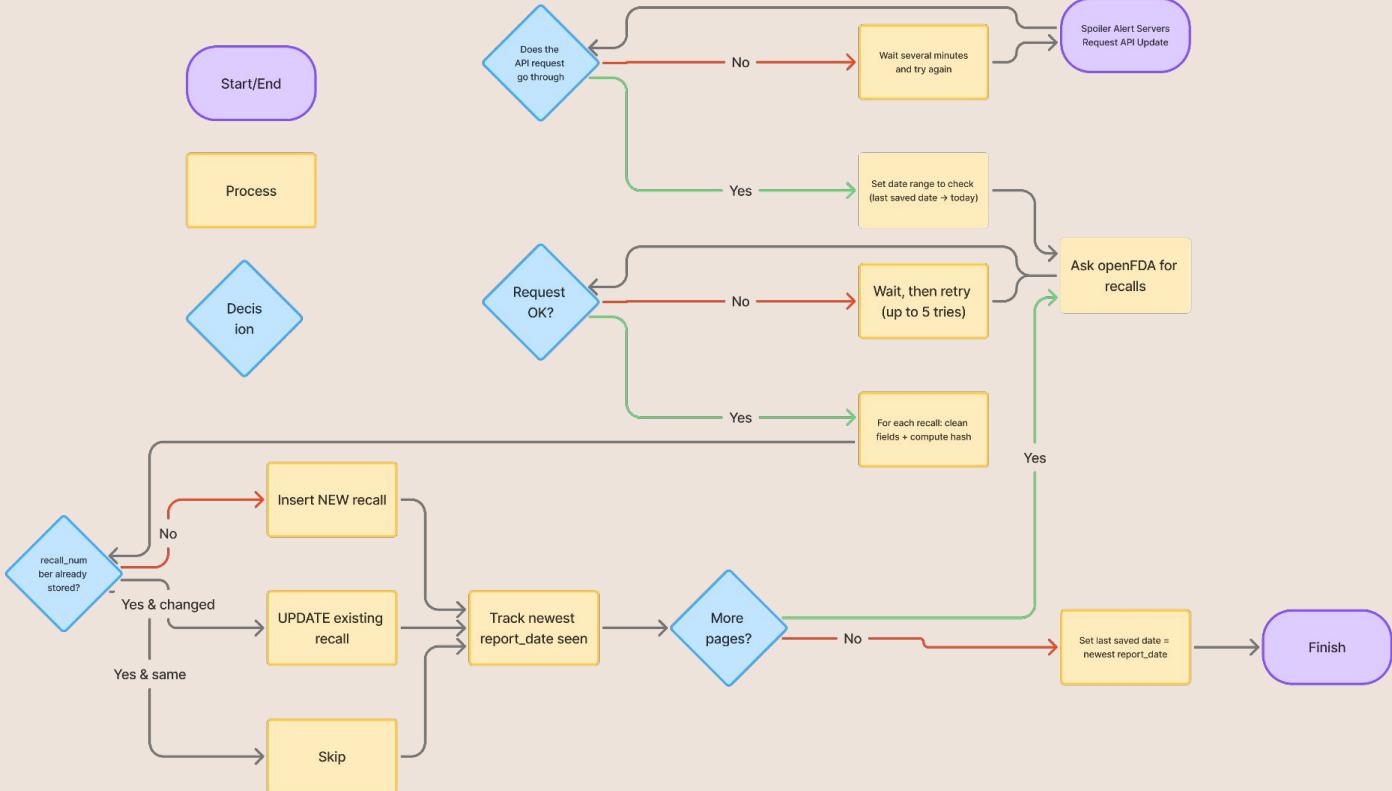
Work Breakdown Structure



Algorithms: FDA API Data Grabbing



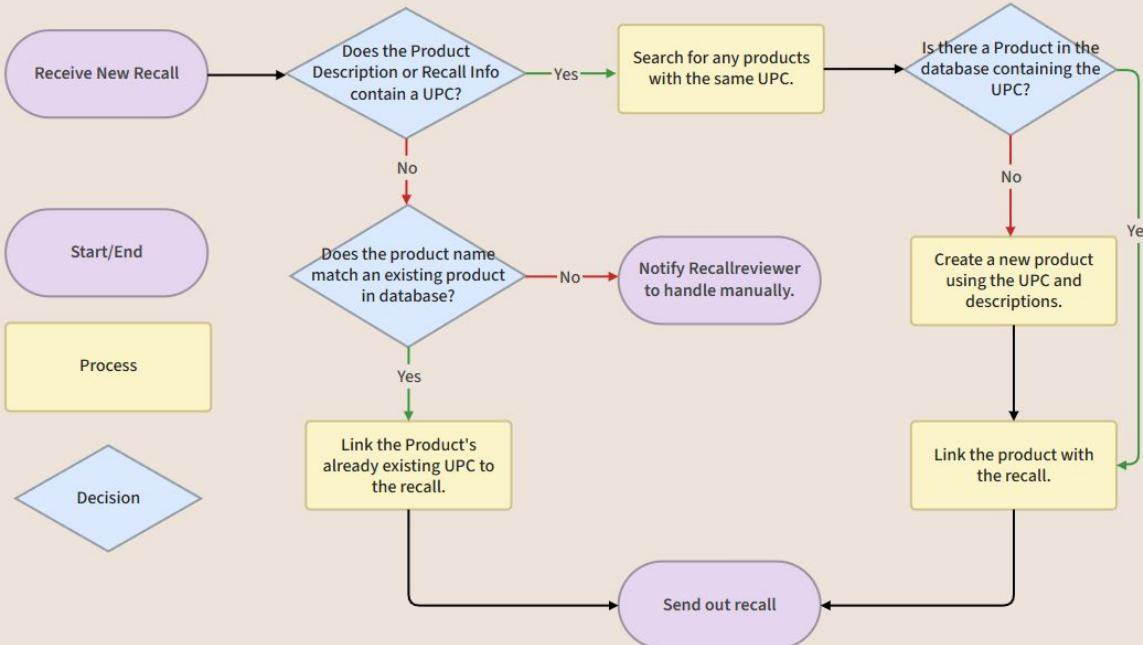
Description of individual algorithm



Algorithms: Recall to UPC Linking



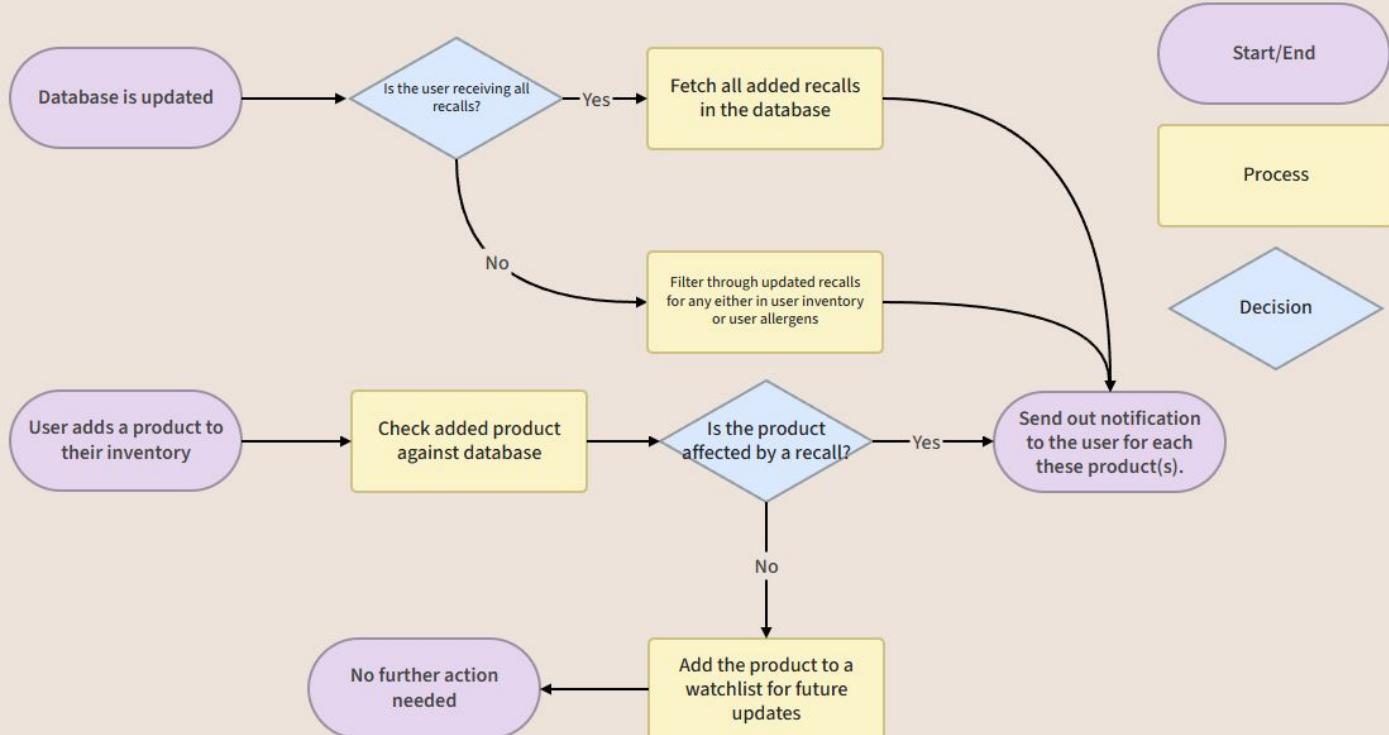
Description of individual algorithm



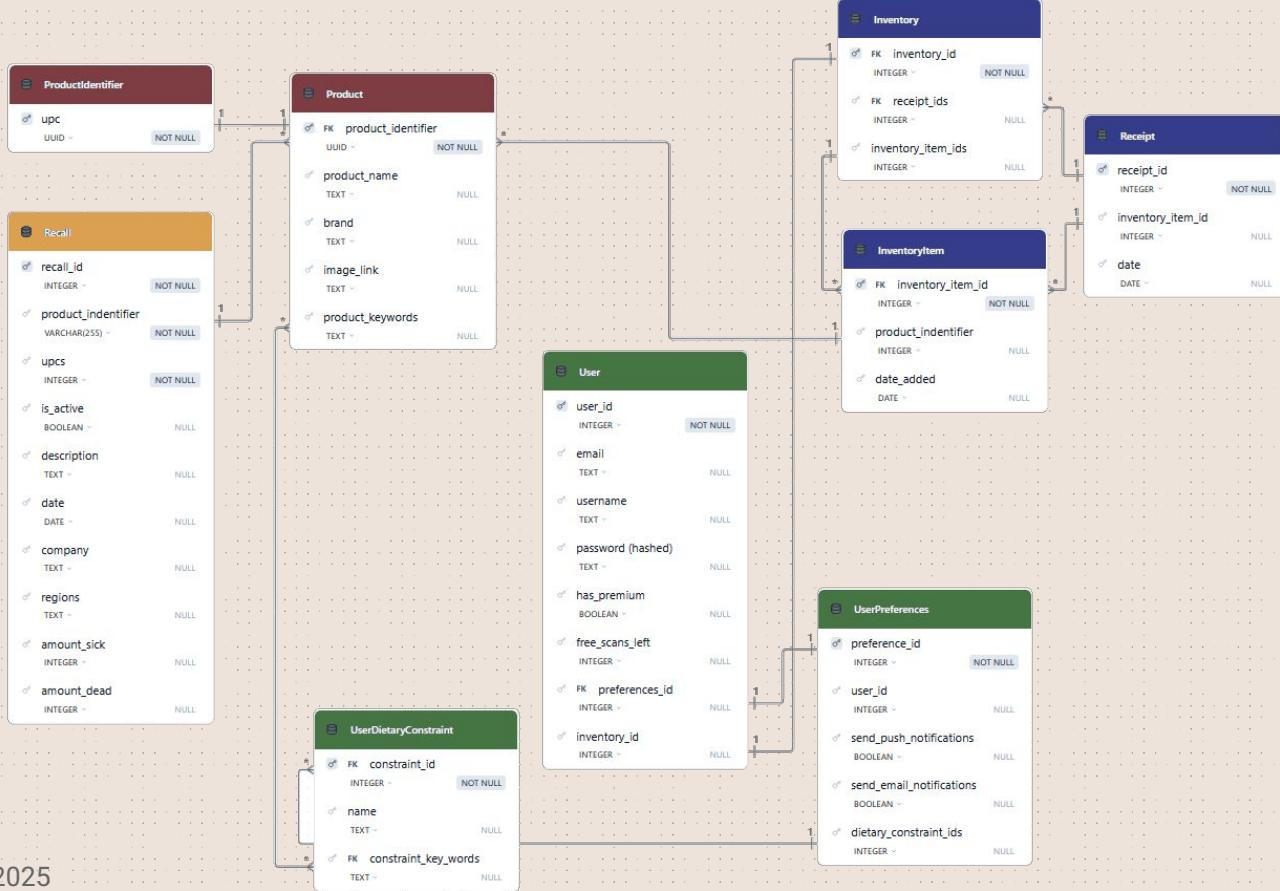
Algorithms: Sending out recall alerts



Description of individual algorithm



Database Schema



Sprint Breakdown

Sprint 0	Sprint 1	Sprint 2	Sprint 3
<input type="checkbox"/> Setup Github repo	<input type="checkbox"/> Build login and signup	<input type="checkbox"/> Implement user accounts and profiles	<input type="checkbox"/> Integrate FAD/USDA recall APIS
<input type="checkbox"/> Prepare dev tools and frameworks	<input type="checkbox"/> Add basic navigation and UI layout	<input type="checkbox"/> Connect to backend for user data	<input type="checkbox"/> Display recall feed and search features
<input type="checkbox"/> Setup code repositories			
Sprint 4	Sprint 5	Sprint 6	Sprint 7
<input type="checkbox"/> Add push notifications	<input type="checkbox"/> Add premium features	<input type="checkbox"/> Create app outline and design for user-friendly access	<input type="checkbox"/> Test and fix bugs
<input type="checkbox"/> Enable alert customization settings	<input type="checkbox"/> Set up payment and subscription flow		<input type="checkbox"/> Improve UI and performances

References

Food Safety and Inspection Service. Summary of Recall and PHA Cases in Calendar Year 2023 | Food Safety and Inspection Service. (2024, February 28). <https://www.fsis.usda.gov/food-safety/recalls-public-health-alerts/annual-recall-summaries/summary-recall-and-pha-cases-0>

Schildhouse, J. (2024, December 20). *Why are there so many food recalls right now?* Taste of Home.
<https://www.tasteofhome.com/article/why-are-there-so-many-food-recalls-right-now/>

Centers for Disease Control and Prevention. (n.d.). Listeria outbreak linked to prepared pasta meals. Centers for Disease Control and Prevention. <https://www.cdc.gov/listeria/outbreaks/chicken-fettuccine-alfredo-06-25/index.html>

Recall Modernization Initiatives with the Consumer in Mind. 2025 Food Safety Summit, Dr. William Hallman.
https://www.food-safety.com/ext/resources/FSS_Event/Presentations/2025/S7--Combined-Slides.pdf

Conagra Subsidiary Sentenced in Connection with Outbreak of Salmonella Poisoning Related to Peanut Butter. US Justice Department. [Conagra Subsidiary Sentenced in Connection with Outbreak of Salmonella Poisoning Related to Peanut Butter | United States Department of Justice](#)

U.S. Department of Agriculture, Food Safety & Inspection Service. (2025, September 27). *The Hillshire Brands Company recalls corn dog and sausage on a stick products due to possible extraneous matter contamination.*
<https://www.fsis.usda.gov/recalls-alerts/hillshire-brands-company-recalls-corn-dog-and-sausage-a-stick-products-due-possible>

Aleccia, J. (2025, November 10). Preliminary tests find germ that causes botulism in ByHeart baby formula. PBS NewsHour.
<https://www.pbs.org/newshour/health/preliminary-tests-find-germ-that-causes-botulism-in-byheart-baby-formula>