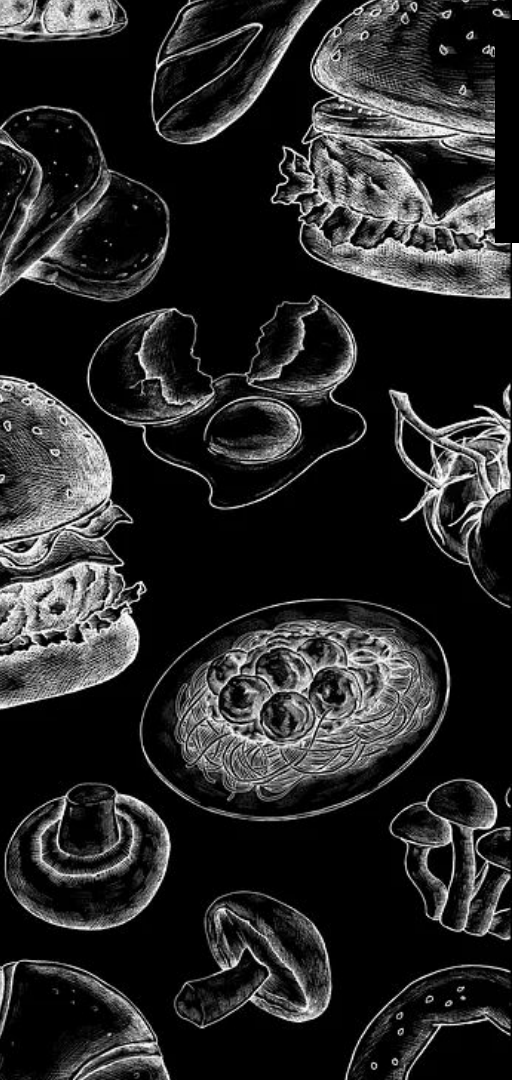
TasteBuddies

"Dine with confidence"

Team Iron
Fall 2024



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Meet the Team

Colette Woods
Creative Director
Maître d’

Grant Fitch
Project Lead
Iron Chef

Ben Nissley
Webmaster / Frontend Developer
Sommelier / Cicerone

Andrew Miller
Mentor
Conseiller Culinaire

Oronde’ Brown
Backend Developer
Saucier

Ashley Barasebwa
Backend Developer
Grillardin

Nate Donald
Database Developer
Rôtisseur

Problem Statement

Despite the fact that dining out offers a rich experience—bringing people together and enhancing social bonding—rising inflation has shifted the behavior of many Americans. With inflation up and restaurant prices increasing by 4.1%, 68% of Americans are now choosing to eat at home.[8] This means that people are missing out on new culinary experiences and the well-being benefits of communal dining.[4] Furthermore, with the overwhelming number of restaurant choices and generic reviews, finding the perfect dining option has become a risky financial decision, leaving many diners hesitant to explore new venues.

Problem Characteristics

High Financial risk:

With restaurant prices outpacing inflation, dining out has become a more expensive and risky decision for the average consumer. In recent years, United States food prices rose by 25%. [11]

Overwhelming Choice:

Customers experience indecision when selecting dishes, making it difficult to confidently choose meals they will enjoy based on taste.

Generic Reviews:

Online reviews may not accurately reflect the customer's personal taste, leading to dissatisfaction in the dining experience. About 30% of online reviews are fabricated. [9] How do you know which reviews to believe?

Group Indecision:

Studies show that group decisions regarding where to eat are heavily influenced by social environment.[12] Can lead to individuals eating at places they do not enjoy just to fit in with the group and avoid conflict.

Solution: Dine With Confidence

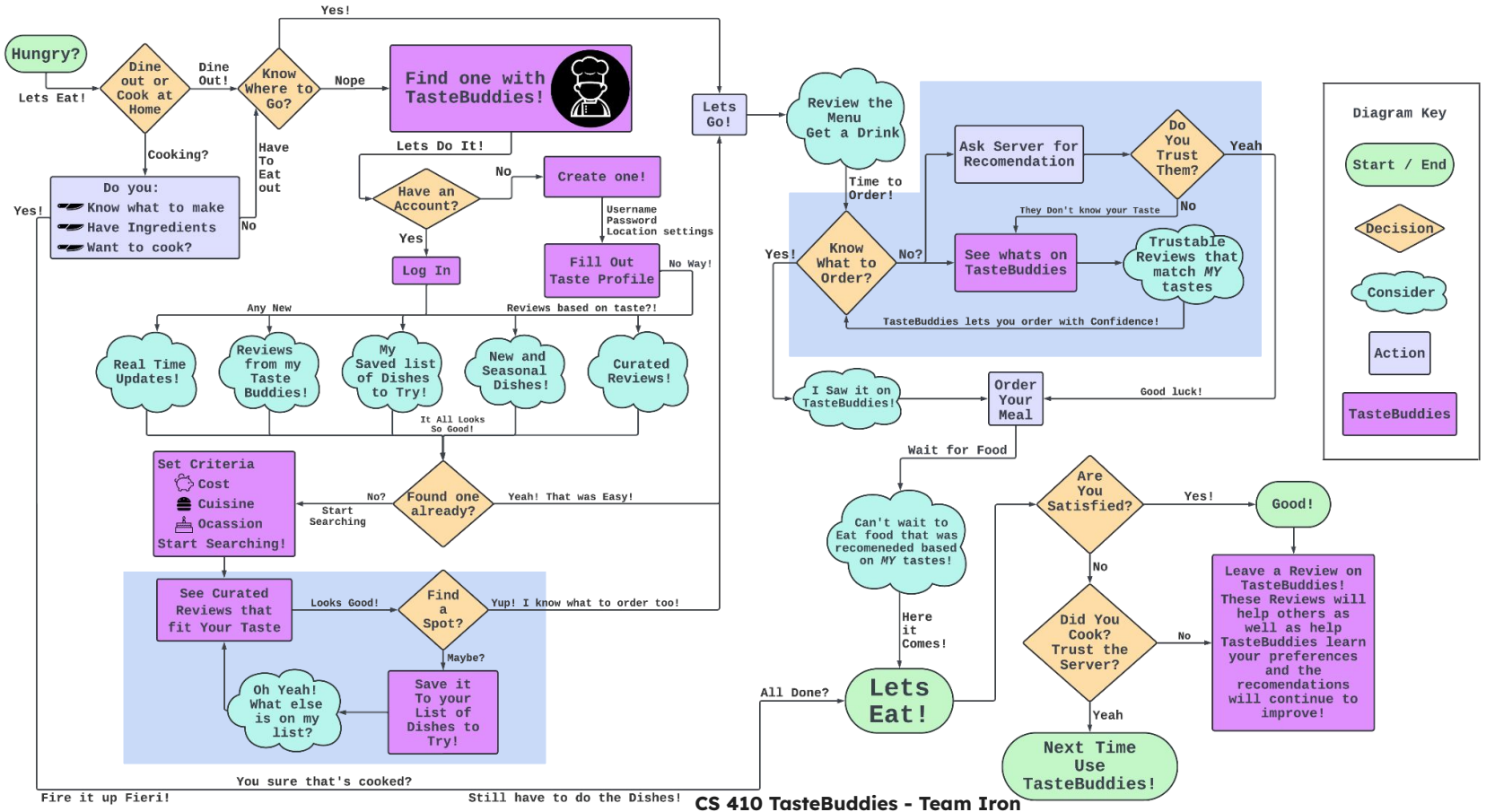
TasteBuddies is a smartphone app that will provide tailored restaurant and dish recommendations based on taste profiles. TasteBuddies will use data clustering to connect users with others who share similar preferences, offering relevant suggestions rather than generic reviews. TasteBuddies dynamically enhances user confidence with real-time feedback from crowdsourced data on dish quality and level of business, adding a layer of insight to support an optimal dining experience.

By using TasteBuddies, diners are more likely to end up with a meal they truly enjoy, while reducing the stress of sifting through irrelevant reviews, enhancing their overall dining experience. Restaurants will also benefit from fewer complaints, less food waste, and happier customers who are more likely to return, give positive reviews, and tip well.

Solution Characteristics

- **Personalization**: Our revolutionary app will provide personalized dish and restaurant recommendations tailored to individual tastes rather than offering a one-size fits all approach
- **Tailored Recommendations:** Instead of relying on broad, generic reviews, the app connects users with others who have aligned taste profiles, offering relevant reviews and a customized dining experience
- **Customer Satisfaction:** By offering recommendations based on individual preferences, the app helps customers get a better value for their money, and food they truly enjoy, enhancing the dining experience.
- **Reduced Waste:** With more accurate recommendations, fewer dishes are sent back due to dissatisfaction, reducing food waste and lost revenue for restaurants.
- **Increased Tips:** Happier customers lead to increased tips for working staff and more positive reviews, benefiting restaurant owners and workers.
- **Crowdsourced Real-Time Updates:** Our platform empowers users to share live updates on restaurant conditions, from wait times and menu availability to special events, ensuring a dynamic and responsive platform that adapts to users' real-time dining needs.

Solution Process Flow



Product Prototype Ingredients

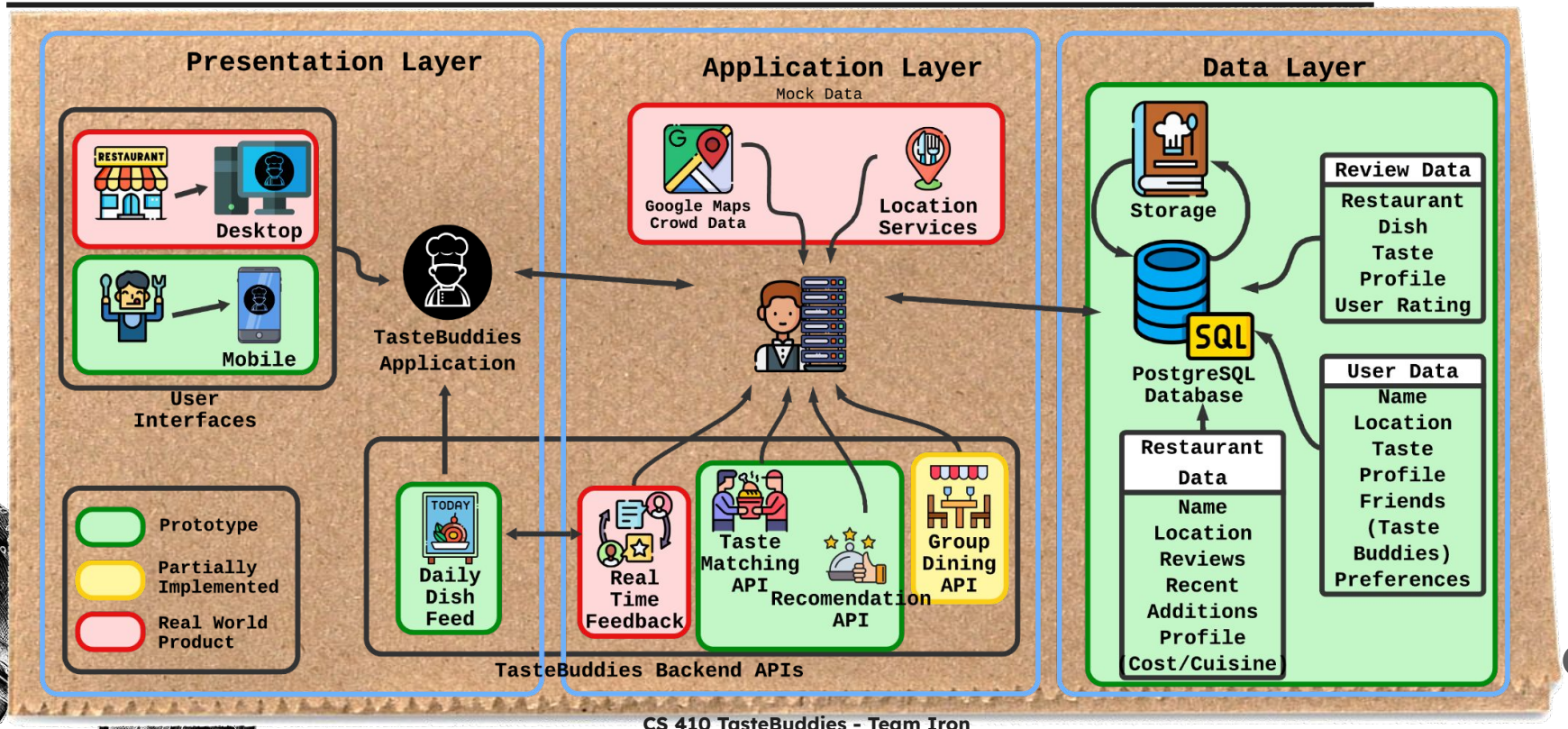
Category	Features	RWP	Prototype	Additional Notes
Account Management	Account Creation	✓	✓	
	Login / Authentication	✓	Eliminated	
	Access Permissions and Preferences	✓	Partially Implemented	Access Permissions required for database
	Taste Profile	✓	✓	
Mobile App Features	Social Engagement	✓	Partially Implemented	Find friends only for group matching
	Daily Dish Feed	✓	✓	
	Group Restaurant Matching	✓	Partially Implemented	Implementation is time dependent
	Dish Recommendations	✓	✓	
	Taste Profile Builder	✓	✓	
	Reviews	✓	Partially implemented	Mock data for compatibility matching
	Community Updates	✓	Eliminated	
	Dish Validation	✓	Eliminated	
	Taste Matching	✓	✓	
	Notification Features	✓	Eliminated	
	Engagement Features	✓	Eliminated	
DataBase Management	Data Analytics	✓	Eliminated	
	Data Privacy and Security	✓	✓	
	Trend Reports	✓	Eliminated	
	Data Backups	✓	✓	

Category		Features	RWP	Prototype	Additional Notes
Expanded User Mobile App Features	Social Engagement	TasteBuddies	✓	✓	
		Super TasteBuddies	✓	Partially implemented	Hard coded
		Add/Find Buddies	✓	✓	
		Follow TasteBuddy	✓	Eliminated	
		Follow Restaurant	✓	Eliminated	
		Add Kudos	✓	Eliminated	
	Live Interactive Updates	Daily Dish feed	✓	✓	
		Add reviews	✓	Partially implemented	Mock data provided
		Post restaurant update	✓	Eliminated	
		Post dish update	✓	Eliminated	
		Notifications	✓	Eliminated	
	Recommend-ation Engine	Taste Profile	✓	✓	
		Read Reviews	✓	Partially Implemented	
		Taste Matching	✓	✓	
		Dish Recommendation	✓	✓	
		Group Restaurant Matching	✓	Partially Implemented	Implementation time dependent
		Rewards	✓	Eliminated	
		Adaptive Taste Profile personalization	✓	Eliminated	Need active data over time
	Search	Restaurant filtering	✓	Eliminated	
		Dish filtering	✓	Eliminated	
	Engagement features	Rewards	✓	Eliminated	
		Badges	✓	Eliminated	
		Challenges	✓	Eliminated	

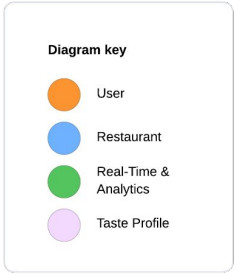
Kitchen Aids (Development Tools)

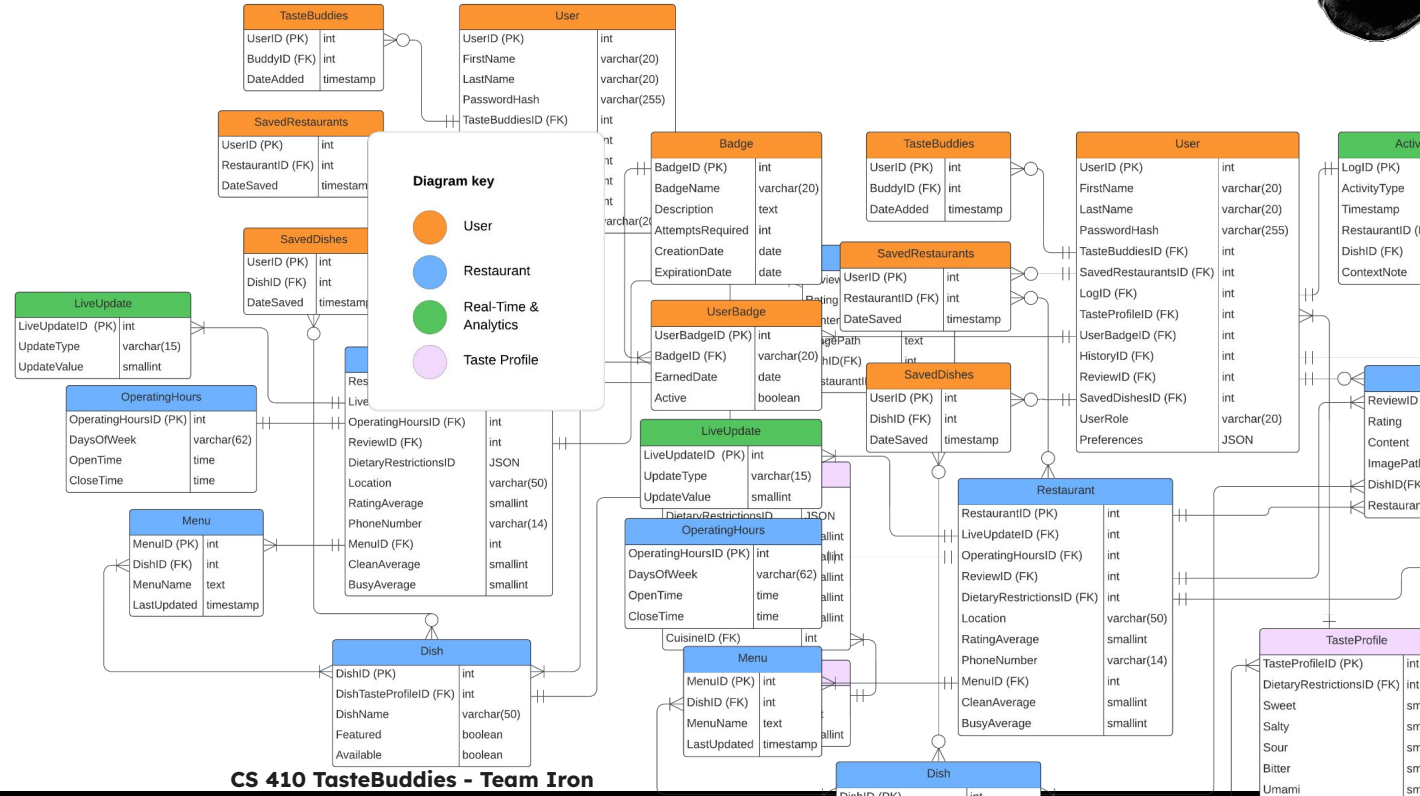
		Planned	Actual
Frontend	Framework:	React	Flask with Jinja2
	Languages:	HTML, CSS, Javascript	HTML, CSS, Javascript
Backend	Framework:	Flask	Flask with SQLAlchemy
	Languages:	Python	Python
Testing Frameworks		Pytest, Jest & Maestro	PyTest
Story & Issue Tracker		Trello & Github Issues	Github Issues
Version Control		Git through Github	Git through Github
Documentation Tool		Pydoc, JSDoc	PyDoc
Database		PostgreSQL	SQLite

Major Functional Components Diagram



Database Schema





Whats on the Grill

Task		Status
Account Creation	Register User & Delete User in Database	Completed
	Login & Logout with Sessions	Completed
	Connected to Taste Profile	Completed
Taste Profile:	Setup Questions & UI	Completed
	Store in DB attached to User	Completed
Add/View Buddies:	UI for Finding, adding and viewing buddies	In Progress
	Basic Search and View Logic	In Progress
	Add Buddy - Connect to User Buddy List	In Progress

Sprint Breakdown

Sprint 0: Project Setup

- Version Control, Git
- Trello Board & Github Issues
- Initial Repository Structure

COOKED

Sprint 1: Foundation

(1/24 - 2/7)

- Framework for Frontend UI
- Framework for Backend
- Setup database schema
- Connect Everything

COOKED

Feb 19
Demo 1

Sprint 2: User Accounts

(2/8 - 2/19)

- Account Creation
- Taste profile setup
- Add/View Buddies

Sprint 3: Reviews & Social

(2/20 - 3/5)

- Dish Review Function
- Mock Data for Dishes, Restaurants, Reviews and User Taste Profiles
- Simple Taste Matching

Sprint Breakdown

Sprint 4: Recommendations
(3/6 - 3/19)
- Implement the Daily dish feed
- Dish recommendation

Sprint 5: Daily Dish Feed
(3/20 - 4/9)
- Suggest Tastebuddies
- Resolve UI decisions
- Refine Taste Matching
- (Group Dining)

Sprint 6: Polish & Finalize
(4/10 - 4/30)
- Testing & Bug fixes
- Polish UI
- Review and Improve algorithms

March 19
Demo 2

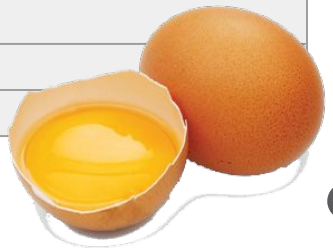
May 6
Final
Prototype

User Stories: TasteBuddy

As a TasteBuddy diner, I shall...	
Fully Implemented	create a personalized taste profile so I can get tailored restaurant recommendations
	find people I know on the app.
	see dish recommendations and how compatible I am with a dish based on my taste profile.
	receive a restaurant recommendation when I create a group with other TasteBuddies.
	modify and further build my taste profile
	view a live feed called the Daily Dish feed that provides recommendations and live updates from users and restaurants I follow.
	connect with other diners who share my taste preferences so I can get relevant recommendations
Partially Implemented	find restaurants that other people with similar tastes enjoy so that I can dine with confidence
	see ratings and reviews from people with similar taste preferences so I can make informed dining decisions
	receive notifications about specials from restaurants that match my taste profile
	rate and review restaurants to help other diners with similar tastes
Not implemented	have my taste profile altered based on my dish feedback and reviews.
	search for specific dishes near me to find restaurants that serve food I like
	track my dining experiences and preferences to improve future recommendations
	earn rewards through the reward system so I can get discounts at restaurants I enjoy
	filter recommendations based on cuisine type, location, and price range
	participate in the crowdsourcing system to help keep information accurate and up-to-date

User Stories: Restaurant

As a Restaurant owner/manager, I shall...	
Not Implemented	reach diners who are most likely to enjoy my restaurant's offerings
	maintain an updated profile of my restaurant's menu and specials
	receive feedback from diners who match our restaurant's taste profile
	understand what dishes are most popular among different taste profiles
	participate in the reward system to encourage customer loyalty
	access analytics about customer preferences and dining patterns
	respond to customer reviews and ratings
	showcase our restaurant's specialties to targeted customers
	receive notifications when our information needs updating
	connect with other diners who share my taste preferences so I can get relevant recommendations
	verify information reported by users about our restaurant
	view data about what potential customers in our area are searching for



User Stories: Administrator

As an administrator, I shall	
Fully Implemented	access analytics about customer preferences and dining patterns
	implement and maintain data privacy measures
	ensure data accuracy and system security
	backup system data
Not implemented	analyze app usage patterns to improve user experience
	manage the reward system
	maintain and optimize the taste matching algorithm
	monitor and validate the crowdsourcing system
	handle user support requests and feedback
	maintain API integrations for location services and mapping
	monitor system performance and implement optimizations
	manage database operations and maintenance
	view data about what potential customers in our area are searching for
	manage user profiles and authentication systems
	generate reports on system usage and user engagement

User Stories to Tasks

Account Management			
Feature	Task	User Story	User Type
Account Creation	Build a taste profile tied to account creation	create a personalized taste profile so I can get tailored restaurant recommendations	TasteBuddy
Access Permissions	Set up access permissions	Implement and maintain data privacy measures	Administrator
Taste Profile	Build and implement algorithm for developing taste profile	modify and further build my taste profile	TasteBuddy

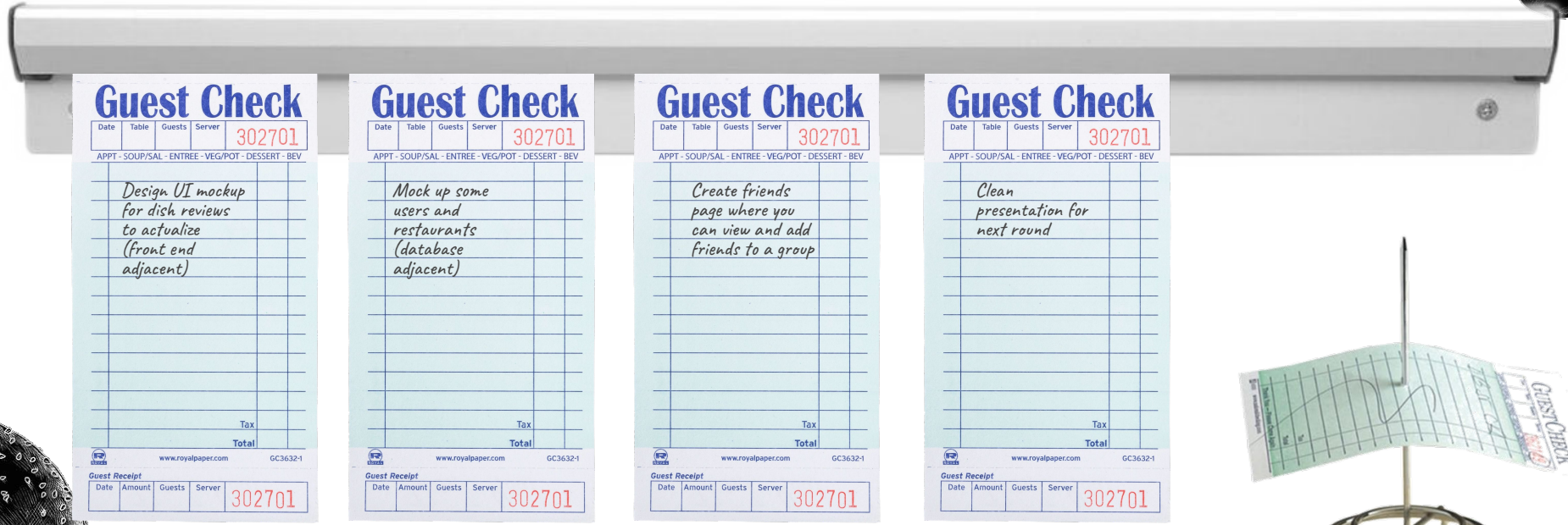
User Stories to Tasks

Mobile App Features			
Feature	Task	User Story	User Type
Dish Recommendations	Implement item-based collaborative filtering	see dish recommendations and how compatible I am with a dish based on my taste profile.	TasteBuddy
Taste Matching	Build algorithm that matches users to similar tastes to match dishes using k-means clustering	connect with other diners who share my taste preferences so I can get relevant recommendations	TasteBuddy
Daily Dish Feed	Implement the Daily Dish Feed to show restaurant and dish recommendations	view a live feed called the Daily Dish feed that provides recommendations and live updates from users and restaurants I follow.	TasteBuddy
Group Restaurant Matching	Build and implement group matching algorithm	receive a restaurant recommendation when I create a group with other TasteBuddies.	TasteBuddy
Social Engagement	Implement basic search	find people I know on the app.	TasteBuddy

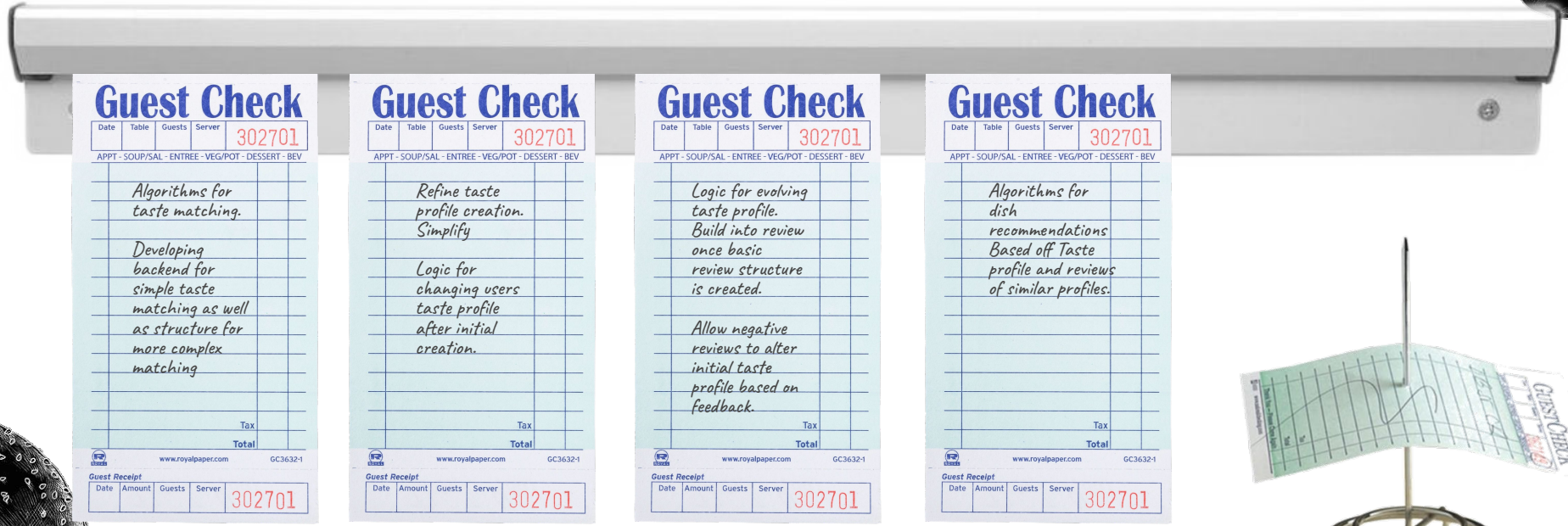
User Stories to Tasks

Database Management			
Feature	Task	User Story	User Type
Data analytics	Use database to analyse data	access analytics about customer preferences and dining patterns	Administrator
Data Privacy and Security	Comply with data privacy regulations and implement access permissions based on user roles	implement and maintain data privacy measures	Administrator
	Create different levels of access permissions and type checks	ensure data accuracy and system security	Administrator
Data Backups	Implement method and policy for backing up data in timely intervals	backup system data	Administrator

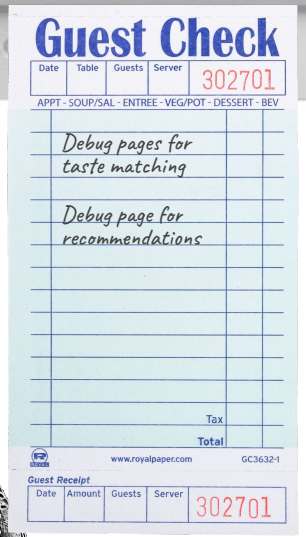
Colette's orders

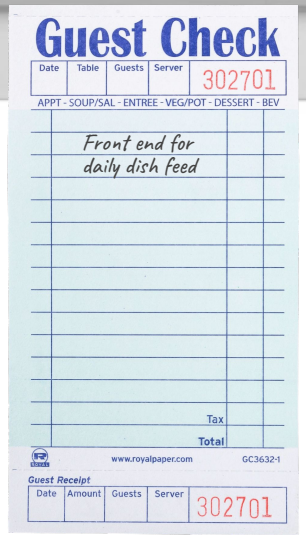


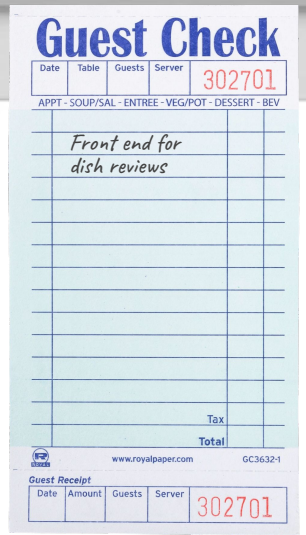
Grant's orders

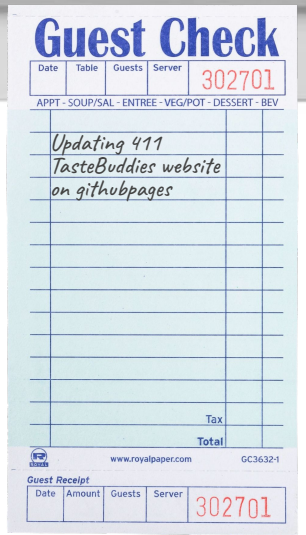


Ben's orders

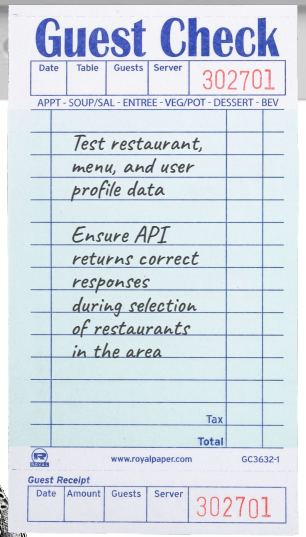

Guest Check
Date Table Guests Server 302701
APPT - SOUP/SAL - ENTREE - VEG/POT - DESSERT - BEV
Debug pages for taste matching
Debug page for recommendations
Tax
Total
www.royalpaper.com GC3632-1
Guest Receipt
Date Amount Guests Server 302701

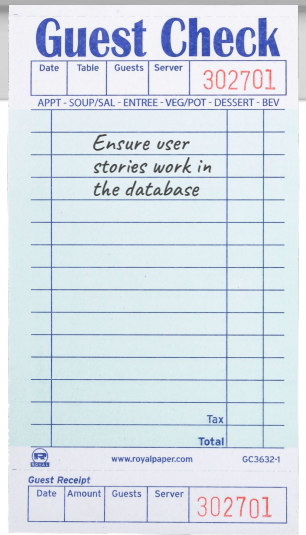

Guest Check
Date Table Guests Server 302701
APPT - SOUP/SAL - ENTREE - VEG/POT - DESSERT - BEV
Front end for daily dish feed
Tax
Total
www.royalpaper.com GC3632-1
Guest Receipt
Date Amount Guests Server 302701

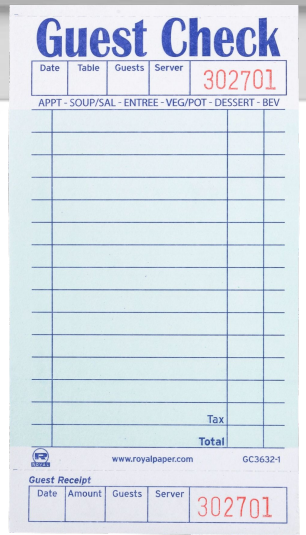

Guest Check
Date Table Guests Server 302701
APPT - SOUP/SAL - ENTREE - VEG/POT - DESSERT - BEV
Front end for dish reviews
Tax
Total
www.royalpaper.com GC3632-1
Guest Receipt
Date Amount Guests Server 302701

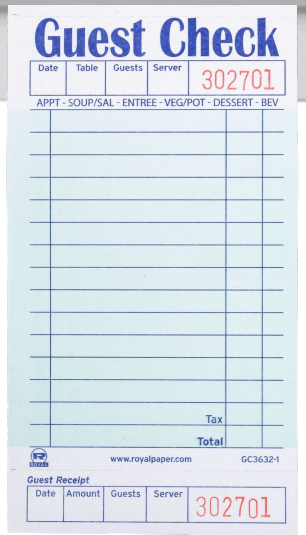

Guest Check
Date Table Guests Server 302701
APPT - SOUP/SAL - ENTREE - VEG/POT - DESSERT - BEV
Updating 411 TasteBuddies website on githubpages
Tax
Total
www.royalpaper.com GC3632-1
Guest Receipt
Date Amount Guests Server 302701

Ashley's orders

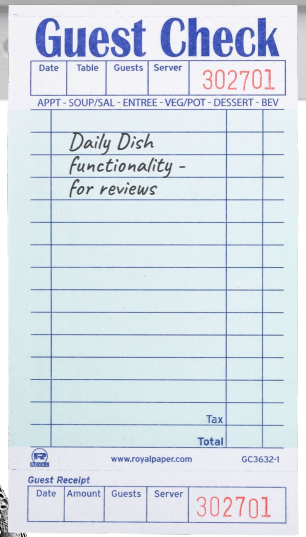


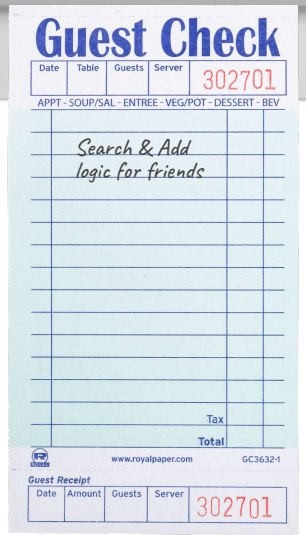


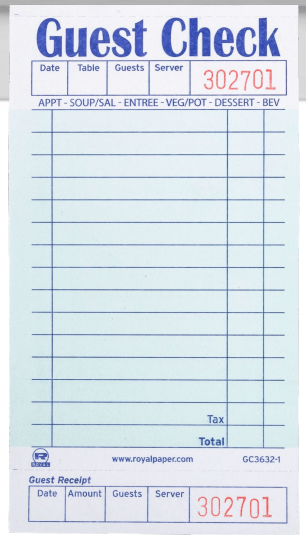


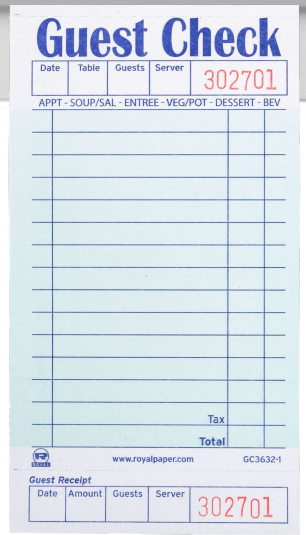


Oronde's orders

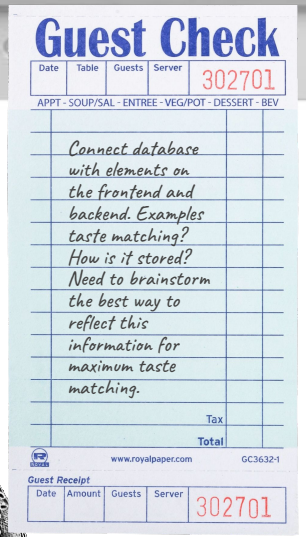


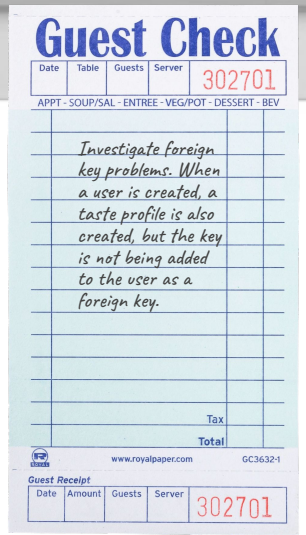


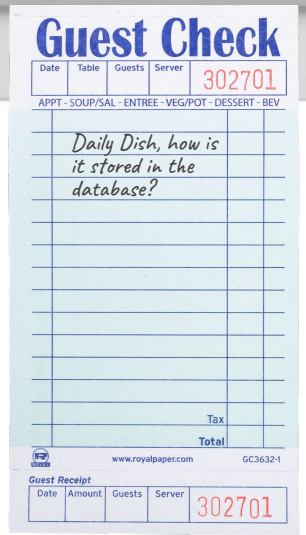


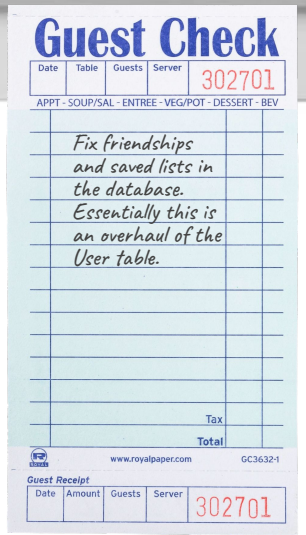


Nate's orders

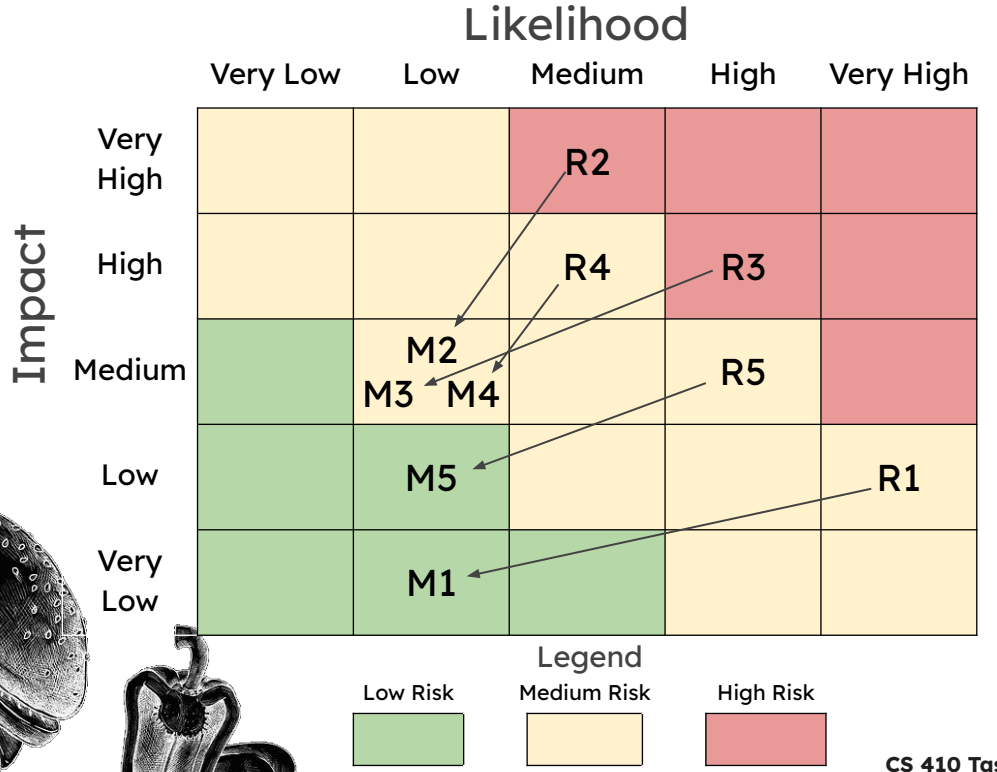








User Risk Matrix



Risks

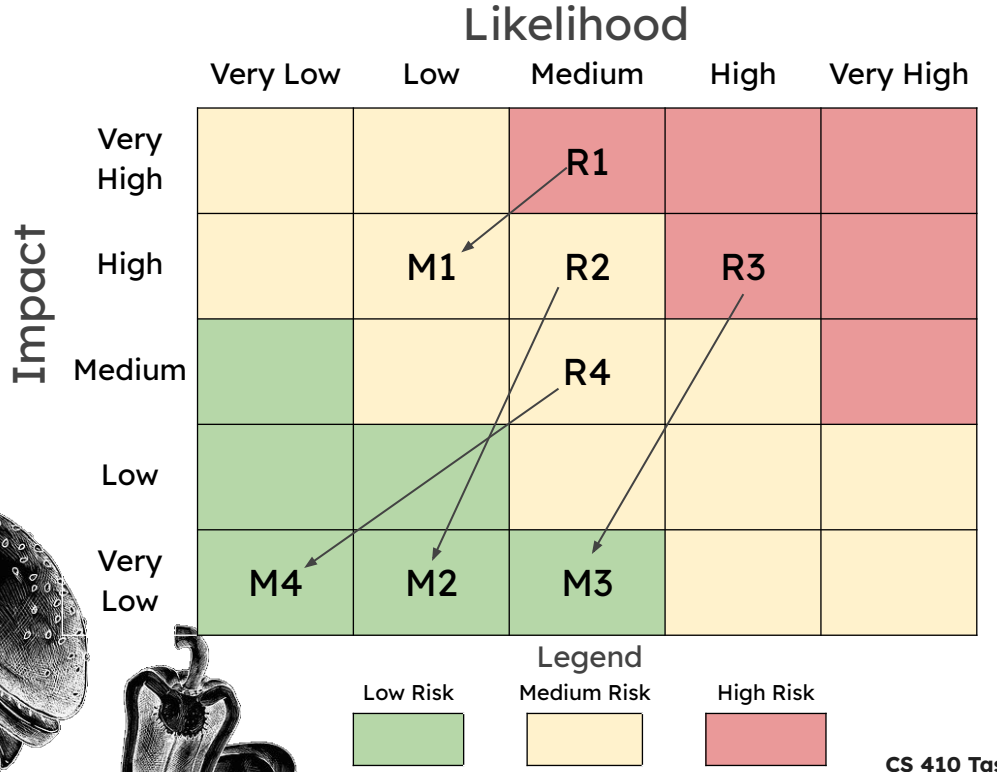
Prototype | Partial/Mock | Real World Product

R1: Fake Profiles and Reviews
R2: User satisfaction with their recommendations
R3: User Participation and Retention
R4: Users evolving taste preferences
R5: Users not wanting to share data

Mitigations

M1: Checking for duplicate accounts and emails, ensuring emails are unique by checking for dot agnostic and + tags for potential false emails.
M2: Allow user feedback on recommendations
M3: Implement milestone-based Badges and rewards system for leaving reviews, and send reminder notifications to encourage participation
M4: Allow users to update preferences and periodically prompt users for updates, “Do you still like…”
M5: Allow users to opt in or out of data collection for specific features

Customer Risk Matrix



Risks

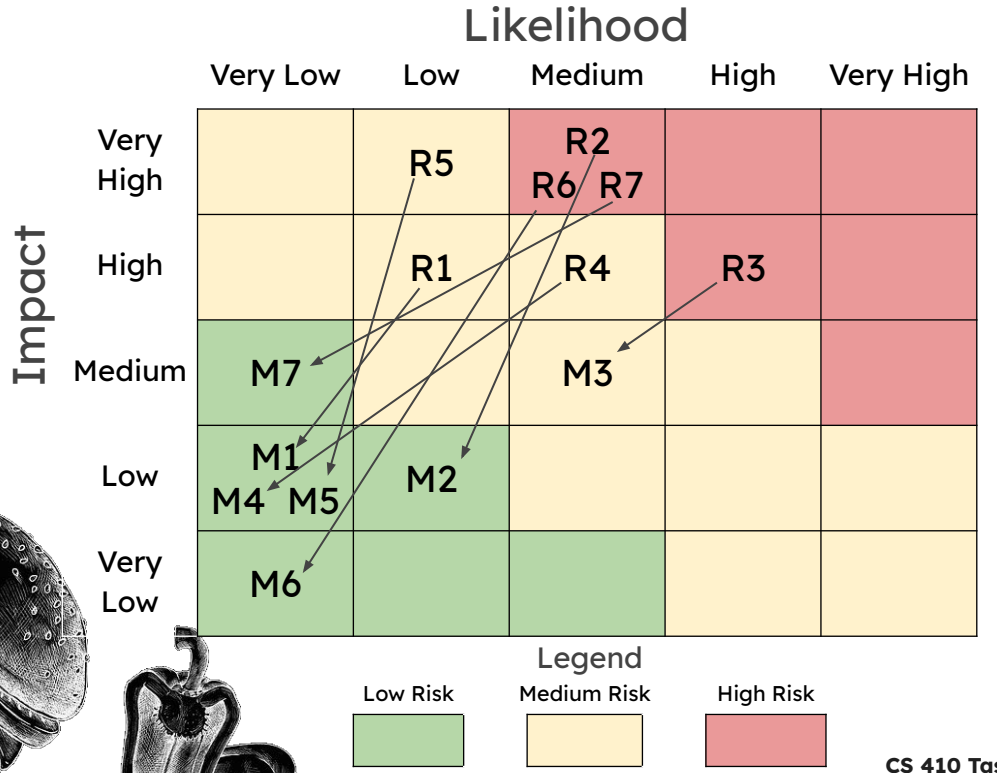
Prototype | Partial/Mock | Real World Product

R1: Restaurants will not upgrade to premium accounts
R2: Matching with closed restaurants
R3: Matching with outdated dishes
R4: Users may feel overwhelmed by excessive notifications

Mitigations

M1: Offer trial subscription to premium accounts and data-driven insights for the success of other restaurants with premium accounts
M2: Enable users to report a restaurant closure with a review process to prevent misuse, as well as reviews triggered by events (ending subscription)
M3: Enable user feedback as well as send periodic reminders to restaurants to verify dish availability
M4: Allow users to customize notification settings Limit notifications restaurants can send based on subscription tier

Technical Risk Matrix



Risks

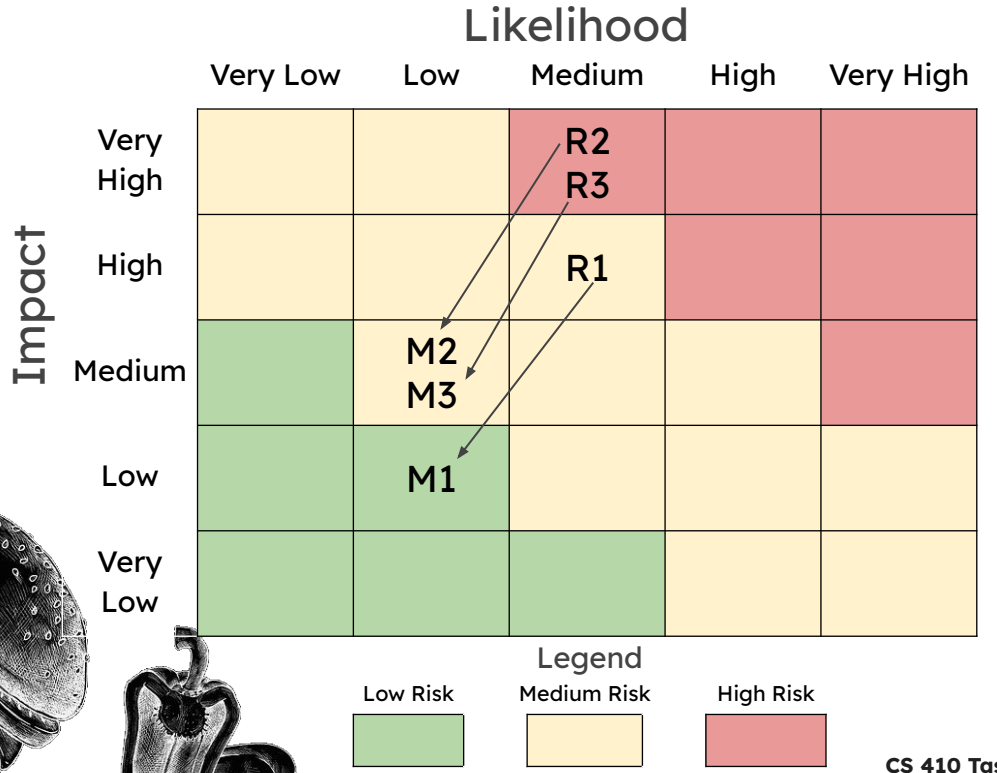
Prototype | Partial/Mock | Real World Product

- R1: Inaccurate recommendations due to error in algorithm
- R2: Not enough users to create a reliable database
- R3: Credentials / Data Compromisation
- R4: App performance issues
- R5: Server downtime
- R6: User refuses location services
- R7: Loss of Cell/Internet Connection

Mitigations

- M1: Thorough User feedback forwarded to development team to improve algorithm along with thorough testing
- M2: Conduct an initial survey among foodies/employees to populate data. Prototype only: extensive mock data.
- M3: Use Best Practices for Cybersecurity
- M4: Optimize codebase for speed and efficiency
- M5: Use reliable hosting services with automatic failover and scaling capabilities. Implement backup and recovery plan
- M6: Allow user to search by Zip Code or City
- M7: Notify user, store recent suggestions in cache

Legal & Security Risk Matrix



Risks

Prototype | Partial/Mock | Real World Product

R1: Civil lawsuits against the app including potential user disputes or trademark violations

R2: Data privacy regulations and potential mishandling of user data

R3: Allergens not listed in dish description

Mitigations

M1: Detailed terms and conditions for both users and restaurant that must be agreed to before use.

M2: Obtain explicit user consent in the initial terms and conditions before collecting any personal information to ensure compliance with data privacy laws, including GDPR, CDPA, and the Privacy Act of 1974

M3: Require restaurant provided dishes to be tagged with any allergens. User submitted dishes will be tagged as 'Unverified Allergens' until the restaurant provides appropriate tags

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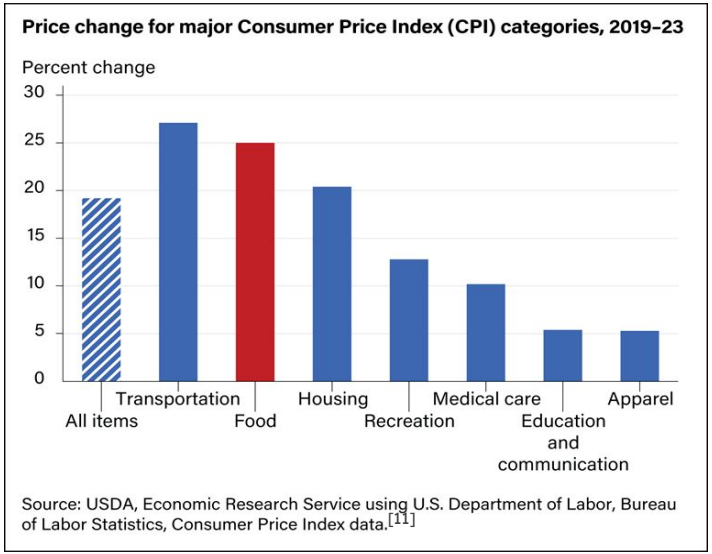
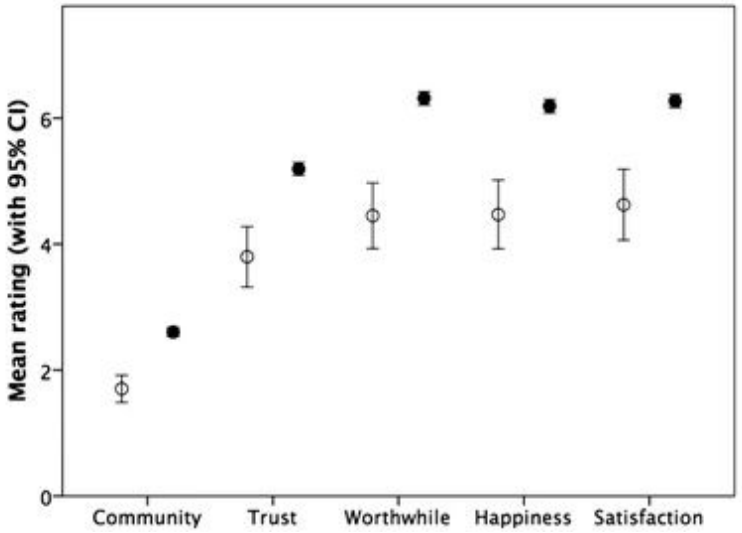
TasteBuddies

Thank you

Q & A

Appendix





Mean rating (with 95% confidence interval)
Open symbols represent those who always eat evening meals alone.
Close symbols are those who at least sometimes ate with others. [17]

Appendix (Matching Algorithms)

Collaborative Filtering
Collaborative filtering is one of the most common algorithms used for recommendation systems and can be applied to matching TasteBuddies.

User-Based Collaborative Filtering:
Identifies users who have similar taste preferences (e.g., similar restaurant ratings or dish preferences).
Matches users based on their shared preferences, creating a group of TasteBuddies who enjoy similar dining experiences.

Item-Based Collaborative Filtering:
Analyzes similarities between restaurants or dishes based on user ratings.
Groups users who rate similar items positively, assuming that they share similar tastes.

Implementation:
Use cosine similarity, Pearson correlation, or Jaccard index to measure the similarity between users.

Content-Based Filtering
This algorithm focuses on matching users based on the attributes of their taste profiles and dining preferences.

How It Works:
Uses the attributes of a user's taste profile (e.g., preference for spicy, salty, sweet dishes, or dietary restrictions).
Matches users with similar attributes and preferences.

Implementation:
Represent user preferences as vectors and use cosine similarity or Euclidean distance to find the closest matches.

Clustering Algorithms
Clustering algorithms group users into clusters based on their taste profiles and preferences.

K-Means Clustering:
Groups users into clusters based on their taste preferences.
Users in the same cluster are matched as TasteBuddies.

Hierarchical Clustering:
Creates a hierarchy of user groups based on their preferences, allowing for finer granularity in matches.

DBSCAN:
Groups users with dense taste similarity while ignoring outliers.

Implementation:
Use user profile data as input features for clustering.
Cluster users and recommend TasteBuddies within the same group.

Matrix Factorization
Matrix factorization is a machine learning technique commonly used in recommendation systems.

How It Works:
Decomposes a user-item interaction matrix (e.g., ratings of dishes or restaurants) into latent factors.
Matches users with similar latent factors, representing hidden patterns in preferences.

Algorithms:
Singular Value Decomposition (SVD)
Alternating Least Squares (ALS)

Benefit:
Captures complex relationships between users and preferences beyond simple correlations.

Graph-Based Algorithms
Graph-based approaches model user relationships and interactions as a network.

How It Works:
Represent users and their interactions (e.g., shared preferences or mutual likes) as a graph.
Apply graph algorithms to identify similar users or clusters.

Algorithms:
PageRank:
Identifies influential users (Super TasteBuddies) based on their connections within the graph.
Community Detection:
Identifies tightly connected groups of users with shared preferences.

Implementation:
Use libraries like NetworkX (Python) to build and analyze user graphs.