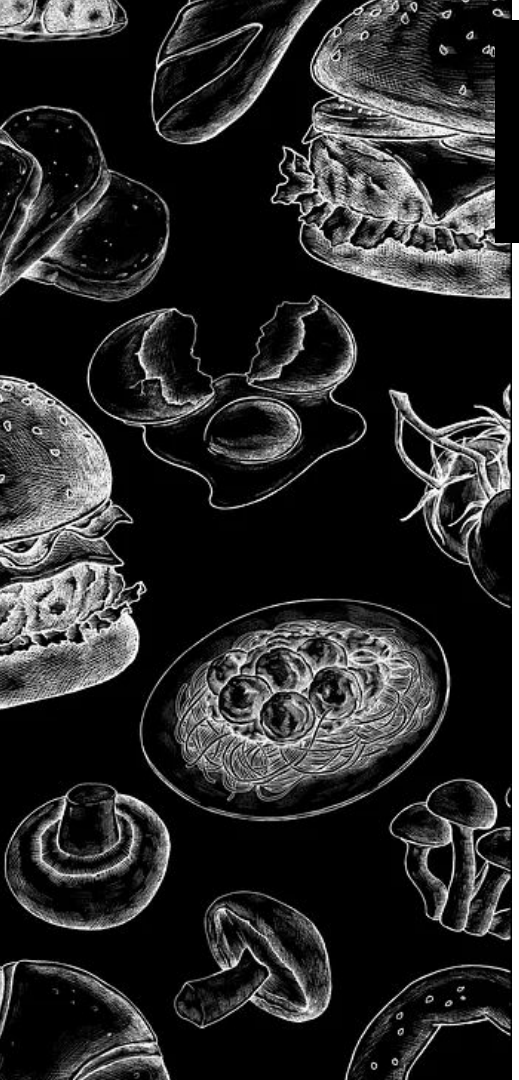
TasteBuddies

"Dine with confidence"

Team Iron
Fall 2024



Today's Menu

Meet the Team

Colette Woods
Creative Director
Maître d’

Grant Fitch
Project Lead
Iron Chef

Ben Nissley
Webmaster / Frontend Developer
Sommelier / Cicerone

Oronde’ Brown
Backend Developer
Saucier

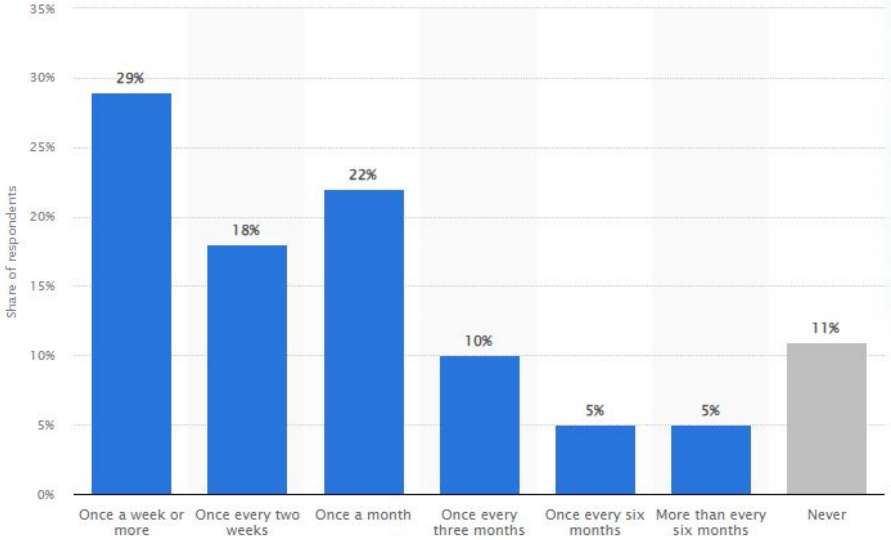
Ashley Barasebwa
Database Developer
Grillardin

Nate Donald
Backend Developer
Rôtisseur

The Dish (background)

- Everyone eats
- In 2023, Americans spent $1.5 Trillion dining out[1]
- Family spending on dining out has increased year after year, passing pre-pandemic levels[2]

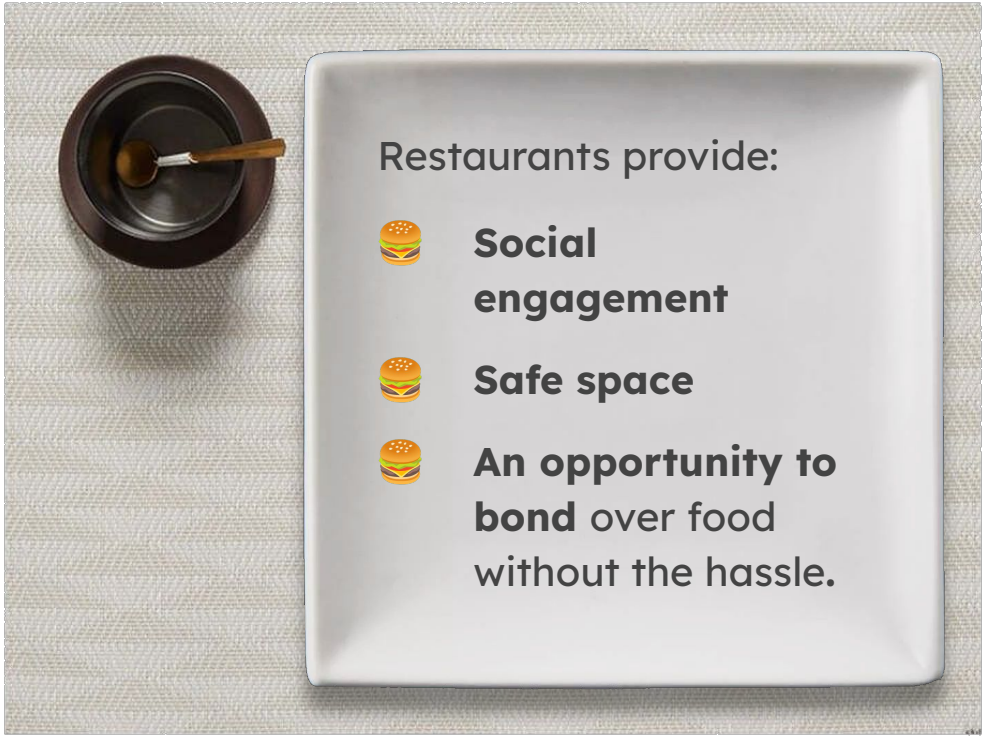
Frequency of eating out at a restaurant in the United States as of January 2022



Source: Statistica [3]

The Dish

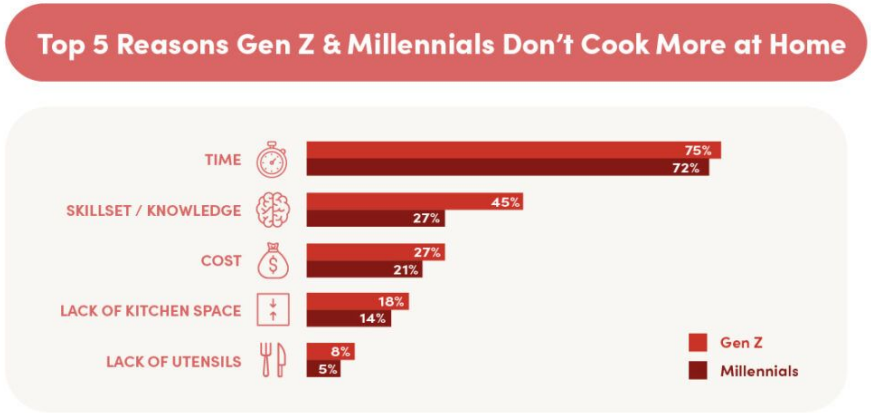
- Dining out is used for several occasions, be it graduations, dates, or just promoting stronger bonding
- Research suggests that communal eating increases an individual's wellbeing, social bonding, and happiness[4]
- 50% of American diners prefer to dine out in a group[5]



The Deep Dish

So why not just eat at home with family and friends?

- **Time**
  - It takes time to cook, and people have busy schedules.
- **Space**
  - Not everyone can accommodate all their friends and family
- **Tastes**
  - Who is cooking? Vegan Val might not find any suitable dishes at Carnivore Carl's house.
- **Skill**
  - Not everyone is capable of cooking at home.



Source: Home Run Pizza [6]

But wait...

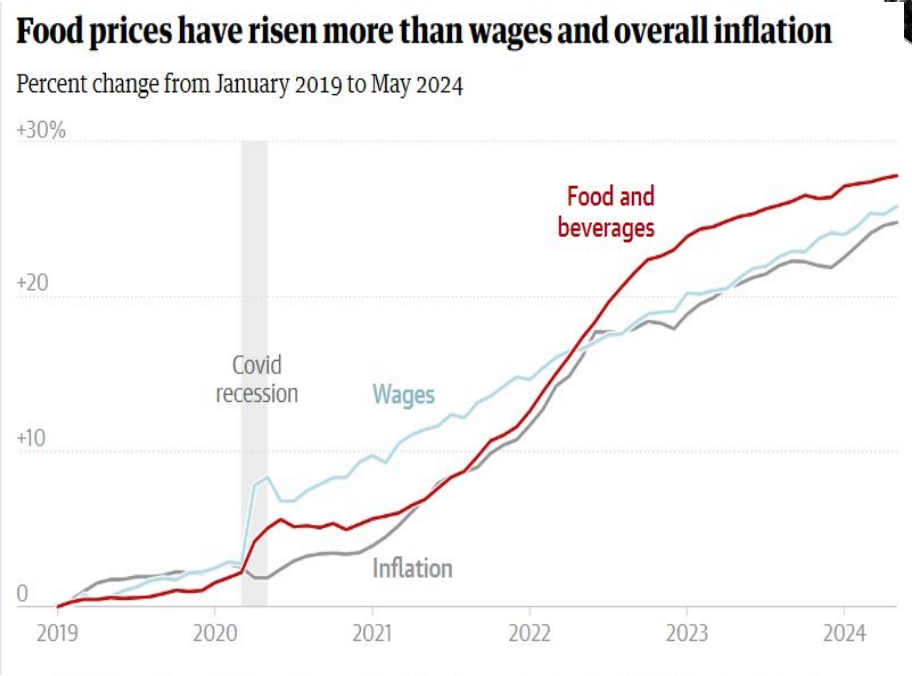
Which restaurant will you go to?

- You can look at online reviews, but they are generic, resulting in inefficient decision making [7]
- Besides, what does your buddy like to eat? How can you find a place that suits both of you?
- Choose wisely, because dining out is becoming increasingly expensive.

The Deeper Dish

- Inflation is up 2.53% over the year with restaurants up 4.1%, affecting the price of dining out and wages not keeping up with these increases.[8][9]

- The financial risk may cause people to avoid going to a restaurant for a possibly disappointing experience.



Guardian graphic. Source: Company profit growth is calculated using a recent quarterly SEC filing compared to the same quarter two years prior. Companies' quarterly calendars differ, their most recent profits range from late 2023 to early 2024. US workers' wage growth from BLS is the change in the inflation adjusted median weekly earnings of private employees. Food and beverage and inflation figures from BLS. Source: T. Perkins [10]

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?

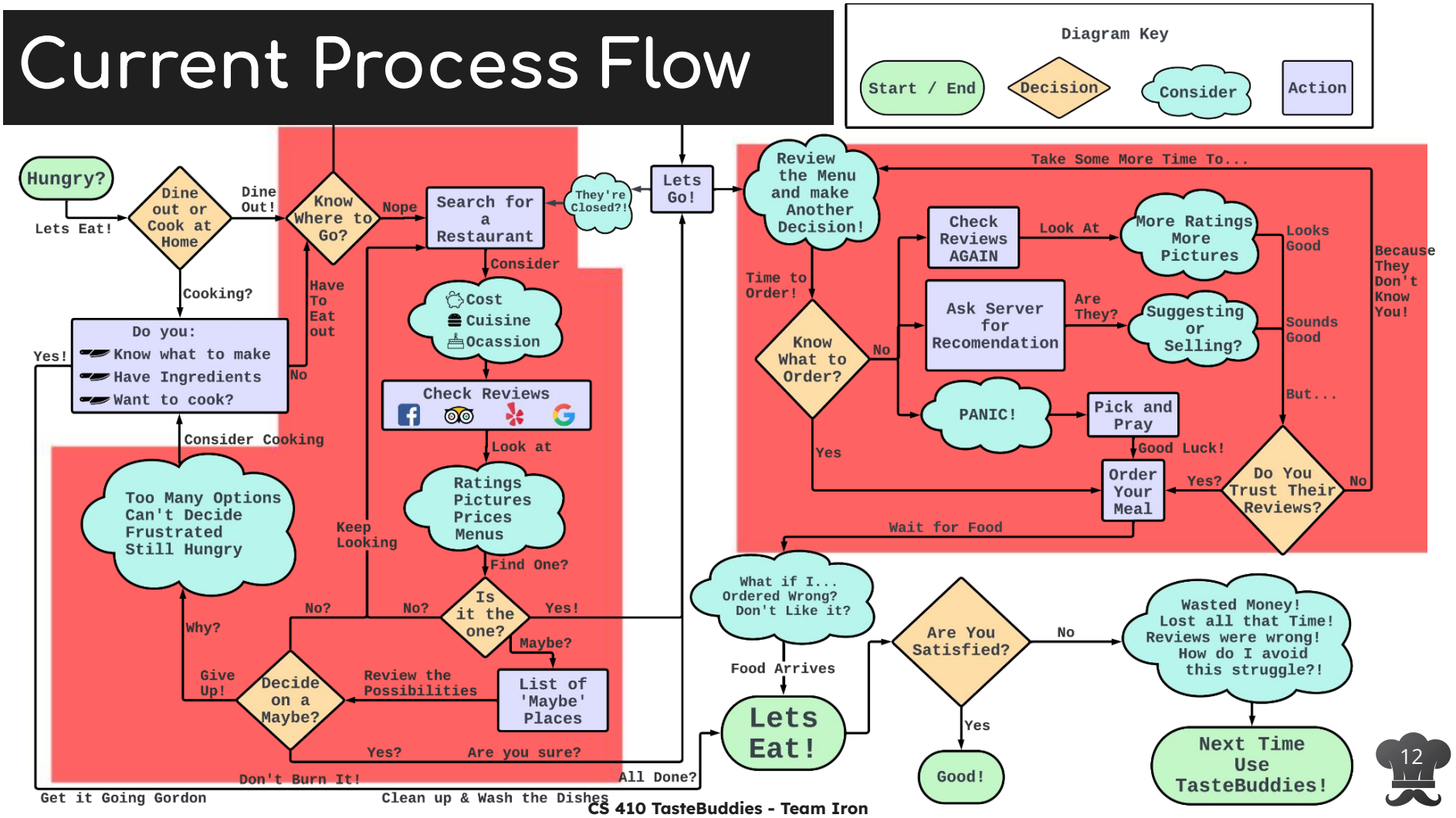
Group Indecision:

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.

Who is Affected

- **Families** looking for a shared experience without the hassle of cooking
- **Young Professionals** that do not have the time or skill to cook
- **Group Organizers** looking for a dining experience that everyone can agree on
- **Tourists** looking to narrow down a long list of restaurants to match the limited amount of meals they will eat

Current Process Flow



Solution: Dine With Confidence

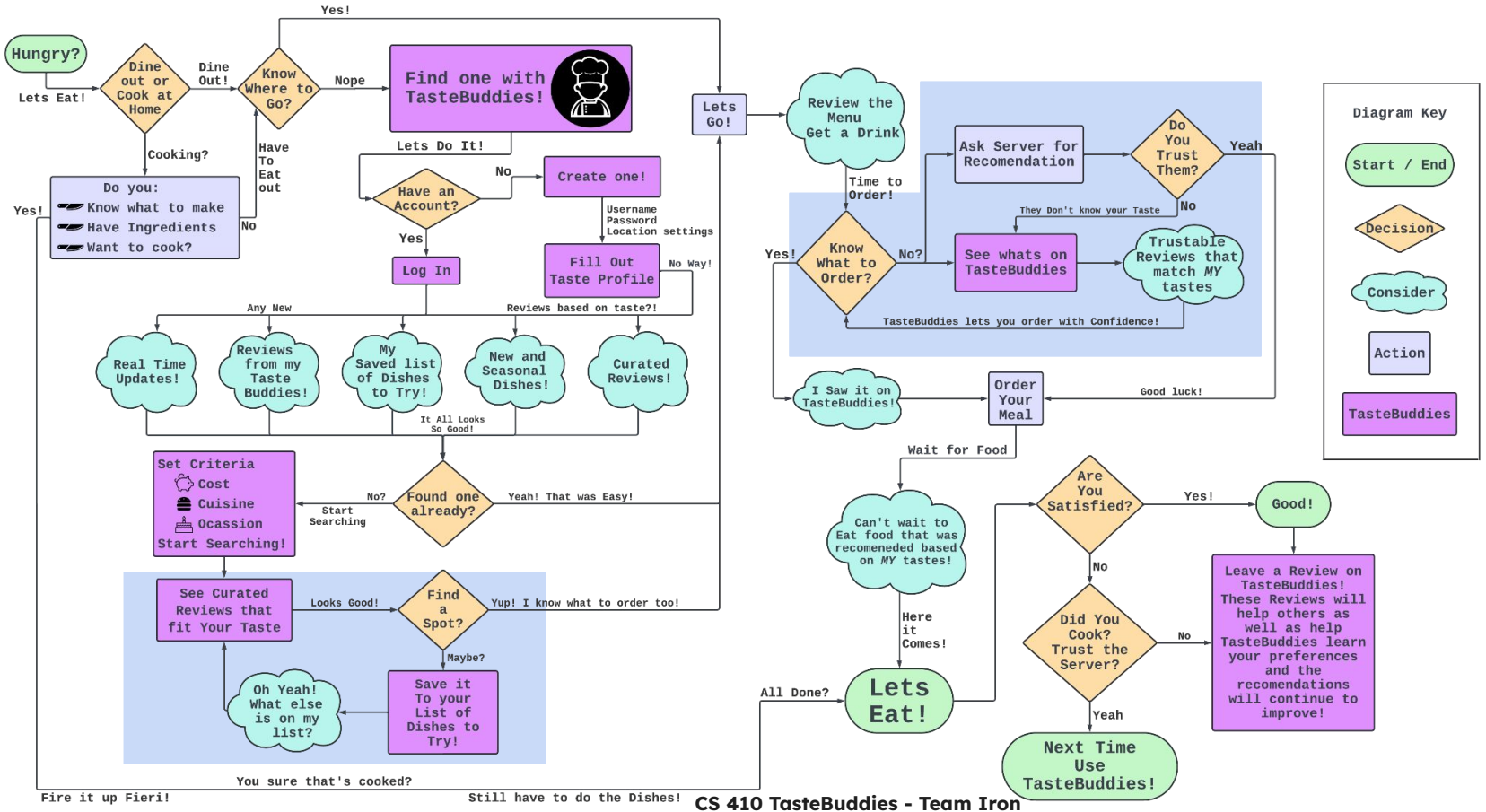
TasteBuddies is a smartphone app that will provide tailored restaurant and dish recommendations based on taste profiles. TasteBuddies will use data clustering to connect users with others who share similar preferences, offering relevant suggestions rather than generic reviews. TasteBuddies dynamically 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.

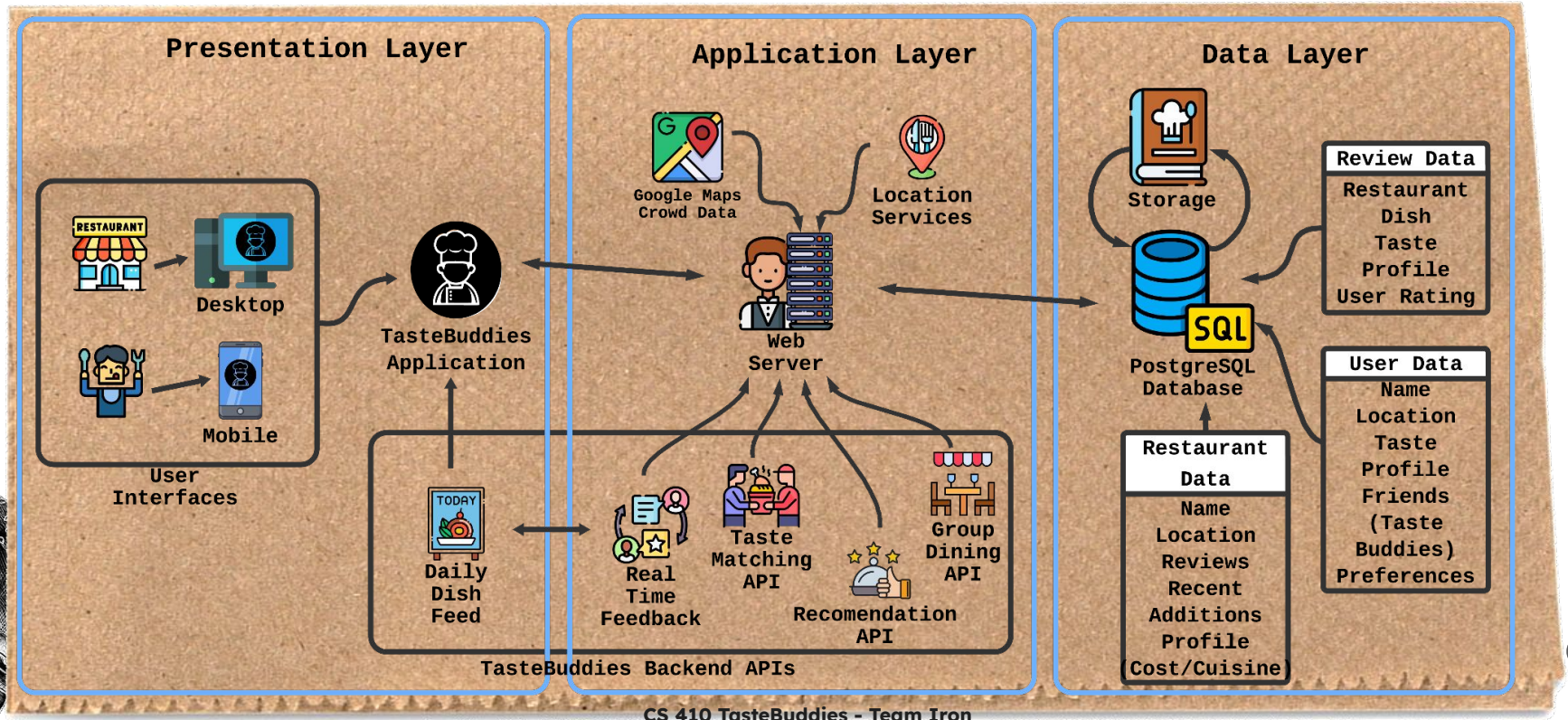
Solution Characteristics

- **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



Major Functional Components Diagram



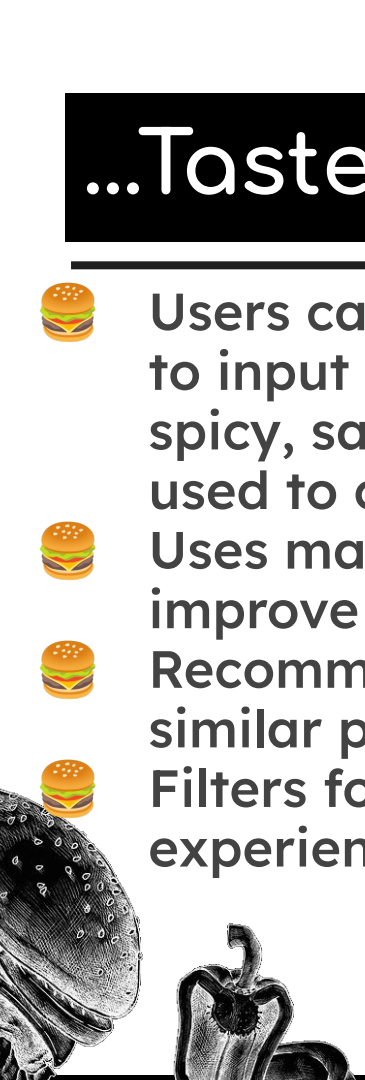
TasteBuddies Will Provide...

...Social Engagement

- **TasteBuddies**: Connect with users who share highly similar taste profiles for accurate suggestions.
- **Super TasteBuddies**: Follow taste influencers for expert recommendations in specific cuisines or dishes.
- **Opt-in notifications** for seasonal dishes or specials that users loved previously.

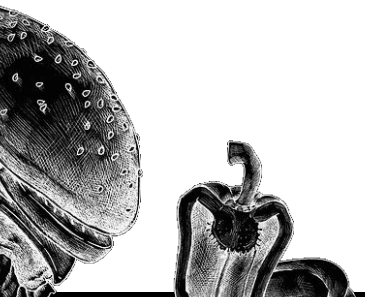
...Taste Profiles

- Users can select their favorite restaurants and dishes, as well as to input their preferences for core taste components, including spicy, salty, sweet, sour, and savory. These preferences will be used to create a personalized taste profile.
- Uses machine learning to continuously refine taste profiles and improve recommendation accuracy.
- Recommendations are based on the collective data of users with similar profiles.
- Filters for allergies, dietary restrictions, and preferred dining experience.



...Intelligent Systems

- **Prioritizes reviews** and ratings from users with similar taste profiles and preferences, ensuring relevant feedback.
- **Match restaurants** to fit the preferences of a group, perfect for company dinners or family outings.
- **Recommends dishes** based on the user's current mood.

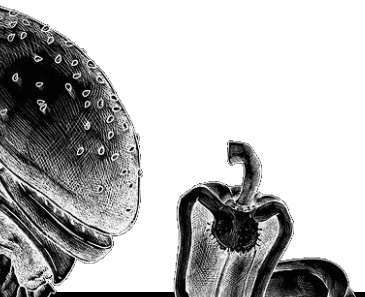


...Farm Fresh (Live Updates)

- **Daily Dish:** Provides live updates from TasteBuddies and restaurants such as new reviews, specials, and dishes.
- **Crowdsourced Data:** Users can report on restaurant wait times, dish availability, quality, or if it has unexpectedly closed.
- **Google API:** Shows the current and expected business levels of a restaurant in real time through Google's crowd data.

TasteBuddies Will Not

- Provide recommendations for non-restaurant establishments or experiences
- Offer health advice or weight loss recommendations
- Prioritize generic reviews from all users
- Offer food delivery or pick up
- Offer budgeting tools

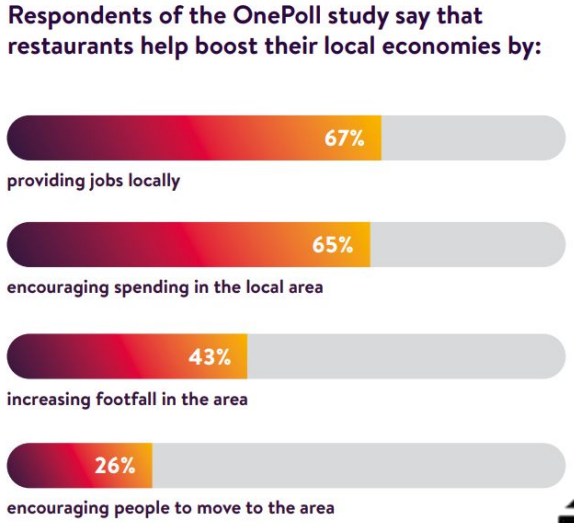


Competition Matrix

Feature	TasteBuddies	yelp	Tripadvisor	Google	facebook	Foodaholix
Taste Profiles	✓					
Personalized Dish Recommendations	✓					
Lifestyle Personalization	✓	✓				
Restaurant Reviews	✓	✓	✓	✓	✓	
Dish Review	✓					✓
Followers	✓	✓			✓	✓*
Restaurant Notifications	✓				✓	✓
Group Restaurant Matching	✓					

Steakholders

Local Economy Feasts on Diners



Source: OpenTable Restaurant Impact Report [13]

Stakeholders

- Restaurants attract more visitors.
- Increased foot traffic supports surrounding businesses, creating a positive effect in the local economy.
- The more guests enjoy their dining experience, the more likely they will spend impulsively.[14]

Community Wellbeing

Stakeholders

- **People** will be encouraged to eat out more, increasing socialization and wellbeing, promoting a sense of wellbeing when connected to the community whilst reducing social isolation [4] [15]
- **Local event organizers** may have options of where to hold their event or eat thereafter, increasing community bonds while bolstering the local economy.

Restaurants win

Customers

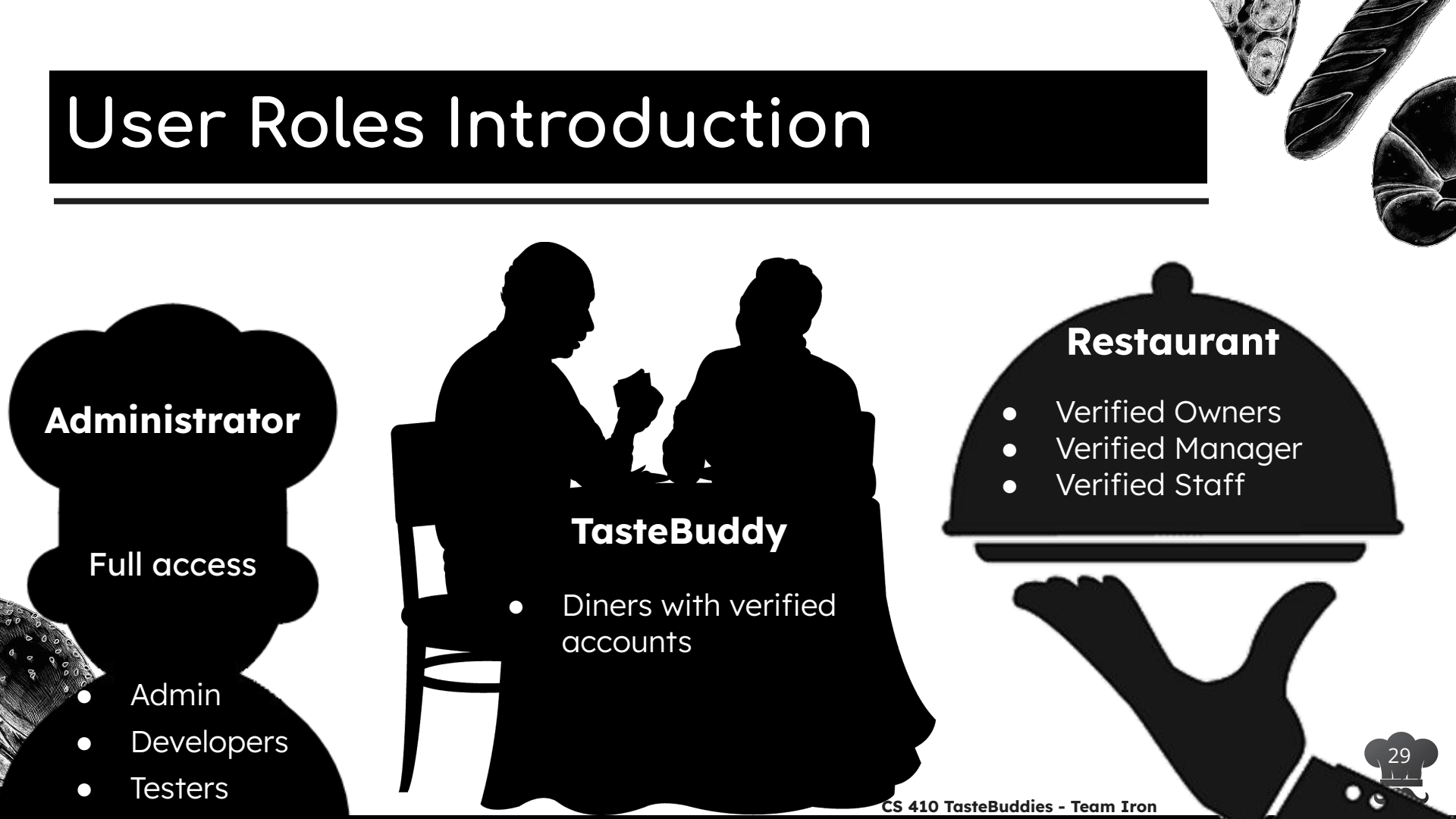
- Increased Customer Satisfaction
- Less Food Waste
- Increased Revenue
- Potential for regular clientele
- New Dishes land
- Targeted Client Outreach
  - Subscription allows notifications about featured dishes and other updates

Everyone Eats, and Everyone Wants to Eat Well.

Users

- **Adventurous Eaters**
  - People looking to try new things and explore different cuisines.
- **Conservative Eaters**
  - Users who prefer familiar foods but may be in a new location and want reliable recommendations.
- **Travelers**
  - Travelers spend 25% of their budget dining out[16]
- **Foodies**
  - Whether looking for a new place to review, post on your blog, or just please your buds, TasteBuddies has you covered.

User Roles Introduction



Administrator

Full access

- Admin
- Developers
- Testers

TasteBuddy

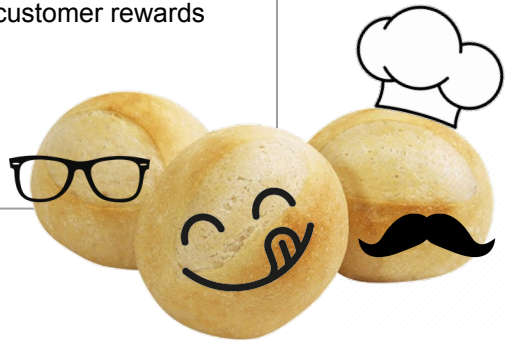
- Diners with verified accounts

Restaurant

- Verified Owners
- Verified Manager
- Verified Staff

User Roles Defined

Role	Administrator	TasteBuddy	Restaurants
Tasks	• Resolve user issues • Keep app content up to date • Account verification: User or restaurant? • Ensure user data is protected • Data analysis regarding app usage and trends in user behavior	• Create account and become a TasteBuddy • Provide information about taste preferences and dietary restrictions • Explore food recommendations • Interact with other users who share similar tastes • Rate/Provide feedback on recommendations	• Create account and get restaurant verification • Keep information updated: Hours,contact, menus,and specials • Monitor customer reviews on food • Provide potential customer rewards

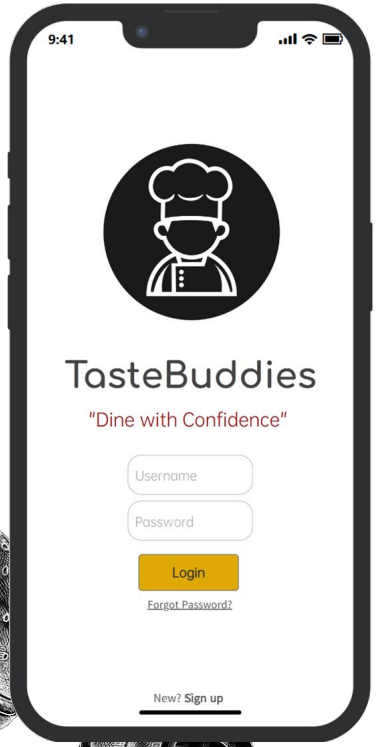


Product Prototype Ingredients

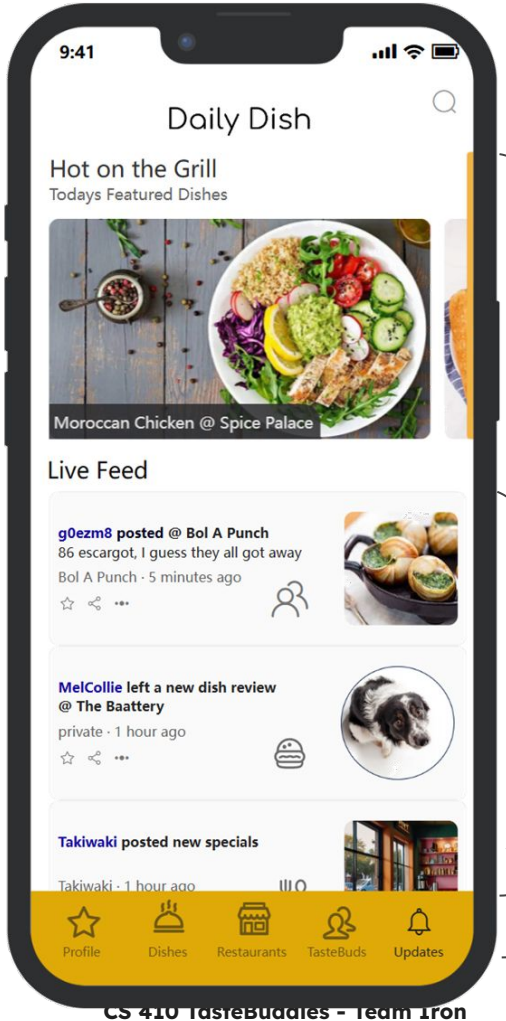
Category	Features	TasteBuddy	Restaurant	Administrator
Account Management	Account Creation	✓	✓	✓
	Login / Authentication	✓	✓	✓
	Access Permissions and Preferences	✓		✓
	Taste Profile	✓		✓
Mobile App Features	Social Engagement	✓		✓
	Daily Dish Feed	✓	✓	✓
	Group Restaurant Matching	✓		✓
	Dish Recommendations	✓		✓
	Taste Profile Builder	✓		✓
	Reviews	✓	✓	✓
	Community Updates	✓	✓	✓
	Dish Validation		✓	✓
	Taste Matching			✓
	Notification Features	✓		✓
	Engagement Features	✓		✓
DataBase Management	Data Analytics			✓
	Data Privacy and Security			✓
	Trend Reports			✓
	Data Backups			✓

Category		Features	TasteBuddy	Restaurant	Administrator
Expanded User Mobile App Features	Social Engagement	TasteBuddies	✓		✓
		Super TasteBuddies	✓		✓
		Add/Find Buddies	✓		✓
		Follow TasteBuddy	✓		✓
		Follow Restaurant	✓		✓
		Add Kudos	✓		✓
	Live Interactive Updates	Daily Dish feed	✓		✓
		Add reviews	✓		✓
		Post restaurant update	✓	✓	✓
		Post dish update	✓	✓	✓
		Notifications	✓		✓
	Recommendation Engine	Taste Profile	✓		✓
		Read Reviews	✓		✓
		Taste Matching	✓		✓
		Dish Recommendation	✓		✓
		Taste Matching	✓		✓
		Group Restaurant Matching	✓		✓
		Rewards	✓		✓
		Group Restaurant Matching	✓		✓
		Dish Recommendations	✓		✓
		Adaptive Taste Profile personalization	✓		✓
	Search	Restaurant filtering	✓		✓
		Dish filtering	✓		✓
	Engagement features	Rewards	✓		✓
		Badges	✓		✓
		Challenges	✓		✓

Mockups : User



Log in

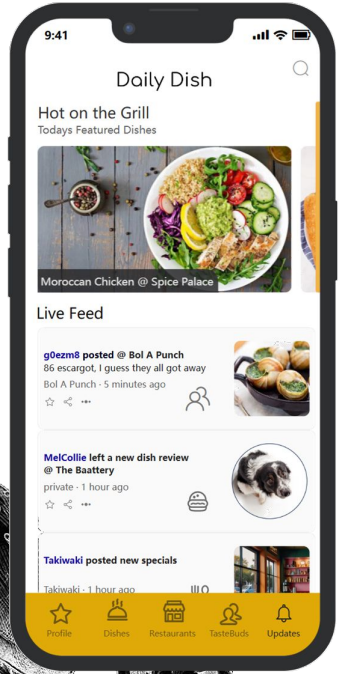


Featured Dishes horizontal scroll from paying customers

Live feed of all updates from restaurants or people you follow

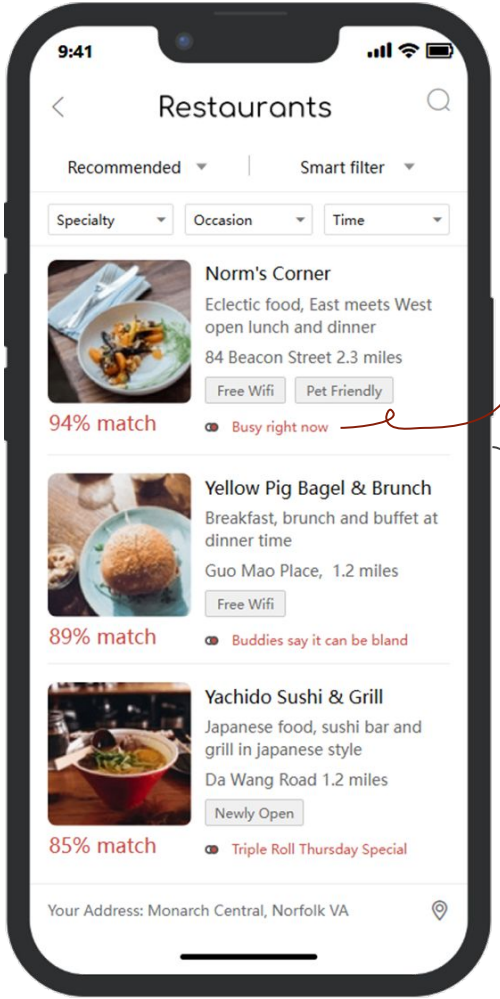
Easy navigation

Mockups : User

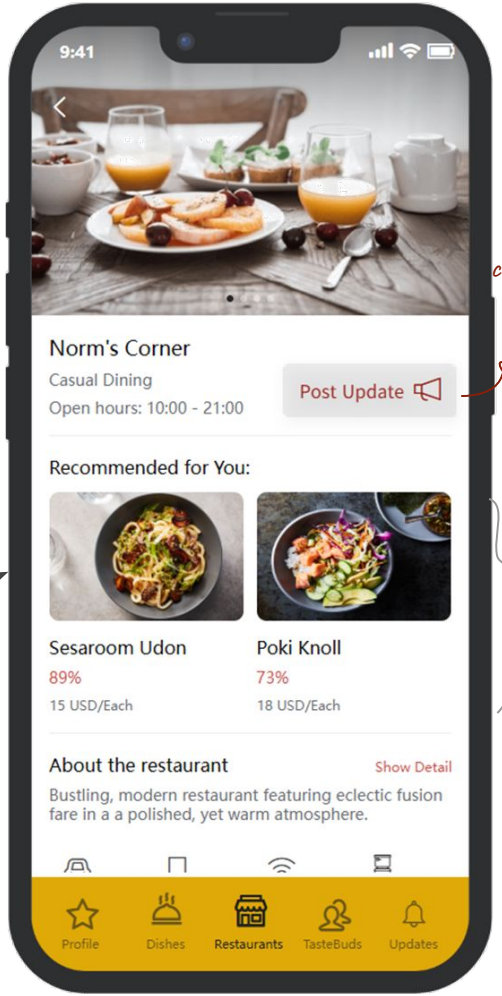


Personal probability rating

Select Restaurants



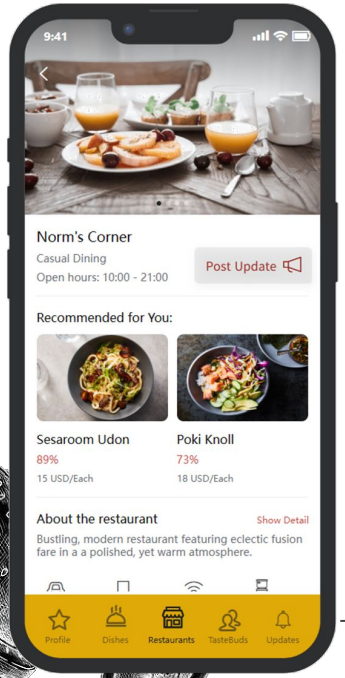
Quick insight to current status



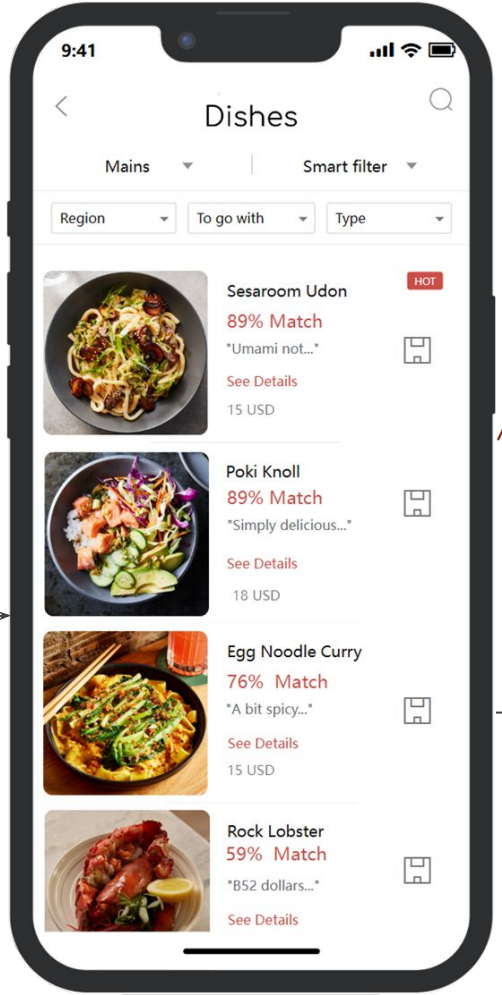
Invites crowdsourced input

Two recommended dishes to provide choice but not overwhelm

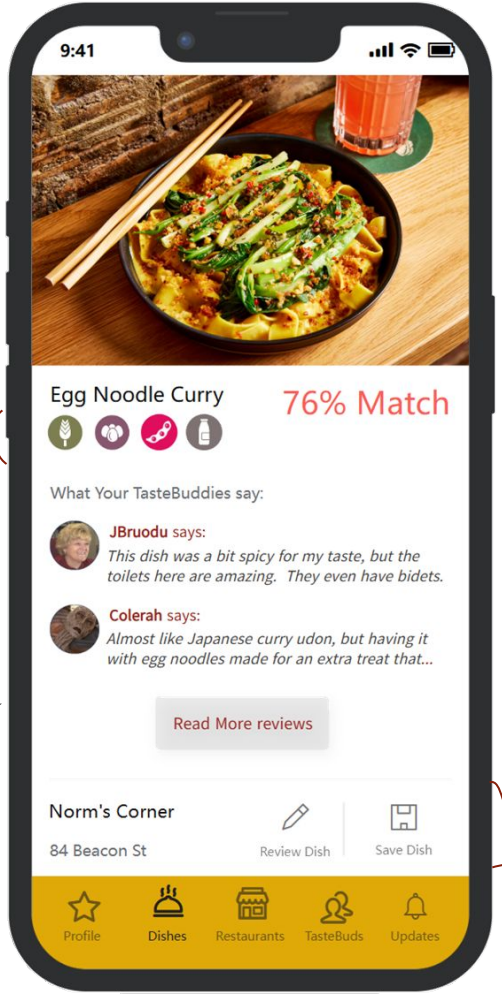
Mockups : User



Select dishes

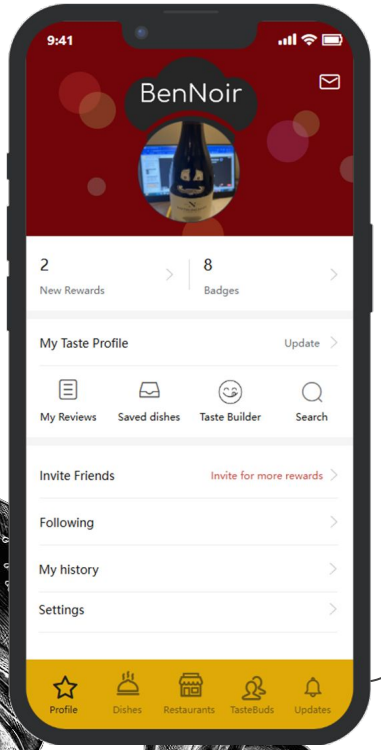


Allergens

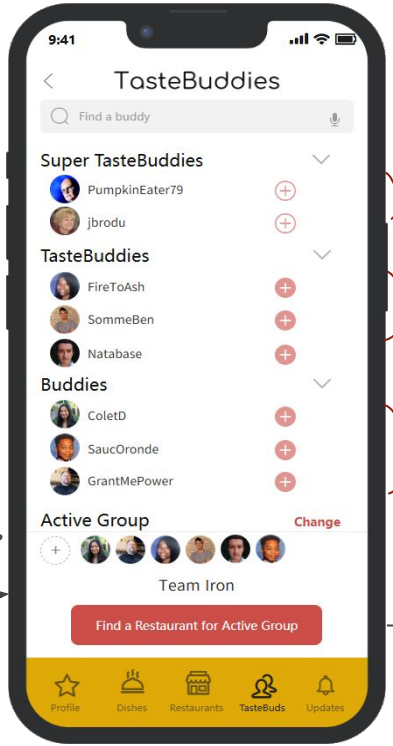


Save or review dish

Mockups : User



Select buddies

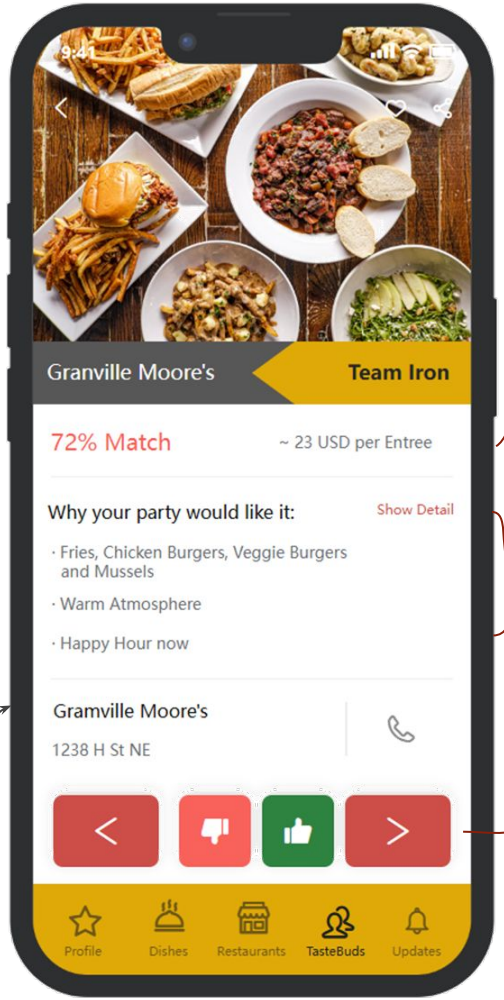


Matched users with ascended status

People with similar taste profiles

Friends who have different palates

Group Matching



Shows average entree cost

Aggregated reasons for how it suits your group

Scroll through picks if needed

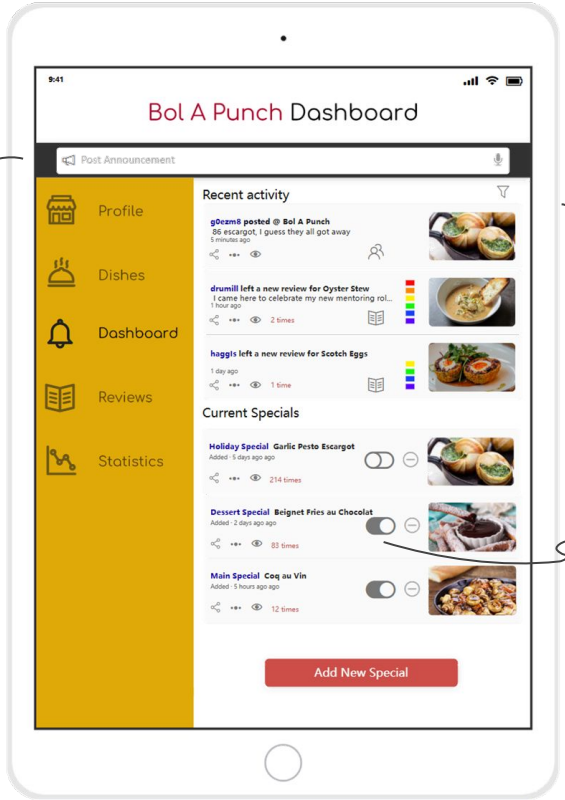
Mockups : Customer

Change how you visualize your data

Change report type amongst options

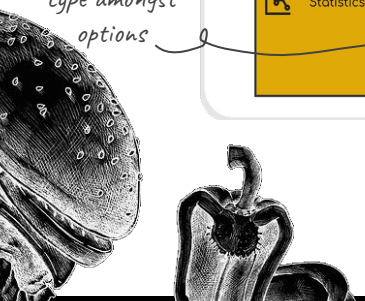
Graph for quick visualization of data

Post quick announcement from all panels

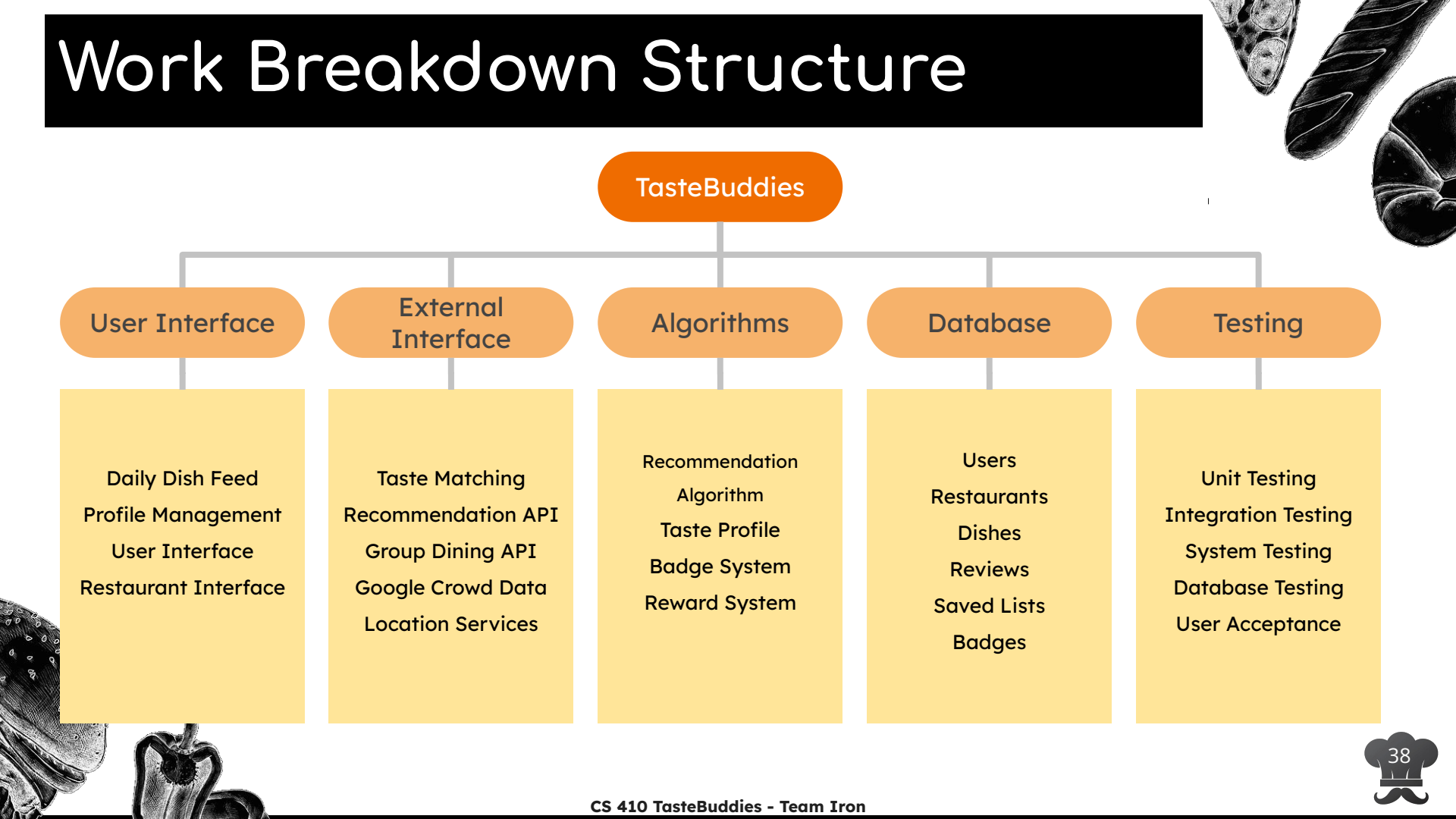


All recent crowd feedback or announcements

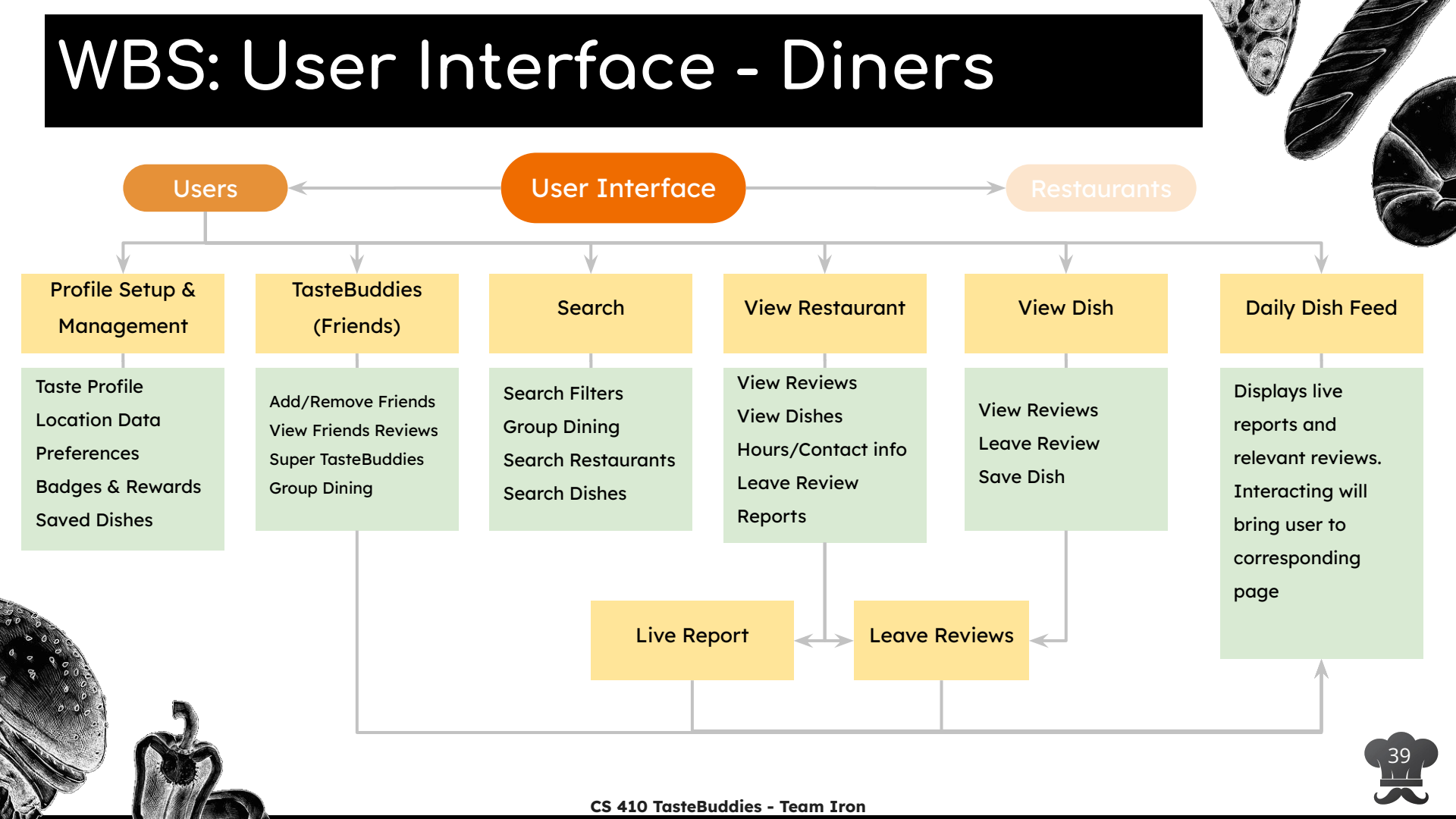
Slider to deactivate specials



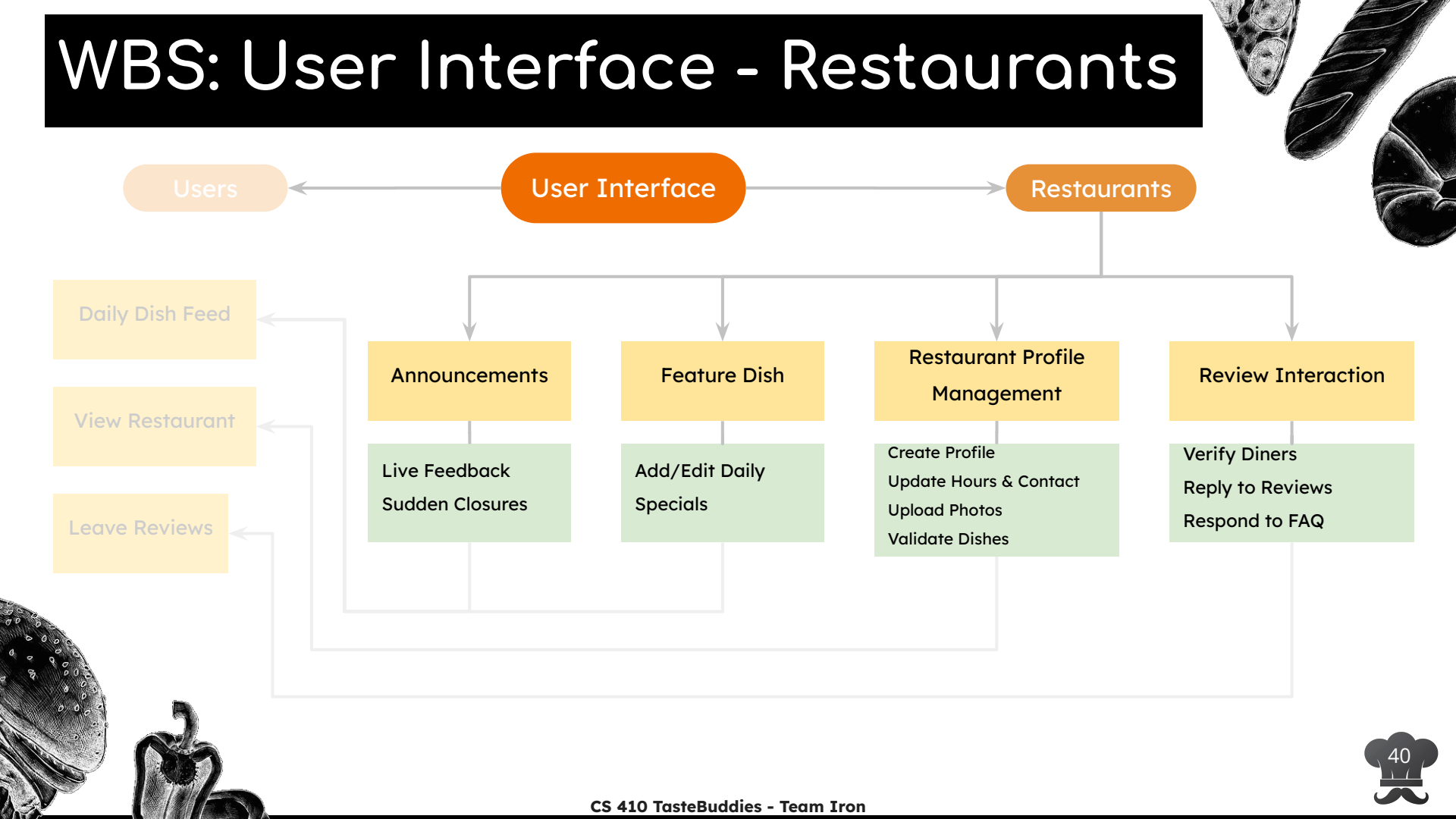
Work Breakdown Structure



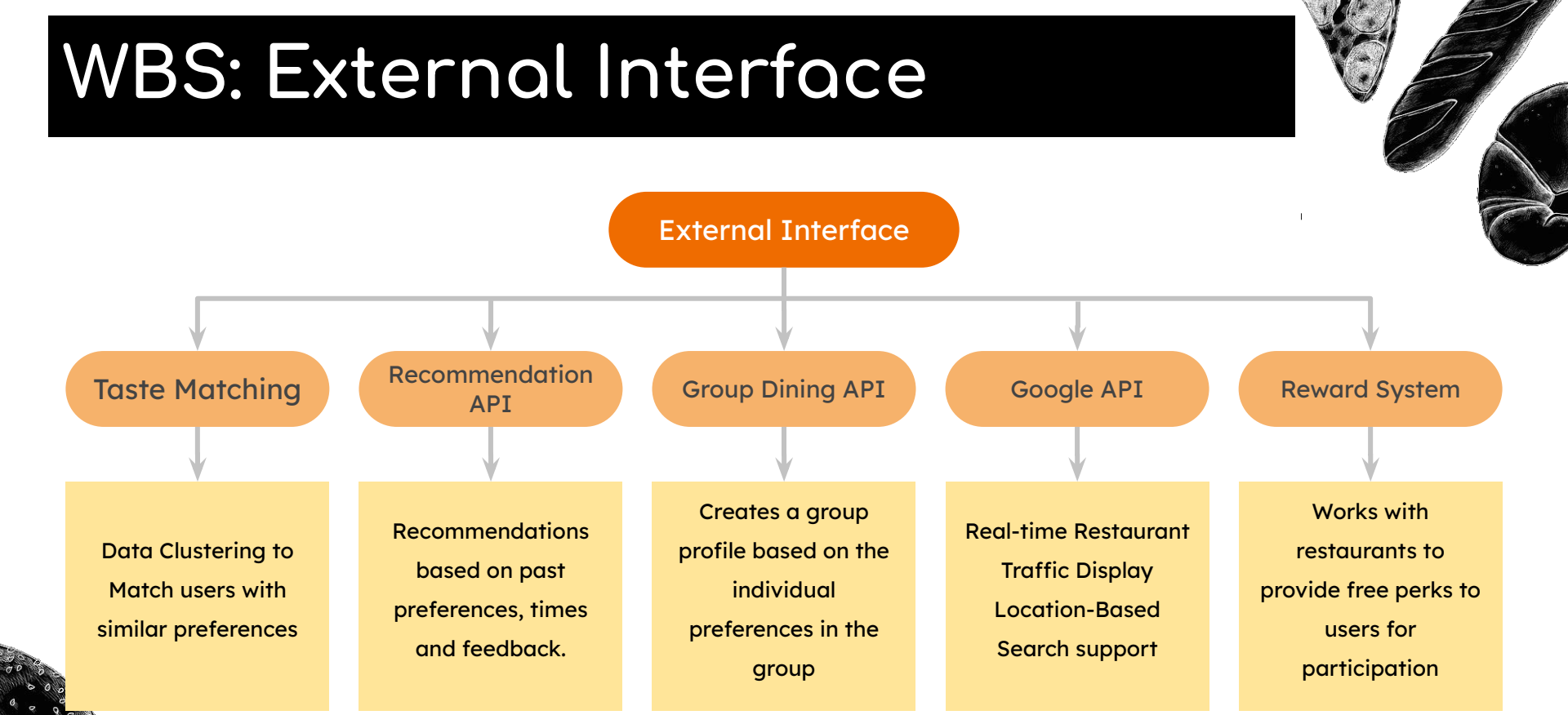
WBS: User Interface - Diners



WBS: User Interface - Restaurants



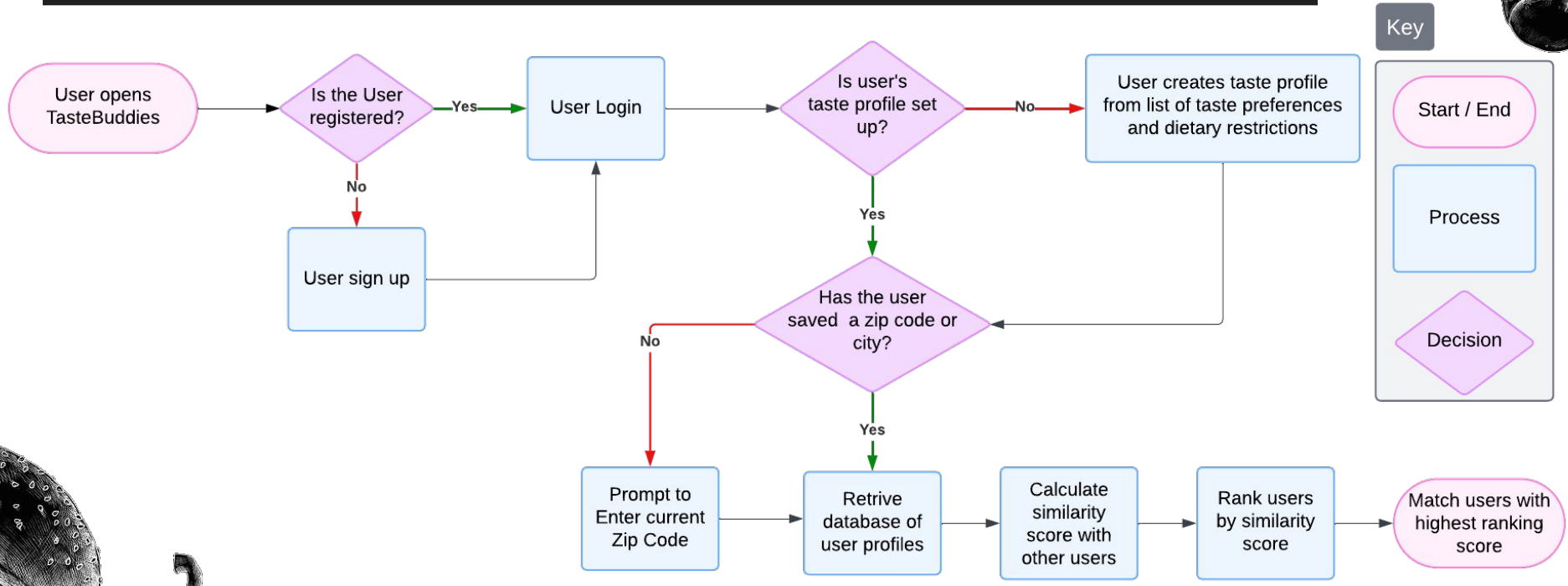
WBS: External Interface



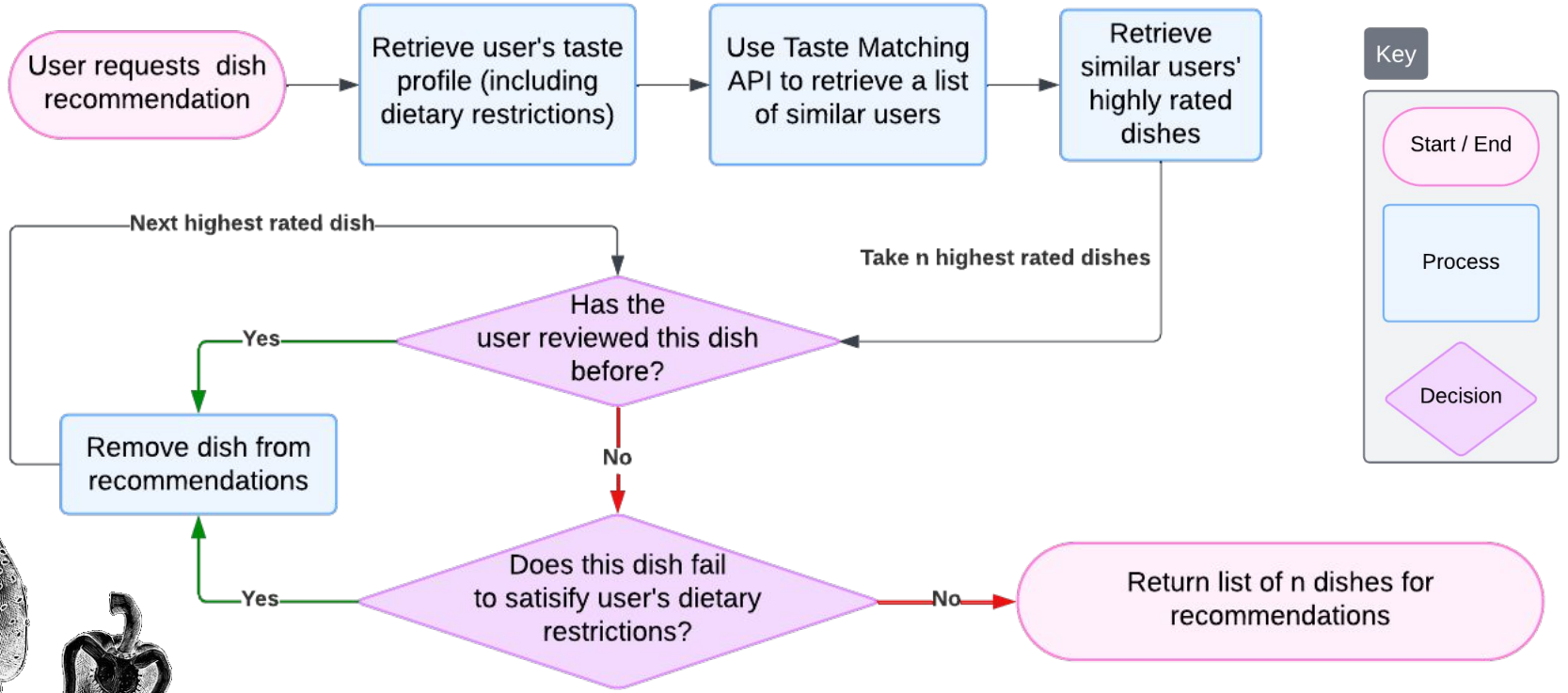
WBS: Algorithms

- Algorithms
  - Data Analytics
    - Google Analytics
  - TasteBuddies specific
    - Taste Matching
    - Recommendation
    - Group Dining
    - Badge & Reward
    - Daily Dish
    - Review Weight
    - Taste Profile
  - Third Party
    - Google Maps API
    - Google Reviews API

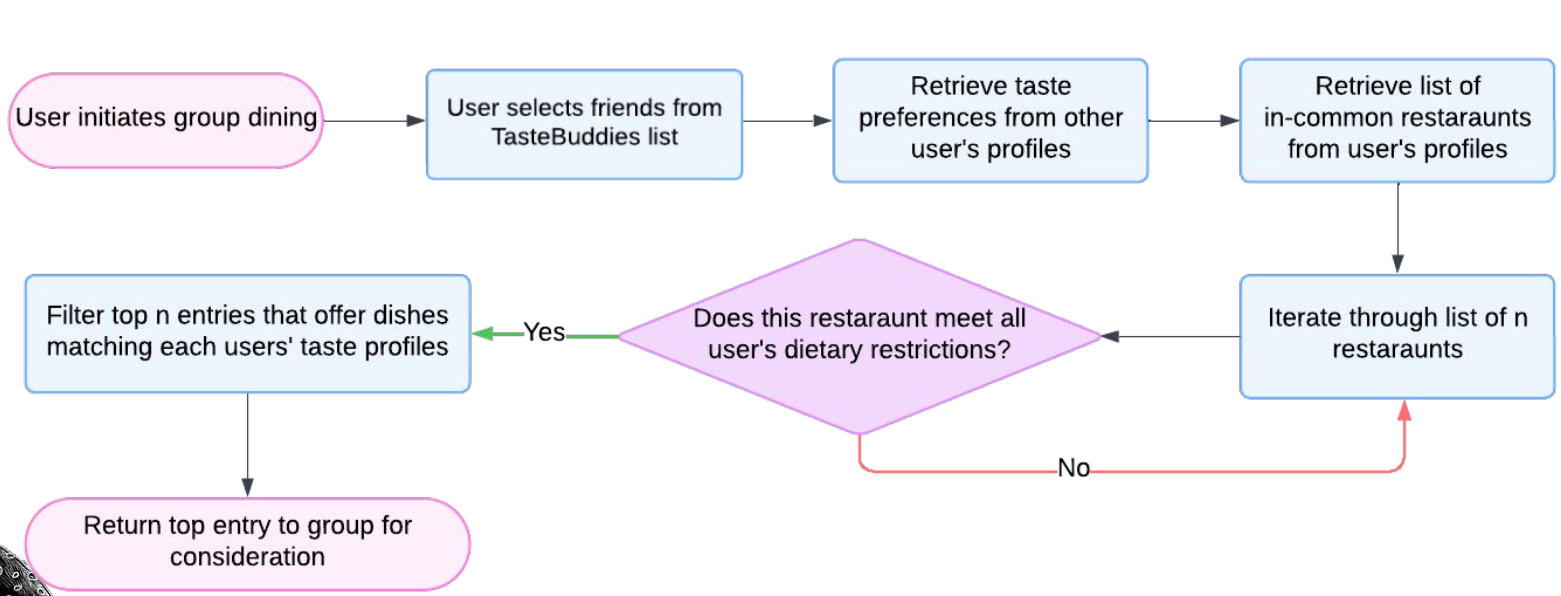
Taste Matching Algorithm



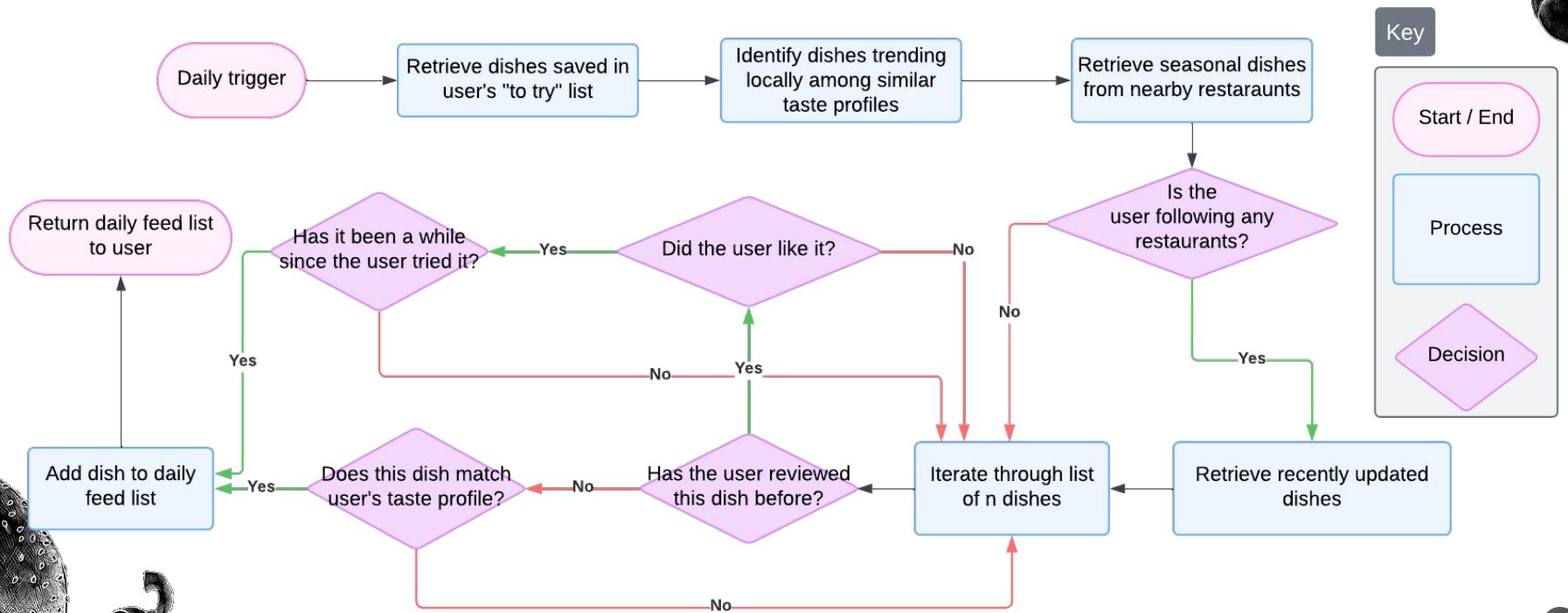
Recommendation Algorithm



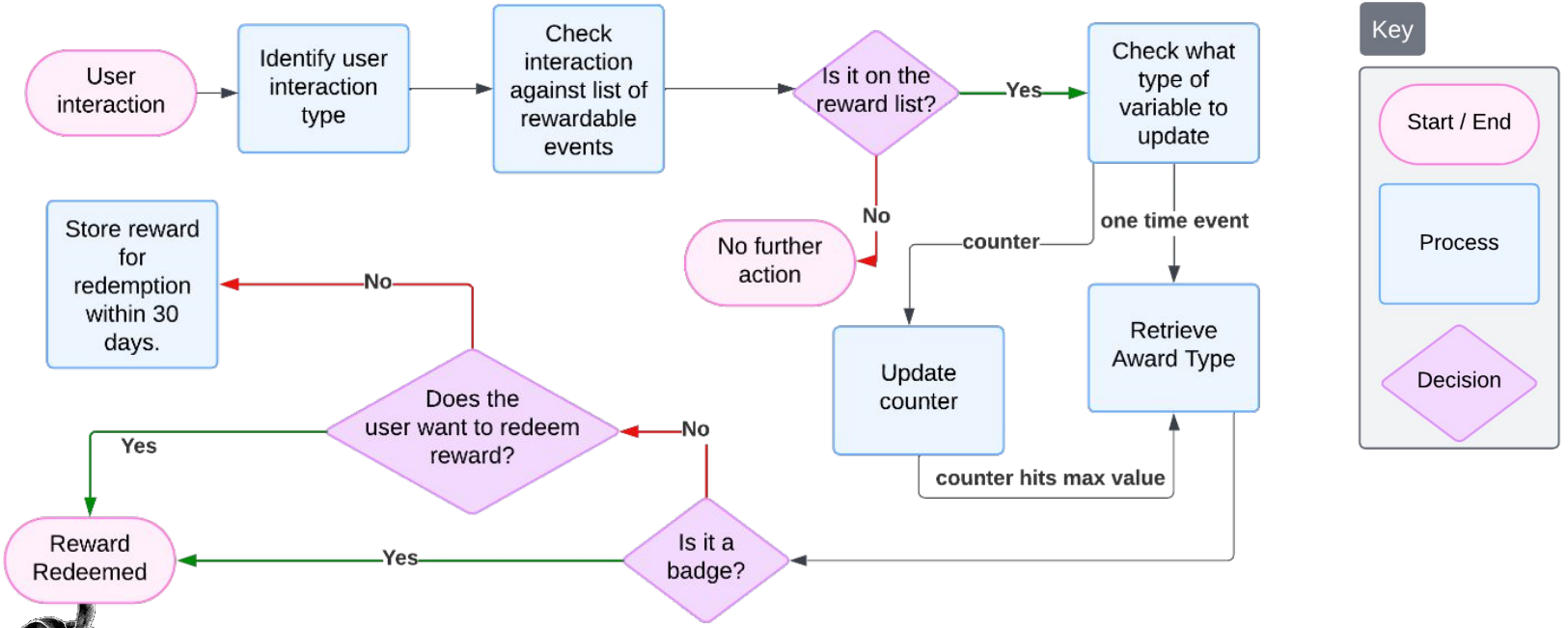
Group Dining Algorithm



Daily Dish Algorithm

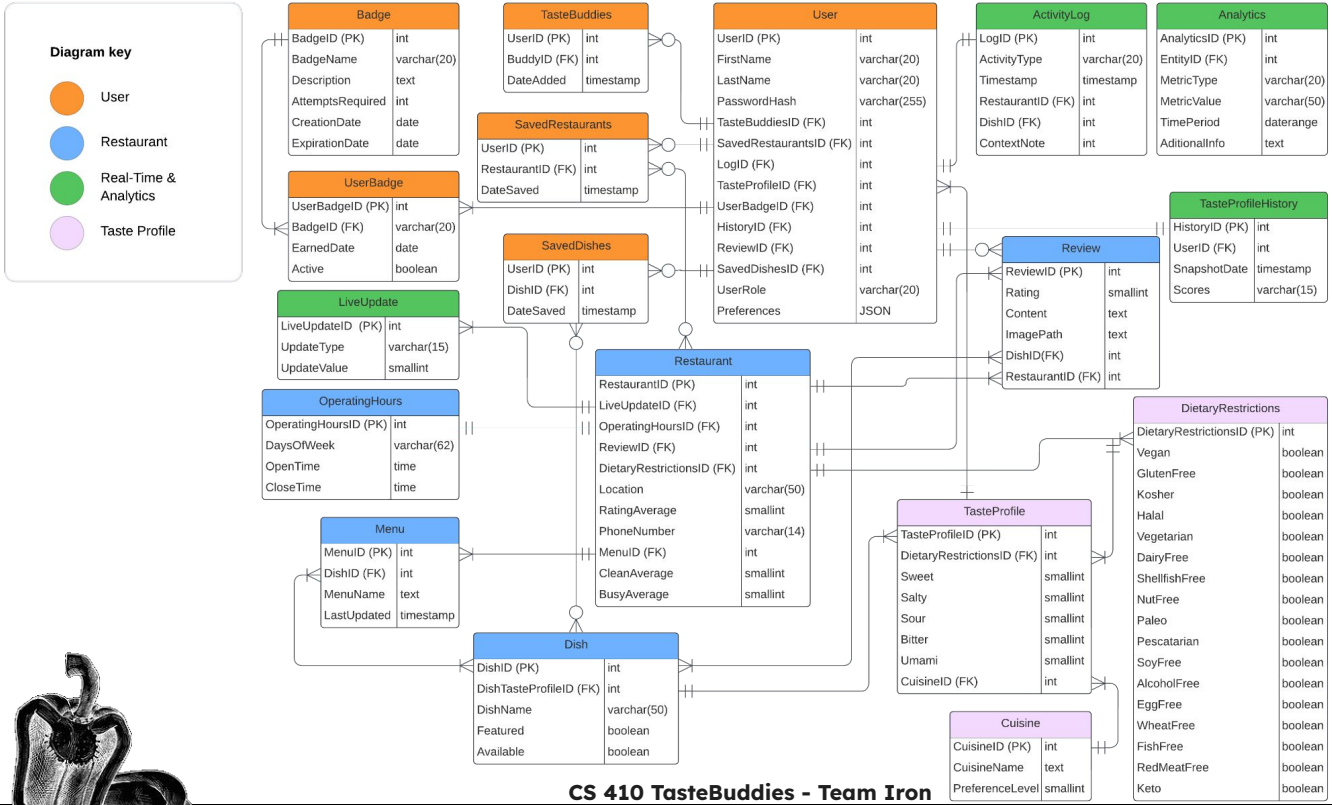


Badge & Rewards Algorithm



WBS: Database

Database Schema



Data Management

Input

User Inputs with Constraints and validation
API calls for real time information

Storage

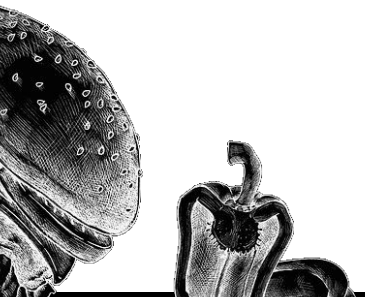
PostgreSQL on Relational Database Service
AWS S3 for user images and reviews

Backup

AWS Glacier
RDS point-in-time ability
Daily backups retained for 30 days

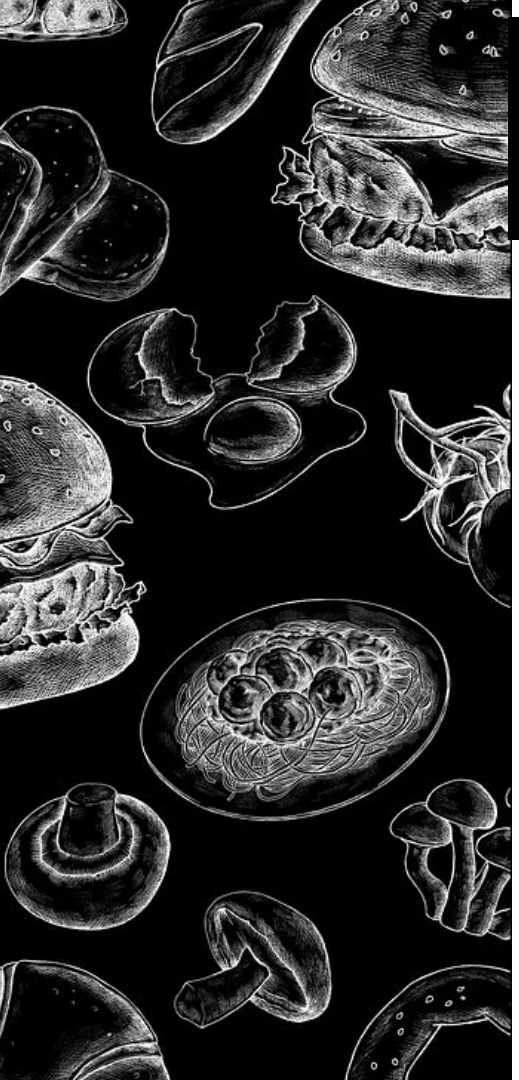
Security

Access controls
AWS Macie
CloudTrail & CloudWatch
GuardDuty



WBS: Testing

- Testing
  - Integration Testing
    - API Calls
    - Database Integration
  - System testing
    - Security
    - Performance
    - Data Validation
    - Functionality
    - End-to-end
    - External systems and interfaces integration
  - Unit Testing
    - Algorithms
    - UI/UX components
    - Functions
  - User Acceptance Testing
    - Accessibility
    - Usability
    - Workflows
    - Behavior



Kitchen Aids (Development Tools)

Selected Languages (Frontend)	HTML, CSS, Javascript, React Native
Selected Languages (Backend)	Python and Node.js
Testing Frameworks	Pytest, Jest & Maestro
IDE	Visual Studio Code
Version Control	Git through Github
Continuous Integration (CI) & Deployment (CD)	GitHub Actions & Workflows
Documentation Tool	Pydoc, JSDoc & React Native
Database	PostgreSQL

Dependencies

Libraries:	PyTest, Psycopg2, Python.io, scikit-learn
Languages:	Python, HTML, CSS, JavaScript
Frameworks:	React Native, PyTest
Project Management:	Trello
Other technologies:	Github, Node.js

Sprint Breakdown

Sprint 0: Project Setup

- Version Control, Git, CI/CD
- Trello Board
- Initial Repository Structure
- Basic database schema:
  Users, Dishes, Reviews
  Restaurants

Sprint 1: Foundation

- User registration & Login
- Database & Backend for user management
- Framework for Front & Backend UI

Sprint 2: User Accounts

- Taste profile setup
- Simple recommendation algorithm
- Daily Dish & Save for Later

Sprint 3: Reviews & Social

- Review Function
- Live Report Function
- TasteBuddy requests
- Integrate with Daily Dish

Sprint Breakdown

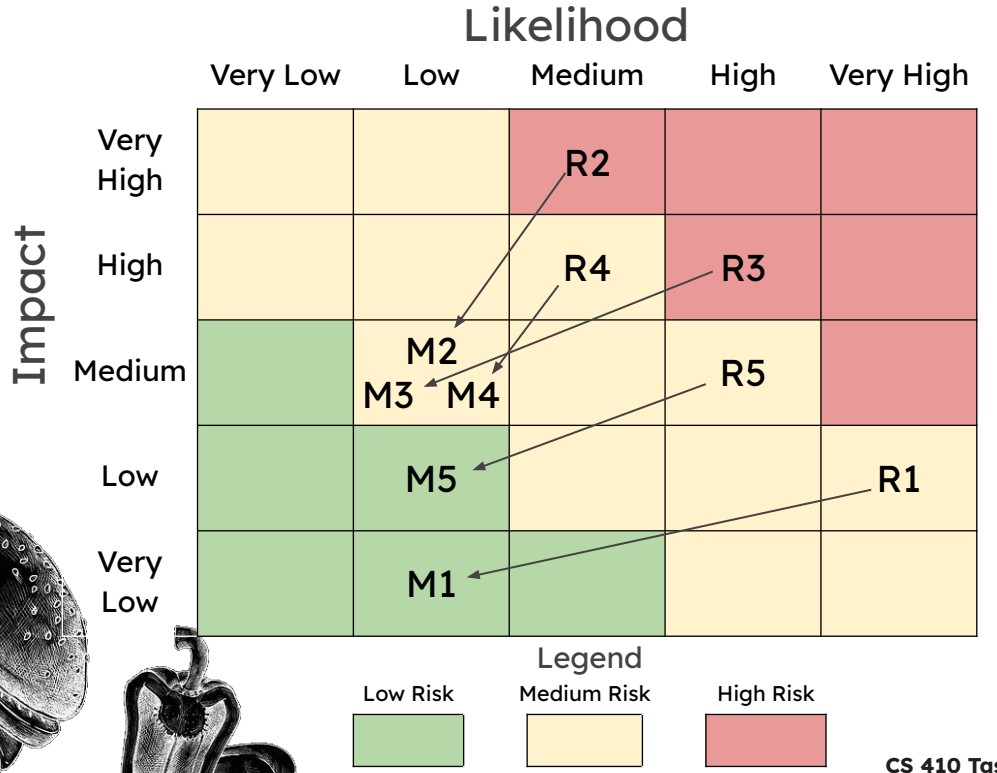
Sprint 4: User Engagement
- Define Badge criteria
- Front end Badge Display
- Backend tracking for rewards and badges

Sprint 5: Restaurant Portal
- Restaurant signup & management
- Featured Dish management
- Review notification & response
- Restaurant Live Report

Sprint 6: Search Functions
- Build search filters
- Implement Group Dining
- Integrate with Live Report and Location
- Search by Zipcode or Map

Sprint 7: Polish & Finalize
- Testing & Bug fixes
- Polish UI
- Review and Improve algorithms

User Risk Matrix



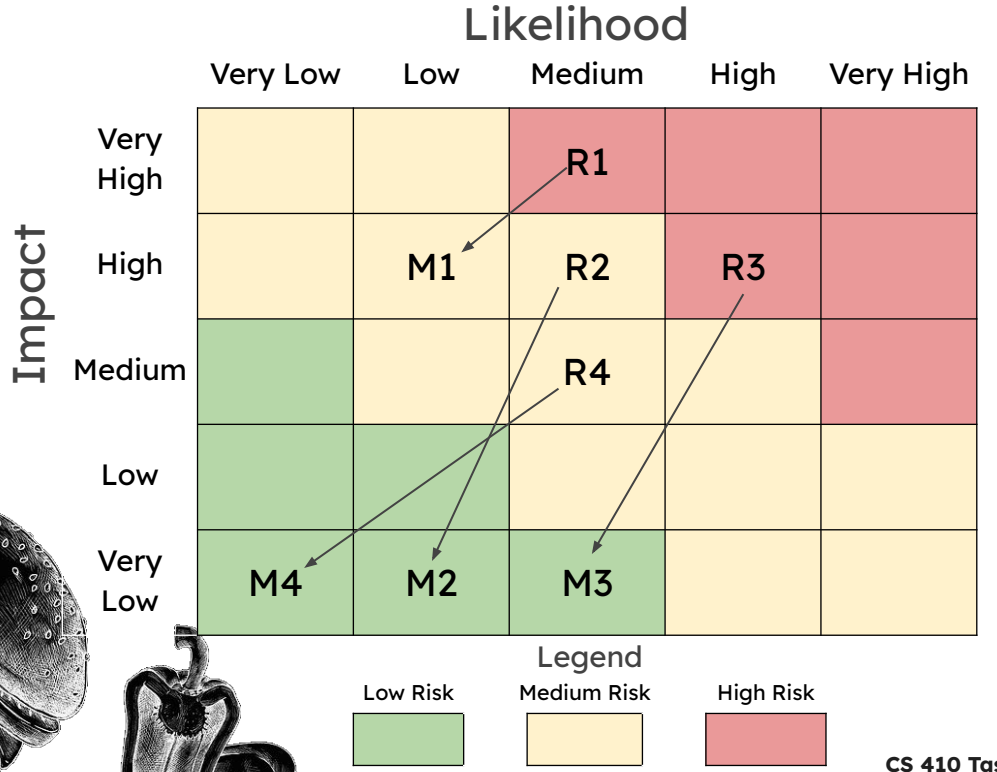
Risks

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: Require users to tie accounts to phone numbers and ban phone numbers from websites that provide temporary phone numbers
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



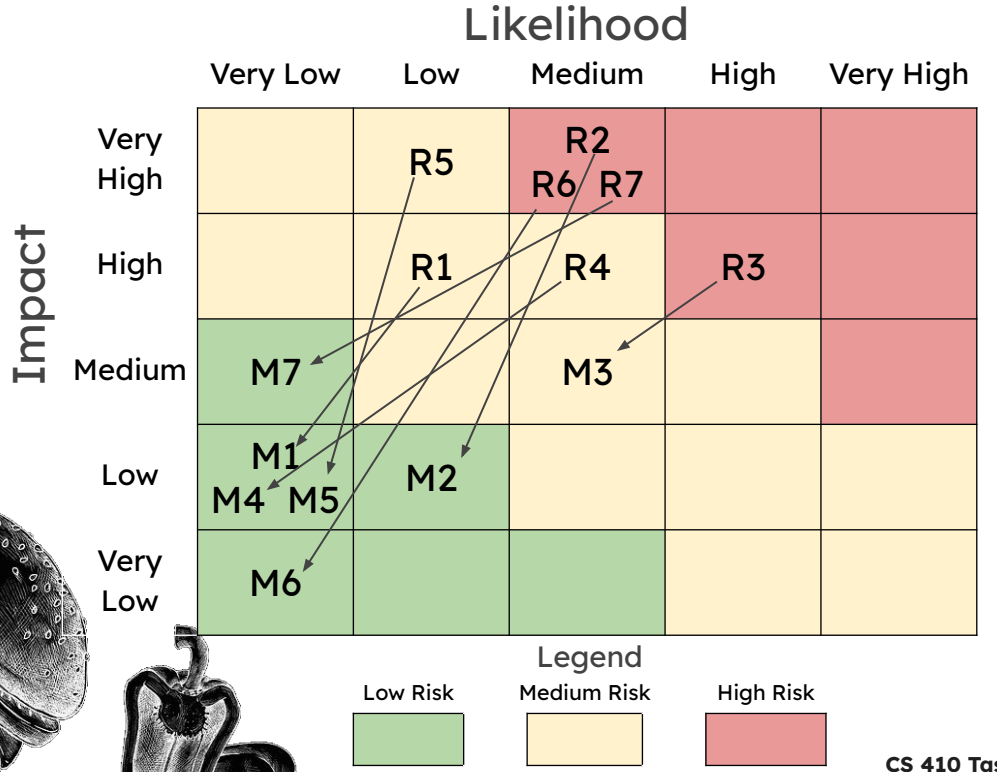
Risks

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



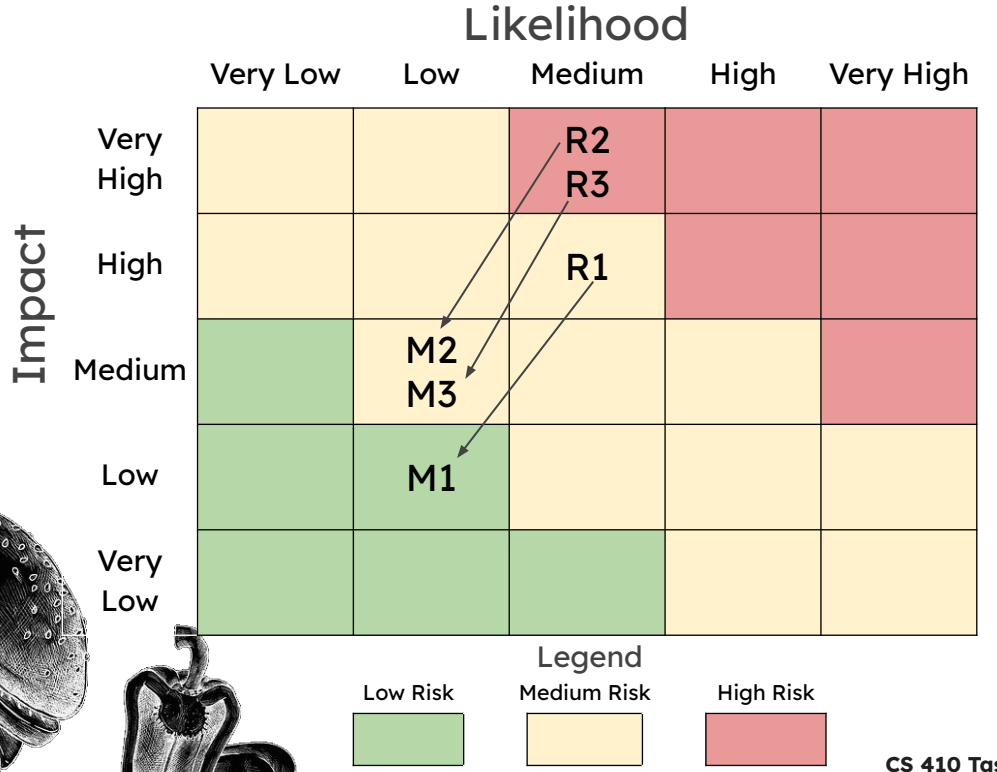
Risks

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: User feedback forwarded to development team to improve algorithm
M2: Conduct an initial survey among foodies/employees to populate 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

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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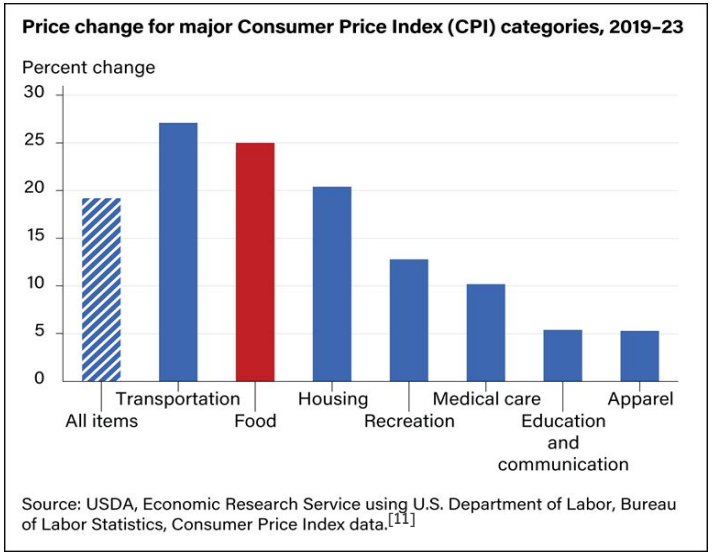
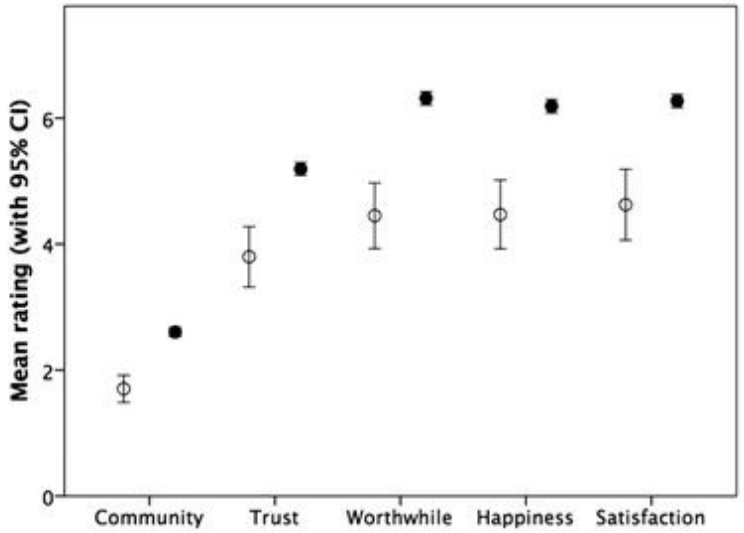
TasteBuddies

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.