munch

CS147: FINAL REPORT

Project: Munch
Instant, location-based dining promotions

Team: *4's A Crowd*
Adam G. (Development & Usability)
Hailey S. (Design & Usability)
Alex T. (Development & Usability)
Victoria W. (Product & Design)

TA: Chris Min

Class: CS147, Fall 2015

Website: http://hci.stanford.edu/courses/cs147/2015/au/projects/crowd_power/munch


Adam Ginzberg


Alex Tran

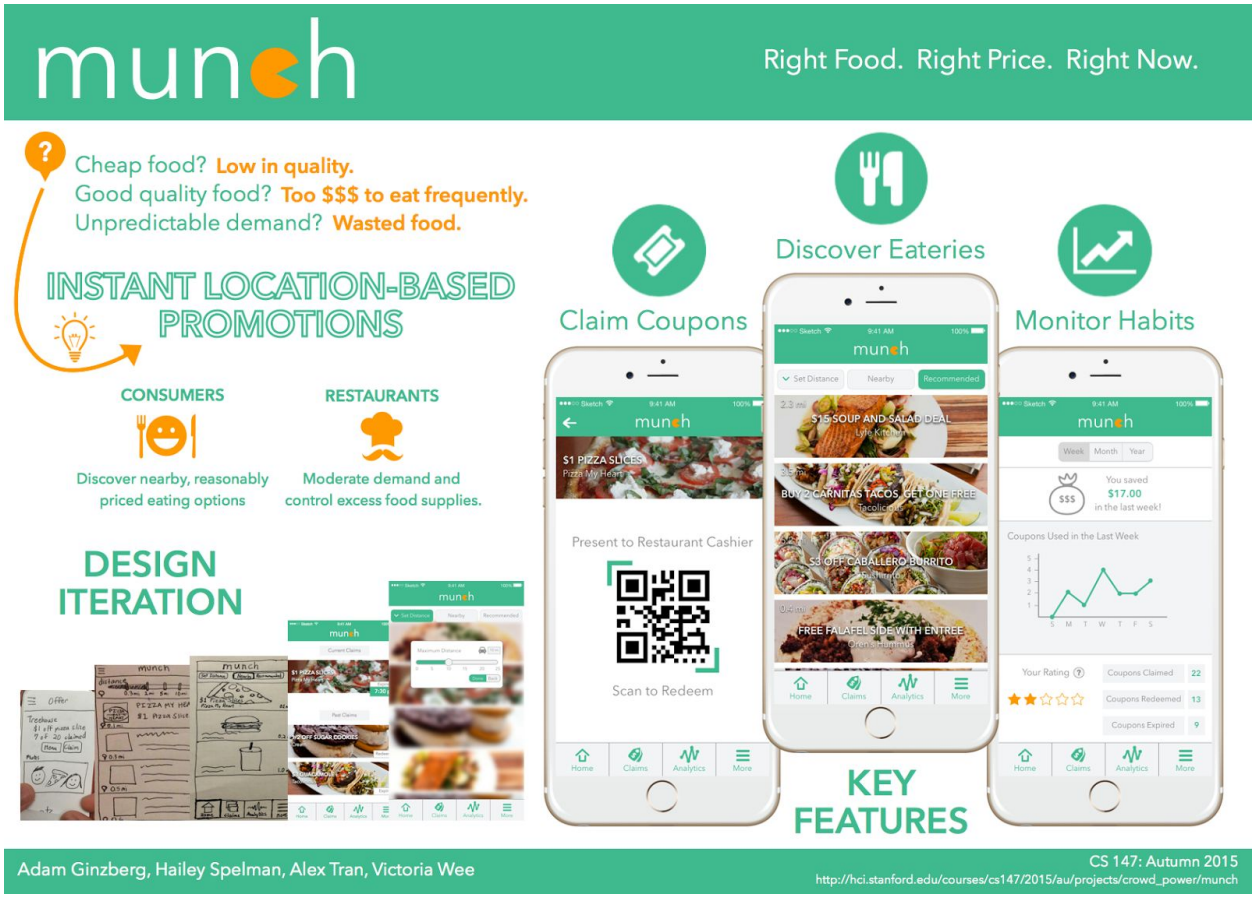

Hailey Spelman


Victoria Wee

I. Problem and Solution Overview

Munch is a functional iOS application developed by Team 4's a Crowd during the Fall 2015 iteration of the ten-week course CS147: Introduction to Human-Computer Interaction Design.

During the first half of the course, the team conducted a series of user interviews and narrowed our investigation to the domain of food surplus and waste in the restaurant industry. Through our experience prototypes and user studies, we identified a cross-cutting problem, that *cheap food is often low in quality, good quality food is often too expensive to eat frequently, and the average restaurant is vulnerable to fluctuations in consumer demand, often leading to wasted food*. Munch is a digital solution developed precisely to solve this problem. The second half of the course was focused on producing iterative versions of the application, testing features incrementally and making changes to the application based on feedback gathered and synthesized weekly from users and peer advisors. In its final form, Munch is a unique platform offering *instant, location-based dining promotions so that consumers can find reasonably-priced eating options and restaurants can moderate demand and control excess food supplies.*



II. Tasks and Final Interface Scenarios

In the design phase of Munch, the team envisioned three tasks that the application would achieve for its users. The tasks are as follows, ordered by complexity:

Task I. Simple (common or introductory)

Consumers find nearby restaurants offering flash dining promotions

Task II. Medium

Consumers track their eating and spending habits over time

Task III. Complex (infrequent or for power customers)

Consumers receive personalized dining recommendations

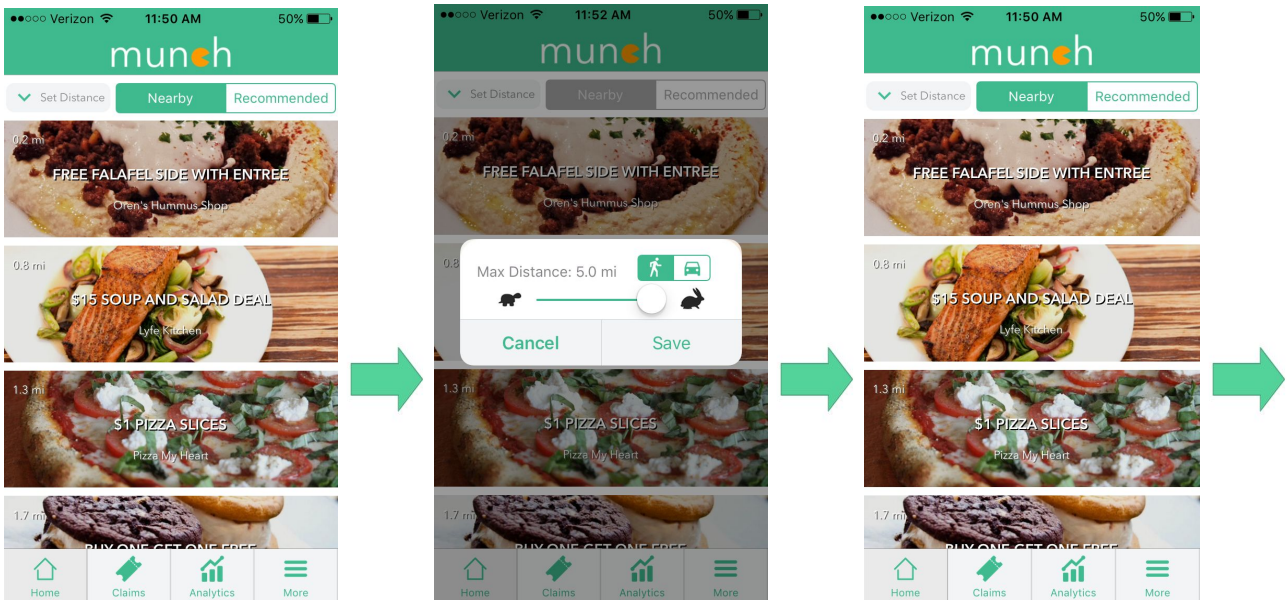
The three tasks were chosen because they directly served Munch's value proposition and because they positioned Munch as a unique product in the already fairly crowded application world catering to the food industry. The first task was designed to be very straightforward, servicing the primary reason why users might use Munch: to find nearby restaurants currently offering deals on food and drink. The second task is slightly more complex than the first. By allowing users to track their eating and spending habits, we identified a task that would grow the significance and value of our application to the lives of its users. We knew that Munch could potentially have access to a wealth of data on eating and spending, so we decided to leverage this data to transform Munch from a simple search and identify machine to a more mature application capable of synthesizing information and visualizing it in a meaningful way. Our third task is to give users personalized dining recommendations. This task was designed not only to build on top of the value provided by the first two tasks, but also to bring a sense of intimacy and familiarity to the application. From our user interviews, we gleaned the understanding that we live in a food-evolved culture where dining locations are picked not only on based on personal taste, but also on variables including mood, time of day, party-size, and party composition. Our third task aims to meet this through offering personalized recommendations, aiming to build a relationship with the user.

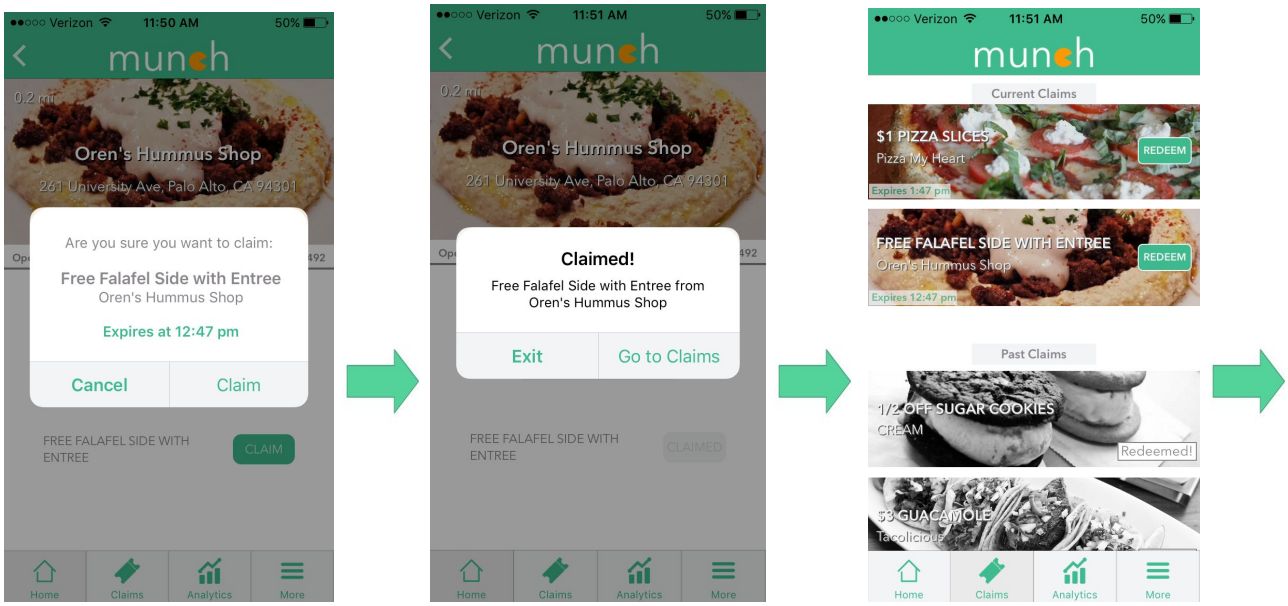
Originally, the three tasks our team chose were slightly different from their final form as reflected above. The initial version of the tasks took a broader look at Munch's impact on both the dining consumer and the restaurant owner. In order words, the three tasks outlined an application that would serve both the consumer and the owner. We realized that by forming our

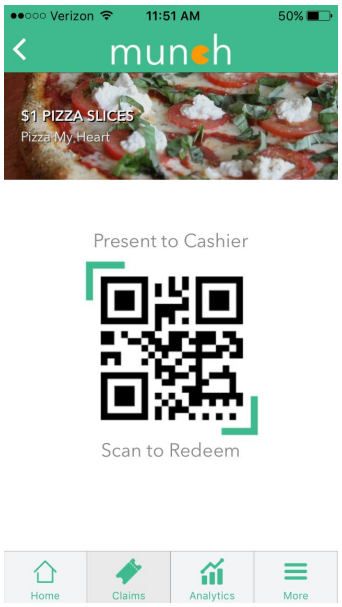
tasks in this manner, we were implicitly suggesting that our application would have both a functional consumer-facing side, and a supplier-facing side. After evaluating the intended purpose of our application against the time-scoped nature of our development schedule, we decided to modify our set of tasks to zero-in on the consumer. We chose to focus on the consumer rather than on the suppliers (restaurant owners) because the vast majority of our users would be interacting with the consumer-facing side, and only a small proportion would be interacting with the supply-side. We reasoned that all restaurant owners are also potential consumers of the application -- using the supplier-facing side in the management of their restaurants and using the consumer-facing side in their personal lives -- but not all users are involved in restaurant management. We further realized that in order to receive restaurant buy-in for our application, we needed to demonstrate evidence of a positive market response through testing initial prototypes with users. This logic launched our decision to focus resources on producing a high quality consumer-facing product.

The following series of images present a storyboard walkthrough of each task using final interface screens taken from Munch.

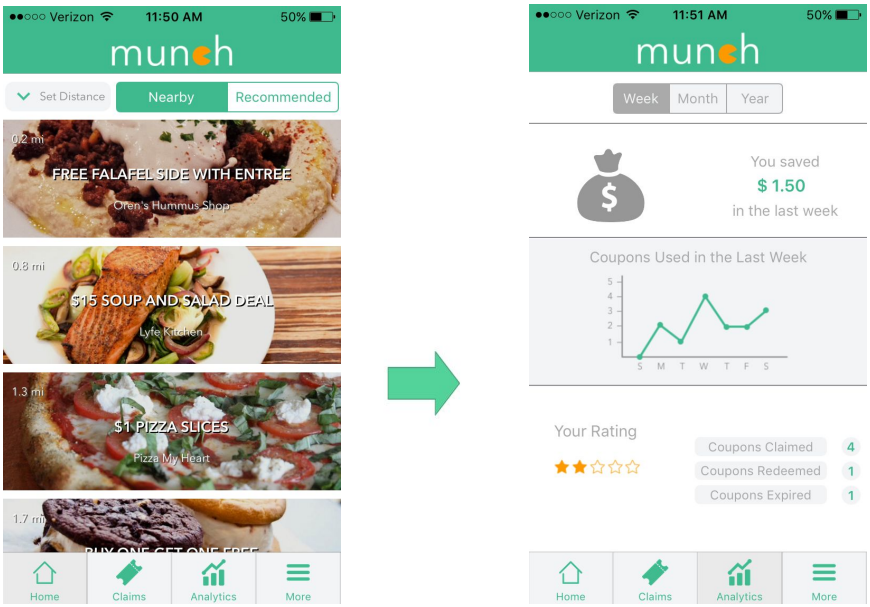
Task I: Consumers find nearby restaurants offering flash dining promotions



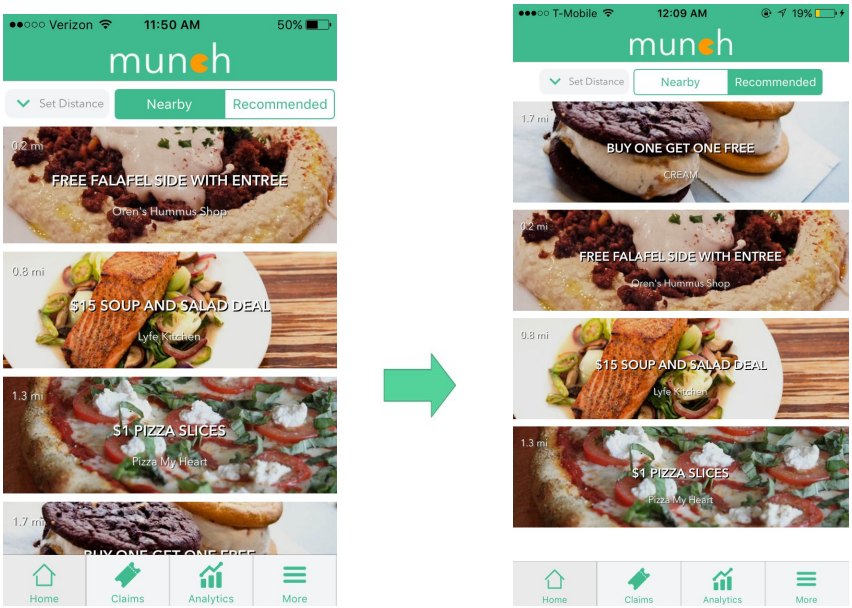

Verizon 11:50 AM 50%
munch
0.2 mi
Oren's Hummus Shop
261 University Ave, Palo Alto, CA 94301
Are you sure you want to claim:
Free Falafel Side with Entree
Oren's Hummus Shop
Expires at 12:47 pm
Cancel
Claim
FREE FALAFEL SIDE WITH ENTREE
CLAIM
Home
Claims
Analytics
More
Verizon 11:51 AM 50%
munch
Claimed!
Free Falafel Side with Entree from Oren's Hummus Shop
Exit
Go to Claims
FREE FALAFEL SIDE WITH ENTREE
CLAIMED
Verizon 11:51 AM 50%
munch
Current Claims
$1 PIZZA SLICES
Pizza My Heart
REDEEM
Expires 1:47 pm
FREE FALAFEL SIDE WITH ENTREE
Oren's Hummus Shop
REDEEM
Expires 12:47 pm
Past Claims
1/2 OFF SUGAR COOKIES CREAM
Redeemed!
$3 GUACAMOLE
Tacolicious


Verizon 11:51 AM 50%
munch
$1 PIZZA SLICES
Pizza My Heart
Present to Cashier
Scan to Redeem
Home
Claims
Analytics
More

Task II: Consumers track their eating and spending habits over time



Task III: Consumers receive personalized dining recommendations



III. Design Evolution

Munch went through four major stages of design: exploration, low-fidelity prototyping, medium-fidelity prototyping, and high-fidelity development. This section of our report aims to illustrate major steps in our project from initial sketches to final designs. This section will also provide reasoning behind changes, including our evaluation techniques, our findings at each state and our design reactions to such feedback. Note that we will leave a detailed discussion of changes between Phase Three and Phase Four (medium-fidelity prototyping and high fidelity development) to the following section in this report, Section IV: Major Usability Problems Addressed. Section IV will outline the peer feedback we received against Nielsen's heuristic evaluation criteria and the final changes we made to our application as a result of this feedback.

Design Phase I. Exploration

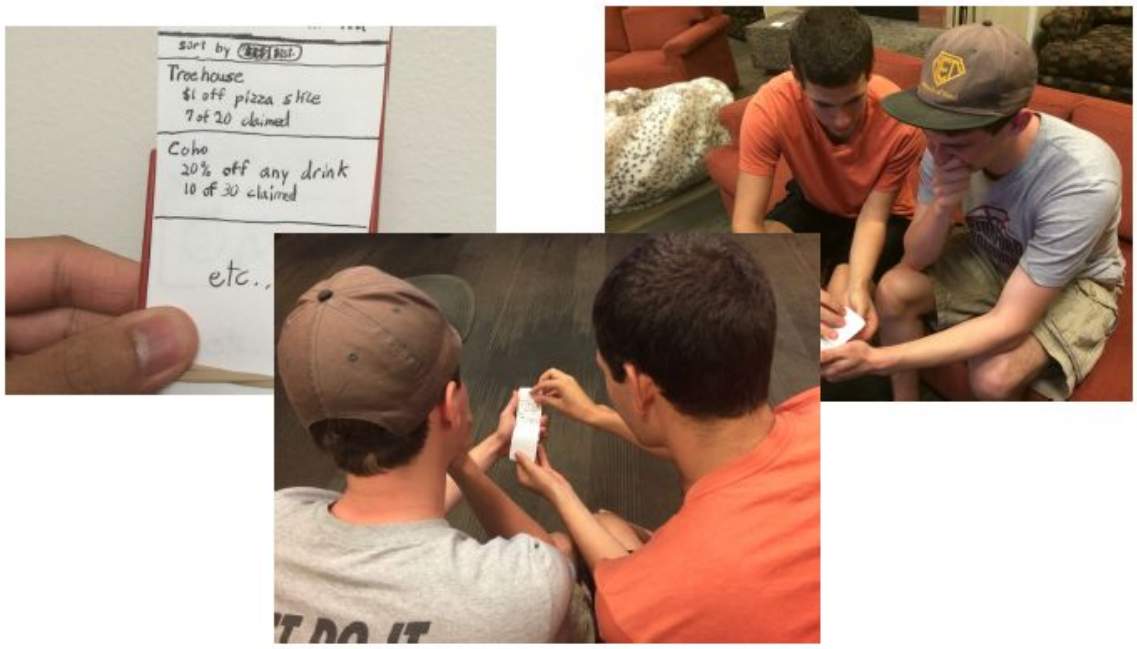
We conducted a round of user interviews in order to formulate Point of Views (POVs) for our potential users. We then conducted a second round of interviews, revised our initial POVs, and generated approximately fifteen How Might We (HMW) statements for our POVs. HMW statements are included in Appendix A. We composed two POVs, one for the business manager and one for the consumer.

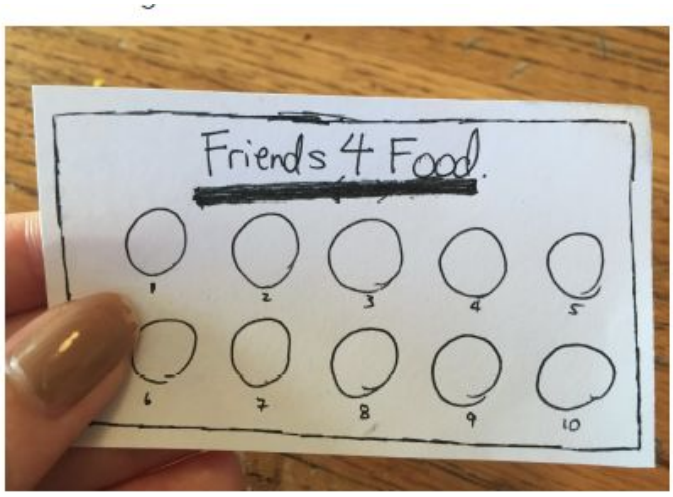
POV #1: We met three business managers, Francisco, Mistie, and Jennifer. We were amazed to realize how hard it is to predict demand, to avoid surplus and waste, and to handle staff relations (particularly firing). It would be game changing to provide business managers with better ways to predict or handle the variability of demand thereby reducing waste.

POV #2: We met two consumers Elliot and Tracey. We were amazed to realize how consistently consumers returned to the same businesses and how much price affected their decisions. It would be game changing to offer consumers recommendations for new restaurants and shops along with promotions and discounts to incentivize them to eat out and shop more frequently and try new places.

We employed the strategy of group consensus to select our top 3 HMW statements for these POVs. We brainstormed solutions for each of the 3 HMWs (see Appendix B), and then created and tested an experience prototype for each HMW. Our experience prototypes included a mobile app for promoting Happy Hours discounts at non-traditional Happy Hour times of day. The second idea we tested was a mobile reward system based on how many new people users brought to restaurants. Our third idea was an application that people would use to create food profiles with their dining preferences. Based on these dining preferences, the application would generate a shortlist of appropriate restaurants.

Images of our experience prototypes and testing:





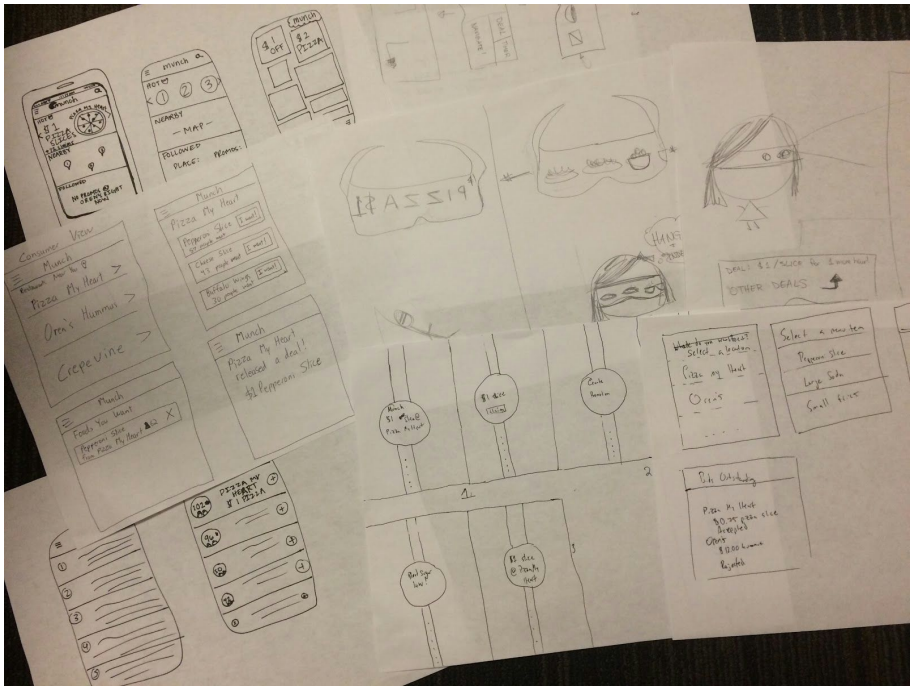
From testing our three experience prototypes with users, we found that our concept for surfacing flash dining promotions was most successful. We reached this conclusion through analyzing our interviews with potential users from both the business and consumer audiences. Businesses were interested in being able to make additional revenue at a discounted price, though highlighted their concern around the appearance of coupons. Businesses were also excited about the idea that the flash hales gives them control over when they give promotions and additional gives them a channel for which to distribute excess or surplus food. Consumers were interested in eating good food at greater discounts, and also were intrigued with the idea of gamifying the eating experience.

Design Phase II. Low-Fidelity Prototyping

During the second stage of our process, we created sketches for a diverse range of implementations of our product and then built a low-fi prototype of our best design. We then performed a series of simple usability tests leveraging POP software in order to gain feedback on our interface and workflow.

Our initial sketches spanned a spectrum of product-types: a wrist-band wearable, a Google-glass integration, and two distinct mobile applications.

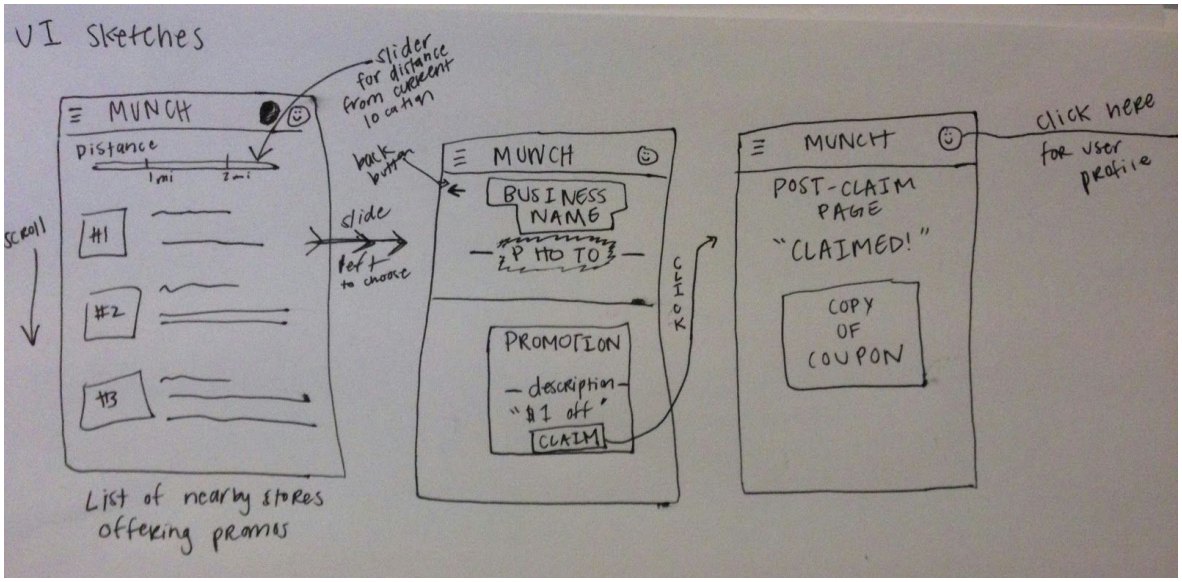
Some of our earliest sketches:

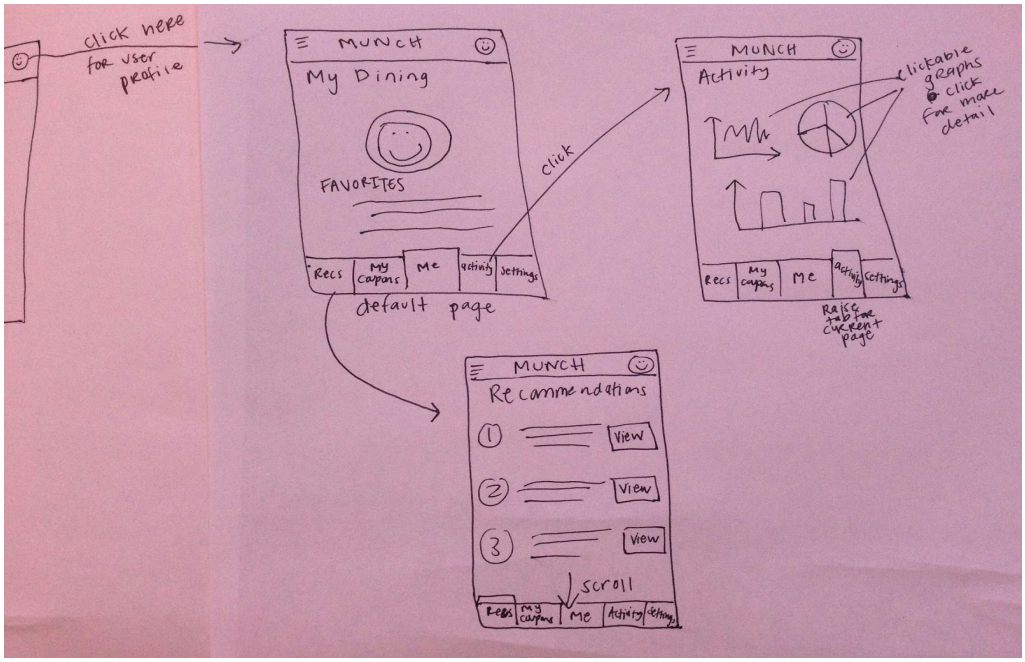


We then picked the two realizations that we found the most compelling and storyboarded the interface designs in greater detail.

Storyboard Sketch #1: Location-Centric & Restaurant Owner Driven Promotions

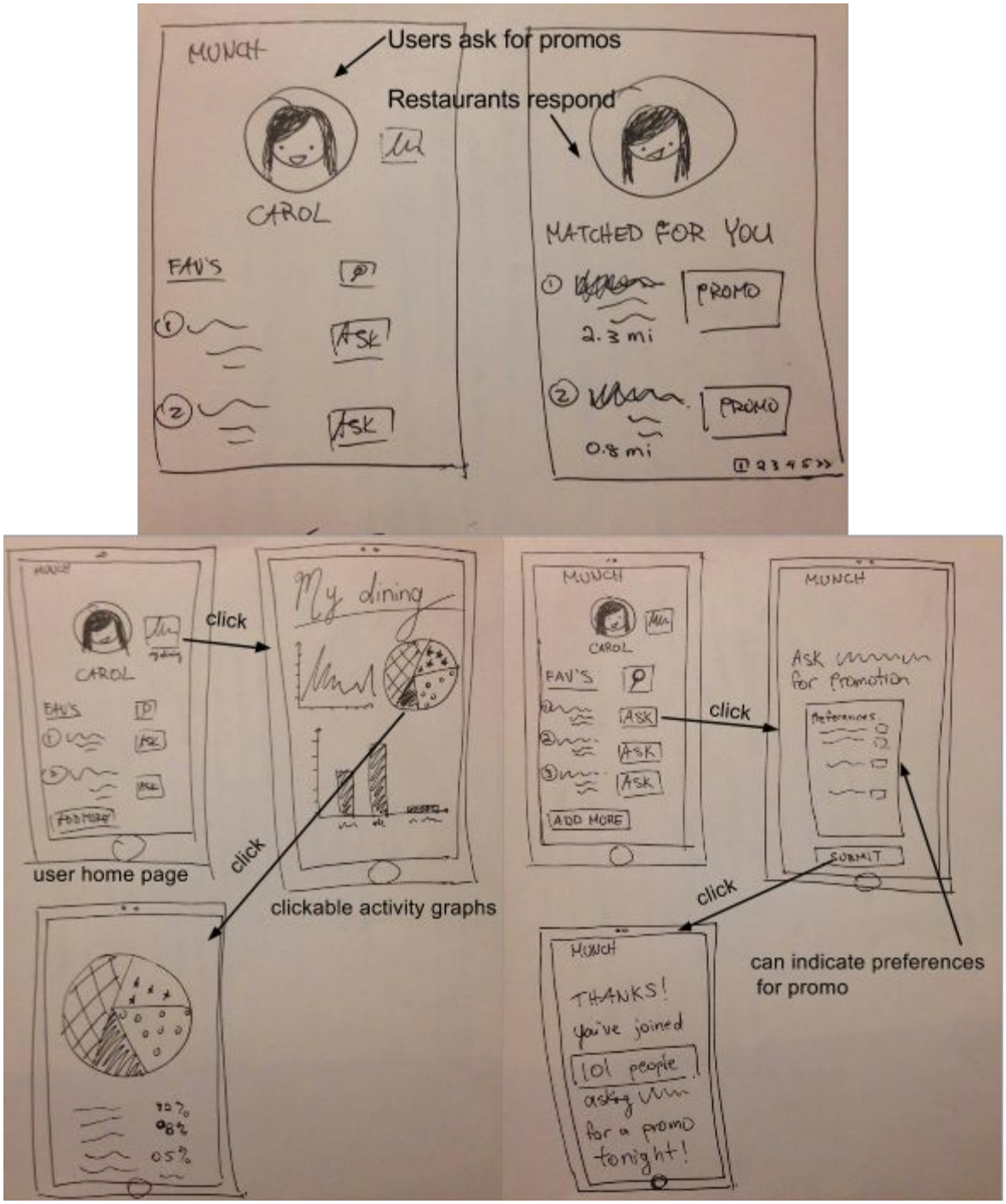
Restaurant owners post promotions that are filtered by location and displayed to consumers to claim and use:



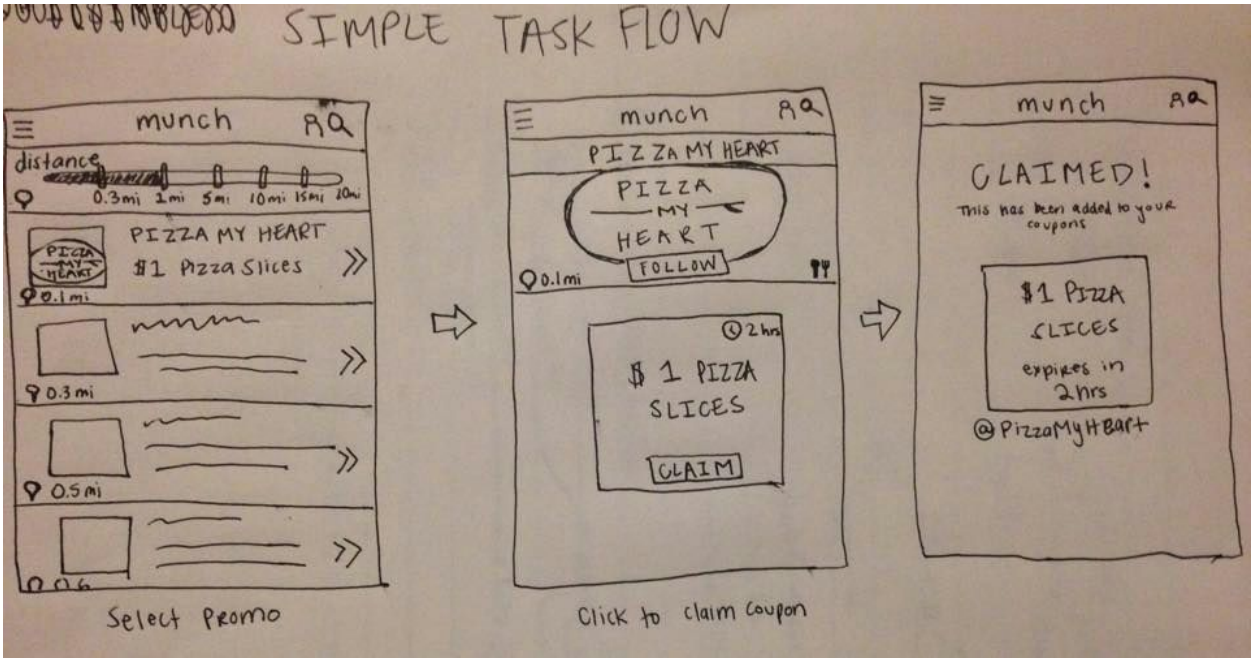


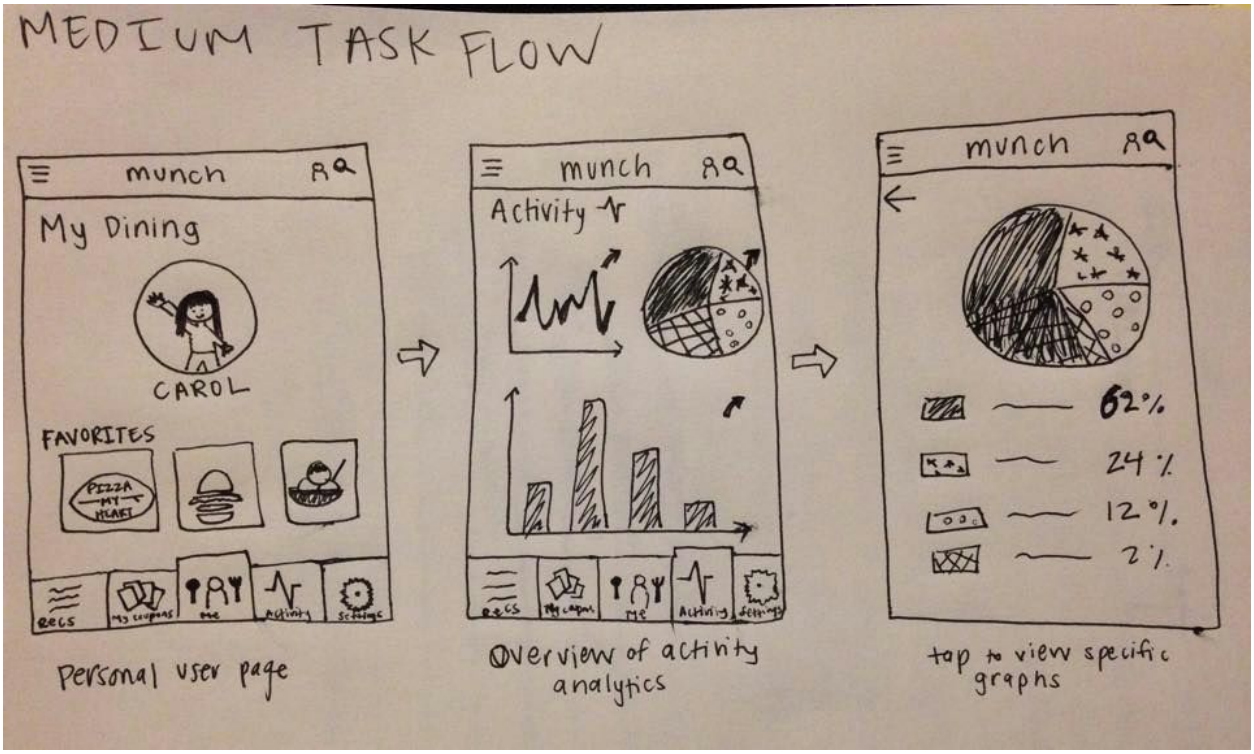
Storyboard Sketch #2: Consumer-Preference Driven Promotions

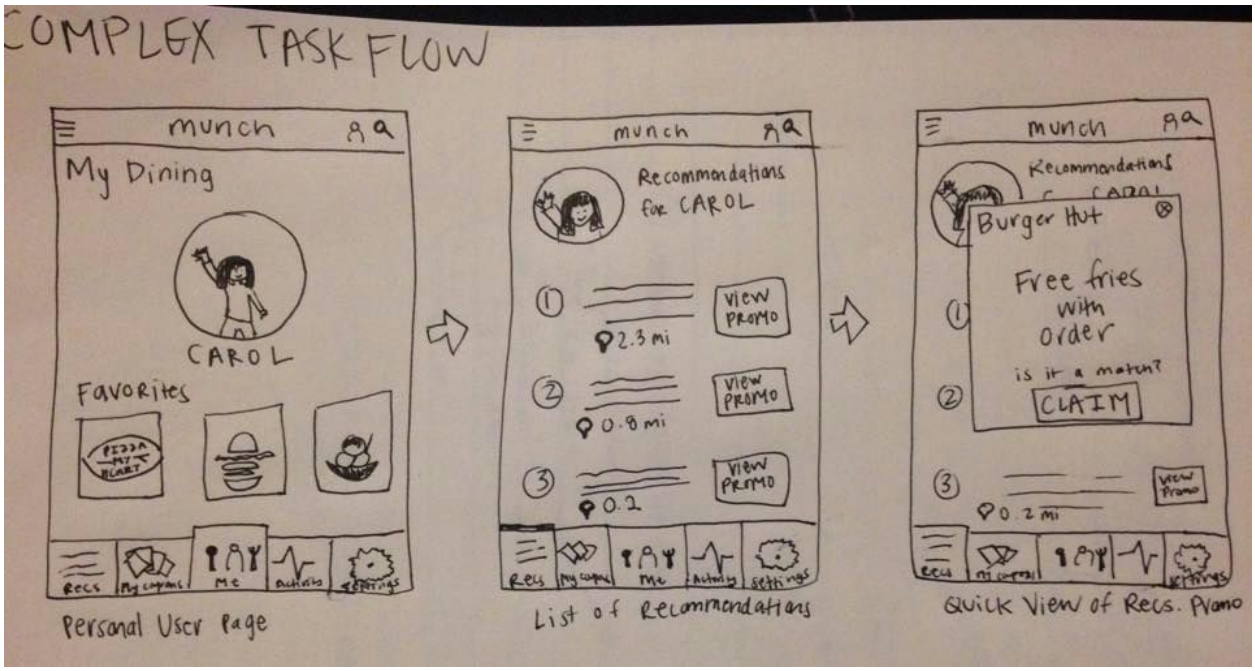
Consumers own personal dining profiles from which they can indicate demand for an item and "request" deals for it. Restaurants can then analyze the desires of the crowd and issue promotions to take advantage of crowd-indicated demand.



We narrowed our product realizations even further in the first phase of the design process; from our top two ideas, we selected the design represented in the section above by "Sketch #1 Location-Centric & Restaurant Owner Driven Promotions" for continued exploration. We chose this design because we found that it allowed for a more consistent and potentially more sophisticated user experience. Our second design "Sketch #2" relied heavily on the timeliness and responsiveness of restaurant managers/owners to approve or deny requested promotions. While restaurant owners liked having more control over the demand chain, "Sketch #2" also gave them additional stress by expanding the audience they were required to directly manage. "Sketch #1", on the other hand, still gives control to the manager by giving them the authority and means to create and push flash deals, but the mechanism by which the deals are transferred is taken out of the hands of the manager. The manager never has to directly interact with the consumers through the application, and we directly cut out the issue of consumer-manager dependencies. This first design phase also saw us create the very first sketches of the simple, medium and complex task flows for Munch:




MEDIUM TASK FLOW
munch
My Dining
CAROL
FAVORITES
Personal user page
munch
Activity
Overview of activity analytics
munch
62%
24%
12%
2%
tap to view specific graphs


COMPLEX TASK FLOW
munch
My Dining
CAROL
Favorites
Personal User Page
munch
Recommendations for CAROL
2.3 mi
0.8 mi
0.2
VIEW PROMO
List of Recommendations
munch
Burger Hut
Free fries with order
is it a match?
CLAIM
Quick View of Recs. Promo

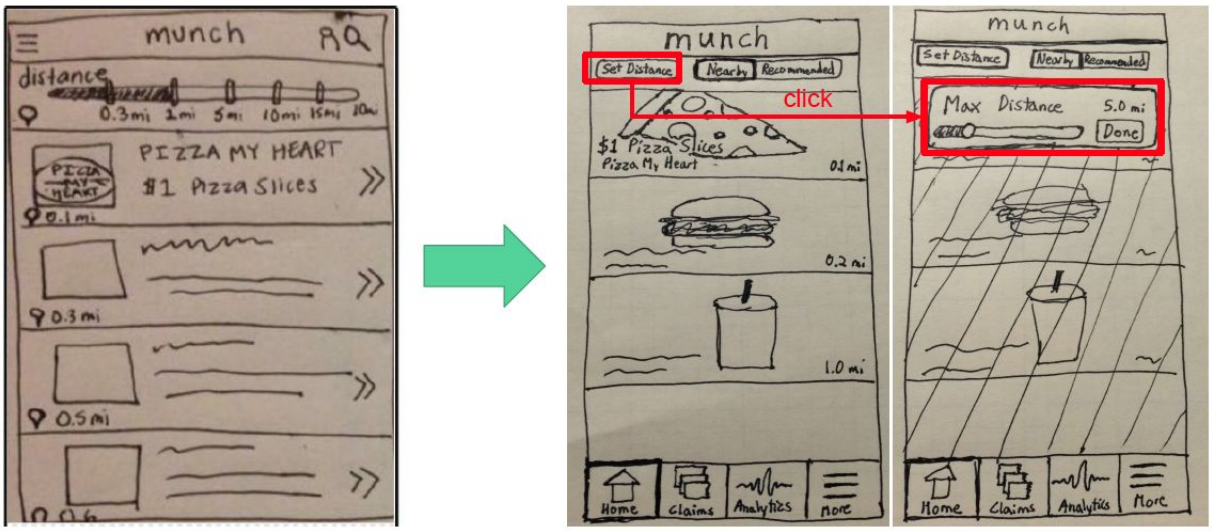
Design Phase III. Medium-Fidelity Prototyping

In the third phase of our process, we redesigned our low-fidelity prototype interfaces to incorporate the feedback we synthesized from our usability testing. We then implemented a medium-fidelity prototype using tools such as Marvel and Sketch. The key findings of our testing data fell into two categories that informed the design changes we made between our low-fi and medium-fi prototypes:

1. UI and user-flow intuitiveness
2. Quantity of screen content

While our testers were able to navigate the low-fi interface unassisted, we noted instances when the users hesitated while completing the tasks or did not take the most direct route through the screen workflow. For example, a participant took several seconds to figure out how to manipulate the UI slider mechanism to set a radius for discovering promotions. We redesigned our screen to make the slider more prominent. We put the slider on its own screen in the task-flow of discovering nearby restaurants, and blurred the shapes behind the slider widget as to make it the center of focus in its particular screen.

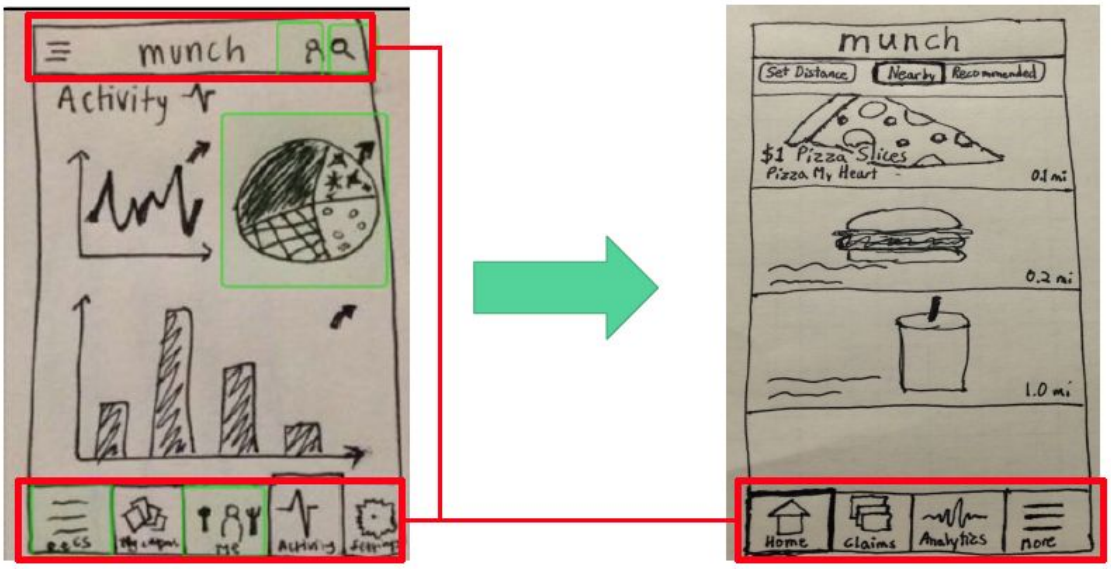
Before and after sketches of slider design:



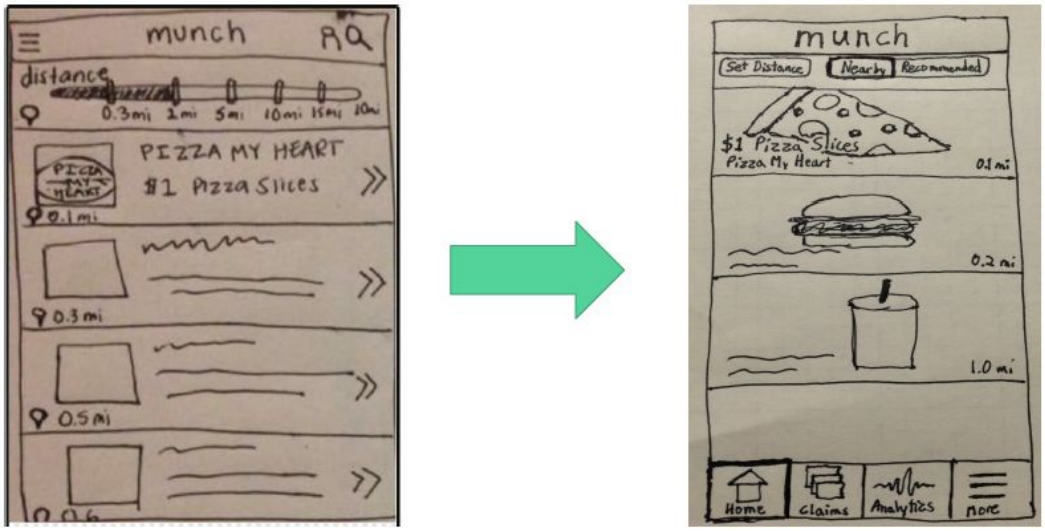
We also identified the content to screen ratio as a UI component that we wanted to improve. We noticed that our testers paused on some screens or made subtle indications of their

approval or confusion. We tracked their eye-movements and realized that they were spending a significant proportion of time parsing content on the page. As a result, we reviewed each screen on the low-fidelity prototype and evaluated whether each content unit contributed to the task that screen was created for. We want to streamline our screens and remove any unnecessary content or features, resulting in a more elegant series of displays and a better user experience.

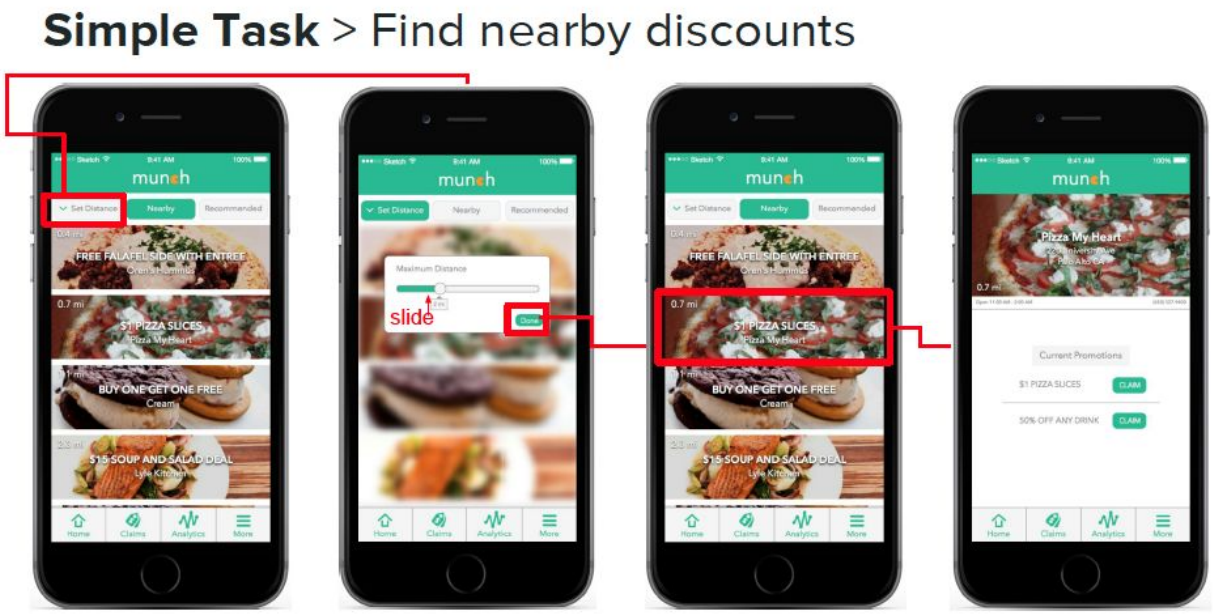
Simpler design with fewer screens (note change in bottom navigation bar):

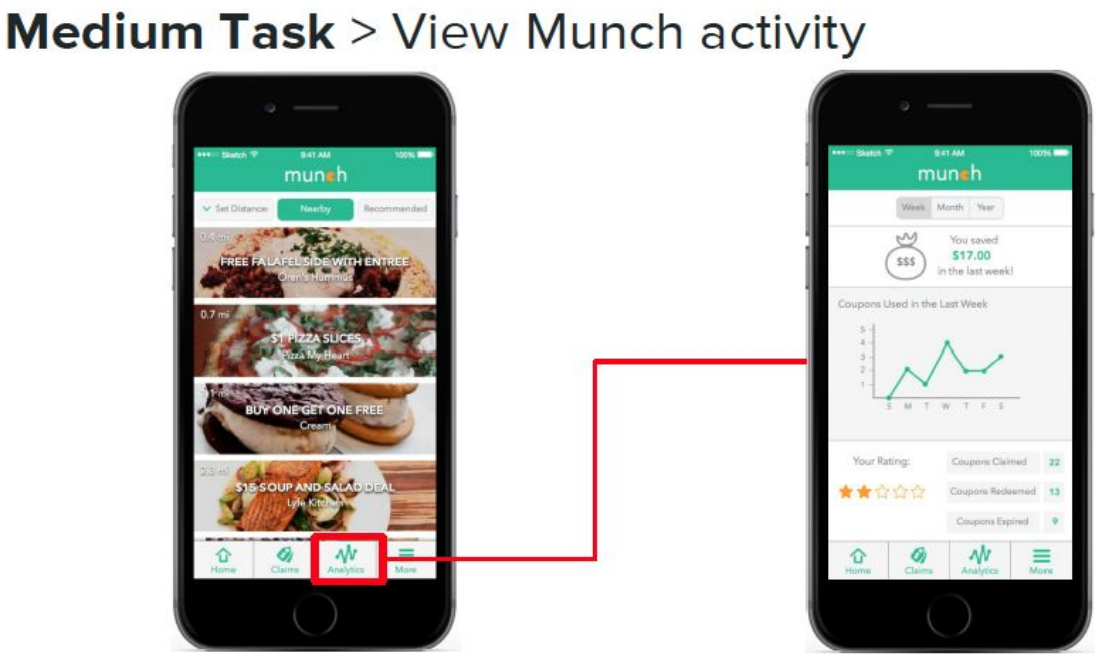


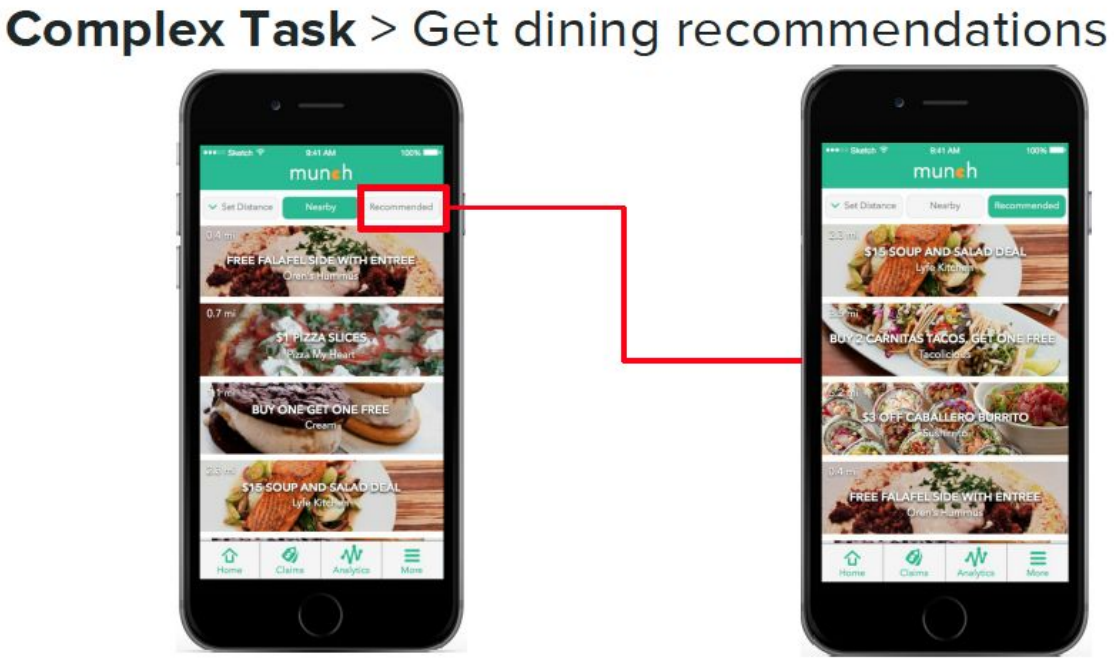
Simplified listings, moving the focus onto the food by decreasing text content and increasing size of visuals:



The following images illustrate the tasks flow of screens for the medium-fidelity iteration of Munch:





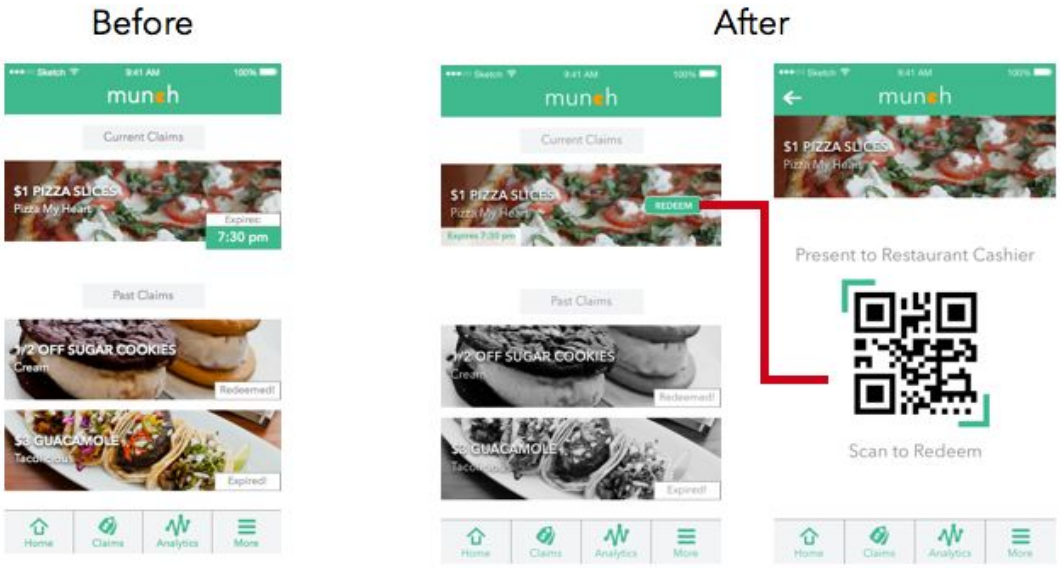


IV. Major Usability Problems Addressed

Three class peers prepared a heuristic evaluation of our medium-fidelity prototype using Jakob Nielsen's 10 Usability Heuristics for User Interface Design. We reviewed the results from our heuristic evaluation and shortlisted the user interface problems to fix in our high-fidelity iteration of Munch. Below we enumerate the four high priority issues identified by our peers, our fix or reason for not fixing the issue, and images of the before and after of each change.

Issue 1: "How do I actually use a claim at the restaurant?"

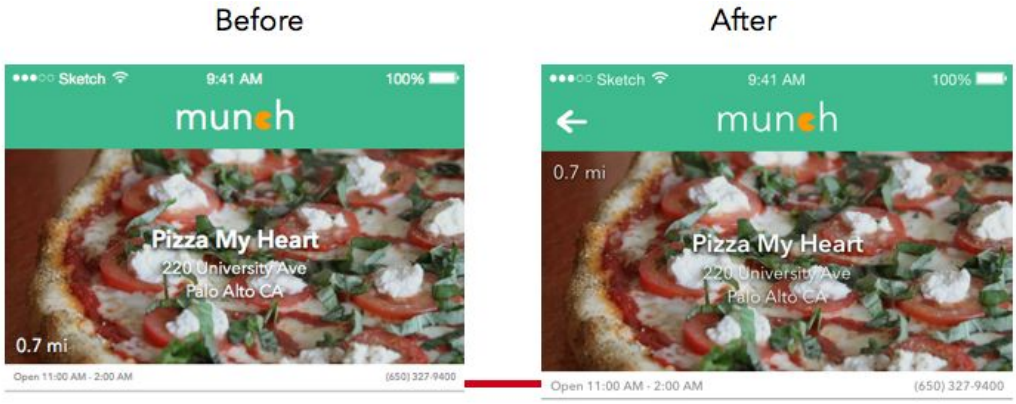
This was our only Severity 4 issue. We chose to solve this issue by adding a "Redeem" button for "Current Claims" on the "Claims" page. This links to a screen with a QR code specific to that user that is to be presented to and scanned by the restaurant cashier. In the iOS app, this scanning is done through a Wizard of Oz effect.



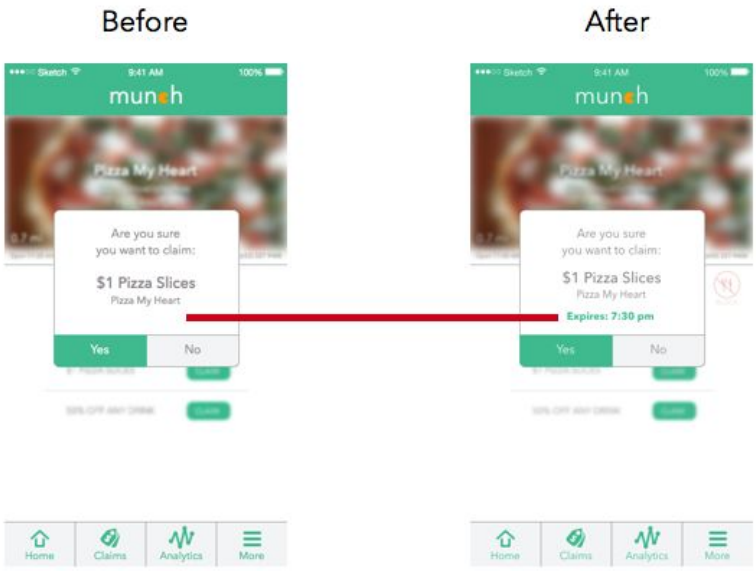
Aesthetically, this amounted to adding the redeem button to the offer box, changing the design of the expiry time box, moving the expiry time box, and adding a new screen to display the QR code.

Issue 2: Illegible text on the restaurant page and no way to determine when a promotion expires

Given that these were easily fixable cosmetic issues, we chose to carry them out. On the restaurant page, we increased the text size of the store hours and phone number, which can be seen below.

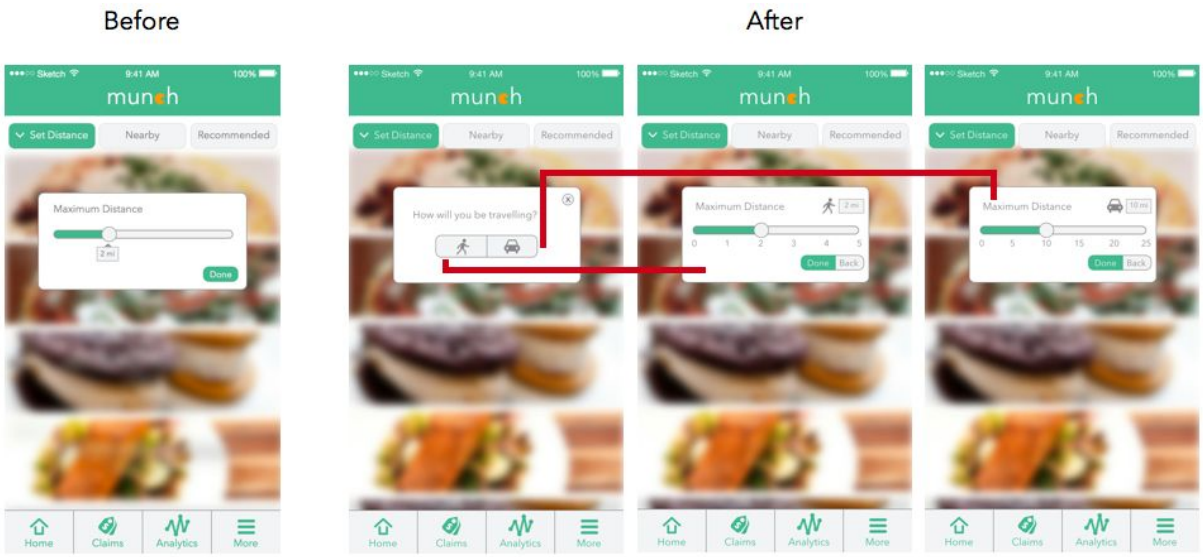


For the other issue, we chose to add an expiry time on the pop-out box that occurs after the “Claim” button is pressed on the restaurant page. Visually, this simply adds one line of text.



Issue 3: Difficulty understanding maximum/minimum values on slider

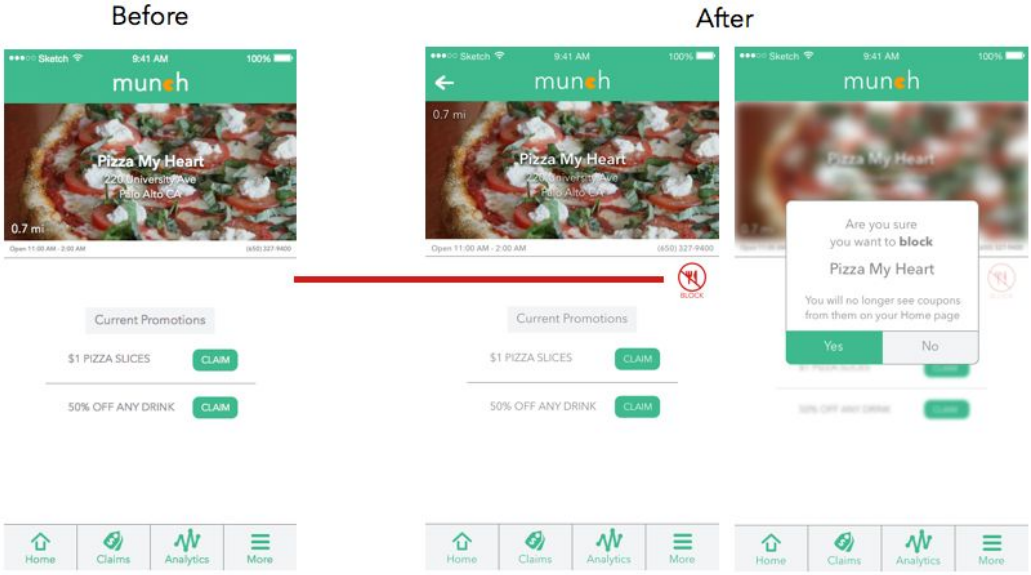
Because the "Set Distance" feature was very unclear and we agreed that it was unintuitive, we chose to change the entire feature in response to this violation. Considering the contrast in scale between a person using the app to find an immediately nearby and a person generally searching for deals in their are, we decided to prompt the user to ask how they will be travelling in order to produce two separate sliders with the appropriate scale for their method of transportation. This led to the three screens pictured below in contrast to the single screen with a nondescript slider in the original version.



In the iOS app, we consolidated the three screens into one screen with a toggle option between walking and driving.

Issue 4: Increasing User Control over which Restaurants to See

Originally we chose to solve this by adding a feature in which the user can block a restaurant from the restaurant's page so that offers from the blocked restaurant no longer appear on the Home page. In terms of design, this led to a "Block" button with the corresponding confirmation pop-up



However, when implementing our final iOS application, we chose not to include this feature because it was not related to any of our primary tasks. In addition, it would require an involved process to unblock that restaurant such as implementing a Search feature or a "Blocked" page.

Issue 5: Unclaim a claimed offer

While adding this option would have been feasible, we chose not to include it. The reasoning behind this is that, although it increases user freedom and control, we wanted the user to choose claims responsibly so that their rating was an accurate reflection of how reliably they actually purchased the items they were claiming. This was mostly so that the restaurant does not receive data that causes them to overestimate the demand of the coupon. Additionally, we felt that with the pop-out to confirm claiming a coupon prevented most users from accidentally claiming a coupon, which would be the other case for needing to unclaim a coupon.

Issue 6: Unclear offers might benefit from a description of what exactly the offer entails

We decided to not implement these offer descriptions because we found them unnecessary and, if the restaurants are meant to be the ones posting the offers, it is up to them to name the offers as descriptively as possible in order to attract customers.

Other notable changes include: grayscaling past claims on the "Claims" page, adding "back" buttons to restaurant pages, exit buttons for pop-up boxes, and adding a pop-up box to explain the user rating on the "Activity" page.

V. Prototype Implementation

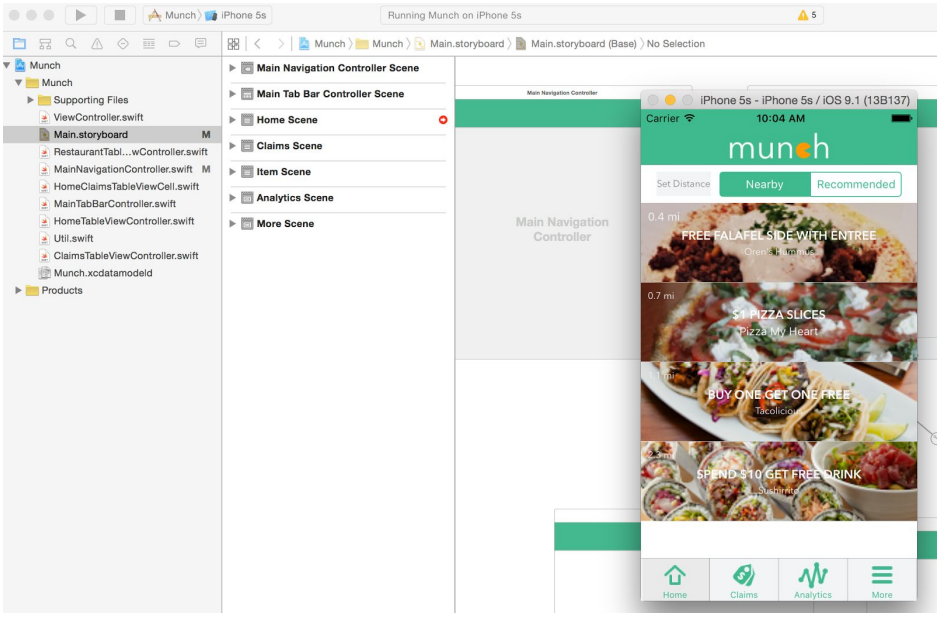
Our final iOS application was developed using Xcode and Swift. All three of our tasks are fully functional in our high-fidelity version of Munch. Swift was an extremely useful tool, with a moderate learning curve, helpful for our short 2-week development timeline. Xcode and Swift did not provide a large host of challenges apart from the usual bugs involved with coding an application using a new language.

We took advantage of a Wizard of Oz technique in our implementation of the promotion claiming process. Once a user has selected a promotion, clicked “claim”, and clicked “redeem”, they are directed to a final screen that shows a QR code. It is implied that when this QR code is presented to the restaurant, the promotion is verified and processed by the restaurant. We do not take care of this verification process in our current consumer-facing implementation of Munch, since it would involve developing a functional business-facing implementation of the application capable of reading and processing codes associated with specific promotions.

A limitation to note is that our application displays a hard-coded list of restaurant promotions. Each promotion also has hard-coded values for distance-away and promotion-type. Despite this, our application does increase or decrease the number of promotions included in the listing, depending on the distance set by the user.

Currently, we are missing the consumer-facing side of our application. Like applications such as Uber that require task flows servicing two audiences (in Uber’s case, drivers and customers), a market-ready version of Munch also requires task flows that service both restaurant owners/managers and consumers. With a functional iOS iteration of Munch complete, the next step would be to turn toward investigating the promotion supply component of our concept.

Screenshot taken during our development process:



VI. Summary

After a packed 10 weeks, we are proud to present a functional iOS application that is positioned uniquely in the dining industry. Munch provides users with right food, for the right price, right now. No longer does the average consumer need to be frustrated by the fact that cheap food is often low in quality, and that good quality food is simply too expensive to eat frequently. No longer does restaurant management need to lie awake at night trying to predict fluctuations in consumer demand and hoping to waste less food. Munch gives users the power to discover nearby, high-quality food at any time of day for a cut of the usual price, and Munch gives restaurants the ability to influence demand and control excess food. Munch does all this right now, and in the future, possibly even more.

Appendix A: HMW Statement Brainstorm

The group brainstormed HMW statements for our two POVs, one from the business manager's perspective, and one from the dining consumer's perspective. .

<u>The Business Manager:</u>

1. HMW help business managers connect with reliable community organizations in order to share surplus/spoilable items?
2. HMW reduce the amount of food that grocery stores donate or throw away and increase store revenue by selling them instead?
3. HMW make crowds/demand more consistent?
4. HMW make it easier to order less surplus food supplies?
5. HMW allow managers to predict variable demand?
6. HMW allow managers to influence demand?
7. HMW make managing staff relations enjoyable?
8. HMW make the process of producing or purchasing surplus items valuable to the business owner?
9. HMW make wasted food, clothes, etc a desirable outcome?
10. HMW make this unfrequented business a desirable place to go?
11. HMW make coupons seem less taboo for businesses?

The Consumer:

1. HMW make close to expired food more desirable to consumers/eaters so that they are inclined to purchase it?
2. HMW help hungry/broke college students find good quality food at peak eating hours when typical discount deals (happy hour specials) are not offered?
3. HMW create a dynamic marketplace for food?
4. HMW leverage a consumer's consistent restaurant visitation in an innovative way?
5. HMW make the process of choosing a place to eat out at less stressful & more fun?
6. HMW make the benefits of a service like Groupon more consistent?
7. HMW gamify the indecisiveness of consumers?
8. HMW incentivize consumers to eat out every night?
9. HMW give consumers a way to engage with waste in the retail/restaurant industries?
10. HMW integrate recommendations and discounts in a more cohesive way?
11. HMW offer consumers location-based notifications about promotions in their area?

Appendix B: Selected HMW Statements and solution brainstorm

The group selected three HMW statements from Appendix A and brainstormed solutions for each HMW.

(1) HMW give consumers a way to engage with waste in the retail/restaurant industries?

Solutions:

1. Blender: recipe builder from restaurant surplus food postings
2. Make consumers take what they don't eat
3. Consumers bring waste to homeless shelters
4. Offer food/discounts in exchange for delivering food for donation
5. Waste tracker in restaurants/supermarkets
6. Food giveaway/notification system
7. Flash Happy Hours at nontraditional times/flash sales & instant coupons
8. Surplus food cornucopia with challenge to earn discount
9. Uber for leftovers
10. AYCE groceries; but if there's waste, you have to pay a larger x the retail cost

(2) HMW allow managers in the food industry to influence demand?

Solutions:

1. Flex menu: recipe chooser for restaurant chefs; top votes for new menu items
2. Make couponing more attractive
3. Restaurant grouper: discount on one food place if you go to another
4. "Test drive": free samples, etc.
5. Combining entertainment with food business
6. Within-restaurant reward system (i.e. 4th visit, sit with the chef), equity in restaurants
7. Tinder for restaurants
8. Slider for demand
9. Restaurant hot spot tracker by time & location
10. Page Rank for Restaurant Consumers: Reward system based on how many new people you bring to the restaurant

(3) HMW make the process of choosing a place to eat out at less stressful & more fun?

Solutions:

1. Meal planner app based on location
2. Machine learning recommendation system
3. Pick your Niche: Combined menu from multiple restaurants
4. Spin the wheel recommendation system
5. Earn points and rewards for trying new restaurants
6. Countdown to claim food at a restaurant
7. App that rewards free food for loyalty
8. Top restaurateur: leaderboard for how many places you've been to, recommendations & featured places, missing places nearby listed
9. Fill out quizzes that give you your fated restaurant for the evening
10.. Anonymous voting for restaurant options
11. Food profiles for each person (ie. vegetarian, massive steak addict, peanut allergy); add people to a eating group; generates short-list of restaurants