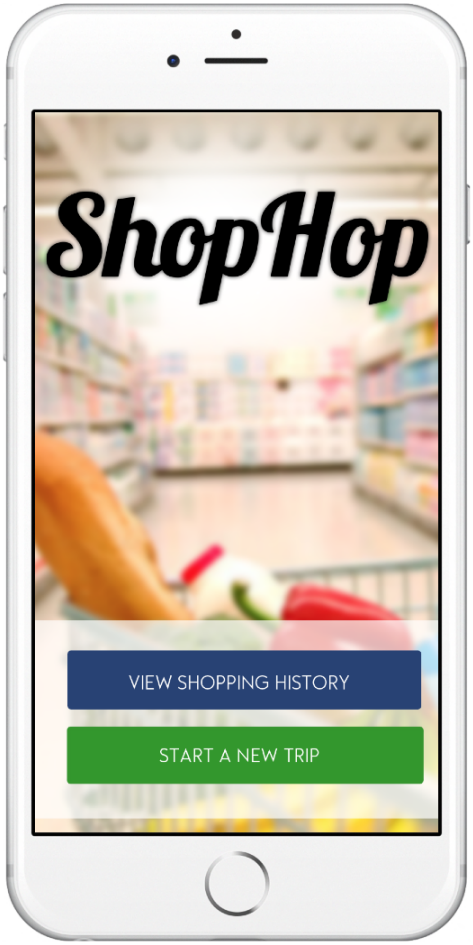


Team Watchmen

Ashkon Soroudi, Jacqueline Xu, Neil Kumar,

Douglas Kim, Ted Avtar

Intro

You can scan your cell phone to buy items, start your car without a key, and even 3D print the mug for your morning coffee. It seems as if you can do anything these days, but the fundamental method of shopping has not changed…until now. Introducing ShopHop! ShopHop is a cross-platform application that forgoes the traditional shopping list in favor of electronic, informationally rich carts that keep track of your needs. The best part: you can now shop completely hands-free! Get discounts, scan your club card, and enjoy our streamlined user experience to make your life easier.

Brainstorming

We first started brainstorming any idea that came to mind where interactions with a smartwatch would be beneficial. We narrowed down our list of 50 ideas to 3 ideas that we felt were unique and also extremely useful when paired with the smartwatch component. After narrowing our list to Tourism (an app to help tourists find the most popular things in an area), ShopHop (an app to help with the everyday task of grocery shopping), and Fun Flap (an interactive game that uses the watch accelerometer as a controller for the phone), we decided on proceeding with ShopHop as our project.

ShopHop can better the shopping experience for anybody that shops, but we decided to target parents who go grocery shopping for their household. We wanted to focus on making the shopping experience better by realizing the needs of our target user group. Grocery shoppers are apt to forget all the items they need to buy at a store. They also spend large amounts of unnecessary time going through multiple aisles just trying to locate where their items are. Lastly, they don't necessarily want to buy the cheapest brand, but they do enjoy the prospect of saving money through discounts and sales. We felt that by addressing these shopping needs, ShopHop has the potential to be a ground-shaker in the grocery shopping app niche.

ShopHop would be extremely easy to use and really captures the essence of the smartwatch to create that unique shopping experience. Currently you can make a list on your phone and look at it as you shop, but this creates many nuisances. You either carry the phone in your hand as you push your cart or you have to constantly reach into your pocket and pull it out. You also have to consider time spent unlocking your phone and opening the app. With the increasing market of smartwatches, we felt that it would be a good platform for our app. By utilizing the smartwatch, you never even have to pull your phone out at the store. By using the watch, ShopHop would be a hands-free shopping experience.

Personas

To more clearly demonstrate how our application could be used, we created personas that embodied what we believed were accurate representations of target users and how different users might use the app in different ways.

Nicholas Porter is a 28 year old, newly-married father of a one-year old son, Klaus, and with the hectic schedule of work and taking care of a very restless child with his wife, he often forgets what exactly he needs when he goes to the store. This makes his wife angry! So when he first heard about ShopHop, he instantly drew to the previous list functionality, and he could choose a list for a specific occasion and always get the right items. His wife is no longer angry!

Kendrick Chapela is a 35 year old father of two, but he is also a motor enthusiast, so when his family needs groceries he jumps at the chance to go so he can have fun in his new BMW as his weekly joy ride. Since he likes driving around, he uses ShopHop's store location functionality to find an appropriate store for his needs, but he might go with a store somewhat farther than the nearest one so he can get more time in his precious sports car. At the end of the day, his wife is just happy she got her groceries, so she's ok with his little trips.

Madison Goldstein is a 58 year old mother of three, but her children are teenagers, so she is not worried about getting all the right items because her kids usually get food for themselves. Instead, she likes going to her local Safeway and getting many different items to experiment with her cooking. She likes using ShopHop to keep track of many different lists of items for different dishes, and she also likes making new lists for when she's feeling crazy and might make a new kind of ravioli. Also, she likes the aisle information displayed on the smart watch which helps her get her items as quickly as possible and gets her earlier in the kitchen cooking up a storm.

Adelaide Cournot is a 33 year old single mother of one whose husband tragically passed away last year in a goat-racing accident. With the loss of her husband, Adelaide has to provide for her daughter by herself, but she has been low on cash since she is the only

person in the family getting income. However, she still wants to provide her daughter with nutritious food, so when she goes to the supermarket, she uses ShopHop's beacon system to get discounted items, and she is able to provide healthy meals for her daughter in a manner she can afford.

Leo LeBlanc is a 47 year old father of five, and he really enjoys sports, movies, and doing swan dives into his pool. What he doesn't like, however, is going to the grocery store to get supplies for his wife's weekly book club meetings, but he still has to do it. Every time he goes, though, he forgets the physical list she gave him, and he even forgets his wallet sometimes. His wife, aware of his forgetful nature, makes sure to push her list to his smart watch using ShopHop, and since he always wears his Toq watch he sees the list she wanted when he gets to the store on his watch. Also, since he forgot his wallet, he uses the embedded bar code to get discounts, so now his wife is ensured that he can't get her items wrong anymore.

As you can see, the personas mentioned above could utilize ShopHop in various ways that most significantly helped in their daily lives.

Scenarios

We came up with three main tasks that a typical user of ShopHop would do. A user would want to create and edit a shopping list, find the items on his list at the store, and be notified about discounts on particular items on their shopping list.

In the first scenario, a new user wants to create a new shopping list. Upon opening the app, he has the option of creating or using a previous list. After clicking on “create new list”, the user has the option of naming his list. On the same screen, the user can now type in items to add them to the shopping list. To edit a shopping list, the user should choose to use a previous list on the first screen of the app. From there, he/she can add more items or take items off of her list.

The second scenario is when the user actually goes to the store and wants to find the items on the list. After choosing/creating a list, the user can choose a nearby store where he wants to shop at. After picking a store, he clicks “Start Shopping” which will send the shopping list to the smart watch. Upon opening the smart watch, the user will see his shopping list ordered by aisle. It will say the name of the item along with the aisle number. He simply has to walk to that aisle and find his item. He can then swipe the item off his list.

In the third scenario, the user wants to be notified about any discounts on the items in his shopping list. After going to the store, he just has to proceed shopping as normal. When he approaches an item on his list, if the item is being discounted, he’ll receive a notification on his watch with the brand that’s being discounted and how much the discount is for. He can dismiss the notification and proceed shopping with the knowledge that an item is on sale and he can choose whether or not he wants to add it to his cart.

User Studies, Details, and Findings

After deciding the general functions of our application and the target users for it, we conducted contextual inquiries using the master-apprentice model. Therefore, we went to a Berkeley supermarket and interviewed three users who (1) were frequent shoppers at supermarkets (went to one at least once every 2 weeks) and (2) had families that they shopped for.

Our first user was a man in his early 40's who has a family of four including his wife. He lives in Berkeley, and his kids are 9 and 12, so he is generally very busy with them. He personally likes watching sports like football and basketball, and he also really likes grilling different meats for his family on big sports game days. Either he or his wife goes shopping at a Berkeley supermarket every 3-4 days, and he personally does not like shopping very much except for his grilling materials. Since he is tasked with shopping sometimes, he usually uses his smartphone to keep a list of items his family needs and generally only tries to find those items specifically.

Our second user was a woman in her mid 30's who has one child with her husband, and her son is in first grade. She lives slightly outside of Berkeley, but local Berkeley supermarkets are still the most convenient for her to visit in her car. She said the things she enjoys most are playing with her son, watching her favorite shows (Scandal), and her job (nurse). She also does not like shopping very much because her days are usually very busy, so going to the store every 3-4 days is usually a chore to her. She usually takes a physical piece of paper with her to the store with a list of items, but she doesn't really ask her family what they want because she knows what they need, and her son generally asks for junk food.

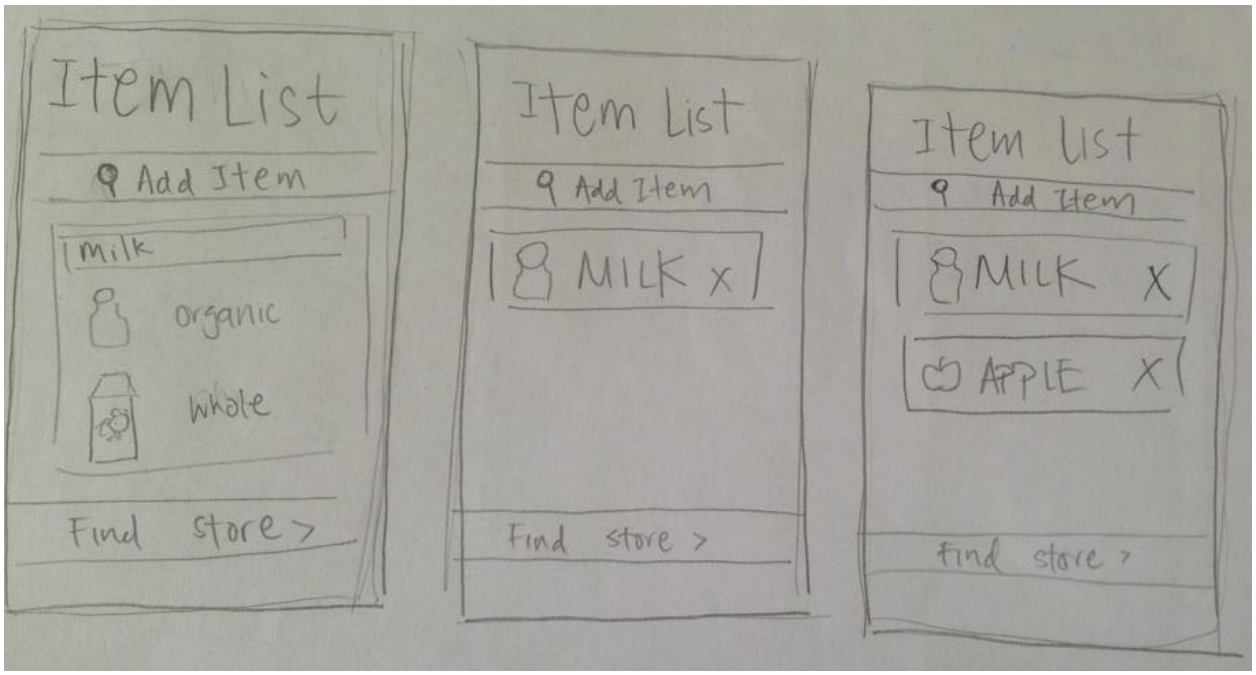
Finally, our third user was a woman in her late 40's who has two children with her husband, and both children are in high school. She lives in Berkeley, and both her kids attend Berkeley High School as well. Since she is an assistant manager at a local business, she is usually able to shop at a local Berkeley supermarket about once a week for groceries and more, but she doesn't shop too often because her kids are old enough to get their own food sometimes. She said she likes shopping because she can get different items every time for experimenting with cooking, and she doesn't really need a list because she knows what she

wants most of the time. She also almost always asks her kids/husband what they want before she goes to the store. She said she does not like driving because she gets annoyed with traffic.

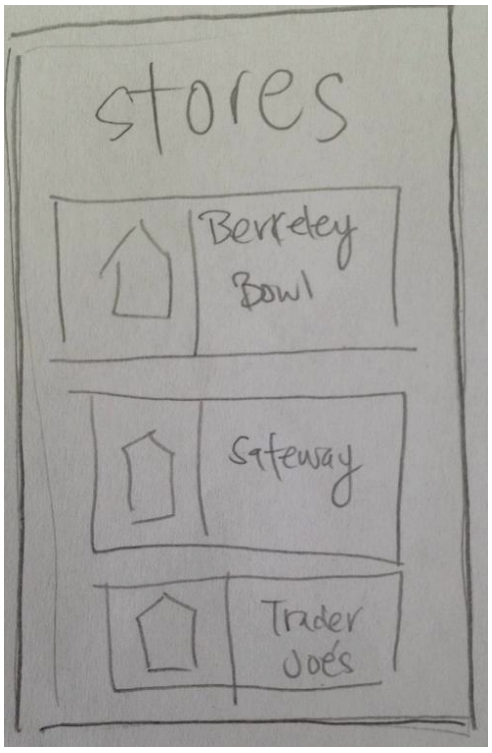
From observing the users described above then interviewing them, we gained much information regarding their shopping habits and what features they felt would be helpful. We noticed that two of the three users did keep a list of the items they wanted, one on their phone and the other on a piece of paper. Additionally, only one of the three users went to specific aisles looking for items (the one who had the list on his phone), while the other two went through every aisle looking at items. However, all three users did look at additional items near their intended items to purchase. From this we learned that providing users with a very accessible method of list access would be necessary, but it also would have to be changeable. Also, we found that most users generally go to the same stores, so instead of showing stores by price we decided on showing stores by their distance from the user's position. Finally, we learned that the users often get similar items on a regular basis, so we knew that adding a "previous lists" option, which we were thinking of, would be a perfect fit.

Initial Ideation: Sketches

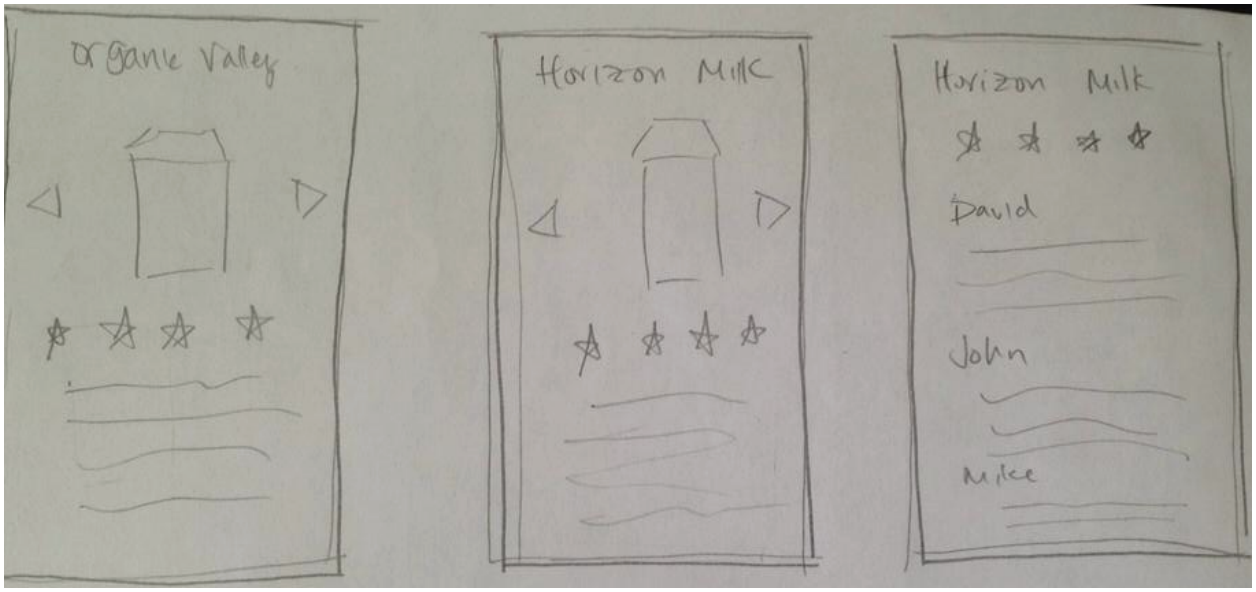
After brainstorming and deciding on the main idea we wanted to implement, we had to break down specific functions we wanted our application to support. First, we thought about the functions we wanted on the phone. We definitely wanted the user to be able to add items to a list on their phone, so our first few sketches detailed list building.



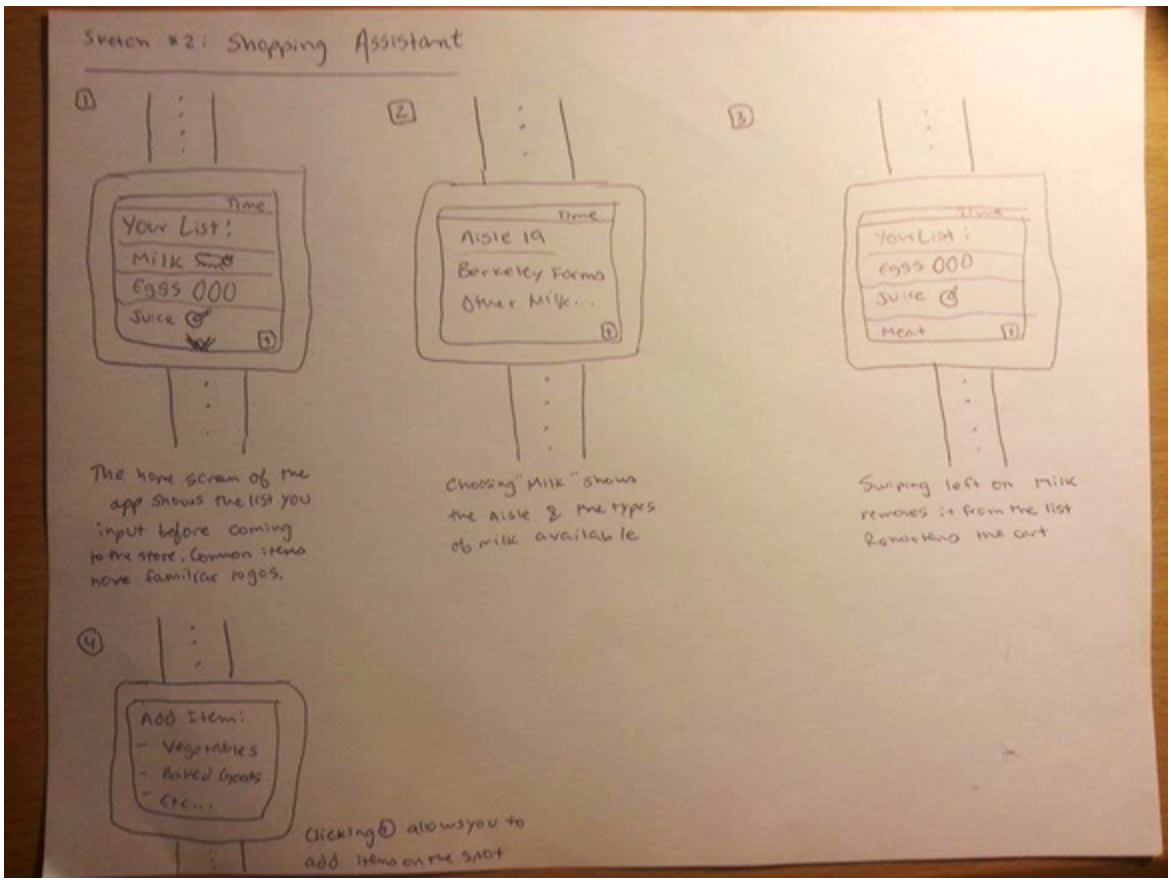
Next, we wanted the user to be able to find a store that they wanted to buy their groceries at. Certain stores would be recommended based on proximity, availability of items, and price.



Finally, we wanted to support additional information. When the user is close to an item, as detected by a beacon, they will receive additional information about that product on their phone, detailing nutrition facts, customer reviews, etc.



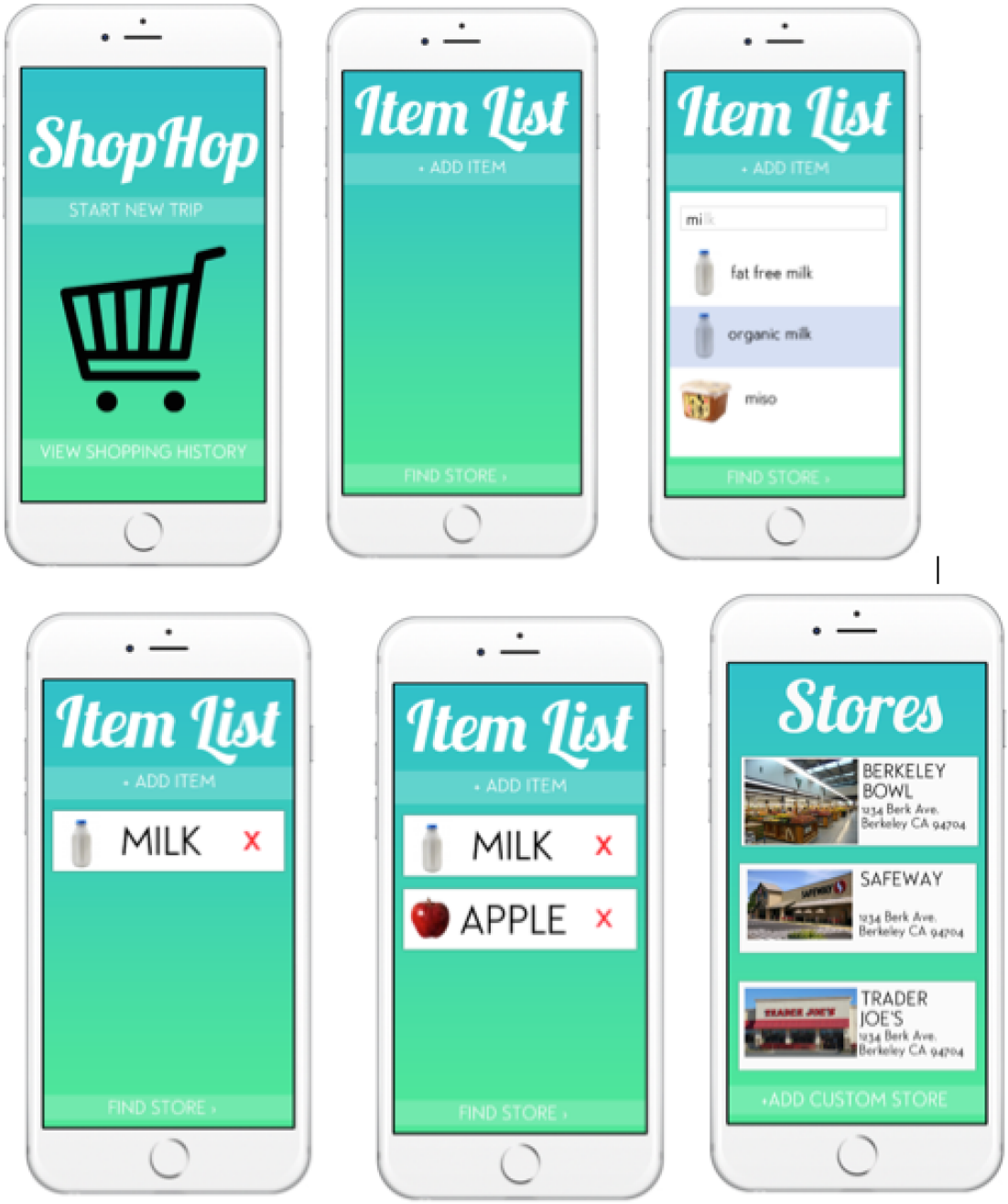
On the watch, we wanted to support viewing a shopping list and swiping off items from the list as you shop. We wanted this interface to be as simple and intuitive as possible.



Intermediate: Wireframes

For our intermediate design process, we basically implemented the ideas we had during our ideation and sketching process in higher fidelity. We thought more closely about what the buttons and lists should look like, what fonts we wanted to use, and how we wanted to use the space in our application.

Our first task was to create the list building interface on the phone. We wanted to make the interface bright and friendly for family use. First the user is presented with a home screen. They have the option of loading a past list or creating a new one. If they choose to create a new list, they are taken to a screen where they can search for and add items. After they are satisfied with their list, they can select a store they wish to shop at.

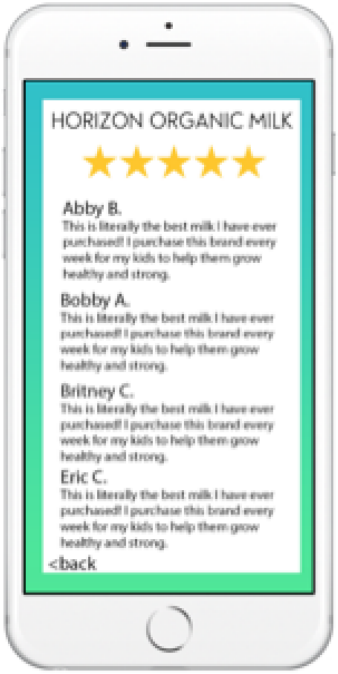


When they arrive at the store, they can see a list of their items on their watch, sorted by aisle number. They can find the items they are looking for down each aisle and will receive a beacon notification when they are close to an item on their list. They can swipe off items from their list as they shop.

When they are close to an item, they can also open up their phone to gain additional information on the item. They can swipe among competitive products and read nutrition facts along with customer reviews.

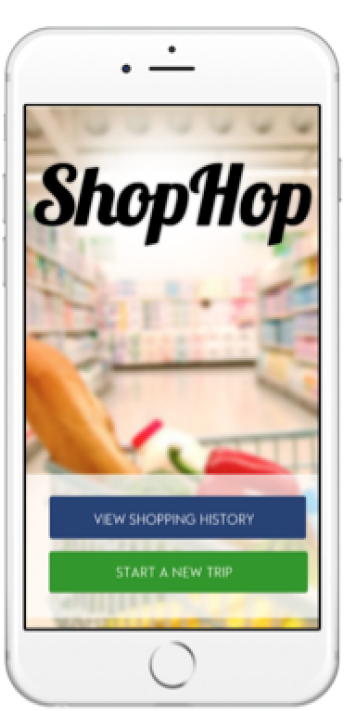
ORGANIC VALLEY
$3.99/carton
$0.20/ounce

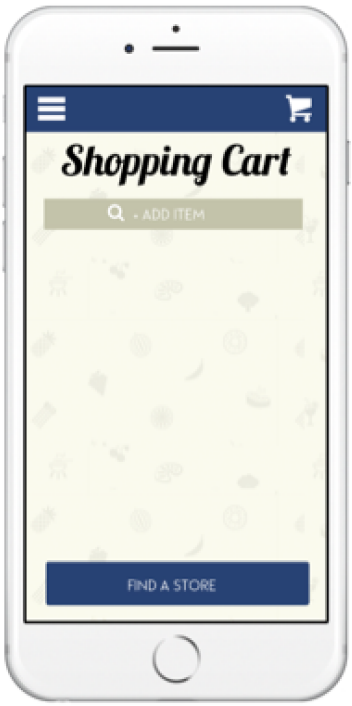
HORIZON ORGANIC MILK
$4.99/carton
$0.25/ounce

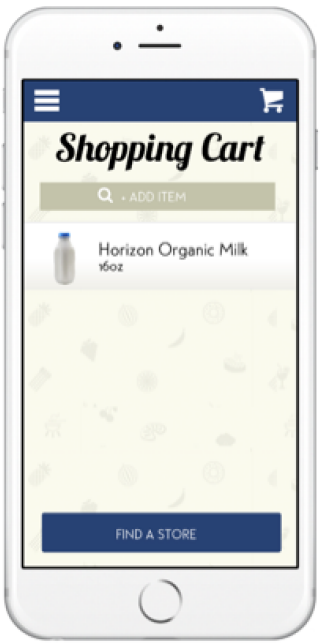

HORIZON ORGANIC MILK
Abby B.
This is literally the best milk I have ever purchased! I purchase this brand every week for my kids to help them grow healthy and strong.
Bobby A.
This is literally the best milk I have ever purchased! I purchase this brand every week for my kids to help them grow healthy and strong.
Britney C.
This is literally the best milk I have ever purchased! I purchase this brand every week for my kids to help them grow healthy and strong.
Eric C.
This is literally the best milk I have ever purchased! I purchase this brand every week for my kids to help them grow healthy and strong.
<back

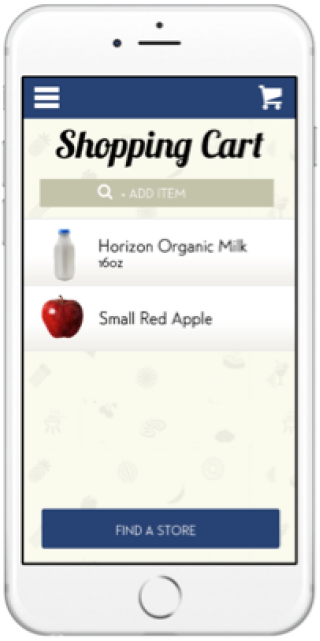
Final: Product

Our final product built on top of our intermediate designs. We decided to make the application layout a bit more serious and organized. Our building a list functionality remained similar.

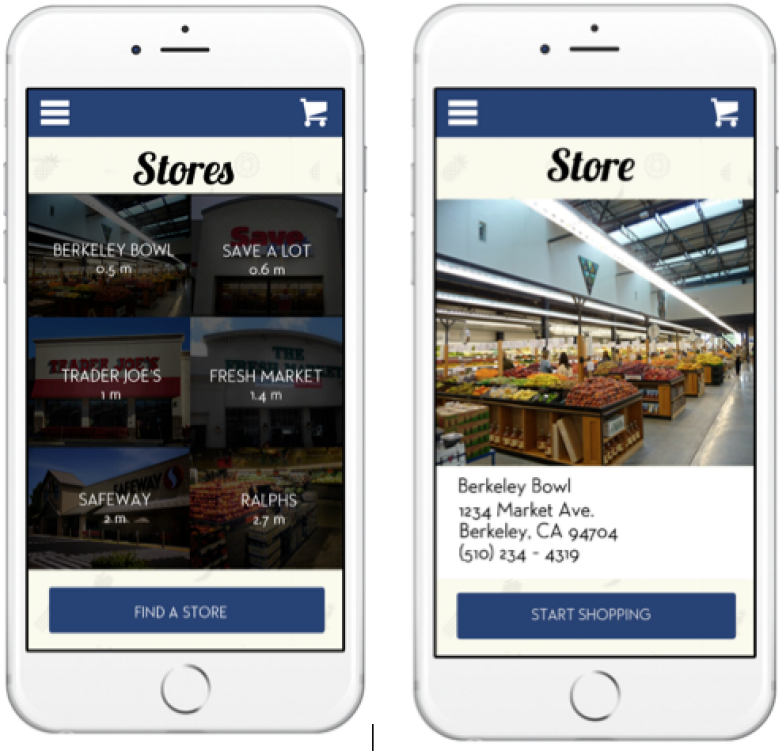








We added an additional confirmation page for finding a store.



We decided to remove functionality for displaying additional information about the product, since we discovered that it was not as useful for users.

Our list viewing on the watch remained pretty similar. However, we decided to add functionality for viewing discounts. If a user walks by an item on their list that is under discount, they will receive a beacon notification.

Start

Your Items
Horizon Organic Whole Milk
Aisle 2
Small Red Apple
Aisle 4
Nature's Pride Wheat Bread
Aisle 12

Discount
Horizon Organic Milk
HORIZON
ORGANIC
2.99
Original $3.99

Your Items
Small Red Apple
Aisle 4
Nature's Pride Wheat Bread
Aisle 12

Competitive Analysis

Our application has a plethora of competitors--including the apps GroceryIQ, Shopping List, and Out of Milk. All these applications have the same target users: frequent shoppers. The competitors along with our product also have the same general set of features: the ability to build lists, use lists while shopping--for example in Out of Milk, the shopper can flag items as added to cart and can consequently see the accumulated price and total price--and finally, some history of their past lists. Though our competitors also provide support for coupons and loyalty cards, reviews from the Google Play and iTunes stores indicate that often such support is very limited and does not support all stores. Finally, all our competitors require the user to actively use their phone while shopping.

How, then, does our app stand out? It is both more functional and more convenient. Unlike our competitors, we use beacons to notify the user of discounts. Assuming the user has turned on his or her notifications, this guarantees that they will always receive up to date discounts on available items. Next we target parent shoppers who have busy lives. We ease their trip by completely removing smartphone and credit interaction when they shop allowing for everything to be done by the watch from swiping items conveniently loaded in the optimal aisle order off to generating a barcode for checkout--something which none of our competitors do. The emphasis on the watch while shopping allows for greater hand usage while shopping and saves busy parents time!

Technical challenges

The technical challenges we faced and solutions responded with in implementing our application are divided into two categories: those with the phone component and those with the watch. The challenges with the phone component are further subdivided into issues concerning data storage and UI. For the watch, we had a little trouble with adding the ability to swipe an item off your shopping list. Lastly, we faced the challenge of modeling something similar to a beacon for discounts.

Our application stores user generated lists with items in them. First we had to decide where these items would come from--would users manually upload their own images and descriptions of items, would we predefine items, or a combination of these? For simplicity, we decided to predefine the items. For stylistic and convenience reasons, we decided to use the singleton design pattern to store item names, descriptions, and a number to ID a resource image thereby serving as a local repository of known items--this way multiple activities are be able to access the same item data.

An arguably tougher unresolved issue was that concerning persisting saved data across sessions and even across different users. We needed a backend and with limited time, we settled with Parse. We had issues with linking a ParseObject to another as wanted to link every list name to a bunch of item objects with their ordering as keys. However, we had multiple undefined and empty issues, and we ended up with workaround where we stored user-defined lists names in listname object and then items associated with given list with their listname as a key. Now retrieval of a list's items is but a matter of invoking a check for a particular list name key on all the items. Not only is this algorithmically inefficient, it is inefficient in space too: the underlying data table will continuously add a column on all item tables for each new list name defined resulting in what looks like a diagonal matrix full of 0s or null values. However, this did not concern us--functionality was preserved. Thus our application is now successfully able to create and store custom user-defined lists, retrieve lists made by anyone, and even add items to those lists to create new ones.

For the watch, we wanted to be able to swipe items off of your list to remove them. We used a deck of cards for the app with one card for each item. While the watch doesn't

exactly support the mechanic to swipe a card off your list, we were able to achieve a similar effect with the abilities of the Toq Watch. We had the watch delete an item off of the list after the user closed the card(onCardClosed). This way, when the user opens up the item on the list and swipes the card off the screen to return to the list, this will trigger an event to delete the card.

Lastly, in order to implement a function similar to a beacon, we used the Android's bluetooth functionality. The phone would be constantly scanning for bluetooth devices, and would trigger an event when it found a specific device (we used name, but you could also use device id). This event would then send a discount notification to the watch. Using this, you could map different device names/id's to different discounted items, and thus be able to use phones or other bluetooth devices as mock beacons.

Final Summary

With Shophop, shoppers can have a quicker and easier time shopping. They won't have to worry about forgetting exactly what items they needed to buy, nor will they have to fumble with their shopping list as they shop. Shoppers can quickly build a shopping list, and shoppers who often buy the same items will be able to easily reuse their old lists.

With Shophop, we made sure to let users be able to have a hands-free experience with the app while they are in the store. Compared with normal shopping lists, or other modern shopping assistant apps, shoppers won't have to constantly take their phones out of the bags or pockets to check their list while shopping. Shophop has a neatly organized list on the watch sorted by isle number, so you can easily find your items and get everything you need in one pass through the store.

In addition, users can even receive discount notifications from beacons to notify them of sales they may be interested in. This saves shoppers the trouble of using coupons or having to look for discounts themselves, and it allows store-owners to easily advertise items as well. Finally, when checking out, Shophop will have your club card's barcode ready to be scanned from your watch. Overall, Shophop will provide a greatly improved shopping experience will be the new future of mobile shopping assistance.