

SimPark

Parking Made Simple

Team

Kathryn Chan

Sepehr Hakami

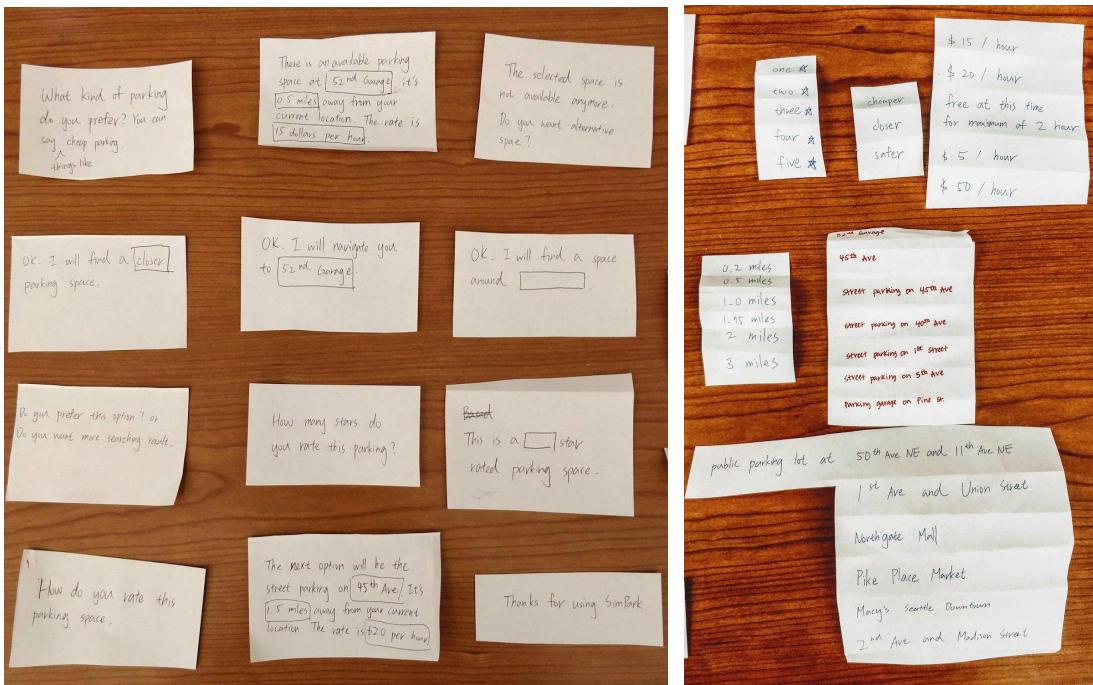
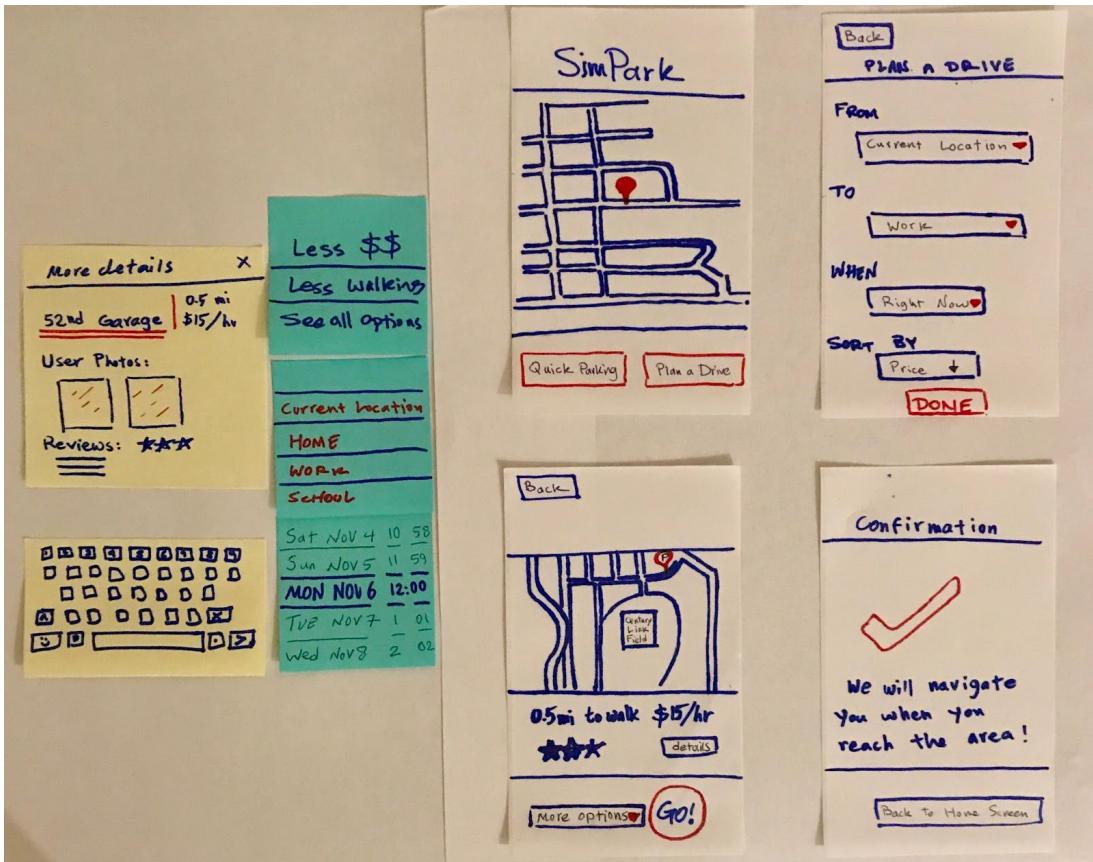
Adilene Pulgarin

Umang Sehgal

Problem and Solution Overview

Locating a place to park is meant to be a task that requires little to no extra effort. However, many drivers find that they need to plan ahead because it has become very time consuming finding a spot that fits their needs. Whether it is finding a place to park at work, school, or at a big event, there are many factors to consider when it comes to finding the right spot. With SimPark, we hope to be able to ease the burden of this task for drivers everywhere no matter the scenario. By designing a mobile application paired with a speech interface, we give drivers an alternative way to find parking according to their standards by giving them the ability to filter through suggested parking through different mediums. With SimPark, a user is given the option to find a suggested parking spot ahead of time using the mobile app. They can also choose to find a spot once in the area of the destination by also using the app, or by using the speech interface to make for easier interaction while driving.

Initial Paper Prototype



Our paper prototype consisted of two components which are a mobile application and a speech interface. The first component is the mobile application. Here, the user has the ability to fill in all the required information as well as choosing which factor they want to sort the suggestions by. Our main focus here was to give users the ability to find a space based off their preferences, but to be able to do that in a straightforward manner. The next component is the speech interface which consists of a set of scripted sentences that will gather the user's preferences for a parking spot. The speech interface handles scenarios where the user may be unable to use their mobile device directly, because they may be driving for example, and they instead need to have a "conversation" with the application to find a parking space.

The main focus of the mobile application design was centered around making the task of planning a drive for since this functionality would also apply to finding real time parking. This is the first task we had in mind for our design, planning a parking spot for a future destination. In the mobile application, we wanted to make the procedure easy for the user so we tried to keep the number of steps required to a minimum. One critical aspect of this design was to allow users to choose a parking space based on their preferences. This made the initial "sort by" option one of the most important since that is what decided the most important factor. It was also important to be able to present the user with more than one option in case the best suggestion shown is not what they prefer. This is why we decided to include a "more options" button since in the case that the user does not find the initial suggestion adequate enough. We also wanted to give users the option to switch between the two interfaces, so we included a "Switch to Speech Interface" button that would allow them to do this easily.

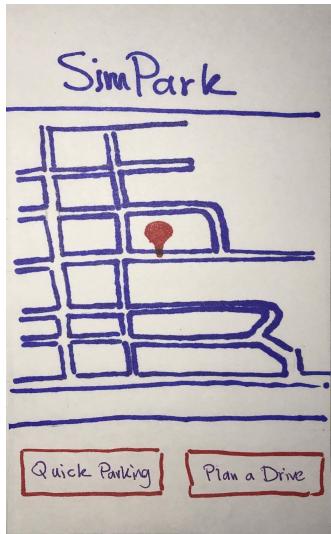
The speech interface also had similar critical aspects. This component takes into consideration our second task, being able to find a parking spot once in the destination area. We wanted to make sure the user still had the ability to choose between different options, so we decided to give them the option to let the interface know what type of parking they were searching for in terms of cheap, close, or safe parking. Another important aspect of the speech interface was to let the user find an alternative parking location if the one they had planned for in advance was no longer available. In this case, the user would be alerted once they entered the destination area that the spot is unavailable giving them the option to find a new one.

By combining both of these components, we feel that we are able to appeal to most drivers. By giving them the option to plan ahead using the mobile application and also, giving them the option to find real time parking using the speech interface or the mobile app, SimPark is able to assist in almost any scenario.

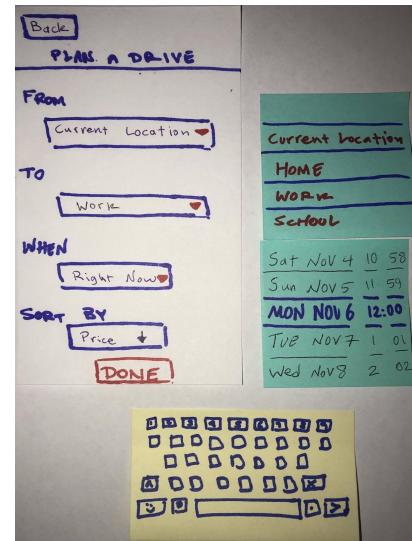
Task 1: Parking Planned Ahead

User is planning ahead for finding parking in future at specific location.

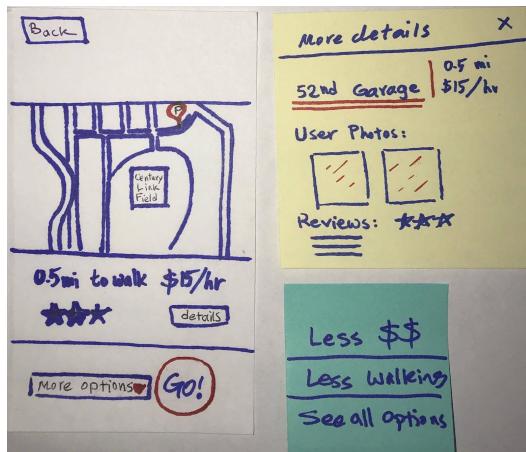
After opening the app, the user chooses “Plan a Drive”



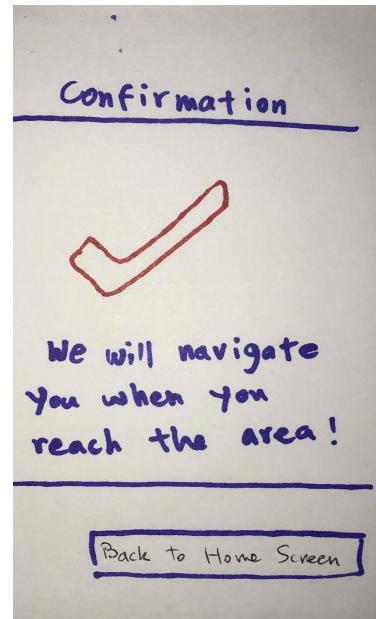
They can select addresses for “From” and “To” given presets to choose from and they can also pick a date/time for the trip.



On the map, they will see their destination with the best parking. They can select “Details” to see more info. They can also ask for another option using the “More Options” drop down menu.



At the end, the user gets a confirmation screen to verify they will be guided once they are near the destination.



Task 2: Find parking when already in destination area

Scenario: The user is in downtown Seattle looking to find parking near a restaurant.

User: "I need to find parking."

App through speech interface:

What kind of parking
do you prefer? You can
say cheap parking.
things like

Follow up by application

App through speech interface:

Do you prefer this option ? or
Do you want more searching result.

User: "I would like parking nearby."

App through speech interface:

There is an available parking
space at [52nd Garage], it's
[0.5 miles] away from your
current location. The rate is
[15 dollars per hour].

User: "No, I would like more suggestions."

App through speech interface:

The next option will be the
street working on [45th Ave]. It's
[1.0 miles] away from your current
location. The rate is [+\$20 per hour].

Follow up by application.
App through speech interface:

Do you prefer this option ? or
Do you want more searching result.

User: "Yes, I would like this spot."
App through speech interface:

OK. I will navigate you
to 45th Ave

App after finding a location.
App through speech interface:

How do you rate this
parking space.

User: "I really liked this location!"
App through speech interface:

How many stars do
you rate this parking?

User: "I'll rate it a four out of five stars."
App through speech interface:

Thanks for using SimPark.

Testing Process

Once we created our initial paper prototypes, we had two heuristic evaluations. The mobile application workflow is mocked visually, and the speech interface workflow is mocked by speaking out the diagram. We found that having these two prior to the usability tests was very effective because we learned about the flaws our design had and gained some new functionality suggestions. This gave us the opportunity to make some changes before the usability tests and it gave us a good idea of which aspects of our design would ultimately need to be modified.

After these evaluations, we were ready to start our usability tests. Our first test was done with a 22-year-old male who is pursuing an MS in Construction Management. The task was we gave him was to plan where to park hours before leaving the destination, but later have to find a new location using the speech interface. This allowed us to test both components of our design. Because he was our first participant, we decided to get feedback on every screen. At the end of the test, we had the opportunity to ask for more suggestions or comments.

For our second and third usability tests, we decided to structure our testing methods to be more organized for the participant and for ourselves. Our usability test protocol began by introducing the participant to the study and to our prototype. We then explained the think-aloud method which would encourage them to speak their thoughts, opinions, reactions, etc. as the test went on. Next, we explained the task for each of the participants which consisted of parking in different scenarios, but still required that they use both components of our design. Lastly, we had a short wrap-up section where we would answer any additional questions the participant may have as well as gather any additional comments they may have.

Our second test was done with a male who is junior majoring in Economics. We thought that because he was not studying a field related to HCI, he would provide us with information different than someone in the field would be able to provide. In other words, his suggestions would probably match that of a user with no prior design background. The task given to this participant was similar to the task of the first participant, find a parking space a day in advance, but interact with the speech interface when he finds that the spot is no longer available. We decided to use the same task to see if we could gather more feedback after adjusting our testing protocol.

Our final test was done with a male who is a senior majoring in Computer Science. As opposed to our second participant, we hoped to get feedback from someone who has had some experience in the field. The task given to this participant was to plan where to park a day in advance, view the planned trip, delete this trip, and finally, find a parking spot once in the destination area using the speech interface. This would provide us with feedback on functionality that we added after conducting our heuristic evaluations.

After conducting all our testing, we found that the testing method we used for the second and third test were more organized which ultimately yielded more constructive feedback. However, the first test did help us develop this method and it gave us more detailed suggestions concerning wording and smaller details.

Testing Results

Heuristic Evaluations

Beginning with the heuristic evaluations was very helpful in gathering feedback before presenting our design to potential users. In conducting the two evaluations, we found that the design we had at the moment was not as straightforward as we believed it was. While it was mostly intuitive, some of the functionality we had actually required some explanation so the user could use it properly. This made the heuristic of “flexibility and efficiency of use” one of the most disobeyed. Some examples include making it clear that users have the option to add their custom location in the “From” and “To” input areas and giving users the option to view and modify planned trips. Another heuristic that was commonly disobeyed was “consistency and standards.” We learned that when it came to the rating system, it was not evident to the user how many stars it was out of and when entering a time and date, it was not clear if it was when the user would leave or when they would like to arrive. After receiving this feedback, it was clear that a user would not be able to efficiently use the application without additional help.

- Landing Page: Added a “Planned Trips” button where the user would be able to see events that they have already planned for in advance.
- Planning a Drive Page: Changed the wording of “When” to “Arrive At” to make it clear that the time indicated when the user wanted to arrive to the destination. Also, changed the “Next” button to “Done” indicating that the user was done filling in the input fields.
- Date and Time: Included a way to get out of this option by adding an ‘x’ to exit.
- “To” and “From” Inputs: Made it clear that a custom location can be added.
- Best Option Page: Change “Go” button to “Plan” since it was confusing to the user to use “Go” when the trip was being planned for a later time.
- More Detail Page: Added a scrollbar to make it easier to view different reviews.
- Speech Interface: Made it a bit more automated in the responses we were expecting from the user since it was too open ended. We decided to change it from individual cards for every option to a diagram to make testing easier.

Usability Test One

During our first usability test we received feedback pertaining to smaller details which caused some important changes on our initial design. As we conducted the test, we asked the participant to give us feedback on every screen. We took most of his suggestions and revised the design accordingly.

- Landing Page: The wording of the original buttons as “Quick Parking” and “Plan a Drive” was confusing for a first time user. The participant and the facilitator at the time agreed that it would be easier to figure out what the options were if they were changed to “Park Now” and “Park Later.”
- Landing Page: The participant felt that making the map as the focus was distracting since it only shows the current location of the user. We decided to keep the map in the background and made the buttons the focus of the page.

- Speech Interface: Began too abruptly before so we added a short “welcome” message where the user would be notified that it was part of the SimPark app.

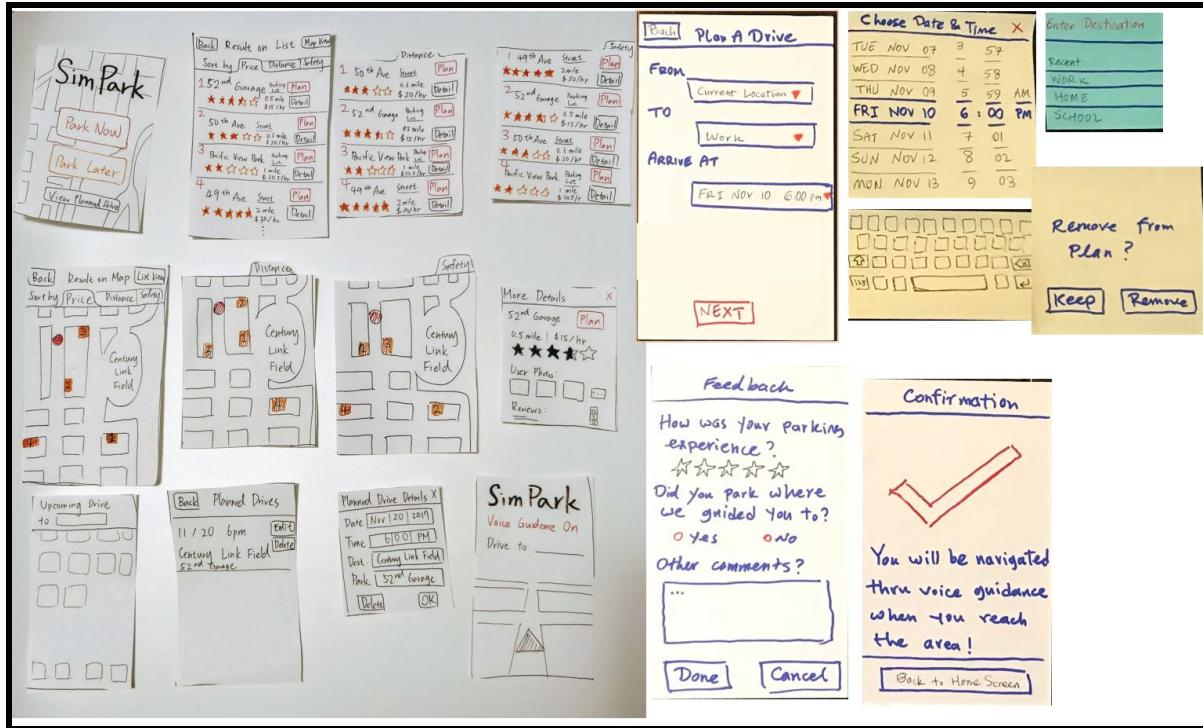
Usability Tests Two & Three

These two tests were conducted back-to-back so we did not have the time to revise the design between the two. After making the changes suggested by the two prior tests, we changed the test protocol to make it more organized for the participants and for ourselves. We found that some of the ways in which we were presenting our information were not very effective. These were the majority of the changes made along with some smaller detail changes.

- Best Option Page: Difficult to navigate through the best options depending on the different factors. Changed to tabbed options where the user has the option to view the suggestion as a list or in a map view.
- More Detail Page: Added a “Plan” button in the case that user wants to plan for this location once viewing the details.
- Planned Drives Page: Made it easier for the user to edit the details of a planned trip since they previously only had the option to delete trips.
- Notifications: Added notifications that let the user know when they should plan to leave for an upcoming trip.
- Speech Interface: Before, it prompted the user for a star rating that would be recorded, but this was found to be inefficient since further details could not be gathered. We decided that reviews would take place on the mobile app instead.
- Speech Interface: User was unsure how they would be navigated once selecting a spot through this interface. Through the speech interface, we directed the user to the app where it would guide them to the location in a new screen.

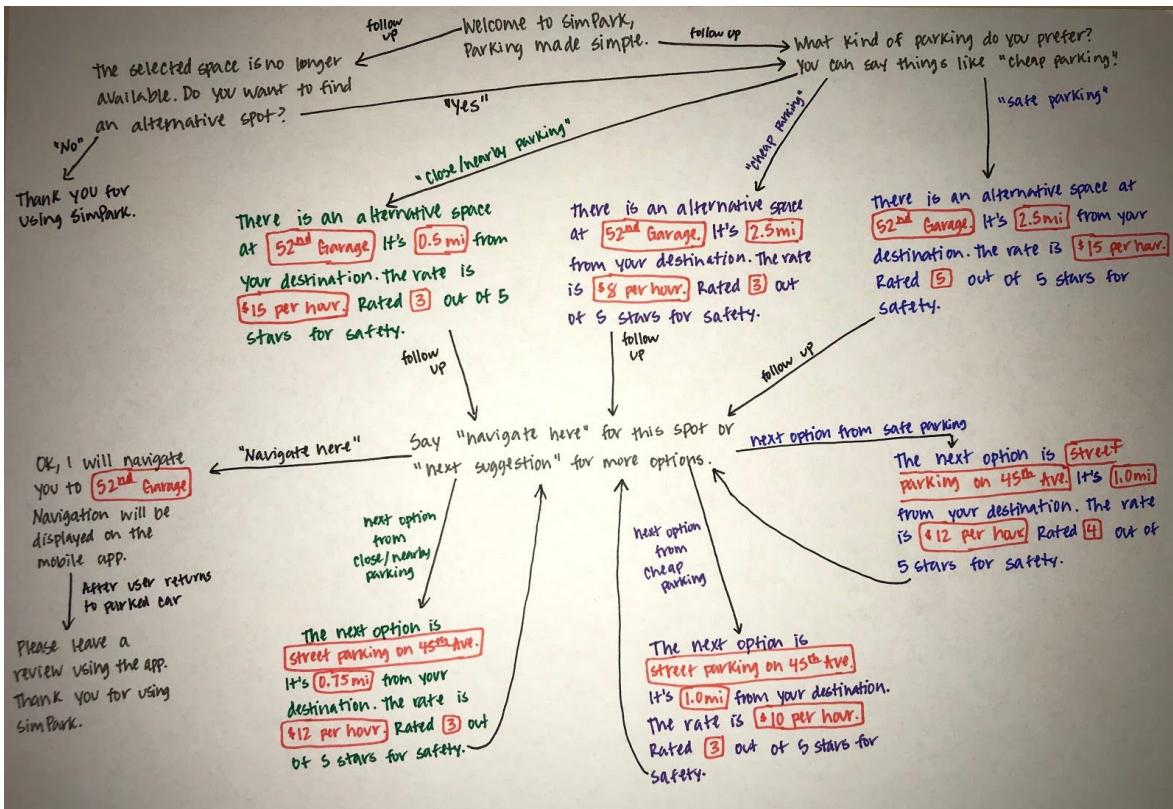
Final Paper Prototype

Mobile Application:



We wanted to keep a minimalistic design when we created our initial prototype and we believe we were able to keep it this way even after completing the testing. Planning for a future trip remained straightforward after changing some of the views. The change of views for suggestions was one of the biggest changes, but also one of the most important. It gave the users the option to view different suggestions based on different factors with a simple tab change rather than having to start the entire process again. Smaller changes also added up throughout the iterations making them significant changes as well. It was important to make these changes in order to make our application clear among all users.

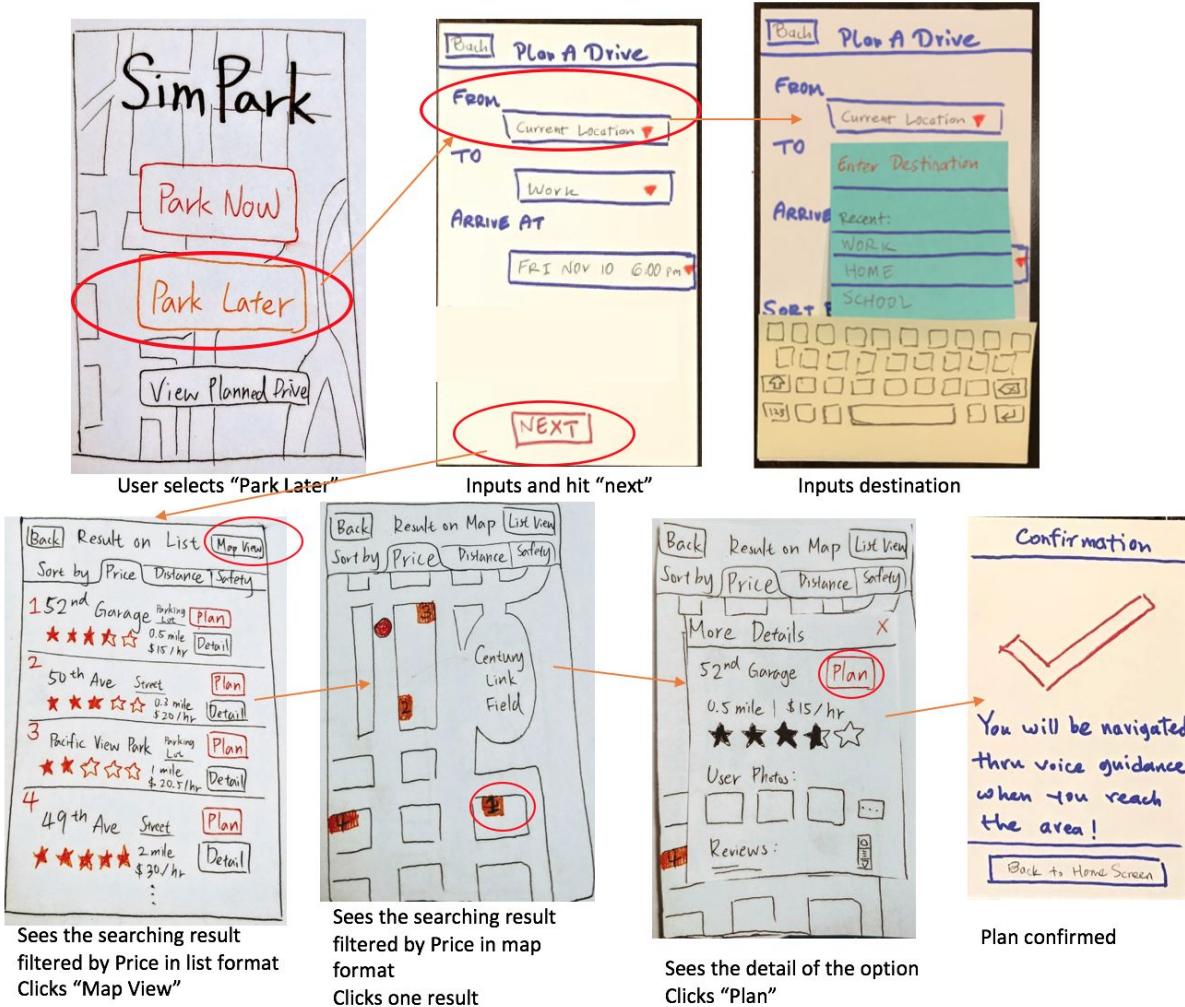
Speech Interface:



Our initial design for the speech interface was not altered as much as we expected. The idea to change from individual cards for every response to a diagram made testing far more organized and it helped the participant see how all possible responses were handled. One of the most important aspects of this design is that we are still able to find parking spots based on the user's preferences despite not being able to interact with the application through touch in some situations. Making the awaited responses more automated made it easier for us to be able to make a concise diagram while also making it clear for the user to know how they should be responding.

Task 1: Parking Planned Ahead

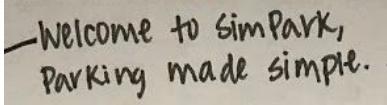
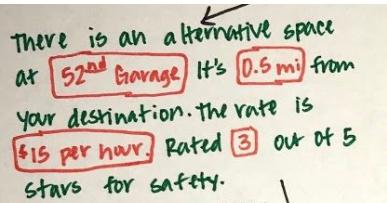
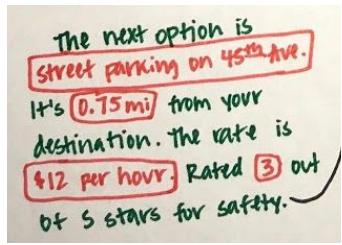
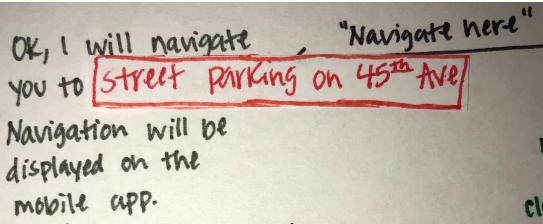
User is planning ahead for finding parking in future at specific location.



Task 2: Find parking when already in destination area

Scenario: The user is in downtown Seattle looking to find parking near a restaurant.

Speech interface is activated automatically when driving.

<p>Speech Interface:</p> 	<p>Speech Interface (follow up):</p> <p>What kind of parking do you prefer? You can say things like "cheap parking!"</p>
<p>User: "Close parking"</p> <p>Speech Interface:</p> 	<p>Speech Interface (follow up):</p> <p>Say "navigate here" for this spot or "next suggestion" for more options.</p>
<p>User: "Next suggestion"</p> <p>Speech Interface:</p> 	<p>Speech Interface (follow up):</p> <p>Say "navigate here" for this spot or "next suggestion" for more options.</p>
<p>User: "Navigate here"</p> <p>Speech Interface:</p> 	<p>Speech Interface (upon user's return to car):</p> <p>Please leave a review using the app. Thank you for using SimPark.</p>

Digital Mockup

Mobile Application:

The digital mockup displays a mobile application interface for parking search and navigation, featuring several screens:

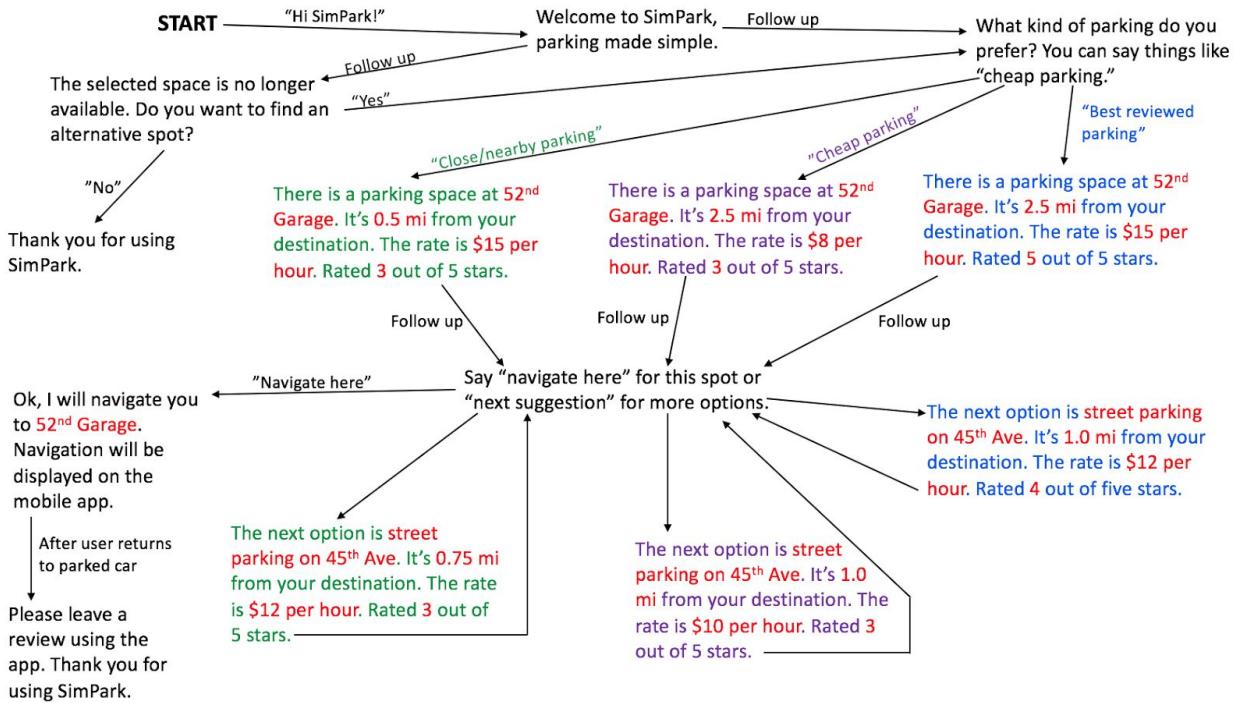
- Home Screen:** Shows a map of an area with "PONTIAC" and "CENTURYLINK FIELD" labeled. It includes buttons for "Park Now" and "Park Later".
- Plan a Drive - Enter Destination:** A screen where the user can enter their destination, such as "Centru".
- Plan a Drive - Set Date & Time:** A screen where the user sets the arrival date and time to "Thu Nov 18 - 6:30 PM".
- Results in List:** A screen showing a list of parking options with details like price and distance. Options include:
 - King Garage (Parking Lot): 0.5 mile - \$15/hr
 - 4th Ave S Street Parking: 0.3 mile - \$20/hr
 - Pacific View Park (Parking Lot): 1 mile - \$20.50/hr
 - 6th Ave S Street Parking: 2 miles - \$30/hr
- Feedback Screen:** A screen for providing overall experience feedback and additional comments.
- Speech Interface Activated Screen:** A screen with a dark background and text "Speech Interface Activated". It includes a blue button "Switch to Visual Interface".
- More Details Screen:** A screen showing more details for a selected parking option, such as "King Garage" (Parking Lot) at 0.5 miles for \$15/hr, with user reviews and photos.
- Map View Screen:** A screen showing a map with turn-by-turn directions to a parking spot, including "800 feet" and "Turn left onto 11th Ave NE".
- Results on Map Screen:** A screen showing a map with multiple parking locations marked.
- Results in List Screen:** A screen showing a list of parking options with details like price and distance.
- More Details Screen (Speech Interface):** A screen showing more details for a selected parking option, such as "King Garage" (Parking Lot) at 0.5 miles for \$15/hr, with user reviews and photos, specifically designed for speech interface activation.

For the most part, the digital mockups reflect the paper prototype almost exactly. One big change we decided to make was to change the factor of “safety” to “reviews” instead. The reason for this being that the star rating is more commonly seen as general review rating scale which can confuse the user if the stars represent only safety. We also decided to change some of the pop-up windows to full screen windows. This was done specifically to the “More Details” page so the user has ample space to see multiple reviews and the “From” and “To” fields to better organize the keyboard and input field.

This mobile application mockup supports both of our tasks by giving the users the option to plan for a trip ahead of time, done through the application, or helps them find an option once in the destination area by directing them through speech interface if they prefer. The app gives the option to view suggestions based on the different factors which was our main focus when we were designing the prototypes. Giving the user to opportunity leave their own review based on their experience was also an important aspect to us since the filtering on “reviews” depends on how users rate a location. The user is prompted to leave a review after returning to their car so they can rate every aspect of the location including safety which cannot be determined ahead of time.

We also added the function of switching between visual (mobile app) and speech interfaces, which can happen when “Park Now” is chosen as the first step or after the user triggers the speech interface. The searching and selecting parking process is similar to the one of planning a drive, but the button of “Switch to Speech Interface” is added, and the “Plan” button is changed to “Go” when more details of an option is shown while using on the “Park Now” option.

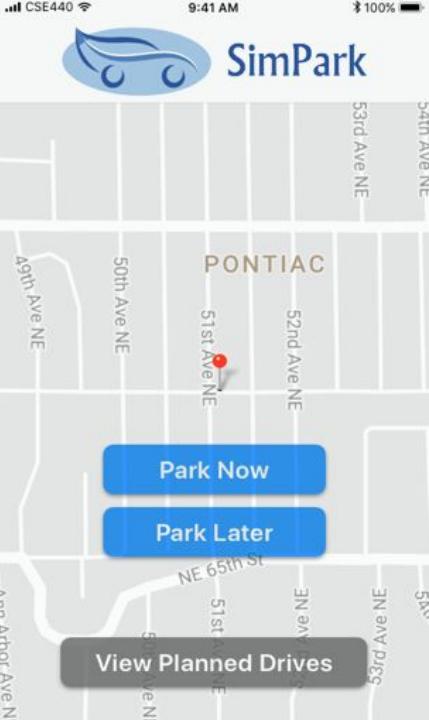
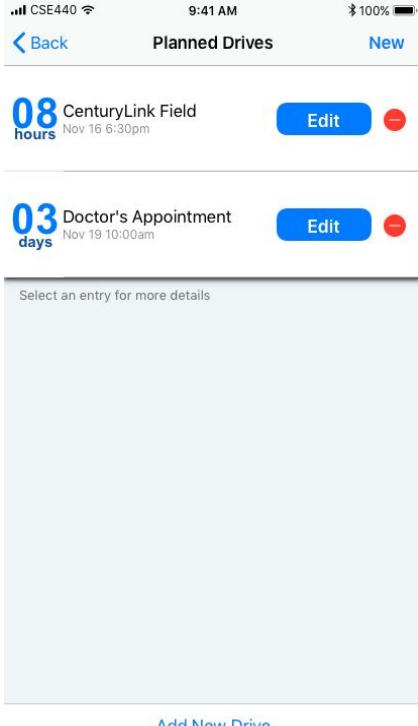
Speech Interface (flowchart with scripted sentences):

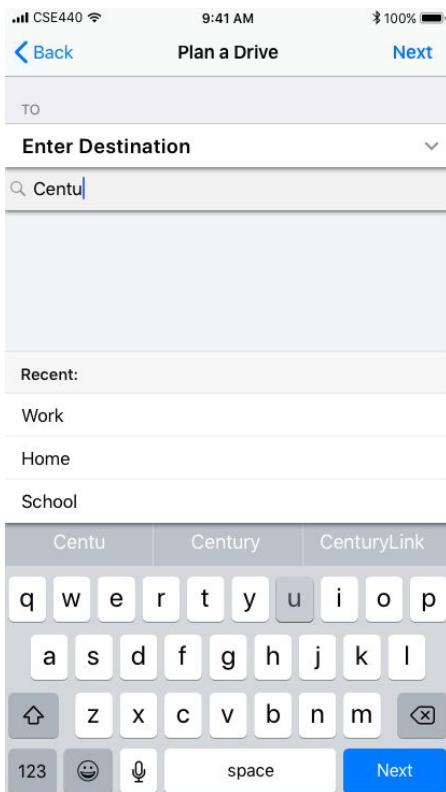


For the speech interface, the paper prototype was simply recreated with minimal changes. We made it easier to see where the dialogue begins by adding the “START” at the very top and gave the user the option to use the phrase “Hi SimPark” to activate the speech interface. This interface can also be activated by clicking the “Park Now” button on the landing page or by clicking on the “Switch to Speech Interface” button. In the diagram, the green text is used to represent the suggestion based on close parking, the purple represents cheap parking, and the blue is best reviewed parking. The red text are the details of the suggested parking spot which change. The text on the arrows are the expected user response or what causes the next piece of dialogue.

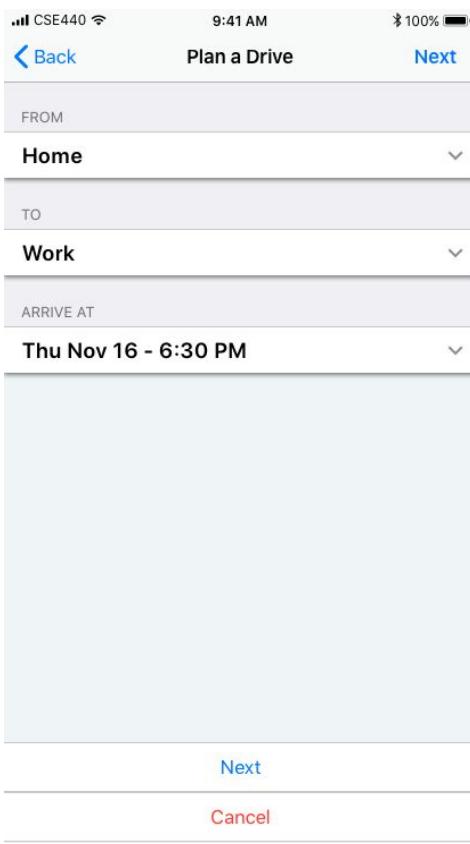
This component of our prototype makes our second task of finding a parking spot once in the area possible without having to interact directly with the app. The reason it is a speech interface is because it is assumed that the user is unable to use their hands because they are too busy driving though they have the option to use the app if they would like. Through this interface, the user is still able to choose which factor they prefer to filter on while receiving suggestions. It also makes sure that the user leaves a review by redirecting them back to the application once they return to their parked car so they are able to review the entire experience, including safety which cannot necessarily be rated ahead of time.

Task 1: Planning where to park prior to the event.

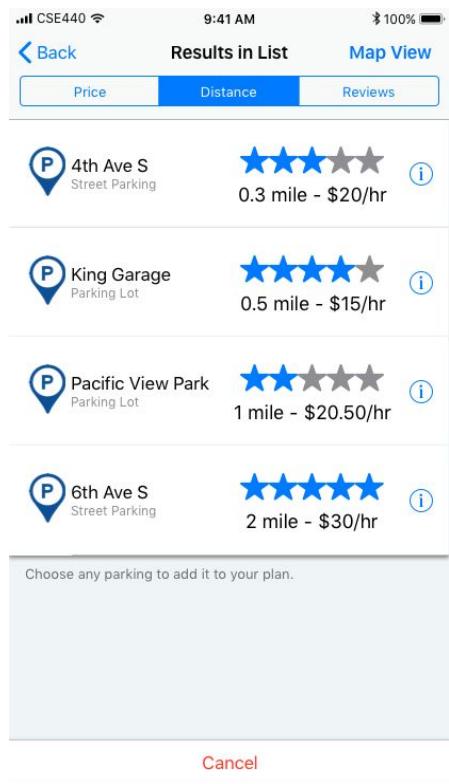
SCREEN	DESCRIPTION
	<p>The participant launches the SimPark app. He/she then decides among three options available to them from finding an immediate parking, parking later or viewing planned drives.</p>
	<p>On selecting the “View Planned Drives” option, the participant is able to view/edit the drives that have been planned before.</p>



On selecting the “Plan Drive” button, the participant is shown the most commonly visited destinations from his usage during his event of typing the desired parking destination



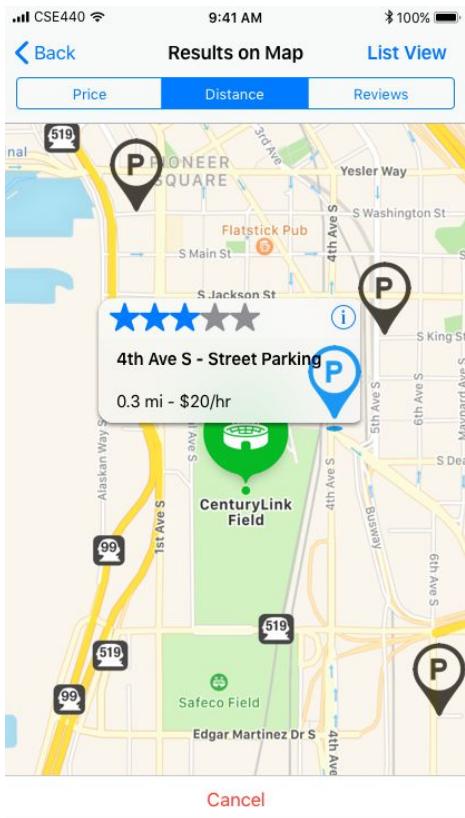
The participant’s inputs are then recorded and he/she gets to review them before moving to the next screen.



The participant is shown available parking spots at the selected location and time/date.

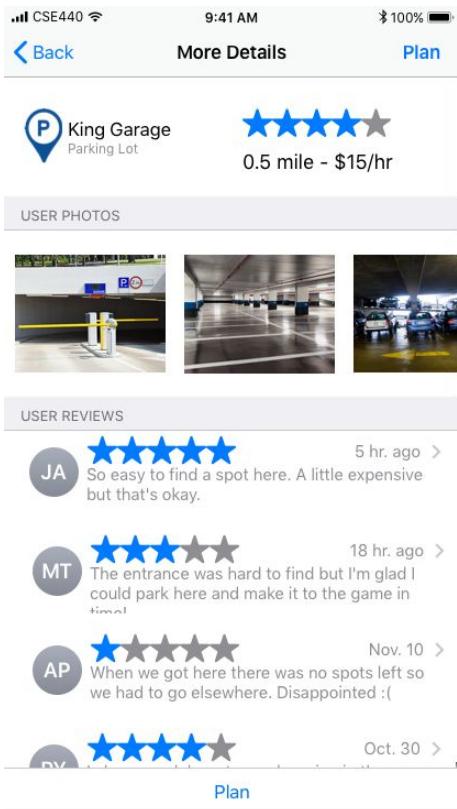
Result list can be ordered by different factors like “Price”, “Distance”, or “Reviews”.

Further information is available for him/her to select before moving forward by clicking “More Details” button on the right of each option denoted by the “i” button.



The participant sees a geographical display of the selected parking location. Other suggested parkings are displayed in black icons while the one currently being viewed is in blue.

Similar to the list format, results can be ordered by different factors like “Price”, “Distance”, or “Reviews”.



When the participant clicks on the “More Details” button, further information is displayed including photos and reviews for the selected spot.



The participant is reminded via a notification to leave at a particular time in order to get to their destination on time.

Wi-Fi CSE440 9:41 AM 100%

[Cancel](#) [Feedback](#) [Submit](#)

HOW WAS YOUR OVERALL EXPERIENCE?

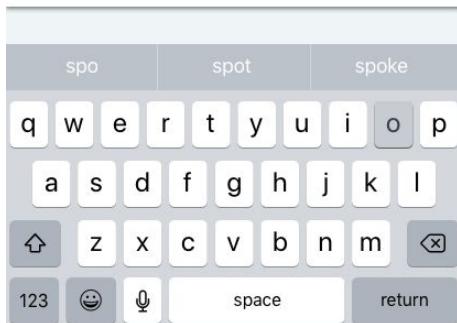
★★★★★

DID YOU PARK WHERE WE GUIDED YOU TO?

[Yes](#) [No](#)

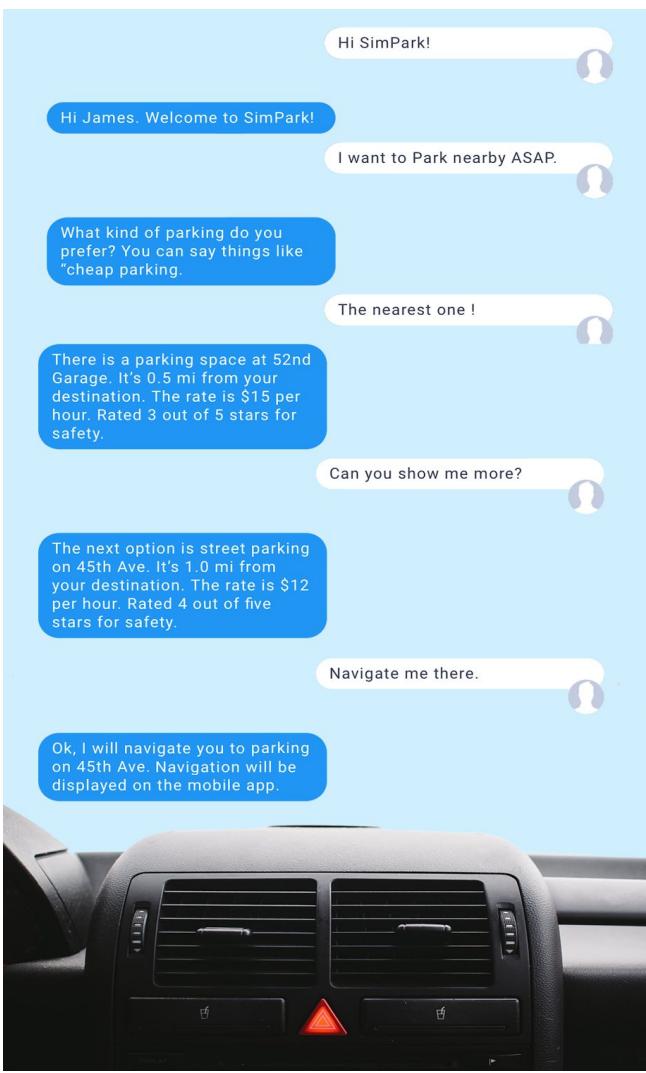
ADDITIONAL COMMENTS

I always park here to go shopping in the area. Very easy to find an empty spo|



On exiting the parking spot and on re-launching the app, the participant is suggested to provide feedback of their experience.

Task 2: Finding where to park when in the destination area.



The participant is on default guided through voice commands when he/she clicks on the “Park Now” at the start of the app.

The participant is also prompted through a voice interactions when he/she is near the destination through voice commands and interactions.

The app is showing the ‘Speech Interface Activated’ screen during the speech interface, user can turn off the speech interface and use the mobile app instead to search for parking if he/she prefer to have visual process, which is similar to the searching process of the driving planning in Task 1.

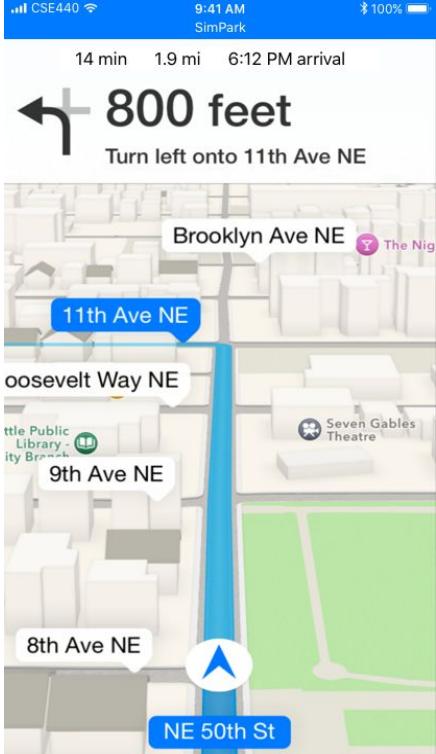
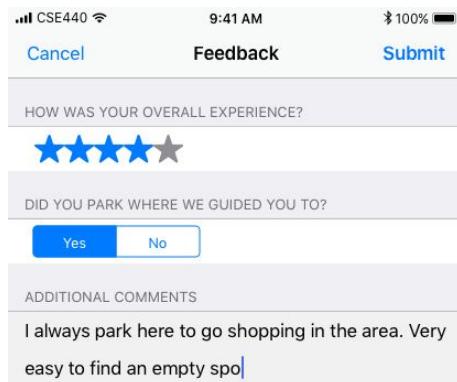
The screenshots illustrate the transition between speech and visual interfaces:

- Screenshot 1: Speech Interface Activated** (Left)
 - Header: Speech Interface Activated
 - Text: Choose any parking to add it to your plan.
 - Buttons: Switch to Visual Interface (blue button), Switch to Speech Interface, Cancel.
- Screenshot 2: Results in List** (Middle)
 - Header: Results in List
 - List of parking options:

Parking Type	Rating	Distance	Price
4th Ave S Street Parking	★★★★★	0.3 mile	\$20/hr
King Garage Parking Lot	★★★★★	0.5 mile	\$15/hr
Pacific View Park Parking Lot	★★★★★	1 mile	\$20.50/hr
6th Ave S Street Parking	★★★★★	2 miles	\$30/hr
 - Buttons: Back, Map View, Price, Distance, Reviews.
- Screenshot 3: Results on Map** (Right)
 - Header: Results on Map
 - Map showing parking locations (P) with details overlaid:

Parking Location	Rating	Distance	Price
4th Ave S - Street Parking	★★★★★	0.3 mi	\$20/hr
 - Buttons: Back, List View, Price, Distance, Reviews.
- Screenshot 4: More Details** (Far Right)
 - Header: More Details
 - Details for King Garage:

Parking Lot	Rating	Distance	Price
King Garage	★★★★★	0.5 mile	\$15/hr
 - Sections: USER PHOTOS (with three images), USER REVIEWS (with three reviews from JA, MT, AP).
 - Buttons: Back, Go.

	<p>Once the participant has been guided through the speech interface, he/she is navigated to the requested parking spot by other navigational tools like Google Maps or Maps on iOS, based on user's preference.</p>
 	<p>On exiting the parking spot and on re-launching the app, the participant is suggested to provide feedback of their experience.</p>

Discussion

Throughout the iterative design process, we learned that in order to make an effective design, we must consider the feedback of groups from many different perspectives. It is crucial to gather feedback through testing to make sure the different components of the design function the way that it is intended. Conducting the heuristic evaluations gave us the opportunity to adjust our design based on the feedback from people who have a similar background as us. The usability tests, on the other hand, gave us the opportunity to gather feedback from potential users.

The iterative design process ultimately allowed us to produce a more efficient design. Putting our prototypes through multiple tests brought up many different comments and feedback that we were able to incorporate in our final design. However, it was important for us to only incorporate feedback that would help in completing our tasks. For this reason, we made sure to incorporate only the suggestions that would make the design more efficient without adding unnecessary details. In the end, our final design turned out to be more accommodating to what user would expect for completing these tasks while remaining simple and efficient. Through the iterative design process, we were able to learn about what extra functionality a user would want when looking for a parking spot and in integrating these ideas into our prototypes, we were able to produce a design that would satisfy a wide range of users.

The tasks did not change much after the usability tests, but the process of completing the tasks were slightly adjusted. As a result of our usability tests, the search result is not only shown in the list format, but also in a map format. In addition, the rating process has changed from being included in the speech interface to being only available on the mobile application. During the usability tests, a participant intuitively tried to drag the map to read the searching result, which was not within our provided functions, but we thought that it would be an efficient way of displaying result. One also thought the rating process in speech interface was unnecessary and difficult to use. After discussing as a group, we came to an agreement that having rating process in both mobile application and speech interface was redundant, so we removed it from the speech interface as people usually use their mobile devices to leave reviews.

We also decided to add the function of switching between speech interface and visual interface for the task of finding immediate parking. Although speech interface provides dynamic parking availability information and it is a safer alternative while driving, there are still potential users who prefer to risk using phones while driving to use mobile app.

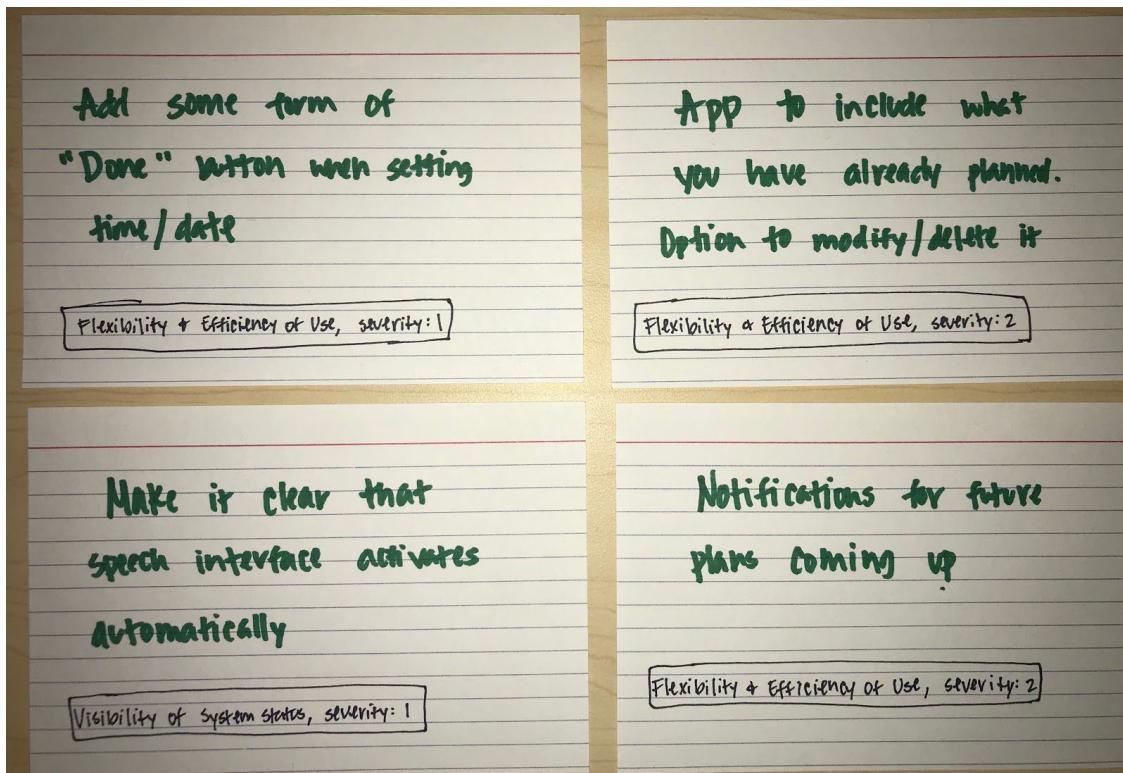
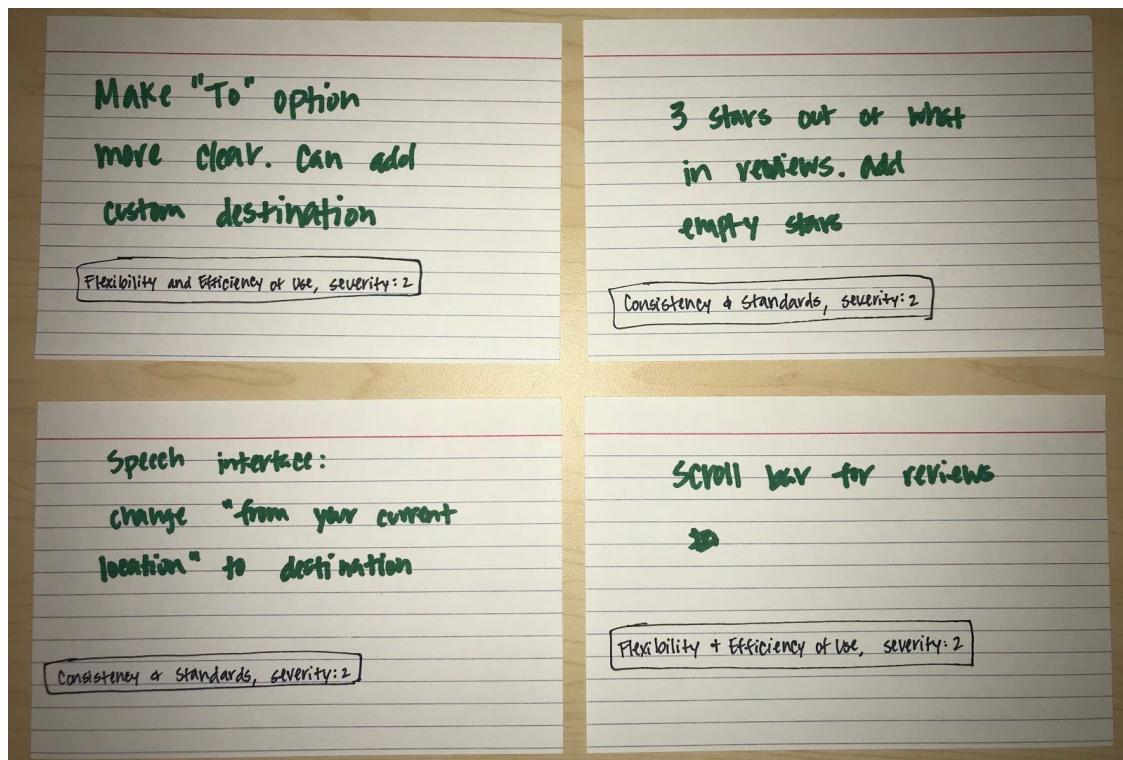
Though we were able to improve our design significantly through the two heuristic evaluations and three usability tests, it would have been useful to include some more iterations. The reason being that we added some new functionality to our design after the last usability test that has not been tested by potential users. While we hope that this new functionality is intuitively easy to use, it would be better if we were able to get direct feedback from others. After this new addition, we considered the design to be complete so the possibility of having someone attempt to complete the tasks with this design would have given us an idea of whether or not this was true.

Appendix

Before each one of our usability tests, we informed our participants of the following:

1. The main purpose of the application and the scenarios it is designed for.
2. The think-aloud protocol. We encouraged our participants to express their thoughts and impressions of the design and provide any feedback as they interact with the application.
3. The task: finding parking in different scenarios for each participant.
4. Our role. We explained to the participants that we would be observing them as they interact with the design and that the goal is for them to be able to use the application in order to complete the task without needing our help. However, if they needed clarification or help, they could ask us to step in; in which case we would take note of that part of the design that was not clear enough for the participant to use without help.
5. Wrap-up. We informed our participants that there would be time at the end of the task to go over any questions they might have about the design as well as to give us any additional feedback on how we can improve our design.

Notecards (Heuristic and severity rating on written on card):



Wording for "do you prefer this option" needs improving. Have a command to prompt more suggestions

[Consistency & standards, severity: 1]

"Out of ___ stars do you rate this space"

[Consistency & standards, severity: 2]

Show planned routes, some kind of calendar or list

[Flexibility & Efficiency of use, severity: 2]

Speech interface & app: prompt for review after coming back to car.

[Match between system & real world, severity: 1]

From speech interface:

Show navigation to spot
maybe option for photo

[Recognition rather than recall, severity: 1]

Not intuitive that suggestions shown is the best option, add some kind of title screen

[Visibility of system status, severity: 1]

"More Options" button was overlooked, make it stand out a bit more

Flexibility & Efficiency of Use, severity: 1

From options screen to next screen, change "Done" to "Next"

Match between system & real world, severity: 2

Planned time, is it when you leave or when you want to arrive?

Consistency & Standards, severity: 3

Selecting "Go" when planning ahead, change to "Plan"

Match between system & real world, severity: 2

History in "To" is not intuitive

Flexibility & Efficiency of Use, severity: 2

Create another section when "all options" is clicked

Flexibility & Efficiency of Use, severity: 1

Arrangement of the keyboard and drop down menu in "To" option on one screen

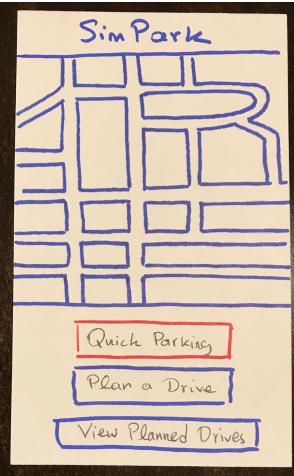
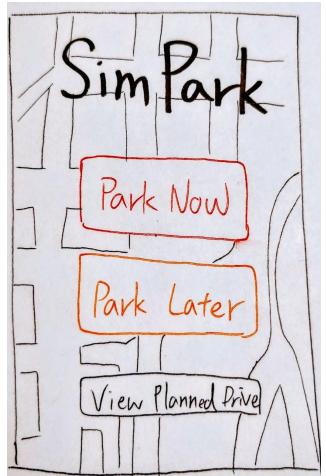
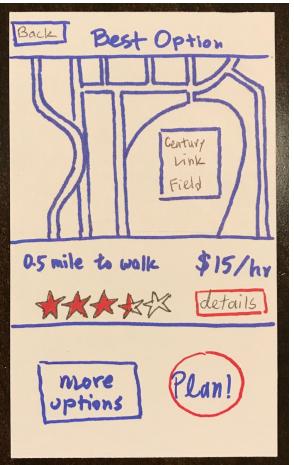
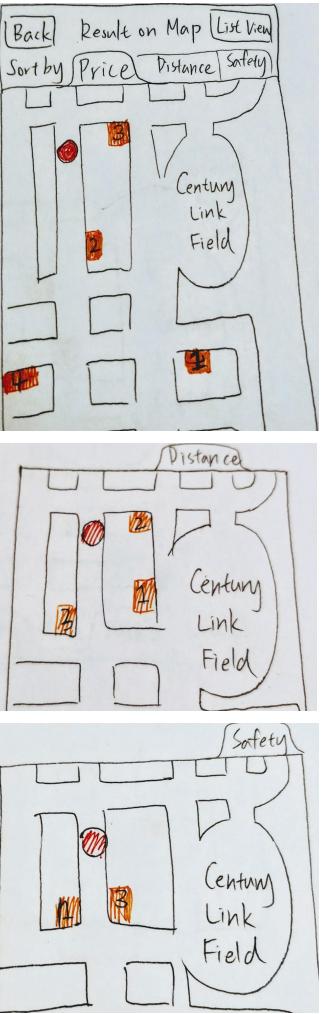
Match between system & real world, severity: 2

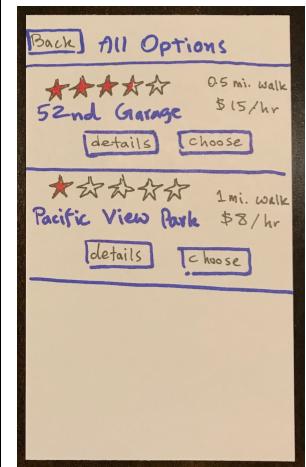
Add follow up sequence for 'Navigation' /

make it more obvious.

Flexibility & Efficiency of Use, severity: 1

Usability Test: Before and After

Original Image	Heuristic	Severity	Revision	New image
	The home page is hard to use. Heuristic: User Control and Freedom	3	Make the buttons the main point of the front screen. Map of current location was unnecessary and distracting.	
	Wording of the two options for finding parking were found to be confusing. Heuristic: Match Between System and the Real World	2	Change "Quick Parking" to "Park Now" and "Plan a Drive" to "Park Later."	
	It is hard to go through the list of searching result. Heuristic: Flexibility and Efficiency of Use		Visualize all the results on map rather than going through them one by one.	



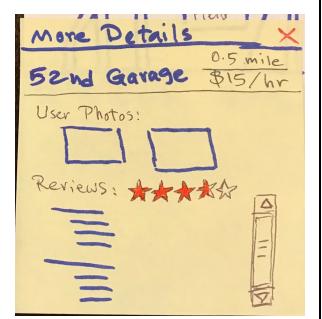
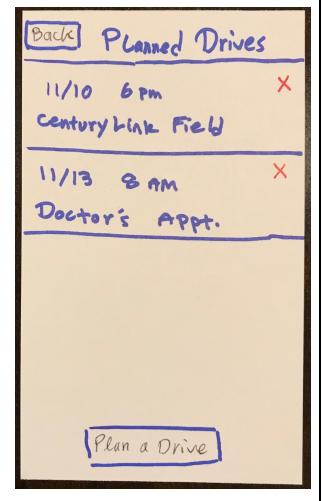
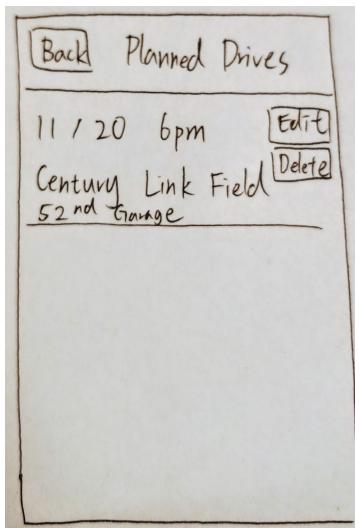
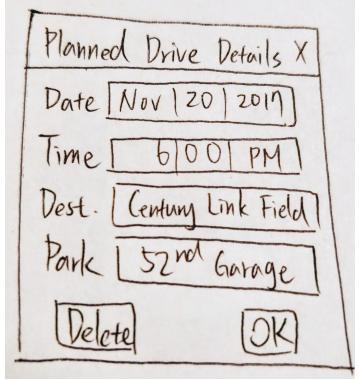
Inefficient for user to search based on a different factor.

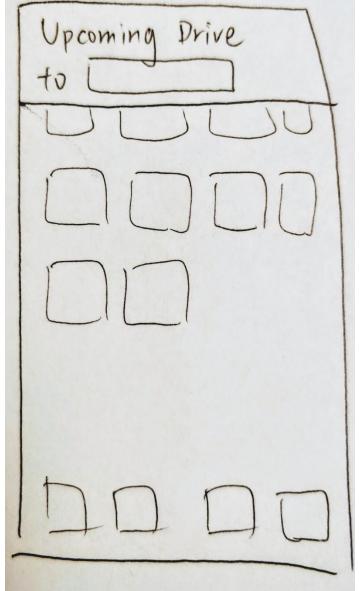
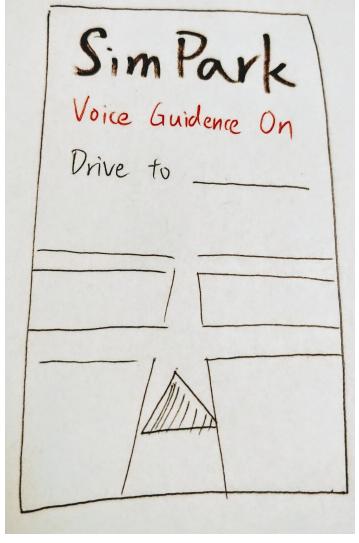
Heuristic: Flexibility and Efficiency of Use

3

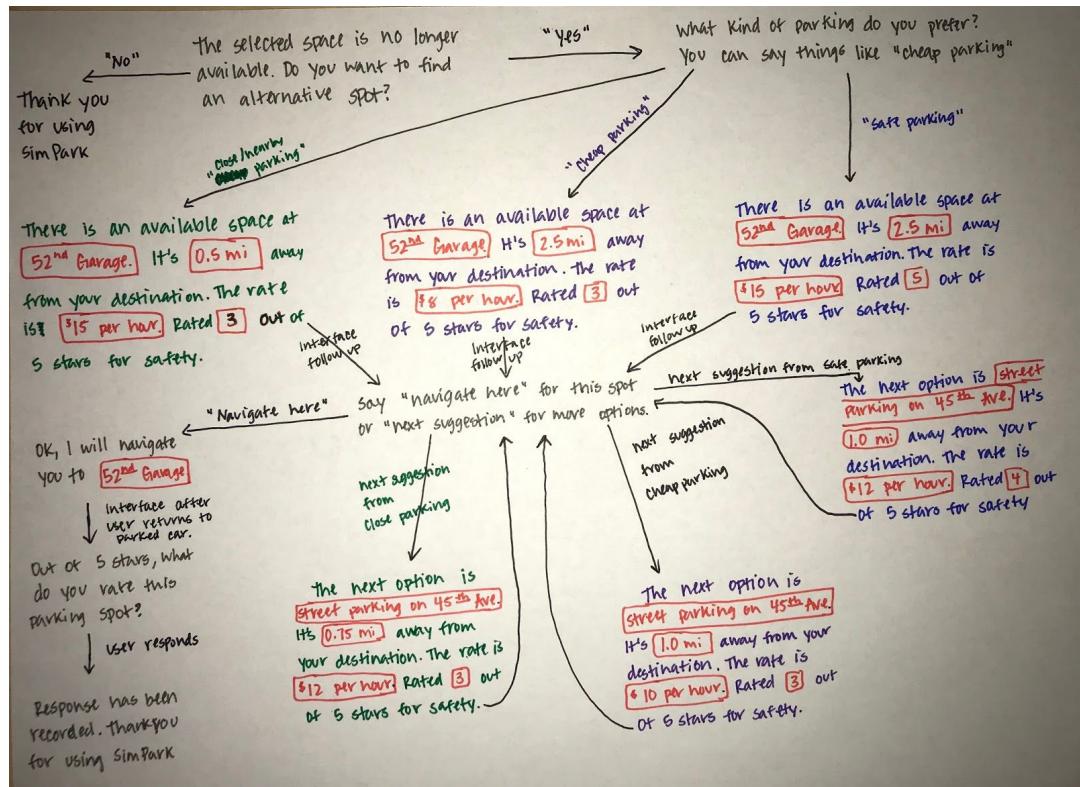
Display different filtered result list with tabs.



 <p>Heuristic: Flexibility and Efficiency of Use</p>	<p>No follow up step to plan for a spot from screen displaying details of an option.</p>	<p>1</p> <p>Add “Plan” button on detail pop-up.</p>	
 <p>Heuristic: User Control and Freedom</p>	<p>Not flexible for the planned drive to modified later on.</p>	<p>3</p> <p>Add detail page with edit function</p>	
			

No prior screen available	<p>Users wanted to be reminded of their planned trips ahead of time.</p> <p>Heuristic: Visibility of System Status</p>	2	Notification for upcoming trips days/hours in advanced.	
No prior screen available	<p>Users were confused on how they would be navigated if they used the speech interface to find a spot.</p> <p>Heuristic: Visibility of System Status</p>	2	From speech interface, the user is directed to the app where they can view where they are driving.	

Speech Interface (Previous design)



Heuristic	Severity	Revision
Inefficient method in recording a review Heuristic: Flexibility and Efficiency of Use	2	User is no longer asked for a review from the speech interface. They are directed to the app to complete this step.
Conversation between interface and user began to abruptly. User was unaware the speech interface was activated. Heuristic: Visibility of System Status	2	User is now greeted with a short message of the speech interface introducing itself as part of the SimPark application.
User was unaware of how they would be navigated to their location from choosing a spot using this interface. Heuristic: Visibility of System Status	2	The user is directed to the application to view the navigation.

Speech Interface Revisions:

