

Switch

Team

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Team Member and Roles

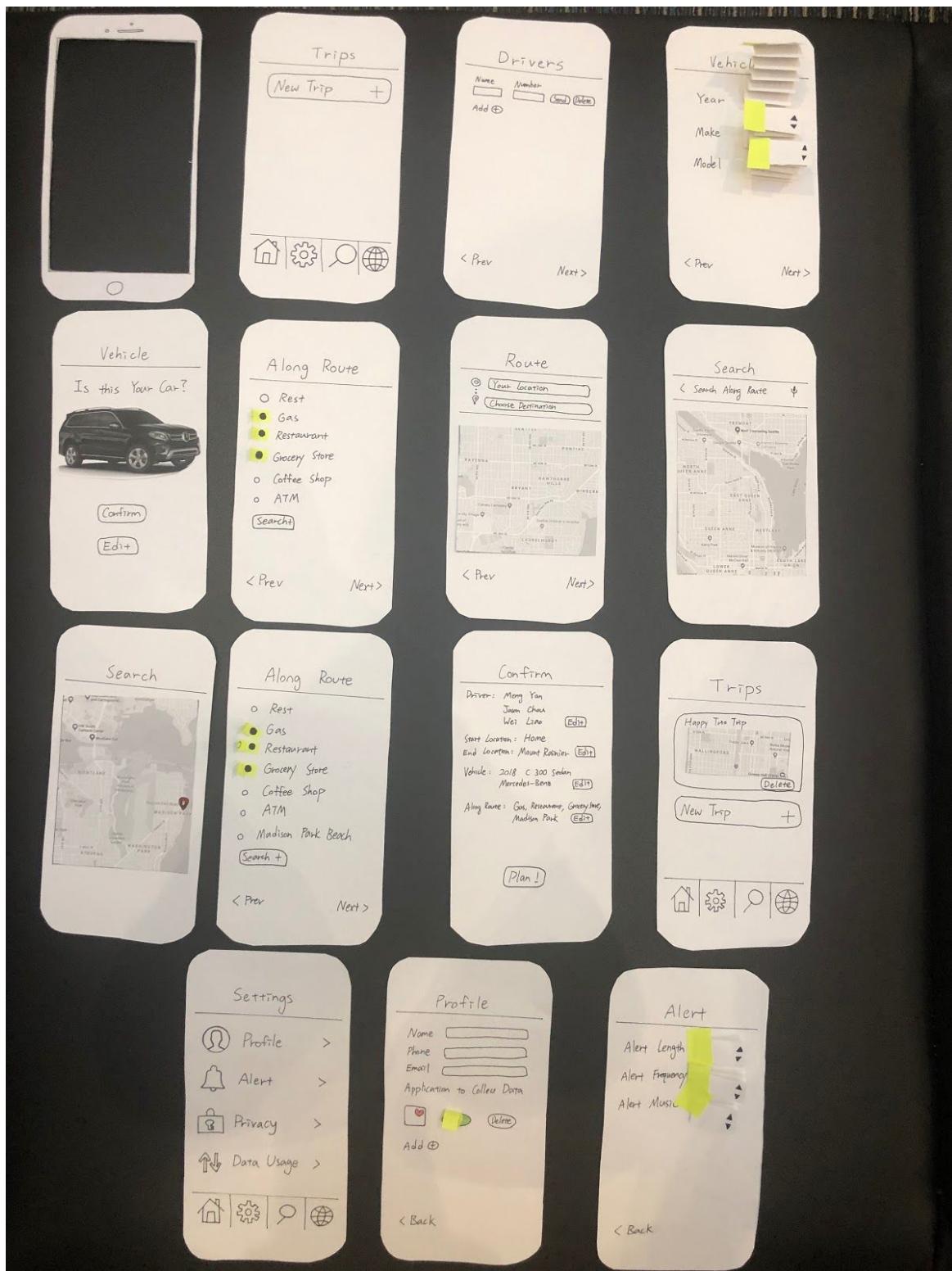
Wei Liao, Meng Yan, and Jason Chou all participated equally in every aspect of the project including paper prototyping, usability testing, analytics, and digital mockup creation.

Problem & Solution Overview

When it comes to road trips, everybody is excited to see their dream places. But the long-distance driving has never been an easy job. Many of us think we can keep our minds alert, even when we're feeling the tug of sleepiness on our brains and bodies. But the truth is that sleep is a powerful biological drive — one that can overtake even the best driver. Rolling down the windows and turning up the radio volume do not effectively wake the driver up. It's important to prevent drowsy driving beforehand to protect the safety of everyone on the road. In order to prevent drowsy driving, we are designing a mobile application, called Switch, that helps users plan a driving/switching/resting schedule for participating drivers before a long distance trip. The app can also provide drivers with a gas and food schedule, which is incorporated into the driving schedule based on the fuel efficiency of the car and the route. In addition, Switch can measure a person's driving limit to provide users with a recommendation on numbers of drivers required for the trip or other commuting options. We hope that Switch can effectively prevent drowsy driving and assist users to experience a well-planned and enjoyable long-distance road trip.

Initial Prototype

Below is an overview of the initial prototype including all the pages of the application.



Description

Our paper prototype represents our mobile app design called "Switch". The critical aspect of the design is to show how the user will be able to perform the two tasks that we aim to tackle: 1) Plan time to drive, rest, and switch on a long distance road trip and 2) Measure a person's driving limit and keep him/her alert. The prototype is designed such that the user will need to enter all the required information such as the participating drivers, the vehicle that will be used for the trip, the trip route, and the stops to visit along the route. After the required information are filled out, the application will be able to plan the trip for the user and keep the drivers alert during the trip.

The first task: Plan time to drive, rest, and switch on a long distance road trip is achieved by filling out a set of pages from the application. The user will first select and name a new trip, then fill in the drivers, select starting and ending location, find the appropriate vehicle for the trip, select places to visit along the route, confirm all filled out information, and complete planning for the trip. The critical aspect of design for task 1 is to demonstrate to the user the actual steps to take to plan the trip and show the user the functionality of the application. For example, route selection page will resemble the look of the Google Map application, vehicle selection page will use drop-down menus with all possible options available, and the along-the-route selection page will have radio buttons to select existing options and a search button for adding unlisted options.

The second task: Measure a person's driving limit and keep him/her alert is achieved by navigating through different tabs in the Settings page and edit relevant information accordingly. The user can select "Profile" in the Settings page to edit user's name, phone, and email and control which health application the Switch app can have access to. The user can also select the "Alert" in the Settings page to change the length, frequency, and music of the alert that will be activated during the trip to keep the driver awake and prevent drowsy driving. The critical aspect of design for task 2 is to demonstrate to the user what the user can edit and to show the user the exact steps to achieve those editing. For example, user can know from the prototype that personal information, application privacy, and alert preferences are editable and the modifications can be achieved through going to the corresponding sections in the Settings page.

In summary, the initial prototype shows the general functionality and look that our application will have and gives user an opportunity to interact with the design. Below this section are two detailed walk-throughs of the two tasks that our design aims to tackle using the initial paper prototype.

Task 1: Plan time to drive, rest, and switch on a long distance road trip

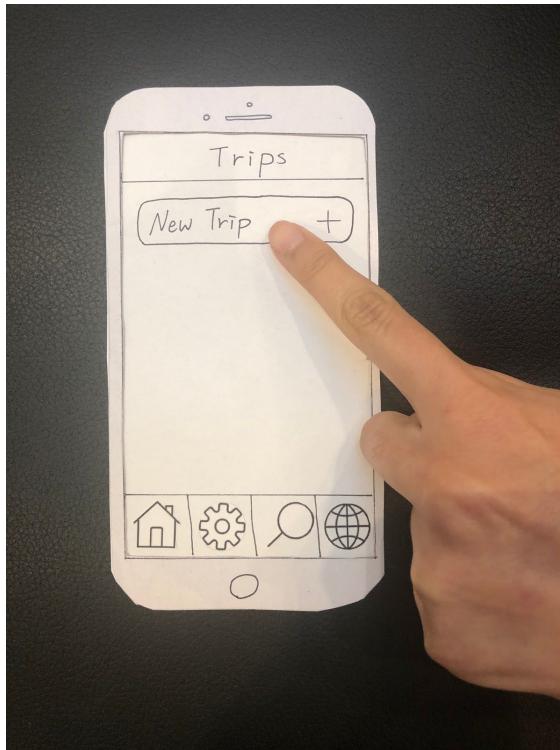


Figure 1: Select and name a new trip data)



Figure 2: Add co-drivers (need their

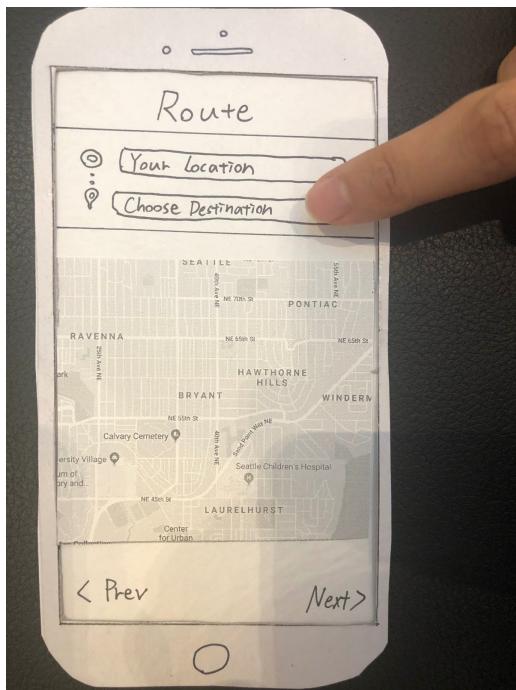


Figure 3: Select start and ending location

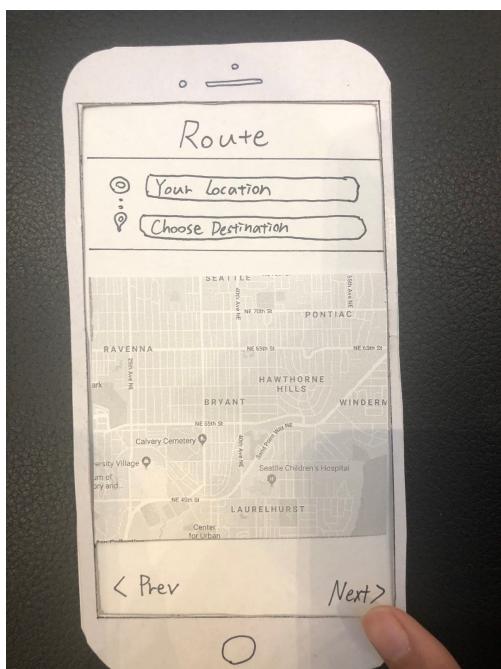


Figure 4: Proceed

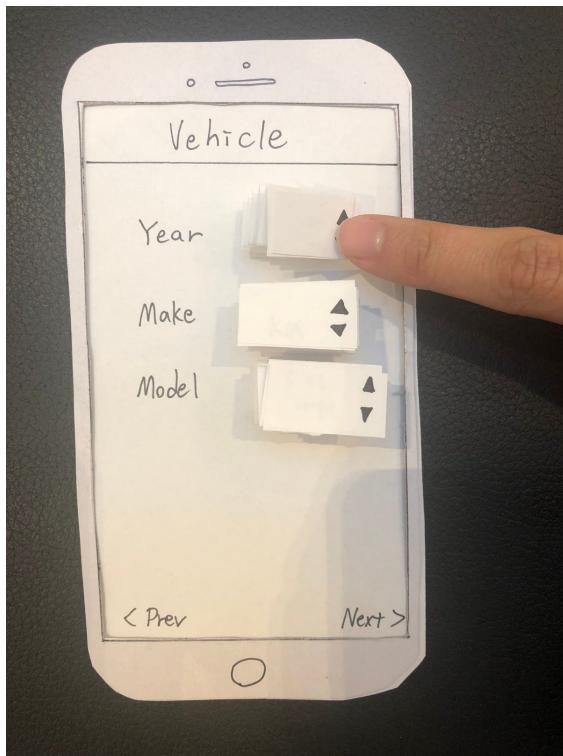


Figure 5: Select what kind of car the user has to select



Figure 6: Use drop down menu

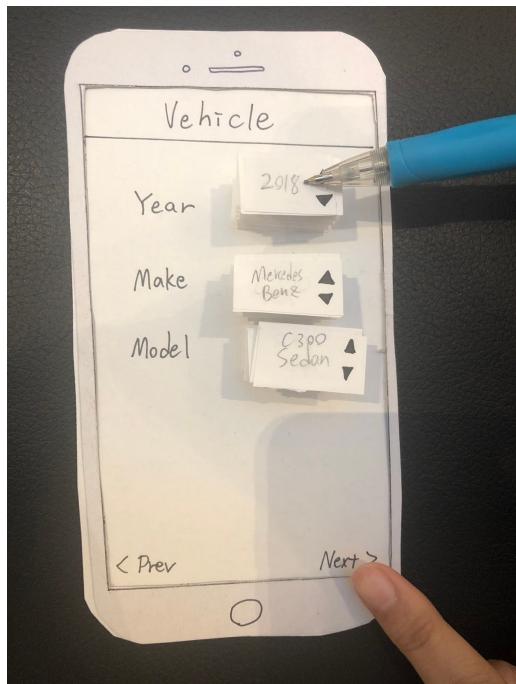


Figure 7: Fill out all fields and proceed is correct

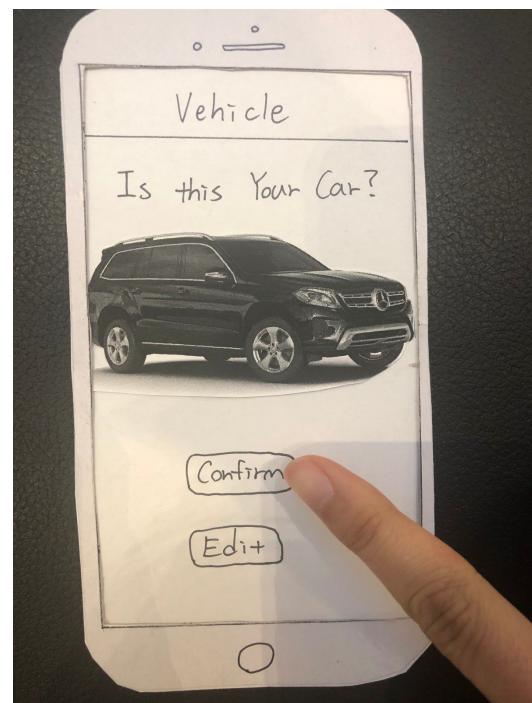


Figure 8: Confirm the found car

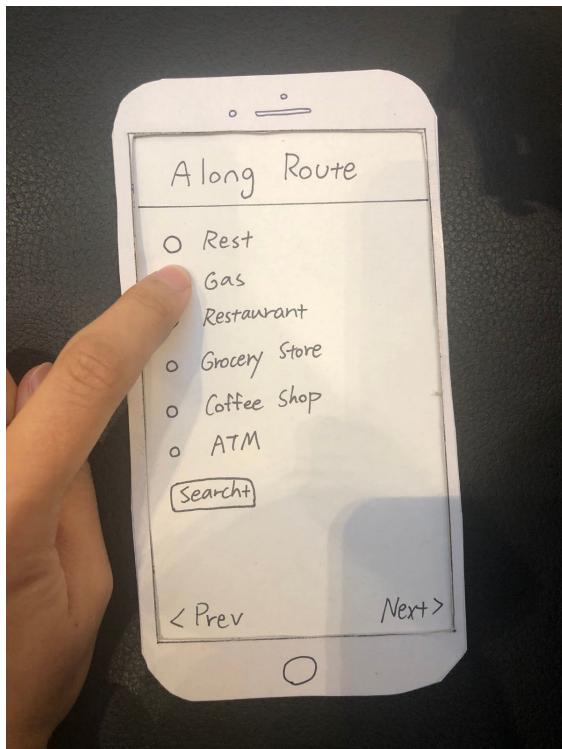


Figure 9: Select places to visit along route additional options

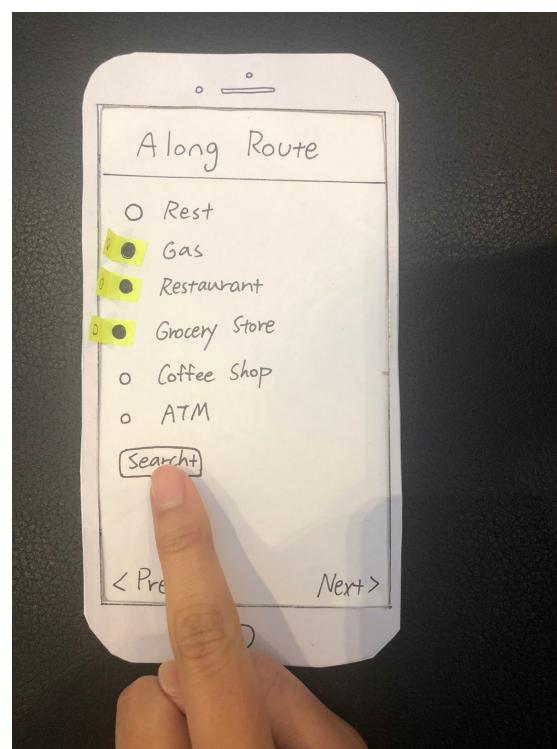


Figure 10: Search for unlisted



Figure 11: Enter location to search for

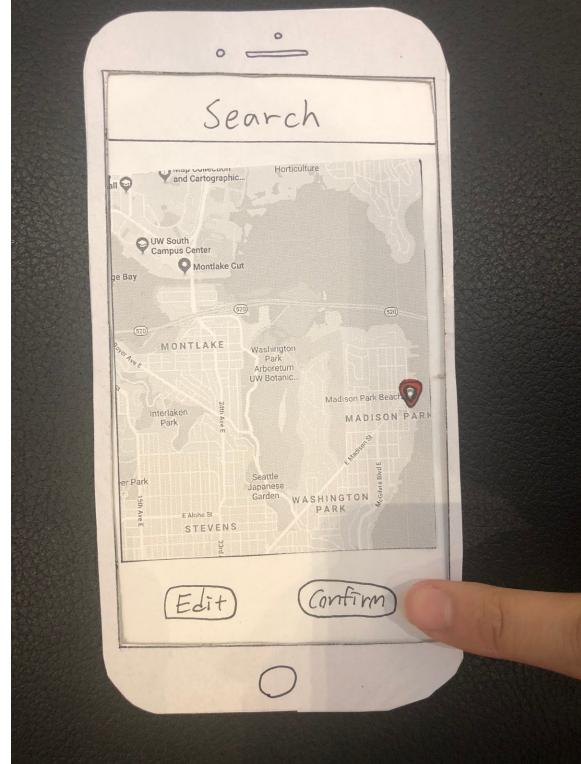


Figure 12: Confirm the found location

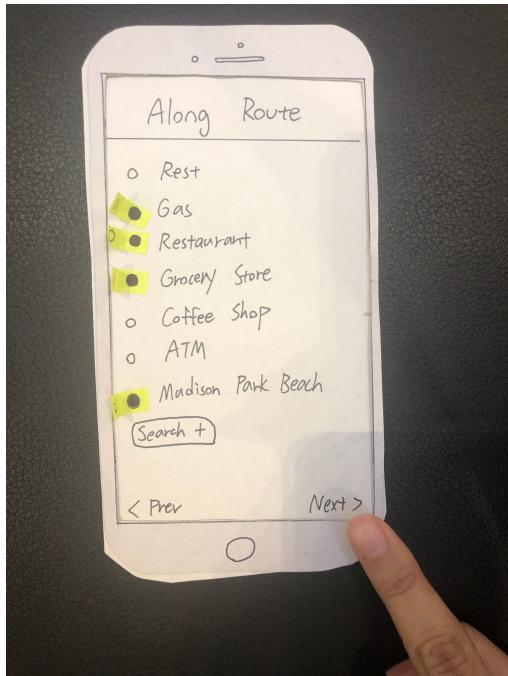


Figure 13: Proceed to next step
ok

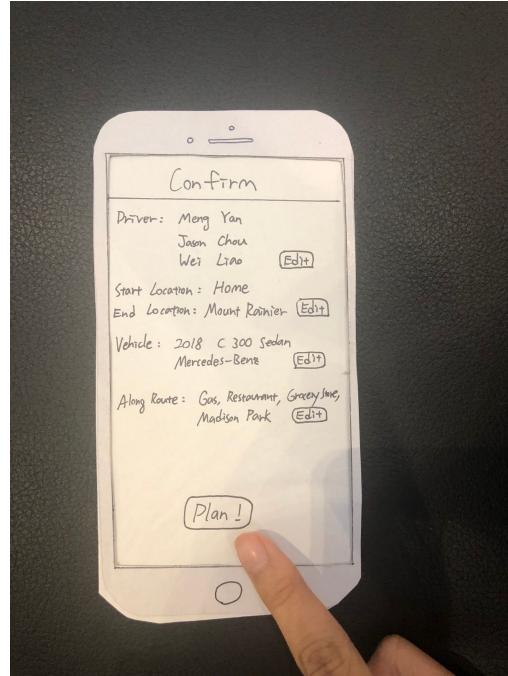


Figure 14: Confirm all the entered fields are ok

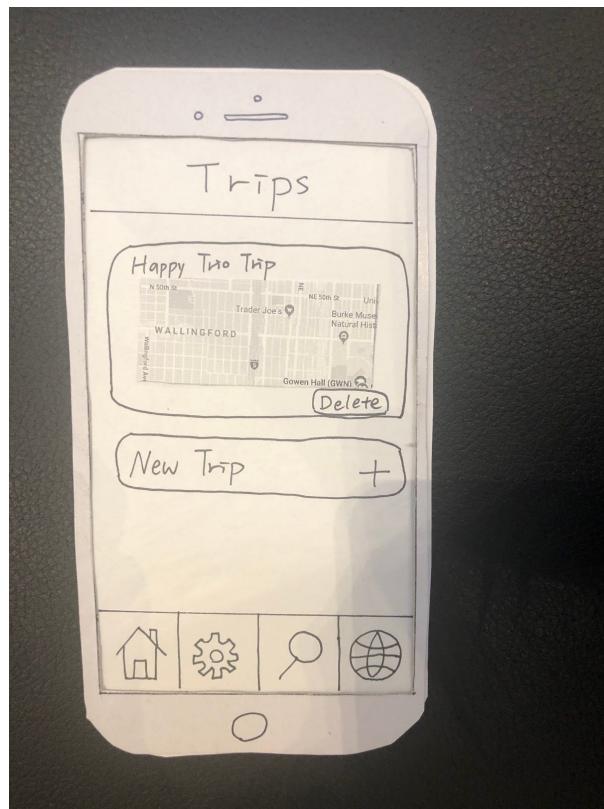


Figure 15: Finish planning the trip. Click on trip to activate when users begin the trip.

Task 2: Measure a person's driving limit and keep him/her alert

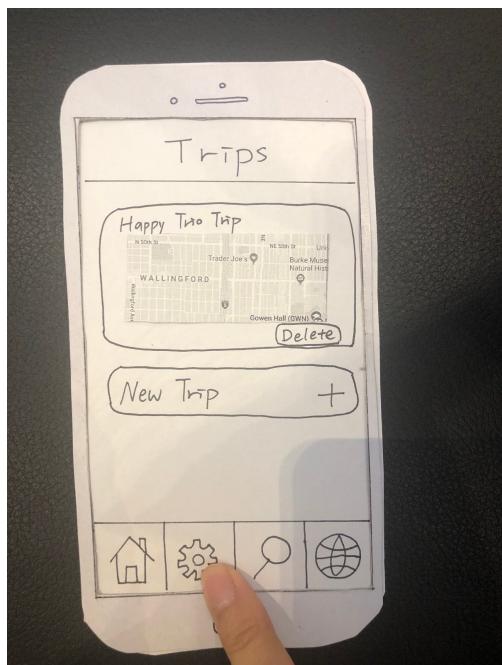


Figure 16: Go to settings

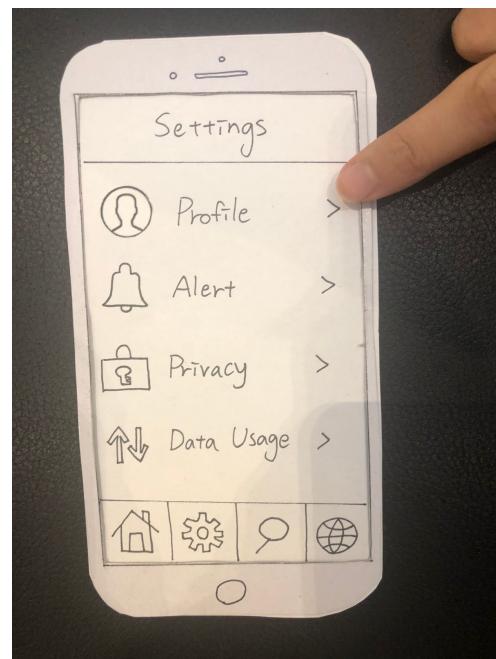


Figure 17: Select Profile in Settings

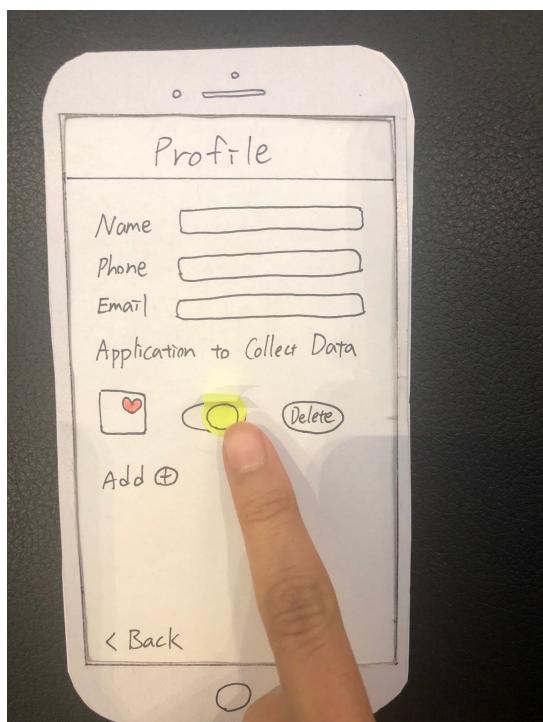


Figure 18: Enable app to send sleep/health data

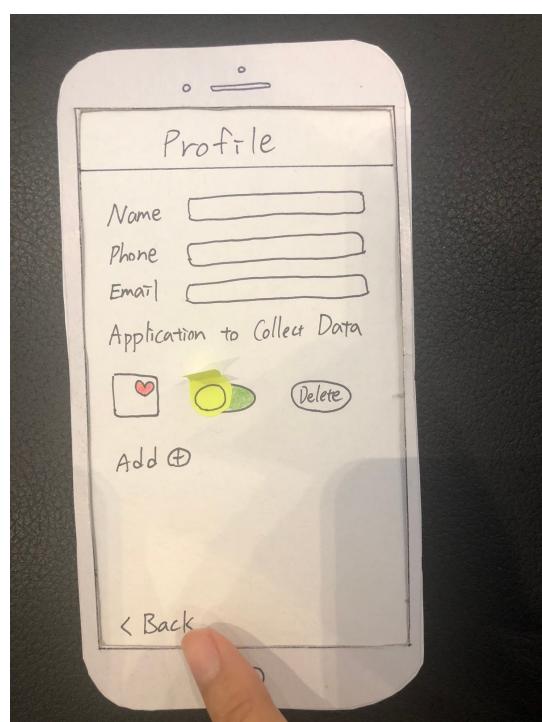


Figure 19: Go back to settings

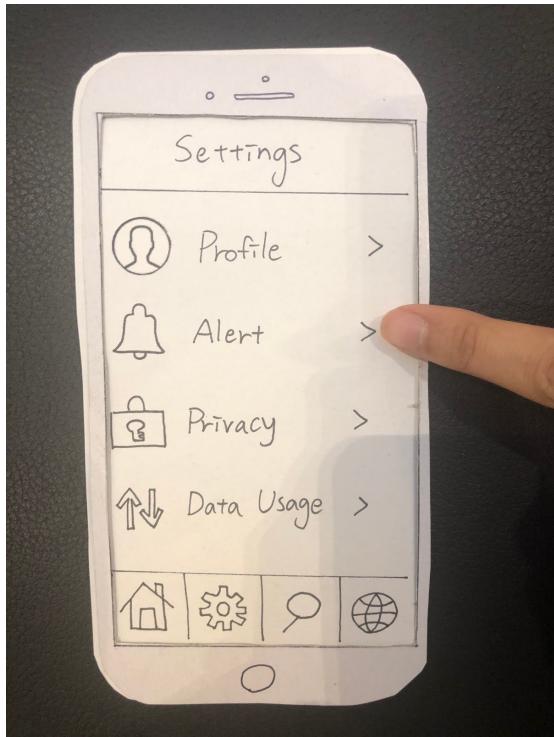


Figure 20: Select Alert in Settings

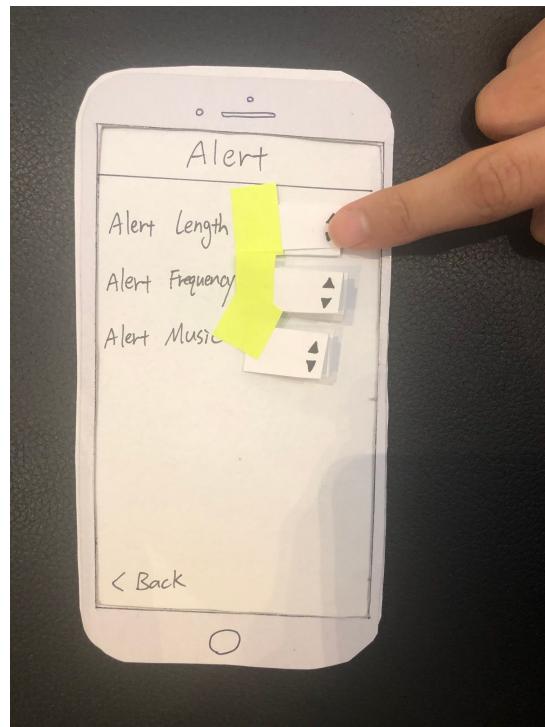


Figure 21: Adjust alert details



Figure 22: Finish setting up alert and go back to settings

Testing Process

Our testing process includes two stages: Heuristic Evaluation and Usability Testings. The following sections elaborates on the two stages.

Heuristic Evaluation

The first stage of our testing process began in class, where two heuristic evaluations were performed on our paper prototypes by other groups in the CSE 440 class. The first heuristic evaluation was performed by the team "Networking for Introverts". The second heuristic evaluation was performed by the team "Procrastination". The feedbacks help us refine the testing process and come up with the concrete structure of each step of the usability testing.

Usability Testing

We conducted a total of three usability testings at the private room at Games Area in the Husky Union Building on the University of Washington, Seattle campus. For all of the tests, Wei Liao was the Administrator, Meng Yan was the Computer, and Jason Chou was the Notetaker and Observer. Our usability tests were structured into the following points:

1. Introduction to the usability test
2. Ask participant to perform Task 1: Plan a long distance trip using our app
3. Ask participant to perform Task 2: Set Profile, preference for Drowsy Alert, and create a group
4. Ask for additional user feedback on application
5. Questions addressing any confusion of the application

Usability Test 1: Chianson

University of Washington senior Geography student. Chianson suggested that we give participants an overview of the testing process at the start of the test, thus we added an introduction to our usability test.

Usability Test 2: David

Working adult. We received feedback from David that we did not give enough time to answer the participant's questions or confusions on our prototype. Thus, we ended up including another Q&A session at the end of the usability testing to answer any lingering questions.

Usability Test 3: Gina

Working adult. Gina gave us some final few points of suggestions (e.g., give participants less help on going through tasks) and helped us finalize the refinement of our testing process.

Testing Result

Heuristic Evaluation Result

Our heuristic evaluations were helpful for us to identified several problems. One problem that we found out was that the search button was inconsistent with other buttons. Therefore, we decided to change it to "Add +" for consistency. The second problem that we found was in the privacy setting, the enable button direction was inconsistent with the iOS design language. Therefore, we fixed the button to have the same direction as Apple iOS. The third problem we found was that we need more actions to perform on the made trips. It cannot edit/view trips. Therefore, we add a pop-up menu to have buttons for "edit trip", "view trip", "start trip", and "delete trip". The fourth problem we found was that the user may not want to reselect drivers and vehicles every time. It should provide use default setting option. Therefore, we made a pop-up at the start of planning a new trip to ask whether the user wants to use default settings of drivers and vehicle. The fifth problem we found was that the name "Alert" is confusing. The user might mistakes it as some sort of notification alert instead of the drowsy alert that happens during driving. Therefore, we change the name of "Alert" to "Drowsy Alert". The sixth problem was that in the enter drivers information page, it is unclear what the "Number" is referring to. The user could be confused and enter the wrong information. Therefore, we change the description of the text-box to "Phone Number" to ensure the user understand what is going on.

Usability Testing Result

Usability Test 1: Chianson

From our first usability testing, we discover that there are some problems in the visibility of the system status (H1), the match between the system and the real world (H2), aesthetic and minimalist design (H8), and user control and freedom (H3). For the visibility of system status, we decide to fix our tab, change the icon, and move the "About" tab into settings. For the match between the system and the real world, we decide to follow the Google Maps format for showing information, seeing the distance and time between destination, and adding a new destination. For the aesthetic and minimalist design, we decide to move the option to choose and edit health data collection apps into "Privacy" and move drivers' information into "Group & Friends". For user control and freedom, we decide to fix the drivers section to have existing groups to select and have the ability to add new drivers. If added new drivers, when clicking next, there will be a pop up asking if you want to save as a new group.

Usability Test 2: David

From our second usability testing, we discover that there are some problems in Consistency and standards(H3), and match between the system and the real world(H2). For the consistency and standards, we decide to change the route map interface to match the usage of Google map, so after users input the current location and destinations, the map will show them the whole route instead of only showing the information of destinations. For the match between the system and the real world, we decide to change the setting of the profile, first, when the user clicks on the profile setting, it will show the default information of the user. The user can click on the boxes to edit and click on the Done button to save the information.

[Usability Test 3: Gina](#)

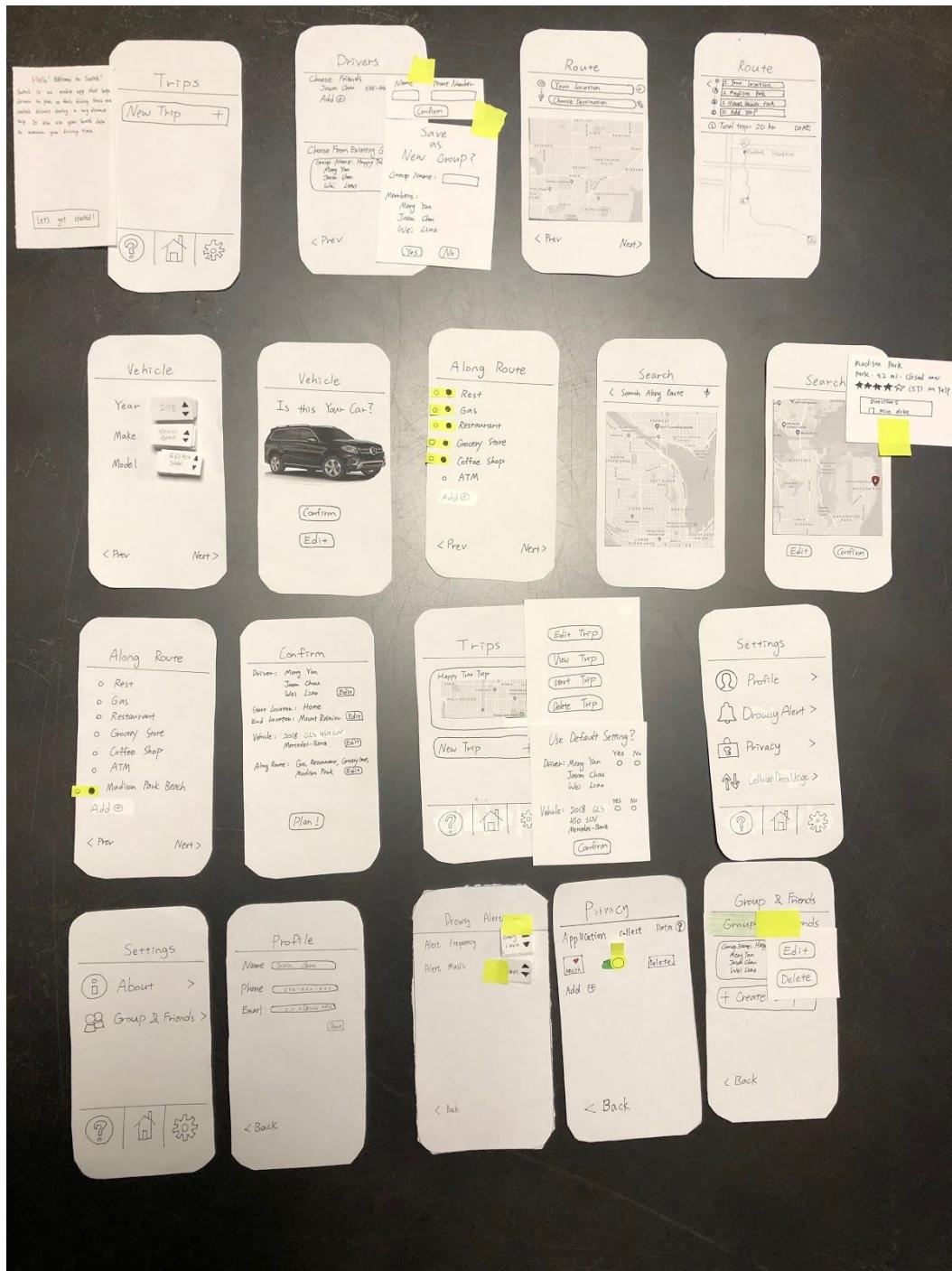
From our third usability testing, we discover that there are some problems in Match between system and the real world (H2) and Help and documentation (H10). For the Match between system and the real world (H2), we decide to eliminate the alert length and keep the alert frequency and alert sound in the drowsy alert setting. Because the user refers to the alarm clock in her phone, there is no setting on how long the alarm will sound, only how frequent you want the alarm to sound. For Help and documentation, we decide to add an explanation in privacy setting about why we will collect the health data and add introduction about this app when the user first time using it.

[Design Critique](#)

We received two TAs' feedback from our design critique. The first design issue was the user wants to know how many steps are there in our planning phase, the TA suggests us to have dots on the button that can indicate pages. Therefore, we used the TA's advice and added buttons on the button. The second issue was that on along the route page, the user wants to see more visual information. The TA suggested adding a map. Therefore, we fixed it by adding a map that suggests gas station for the user to get gas and switch drivers. We also have a search button for the users to search for other things they need along the route. The third issue was in the confirm page, the user wants to see the complete trip. Therefore, we added the map in the confirm page with all the information the user needs on top. The fourth issue was in our setting page, we have some unnecessary tabs, and TA suggests us to remove them. Therefore, we clean up our setting into one page.

Final Paper Prototype

Below is an overview of the initial prototype including all the pages of the application.



Description

The final prototype conveys the main ideas from the initial prototype (please refer to the Description of the Initial Prototype section to see more details). However, three important modifications were executed to form the final prototype.

The first significant modification focuses on the route selection page of our application. Originally, the route selection page only enables the user to select the starting location and ending location. Furthermore, the route selection page does not resemble the Google Map interface closely. After our modification, the route selection page now enables the user to choose multiple stops along their way to the destination. The interface of the route selection page also closely resembles the Google Map interface and can do all the functions that Google Map can do.

The second significant modification is to separate the original cramped profile page content into three different sections. Originally, the profile page includes personal information, health data usage, and default group and vehicle settings. After the modification, the profile page only includes personal information. Health data usage and default group or vehicle settings are individually separated into two sections.

The third significant modification is to include an introduction to our application when the user first opens it up and add other help buttons. Originally, users are left to explore and understand the application on their own. After the modification, we included an introduction message when the user opens the application for the first time. We also included help buttons next to icons and potential confusing pages or texts.

In summary, the three modifications made our application more consistent with existing mainstream applications, easier to find individual sections that correspond to unique functions, and more understandable for first-time users that have never used any similar products before.

Task 1: Plan time to drive, rest, and switch on a long distance road trip



Figure 1: Open the application.

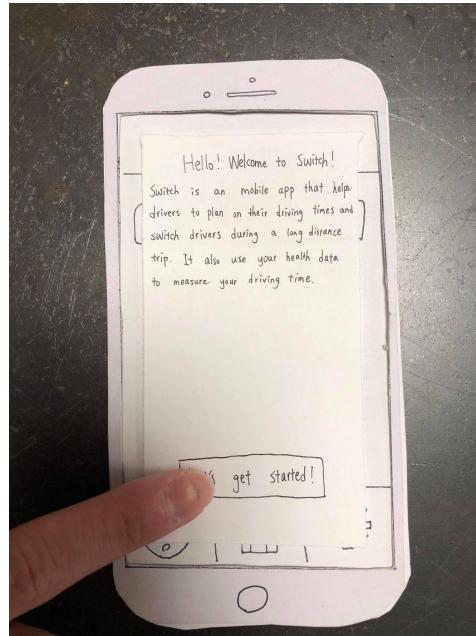


Figure 2: Read the introduction and start.



Figure 3: Create a new trip.

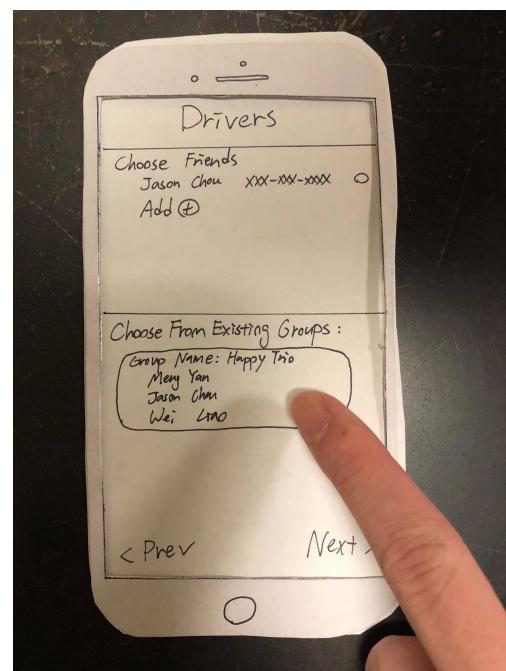


Figure 4: Select a group to travel with.

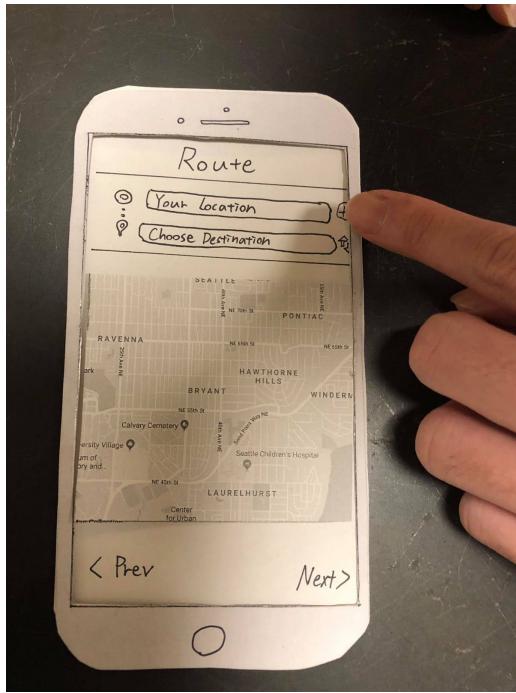


Figure 5: Select start location and add location.

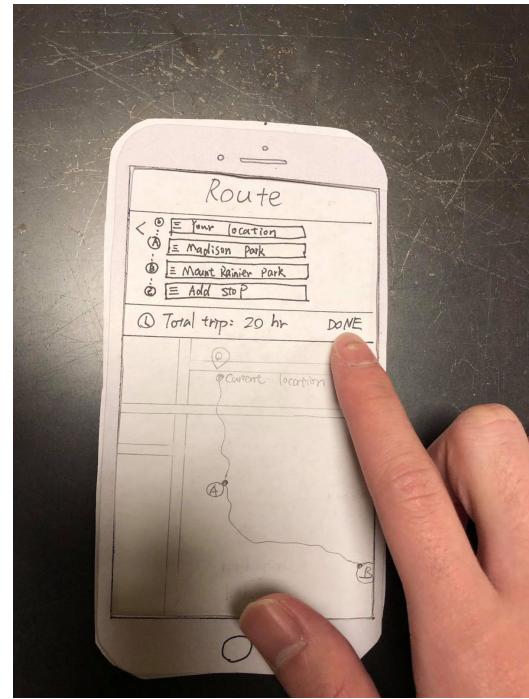


Figure 6: Finish adding the location.

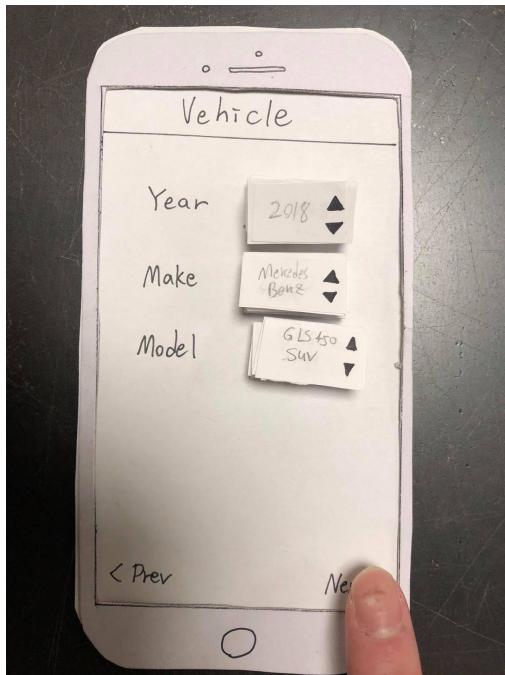
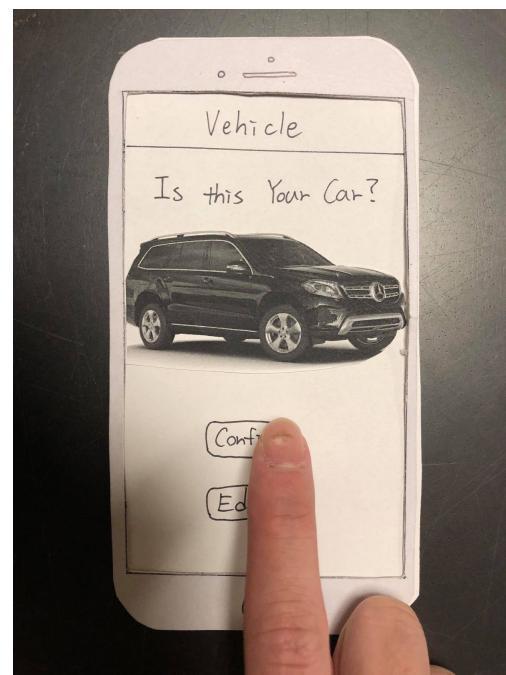


Figure 7: Select what kind of vehicle. Figure 8: Confirm the vehicle.



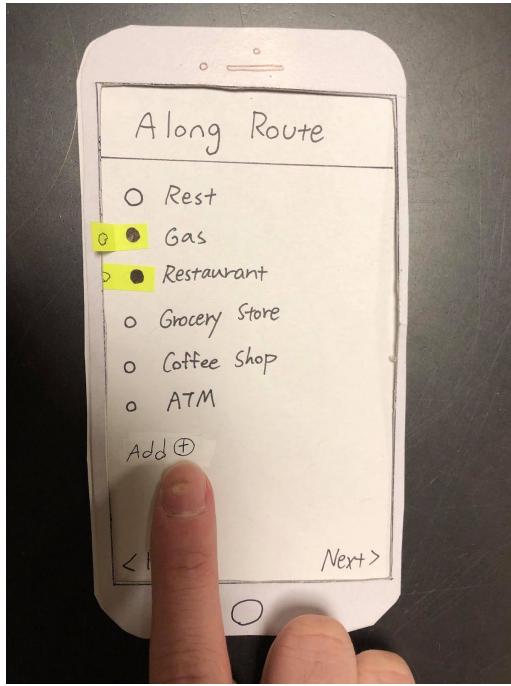


Figure 9: Select along route location.

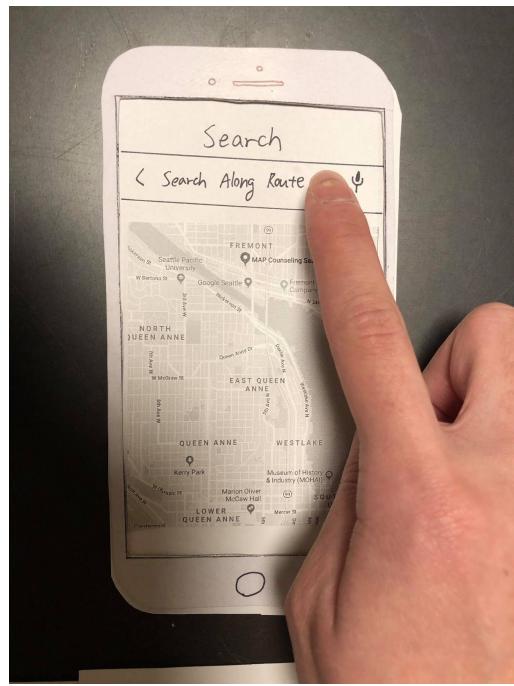


Figure 10: search for the unlisted option.

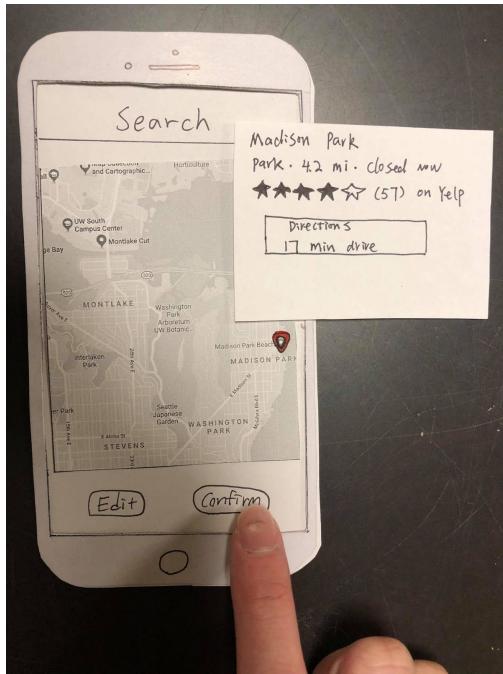
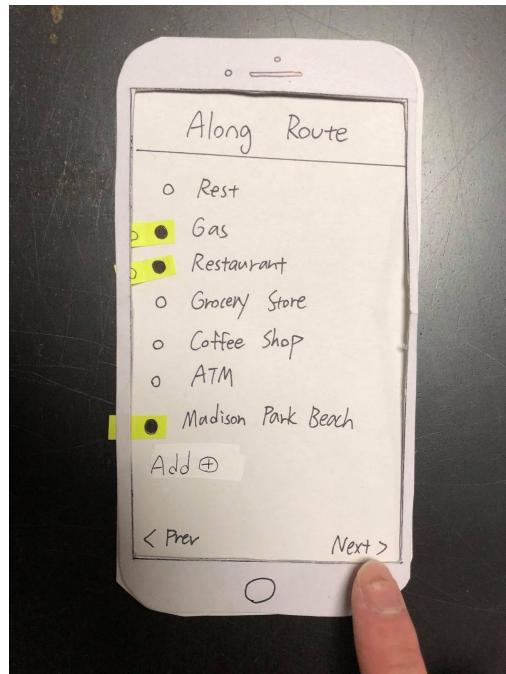


Figure 11: Confirm the location is correct. Figure 12: Proceed to the next step.



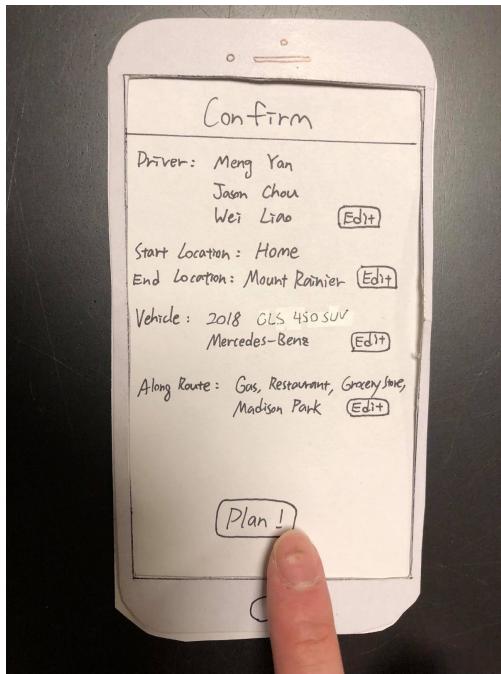


Figure 13: Confirm info and plan the trip. Figure 14: Edit/View/Start/Delete trip.

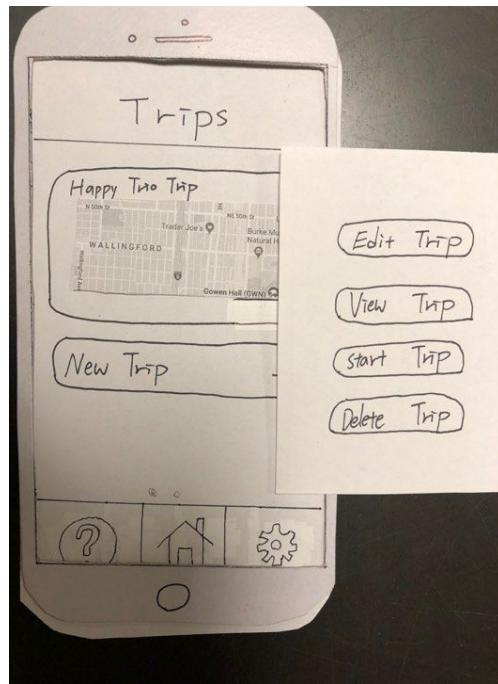


Figure 15: Tapped on the created trip to reveal options.

Task 2: Measure a person's driving limit and keep him/her alert

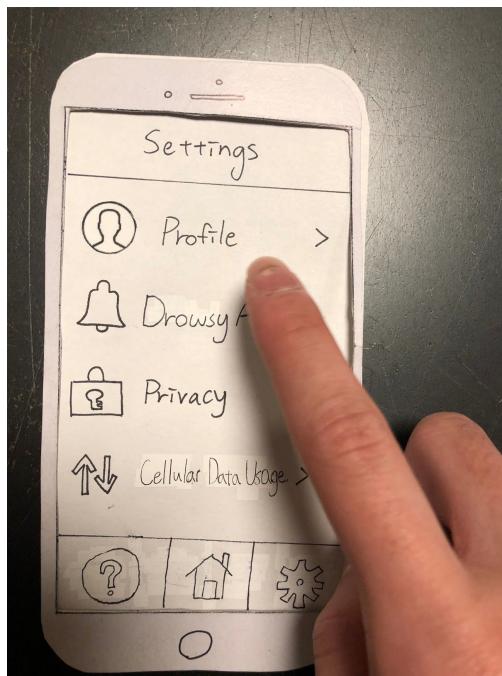


Figure 1: Go to Profile in settings.

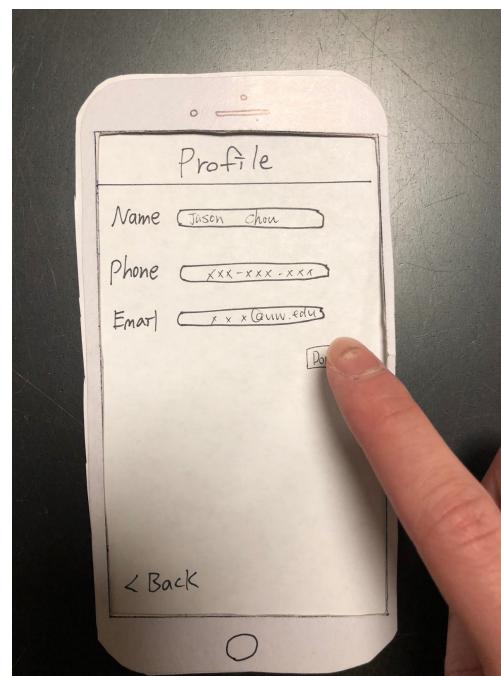


Figure 2: Change profile info and done.

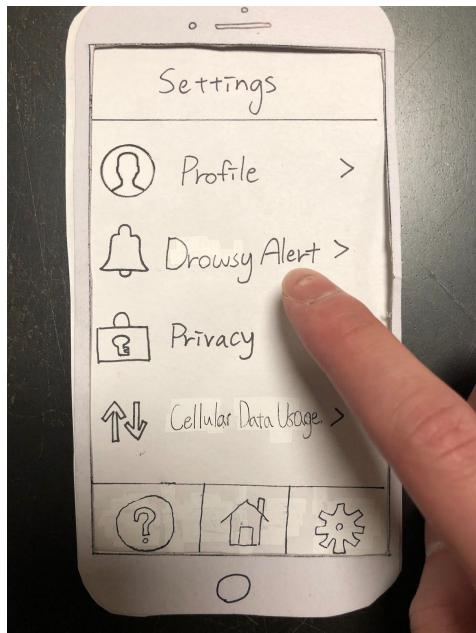


Figure 3: Go to Drowsy Alert.

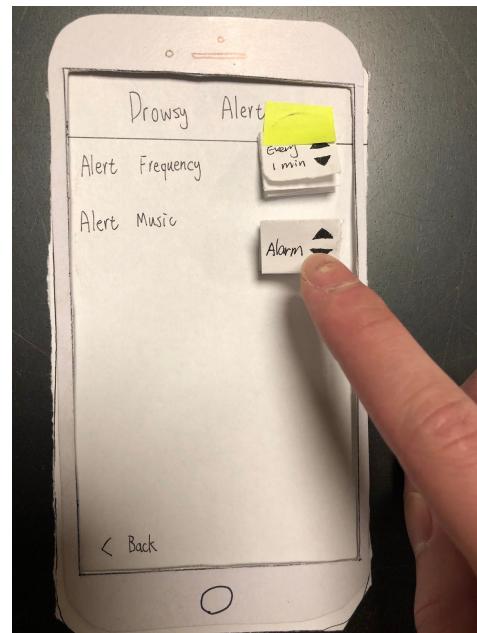


Figure 4: Set preferred frequency and music.

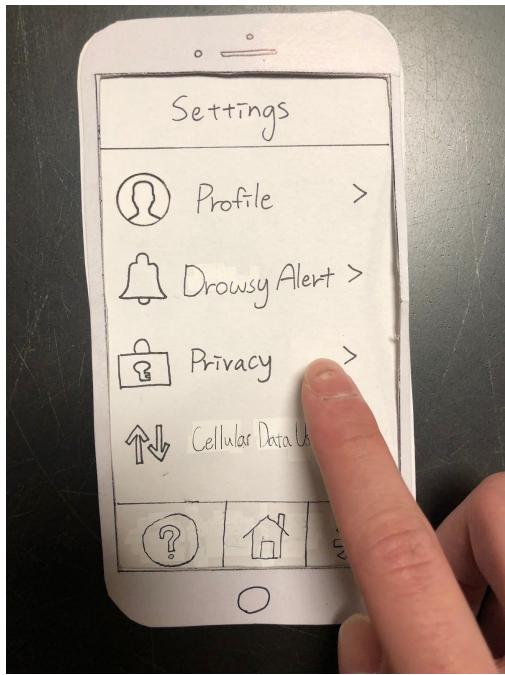


Figure 5: Go to privacy settings.

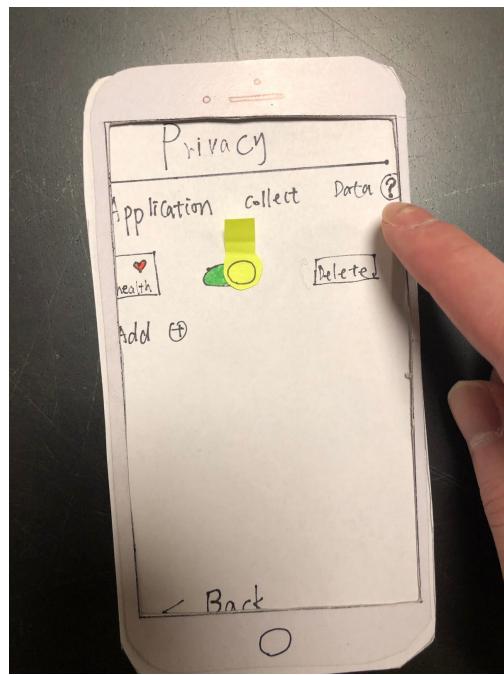


Figure 6: Ask for more info on this area.

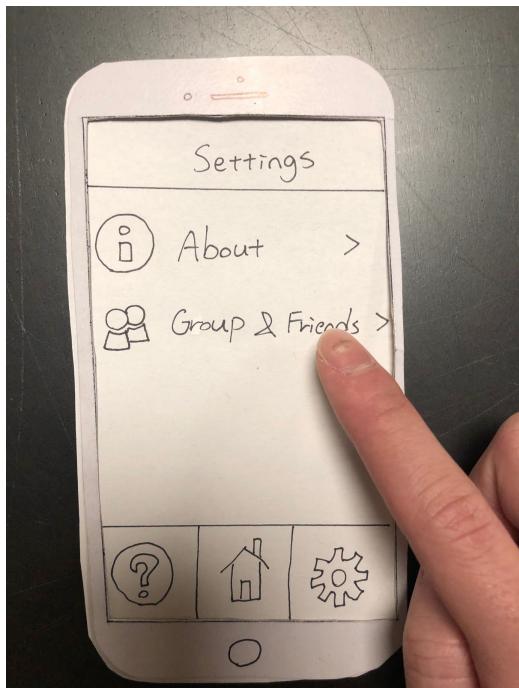


Figure 7: Go to Group & Friends.

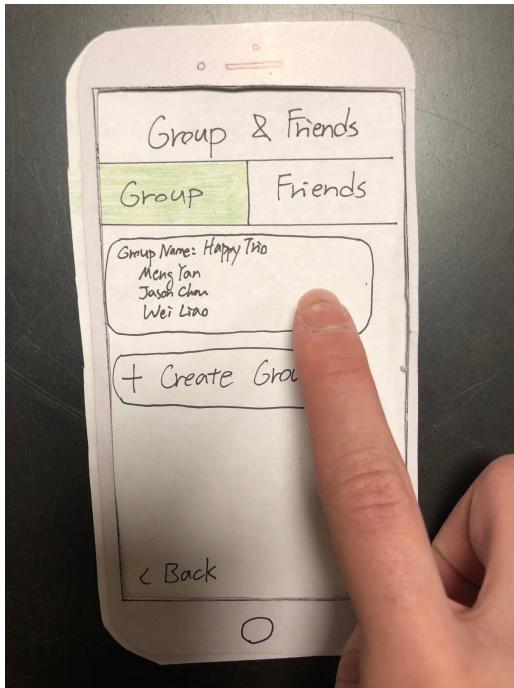


Figure 8: Tap on the .group to reveal options.

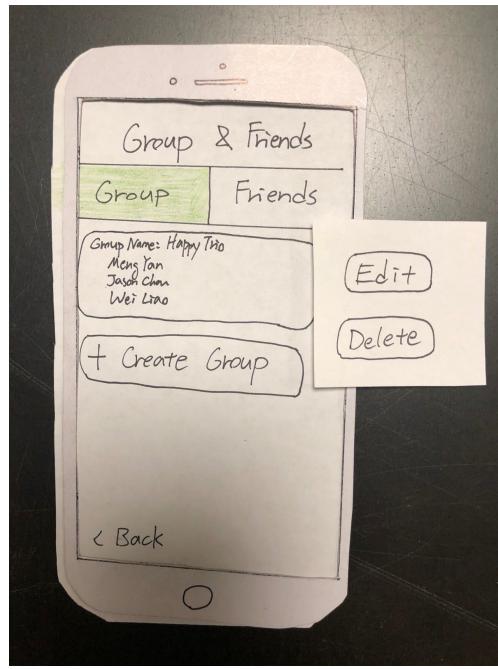
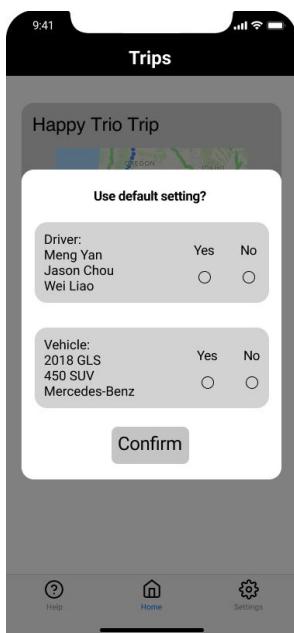
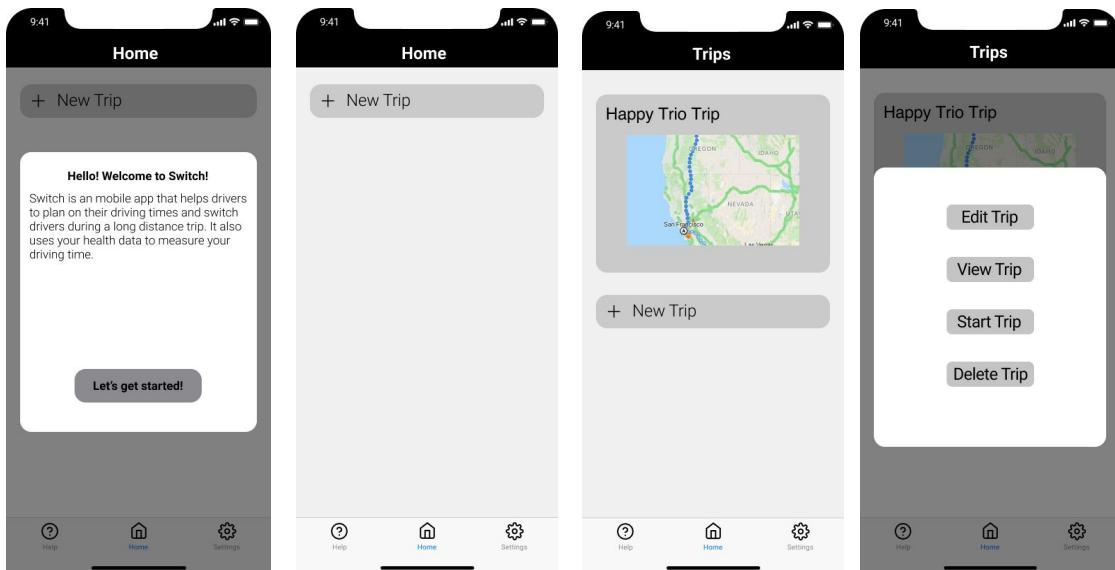


Figure 9: Edit existing group options or friends.

Digital Mockup

Switch is an application that enables users to plan for long-distance road trips and keep alert on the road. Switch uses algorithms to calculate the user's vehicle gas efficiency and the driver's personal driving limit to produce recommended stops to visit along the route and optimized alerting/switching schedule. The following images shows the three sections of the application: the main pages, trip planning pages, and settings pages.

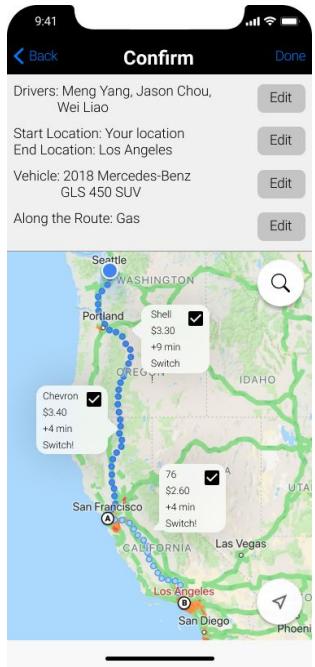
Main Pages



Trip Planning Pages

The image displays a grid of eight screenshots from a mobile application for trip planning, arranged in two rows of four. Each screenshot shows a different step in the process, with the time '9:41' and signal strength visible at the top.

- Row 1:**
 - Drivers:** Step 1 of 4. Shows 'Choose Friends:' with Jason Chou (XXX-XXX-XXXX) selected. Below it, 'Choose From Existing Groups:' lists 'Happy Trio' with members Meng Yan, Jason Chou, Wei Liao.
 - Drivers:** Step 2 of 4. Shows 'Choose Friends:' with Jason Chou (XXX-XXX-XXXX) selected. Below it, 'Choose From Existing Groups:' lists 'Happy Trio' with members Meng Yan, Jason Chou, Wei Liao.
 - Drivers:** Step 3 of 4. Shows 'Choose Friends:' with Jason Chou (XXX-XXX-XXXX) selected. A modal dialog 'Save as new group?' asks 'Group Name:' with a text input field, 'Members:' list with Meng Yan, Jason Chou, Wei Liao, and 'Yes'/'No' buttons.
 - Route:** Step 4 of 4. Shows a map of Seattle with a route highlighted. Destinations include 'School of Law', 'American Grill', 'Parrington Lawn', 'Odegaard Undergrad Library (OUG)', 'Suzzallo and Allen Libraries', and 'UW Farm'. The map includes street names like NE 42nd St, 15th Ave NE, Brooklyn Ave, University Way, and 75th Ave NE.
- Row 2:**
 - Route:** Step 1 of 4. Shows a map of a West Coast route from Seattle to Los Angeles, passing through Washington, Oregon, California, and Nevada. It highlights stops in Seattle, Portland, San Francisco, Los Angeles, and Las Vegas. Total trip time is 19 hr 45 min.
 - Vehicle:** Step 2 of 4. Shows 'Search Your Vehicle:' fields for Year (2018), Make (Mercedes-Benz), and Model (GLS 450 SUV). A 'Search' button is present.
 - Vehicle:** Step 3 of 4. Shows 'Search Your Vehicle:' fields for Year (2018), Make (Mercedes-Benz), and Model (GLS 450 SUV). A modal dialog 'Is this your car?' displays a black Mercedes-Benz GLS 450 SUV with 'Confirm' and 'Edit' buttons.
 - Along the Route:** Step 4 of 4. Shows the same map as the first vehicle screenshot, but with gas station information overlaid. It lists stops at Shell (\$3.30), Chevron (\$3.40), and 76 (\$2.60), each with a 'Switch!' button. Total trip time is 20 hr 2 min.



Settings Pages

The image displays five screenshots of a mobile application's settings interface, arranged in two rows. The top row contains four screenshots: 'Setting', 'Profile', 'Profile' (with edit mode), and 'Privacy'. The bottom row contains two screenshots: 'Drowsy Alert' and 'Group & Friends'.

Setting Page: Shows a list of settings categories: Profile, Drowsy Alert, Privacy, and Group & Friend. Each category has a corresponding icon and a right-pointing arrow indicating it can be selected.

Profile Page: Shows profile details for Jason Chou. Fields include Name (Jason Chou), Phone (XXX-XXX-XXXX), and Email (xxx@uw.edu). There is also an 'Edit' button at the top right and a 'Done' button at the top center.

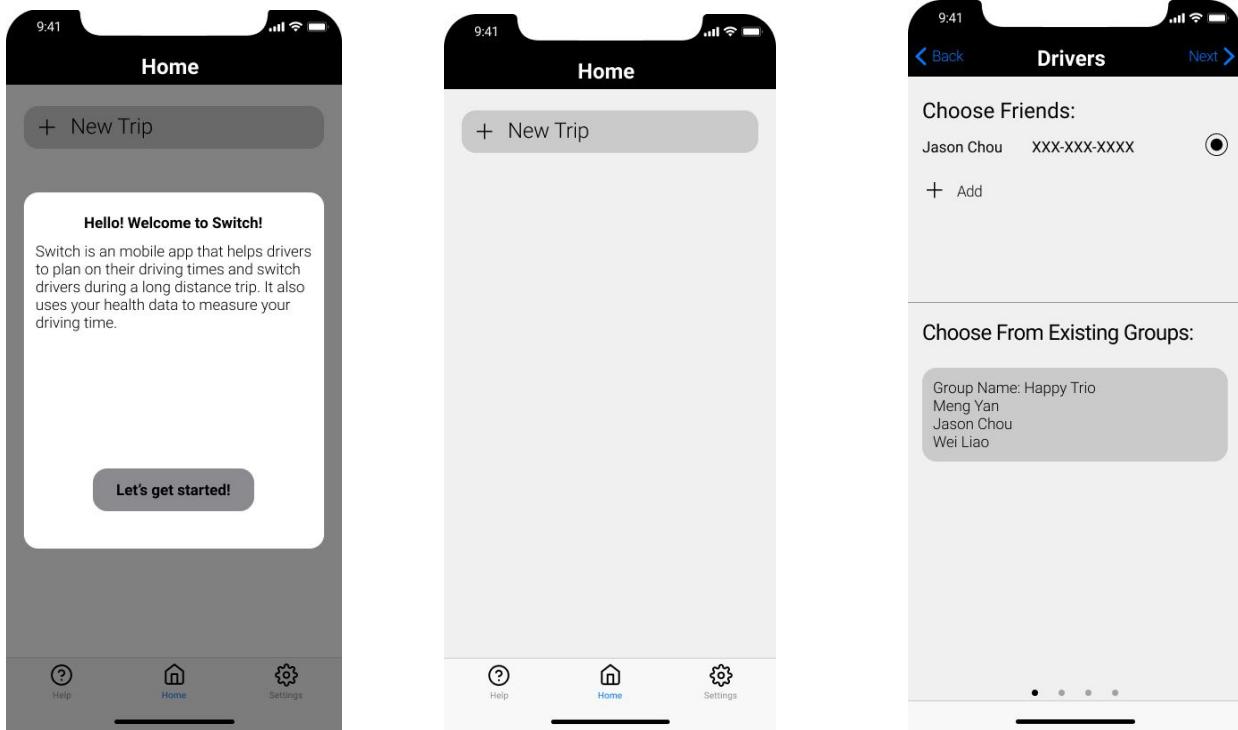
Profile (Edit) Page: Similar to the Profile page, but the Name field is currently active (highlighted).

Privacy Page: Shows application data collection settings. It lists 'Health' with a toggle switch set to 'On'. A '+ Add' button is available for adding more data sources. A note at the top states: "Application collect data: ?".

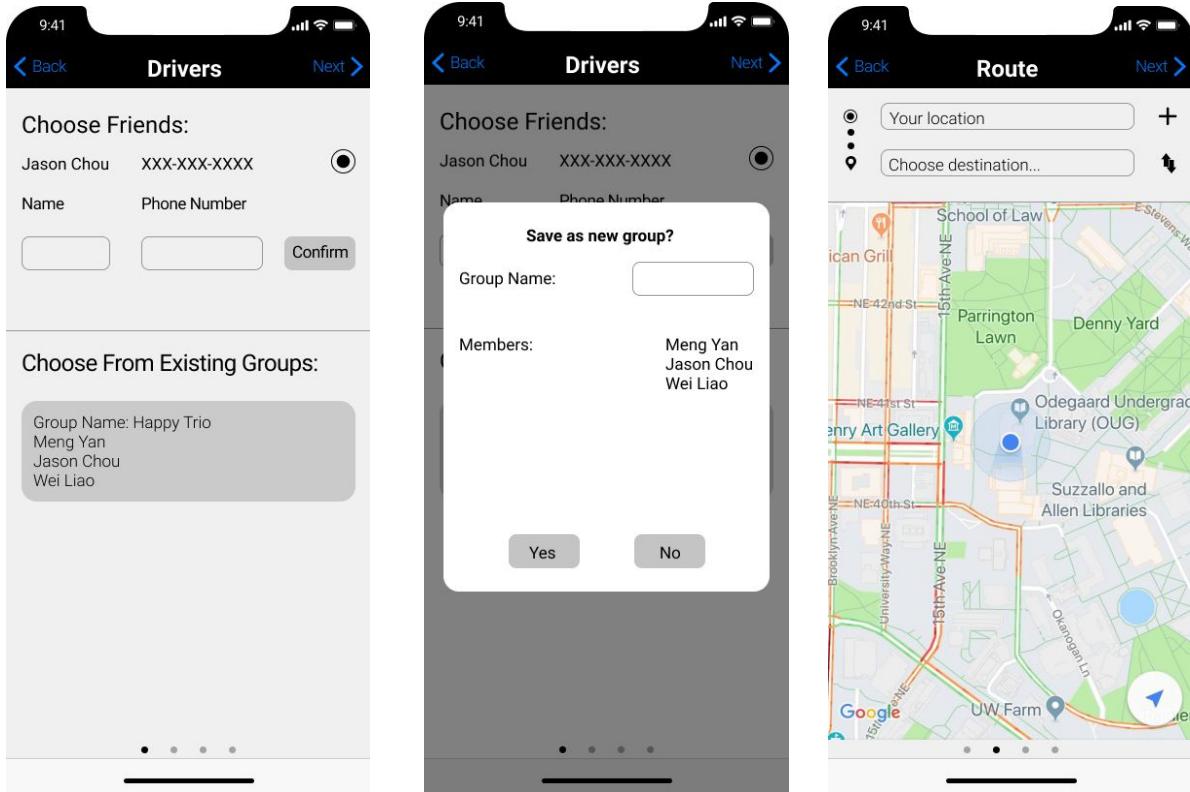
Drowsy Alert Page: Shows settings for drowsy alerts. 'Alert Frequency' is set to 'Every 1 min' and 'Alert Sound' is set to 'Radar'. Both have dropdown arrows indicating they are selectable.

Group & Friends Page: Shows group management. It lists a group named 'Happy Trio' with members Meng Yan, Jason Chou, and Wei Liao. A 'Create Group' button is also present.

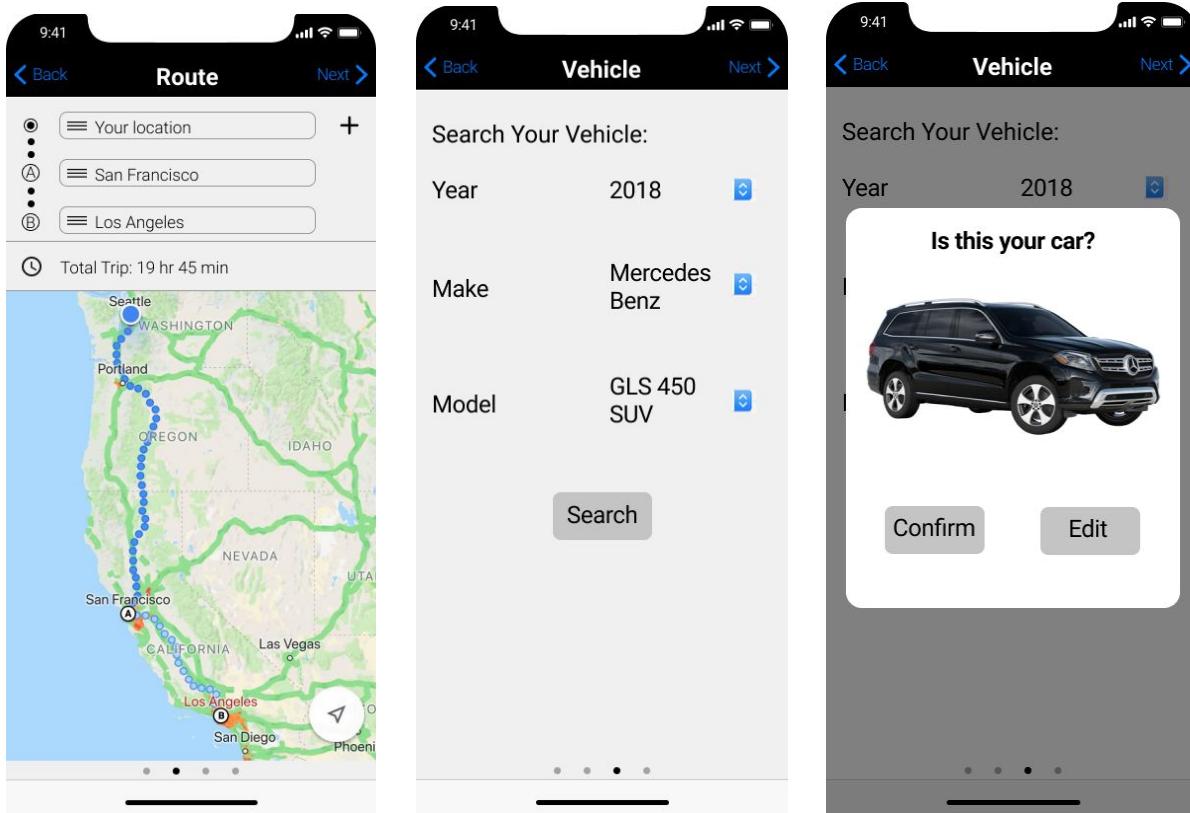
Task 1: Plan time to drive, rest, and switch on a long distance road trip



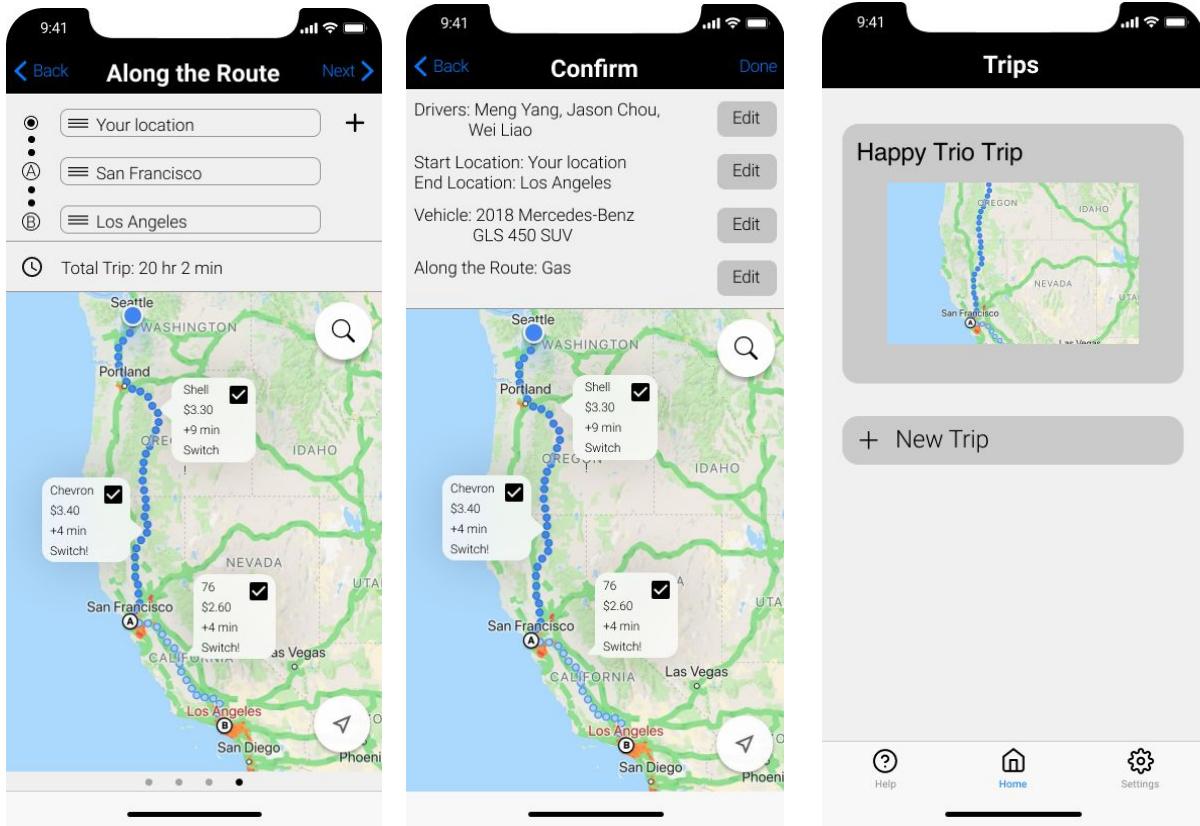
When the user opens the Switch application, a welcome message is shown to the user along with useful information of Switch. Once the user clicks on the "Let's get started!" button, the user is taken to the main page of Switch where the user can click on "New Trip" to start a new plan. The first stage of making a new plan is to select the drivers that will be participating in the trip. The user can choose from existing groups or add a new selection of friends.



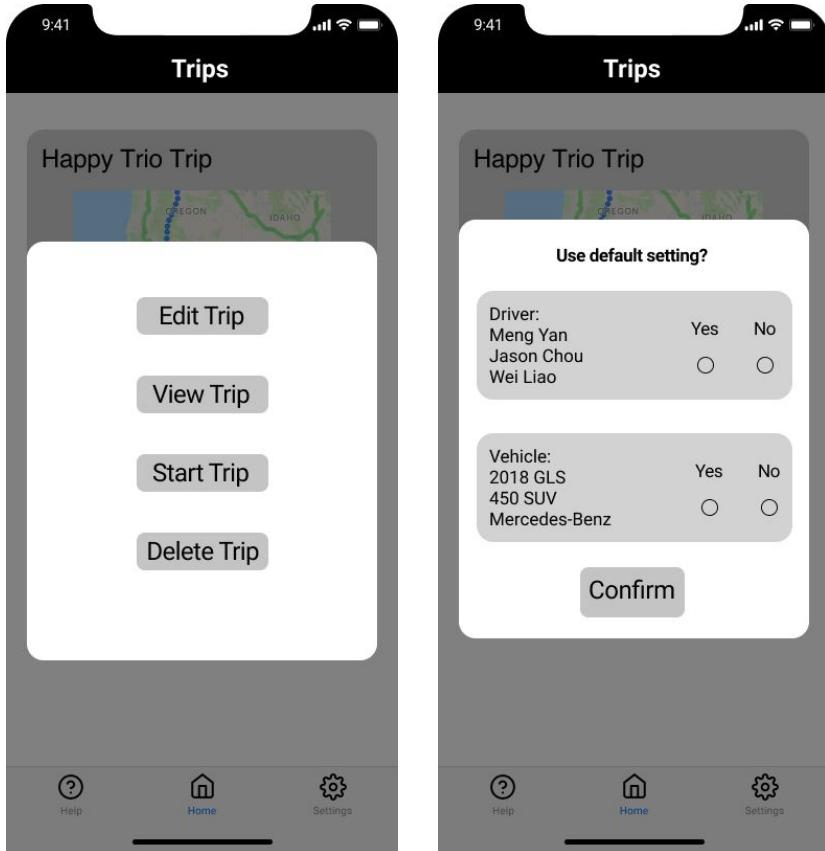
If the user chooses to add a new selection of friends, the system will ask the user if whether the user would like to save the new selections of friends as a new group or not. If the new group is saved, the user will be able to select that new group next time when the user is planning for a trip. The next step is to select the starting and ending location of the trip. The interface is designed so that it resembles the popular application Google Map closely. The consistency with the popular application should help users use our application much easier.



In addition to the starting and ending location, the user can also add additional stops to visit along the way. After the user is done with route selection, the system asks the user to select the vehicle. The information of the vehicle is required to use our application due to that our application is able to calculate how far the user can drive before needing to visit a gas station and recommend nearest gas stations along the route. Once the user finish putting in the various fields required to search for the car, the system presents the best fit result and the user can either confirm the result or go back to edit it.

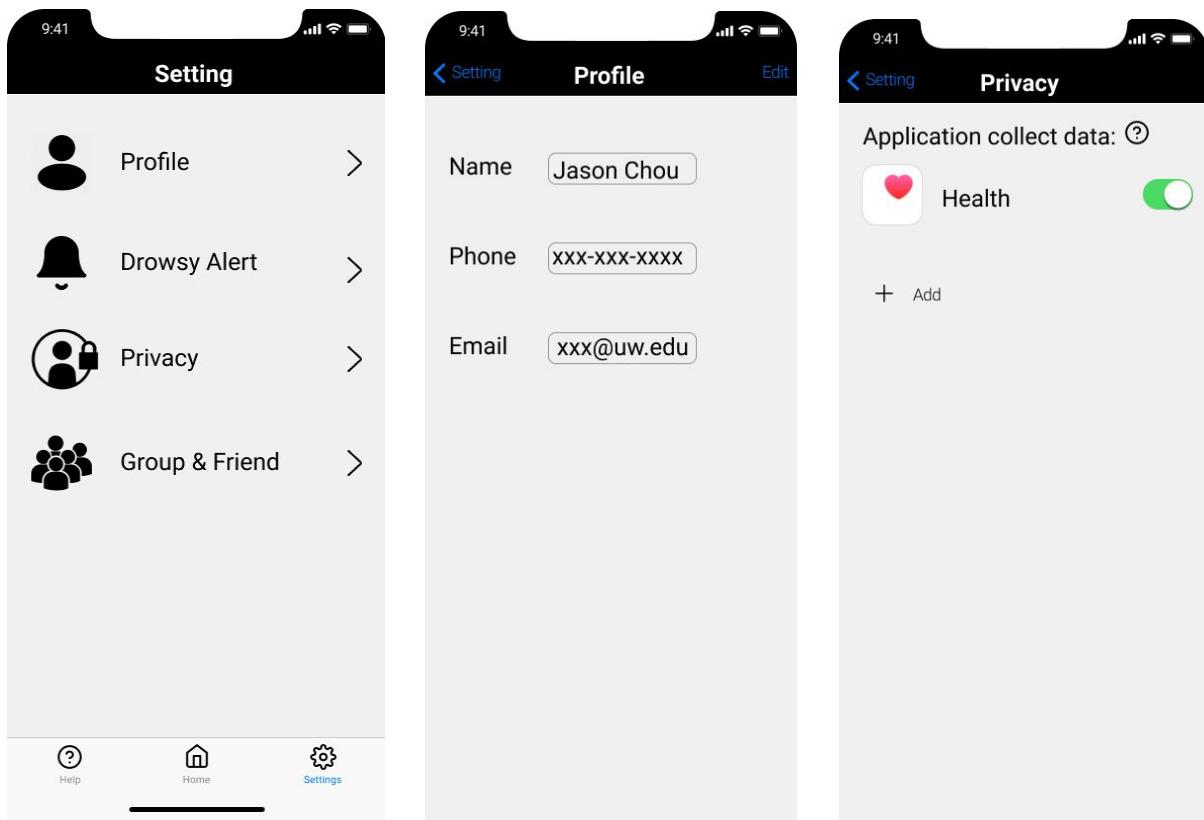


The next step is for the user to choose the general necessary stops along the route. Gas stops is one option that the system will ask the user to choose in all situations. The shown gas stops along the route are recommended gas stops that are calculated by our system's algorithm. The system algorithm takes into account when the user's vehicle will need gas, how close the gas stop is to the route, and different price ranges of gas. To search for more options such as restaurants, coffee shops, groceries stores...etc. the user can click on the magnifying glass on the upper right hand corner to find desired stops. The system will then again calculate the best-fit options and provide users several options to choose from. Once the user is done with the planning, the system will ask the user to confirm the information and officially create the trip plan.

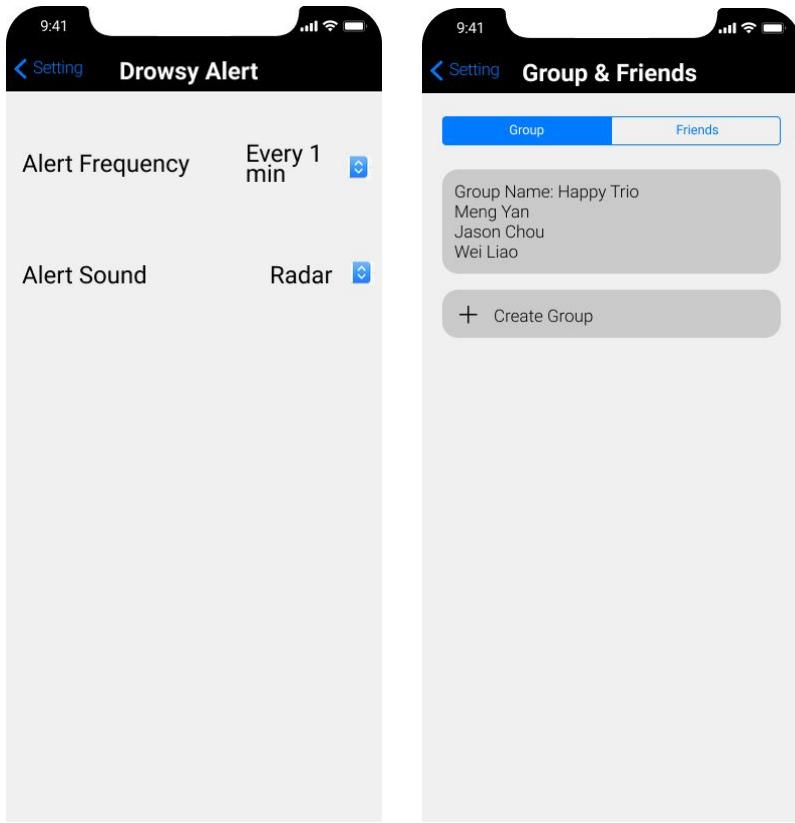


Once the user is done with the trip, the user can click on the trip to reveal possible actions to do to the trip (edit/view/start/delete). Furthermore, when the user creates a new trip next time, the system will have remembered the user's default settings (can be changed in settings) and ask if the user would like to use the default settings so that the user can skip those steps in the planning stages.

Task 2: Measure a person's driving limit and keep him/her alert



The Settings page of the application gives user flexibility to change the profile settings, drowsy alert settings, privacy settings, and group and friends settings. The profile settings enable the user to change the name, phone, and email of the user. The privacy settings enable the user to change different apps to send health data to Switch and also control which application Switch can have access to.



The drowsy alert settings enable the user to set the frequency of the alert and change the sound of the alert. Last but not least, the Group & Friends settings allow the user to add/delete friends and add/edit/delete existing groups.

Changes Made From Paper Prototype to Digital Prototype

The main changes that we executed going from paper prototype to digital prototype are on color, fonts, and consistency issues with current popular platforms and applications. We decided to use black and white as our main color in order to give the application a more professional feeling and ensure that the colors are easy on the eyes. The black and white background also helps other important colored parts of the application to stand out more (for example, the map and the health application icon). As for the font, we chose the easy-to-read Calibri to create a better experience for general users. Last but not least, we tried to mimic the looks and functionality of general iOS applications and the Google Map application to create a familiar environment for the user to navigate. The changes creates more refined details and aim to improve upon our design.

Changes Made From Design Critiques

Three changes are executed based on the design critiques we received from the TAs/. The changes are all aimed to make the product more complete and give user a better experience when using our application.

The first modification we made is on the along the route page. In our paper prototype, the design does not show the user that an algorithm is involved to give out optimized recommendation based on the user's car efficiency and each participating drivers' personal driving limit. Thus, in the digital mockup we changed the page to resemble a Google Map page with the user's route shown on the map and the recommended gas stops shown beside the route. The user can search for additional stops using the magnifying glass icon. The system will then use algorithm to compute the best options based on the available information and add the options to the map page for the user to select.

The second modification we made is to include the four little dots on the bottom of each planning page. The four dots show the user how many steps they have to perform in total and which step they are currently at. There are four steps to complete in the planning stage: 1) Select Drivers 2) Select Vehicle 3) Select Route 4) Select Along the Route Stops, which corresponds to the four light grey dots. The dot that the user is currently on is in dark grey. The dark grey dot moves from the left to the right until all steps are completed.

The third modification we made is to produce visualized trip details. In the paper prototype, our confirm page is a list of text. However, the text information is not very user-friendly. Thus, in the digital mockup we transformed the text information to visual information. The overall route is shown as a blue trial on the map, the along-the-route stops are shown as white boxes with detailed information next to the route, and the drivers and vehicle information is shown in text format at the top of the page.

Discussion

What did you learn from the process of iterative design?

We learned two important lessons through the process of iterative design: 1) There is always room for improvement and 2) What makes sense to you may not make sense to other people. We have gained an understanding that no matter how good you think you have made your design, there is always much room for improvement after a set of fresh eyes have looked over it. Thus, it is important to use low fidelity prototypes so that we may have a chance to dramatically modify our design multiple times. We have also learned that people have different ways of interacting with their environment and it is really important to understand how the user actually sees the program instead of how the designer thinks that it works. If the user does not understand what is going on, it does not matter how much it makes sense to you, the design must be improved upon.

How did the process shape your final design?

The process of iterative design had a significant impact on the way we present the application to the user. In the beginning, most information are presented in text and there are not many visual cues and familiar interacting environments. As we went through the design iterations, we started to transform the information into visual representations and try to make the interface look more like familiar popular applications such as Google Map. The iterative process really helped us make our application much more user-friendly than before.

How have your tasks changed as a result of your usability tests?

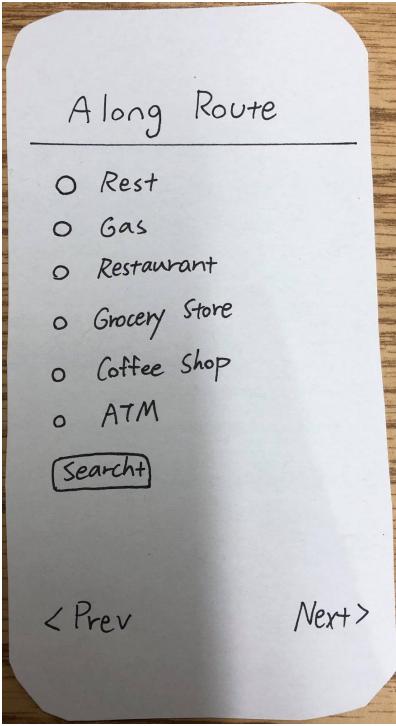
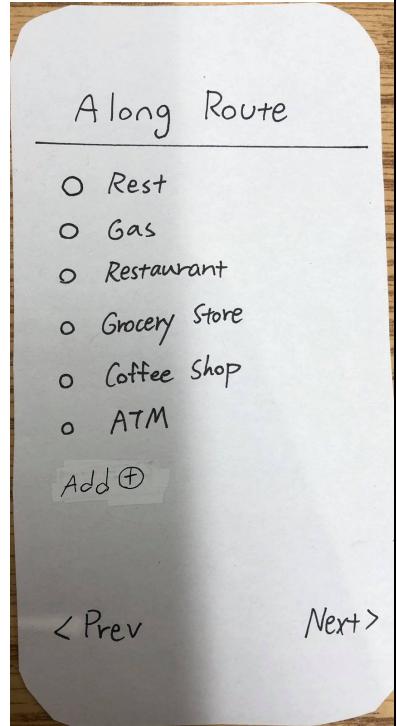
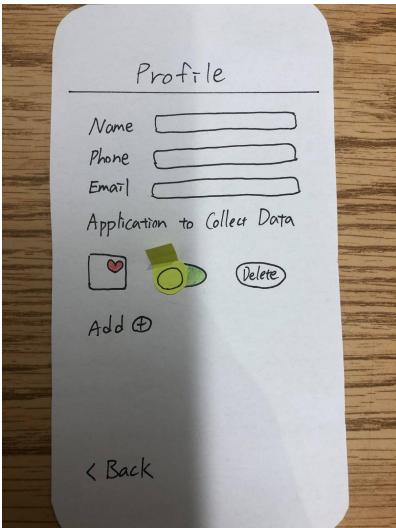
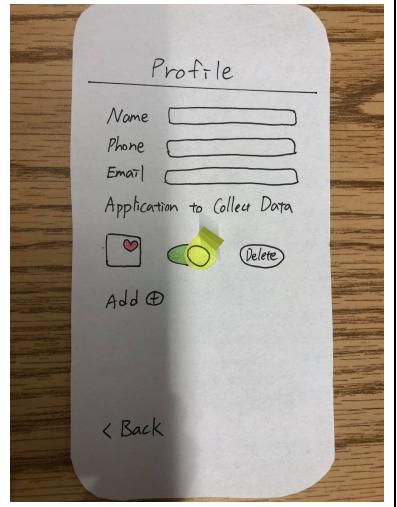
We have not changed our tasks throughout our usability tests. This is mainly due to that our prototype follows very closely the two tasks that our design aims to tackle. Furthermore, the tasks that we ask the participants to perform are also the two tasks that our design aims to achieve.

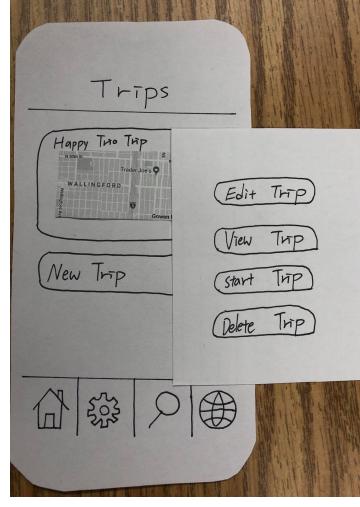
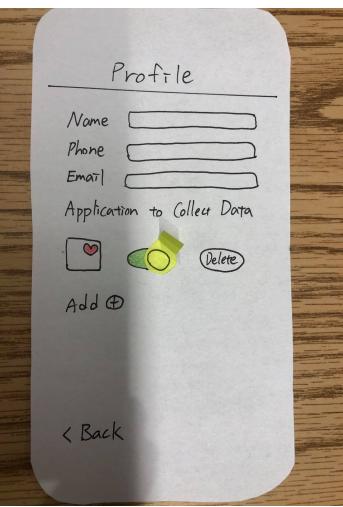
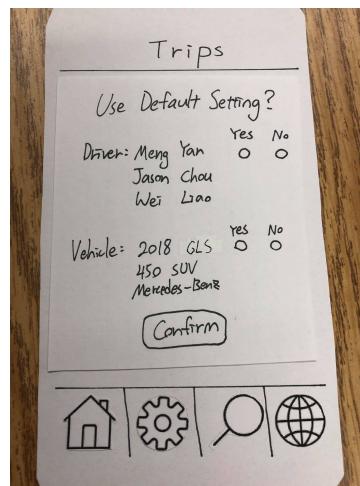
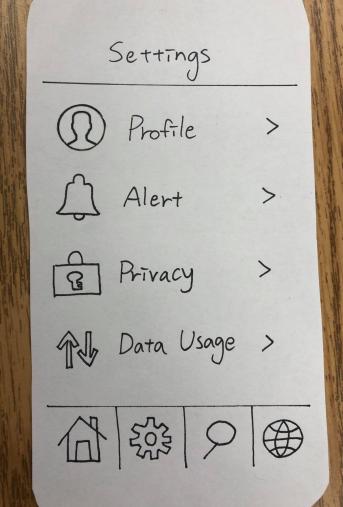
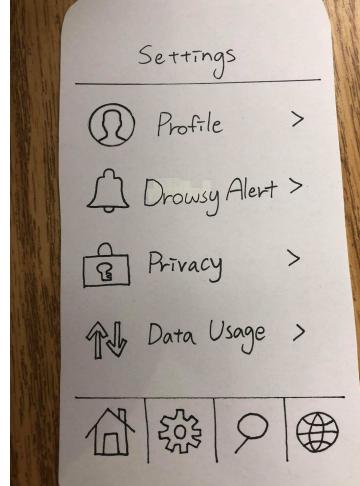
Do you think you could have used more, or fewer, iterations upon your design?

We believe more iterations upon the design would have been more helpful if there were enough time and resource. We had to move on the usability testing after only two heuristic evaluations and we believe that there were still many things we could improve on at that point. Specifically, we discovered that there were still many confusions on how to use our application (for example, why does the application need the user's health data?) and issue with consistency (for example, our route page should look more like Google Map and have similar functionality) when we started our usability testing. If we have had more iterations upon our design, we may be able to remove these problems early on and discover more in-depth and significant feedbacks on our design.

Appendix

Heuristic Evaluation Result:

Image	Issue	Heuristic and Severity	Revision	Revised Image
	The "Search +" button is inconsistent with the previous buttons that add items (all the previous ones say "Add +")	Violated Heuristic: Consistency and Standards Severity: Level 3	Change the "Search +" button to "Add +" to be consistent	
	Enable button direction is inconsistent with the current Apple iOS direction	Violated Heuristic: Consistency and Standards Severity: Level 1	Fixed the enable button to have the same directions as the current Apple iOS direction	

	<p>Need more actions to perform on the made trips. Currently cannot edit/view trips.</p>	<p>Violated Heuristic: Flexibility and efficiency of use Severity: Level 4</p>	<p>Added pop-up menu. When click on the made trip the pop-up menu will appear with options such as "edit trip", "view trip", "start trip", and "delete trip"</p>	
	<p>User may not want to reselect drivers and vehicles everytime. Should provide use default setting option.</p>	<p>Violated Heuristic: Flexibility and efficiency of use Severity: Level 4</p>	<p>Made pop-up at start of planning new trip to ask whether user want to use default settings. Also added option to select drivers and vehicles in Profile tab.</p>	
	<p>The name "Alert" is confusing. User might mistaken it as some sort of notification alert instead of the drowsy alert that happens during driving.</p>	<p>Violated Heuristic: Help and Documentation Severity: Level 1</p>	<p>Changed the name of "Alert" to "Drowsy Alert".</p>	

Alert

Alert Length: 1 min

Alert Frequency: Every 1 min

Alert Music: Alarm

< Back

Drowsy Alert

Alert Length: 1 min

Alert Frequency: Every 1 min

Alert Music: Alarm

< Back

Drivers

Name Number

Add

< Prev

Next >

It is unclear in this step what the "Number" is referring to. User could be confused and enter the wrong information.

Violated Heuristic:
Match between system and the real world

Severity: Level 4

Changed the description of the text-box to "Phone Number" to ensure user understand what is going on.

Drivers

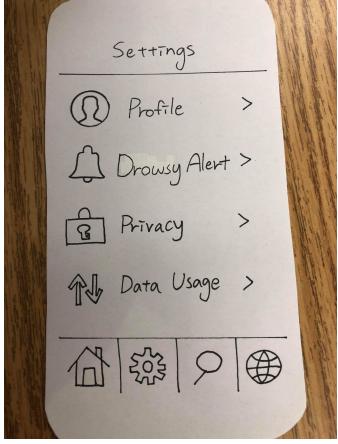
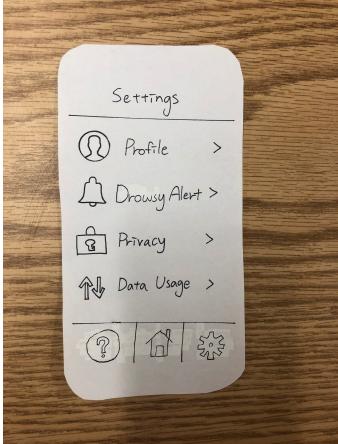
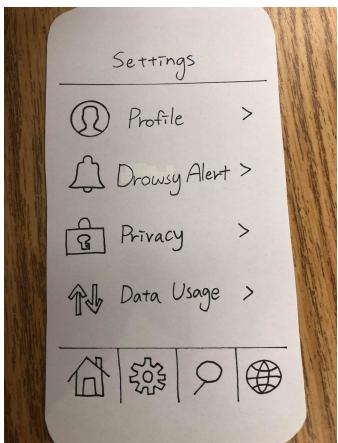
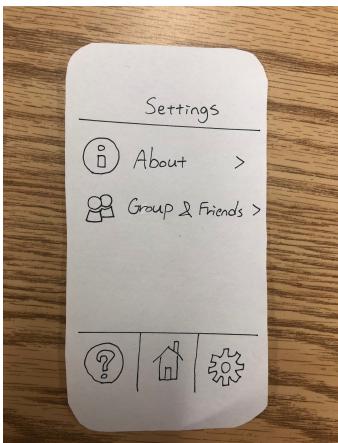
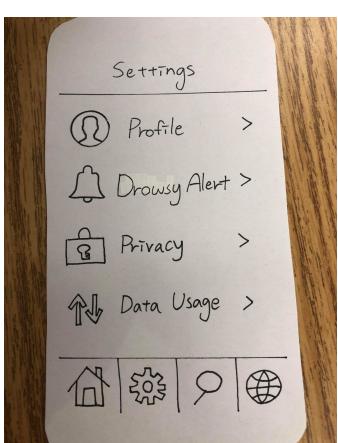
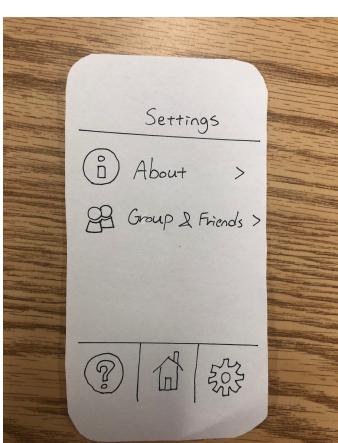
Name Phone Number

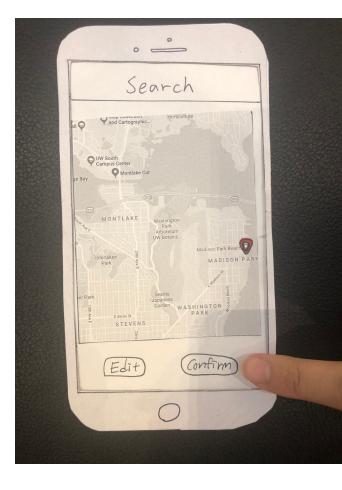
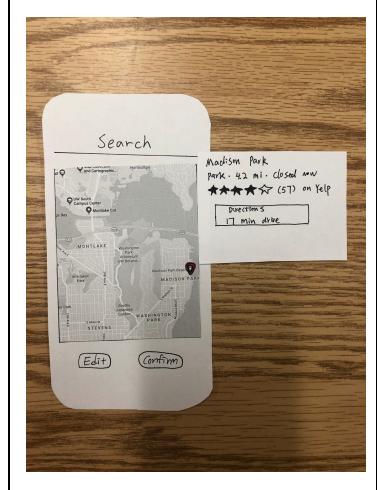
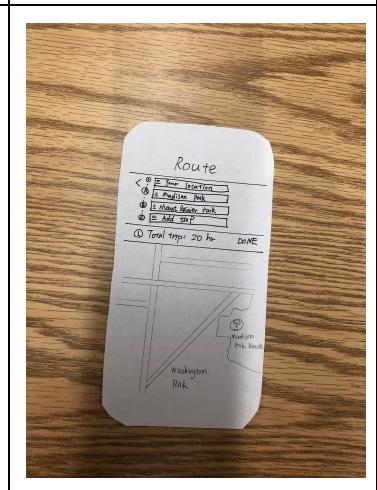
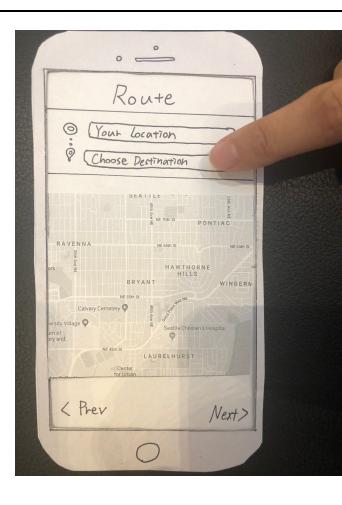
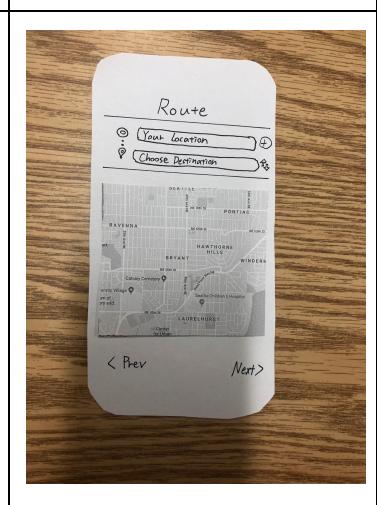
Add

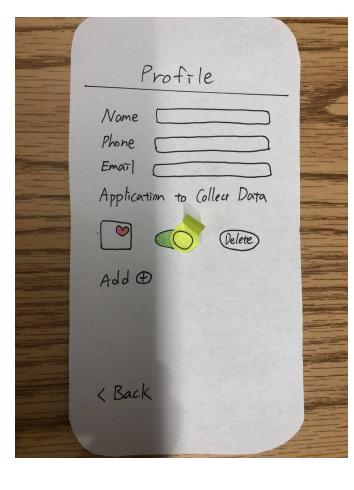
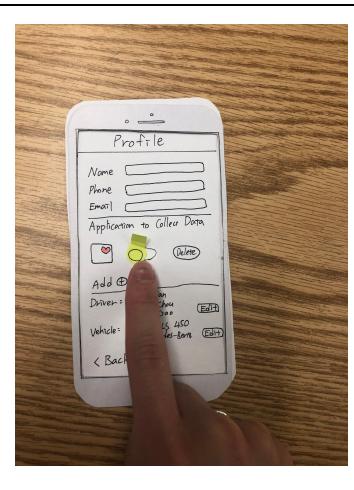
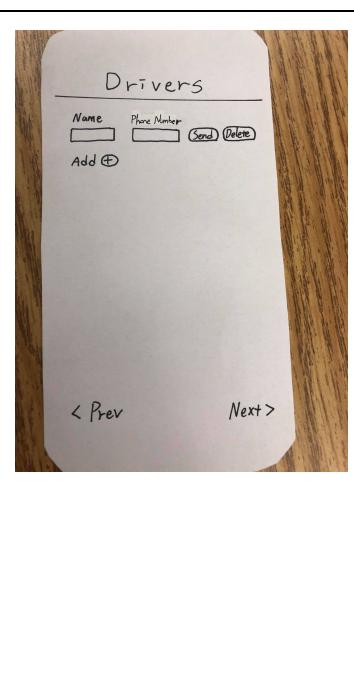
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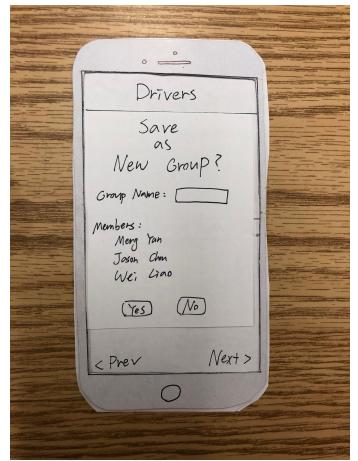
Next >

Usability Test 1 Result:

Image	Issue	Heuristic and Severity	Revision	Revised Image
	Do not know which icon is the help tab	H1 - Visibility of system status / Severity - 1	Giant question mark	
	Do not know which icon is about tab	H1 - Visibility of system status / Severity - 1	Giant i	
	About does not fit in the button tab	H1 - Visibility of system status / Severity - 1	Move the about into setting	

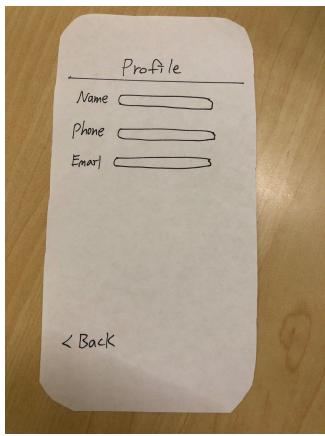
	<p>Tab the location again to make sure it is the right place</p>	<p>H2 - Match between system and the real world / Severity - 1</p>	<p>Pop up like a google map</p>	
	<p>When planning the route, I want to see the distance and drive time</p>	<p>H2 - Match between system and the real world / Severity - 1</p>	<p>Show how much time and distance. When multiple destinations, I want to see the distance and hour for each destination.</p>	
	<p>When planning the route, I want to add more destinations.</p>	<p>H2 - Match between system and the real world / Severity - 1</p>	<p>Add addition stop/destination</p>	

	<p>The application that collects data does not seem to fit in the profile section</p>	<p>H8 - Aesthetic and minimalist design / Severity - 1</p>	<p>Put the application that collects data into privacy.</p>
	<p>I don't know if the drivers' information fit in the profile section.</p>	<p>H8 - Aesthetic and minimalist design / Severity - 1</p>	<p>Put it in a group or friends tab. Default trip setting.</p>
	<p>When setting up drivers I want to be able to select the existing group or add new people into a group.</p>	<p>H3 - User control and freedom / Severity - 2</p>	<p>Fix the drivers section. Have existing groups. When selecting the existing group, automatically jump into the confirm vehicle page. If add new drivers, when clicking next, pop up asking if you want to save as a new group.</p>



Usability Test 2 Result:

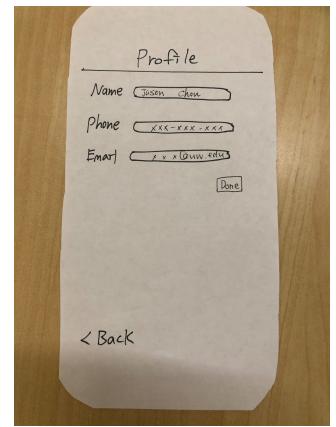
Image	Issue	Severity	Revision	Revised Image
	I do not know the usage of Add + When I click on Add I do not know if that adds a friend or add the existing one to a group	Severity -1	This is not a common issue among all testers. The most testers think this is intuitive when they see add, they know it is used to add friends	
	There are multiple destinations, I want to see the whole route from my location to destination A and B.	Severity- 1	Fix the map interface to contain all locations in the route	



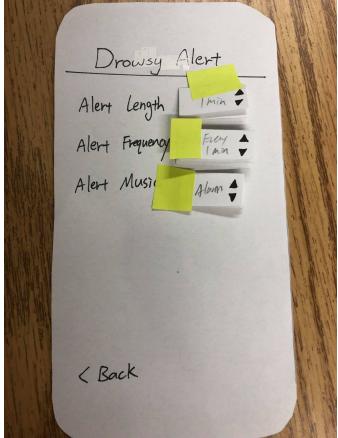
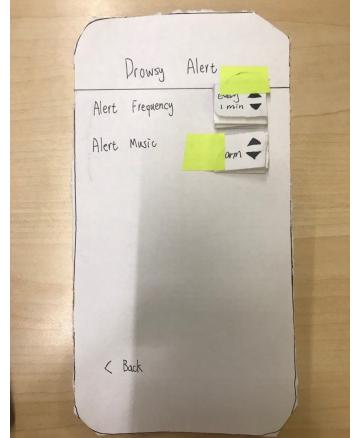
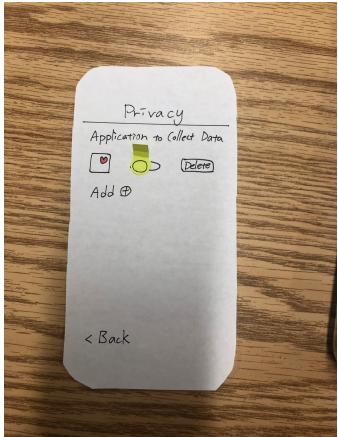
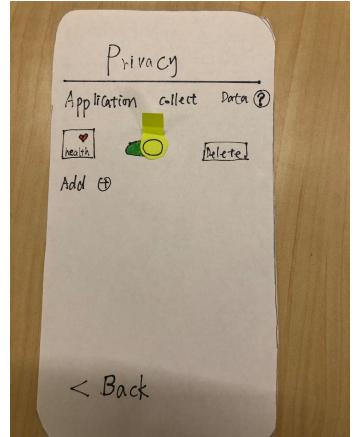
I think my phone knows my information and should already have it filled out. There is no button I can click to save.

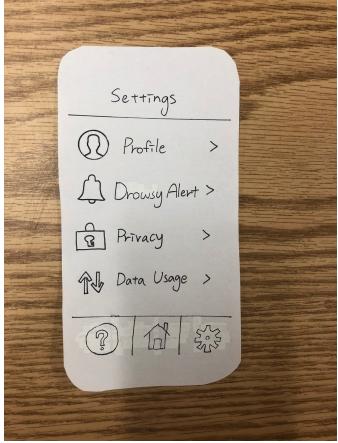
Severity - 1

Let the profile setting show the user his/her information and have a Done button to save it



Usability Test 3 Result:

Image	Issue	Severity	Revision	Revised Image
	Mistake "Alert Frequency" to "Alert Length".	Severity - 1	Eliminate the "Alert Length"	
	The user doesn't know why the app is using the health application and doesn't know what the icon is.	Severity - 1	Add explanation in privacy setting about why we will collect the health data	
	The user doesn't understand what this app is doing when first time using it.	Severity - 1	add introduction about this app when the user first time using it.	

	The user doesn't know what data usage is. Suggest cellular data usage.	Severity - 1	Change "Data Usage" to "Cellular Data Usage"	
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Contribution Statement

Meng Yan: 33% Write-up

Jason Chou: 33% Write-up

Wei Liao: 33% Write-up