TheHappyDriver

Jerry Li, James Shih, Kevin Bang

Low Fidelity & User Testing Report
CSE 440
Autumn 2011

Group

Group Manager	James Shih
Documentation	Jerry Li
Design	Kevin Bang
Testing	Jerry Li

Problem and Solution Overview

Traffic is always a huge problem for people living in big cities that can cause much frustration and cost a lot of time. Although it is fairly easy to acquire information about current traffic conditions, it is impossible to stare at the computer screen all the time. Thus, our goal is to make an application that runs on any mobile devices (smart phones specifically) and combines the benefits of different resources available to make commuters informed about their daily commute. The idea is to have a mobile application that not only provides the traffic information the commuter needs, but also includes the feature of monitoring the route and traffic conditions for the commuter and would notify them if there is a potential delay on their daily commute route.

Paper Prototype

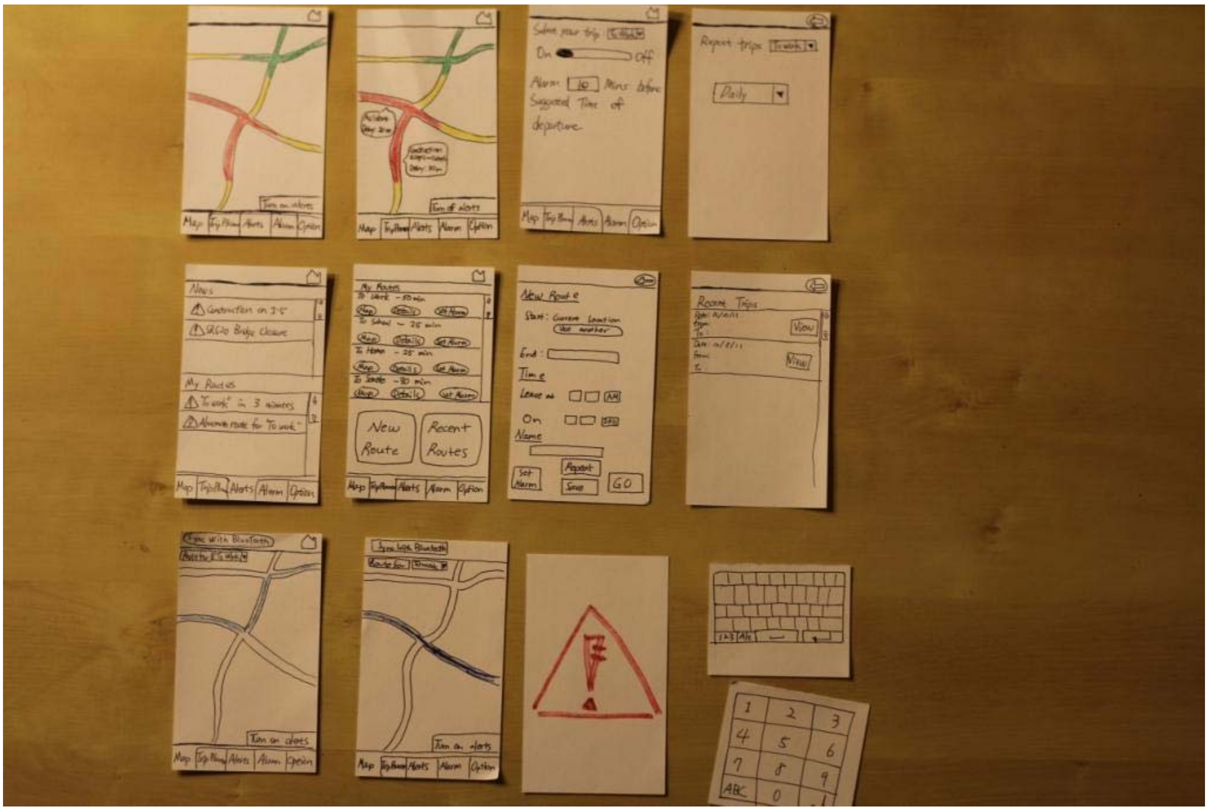

Figure 1: Prototype overview

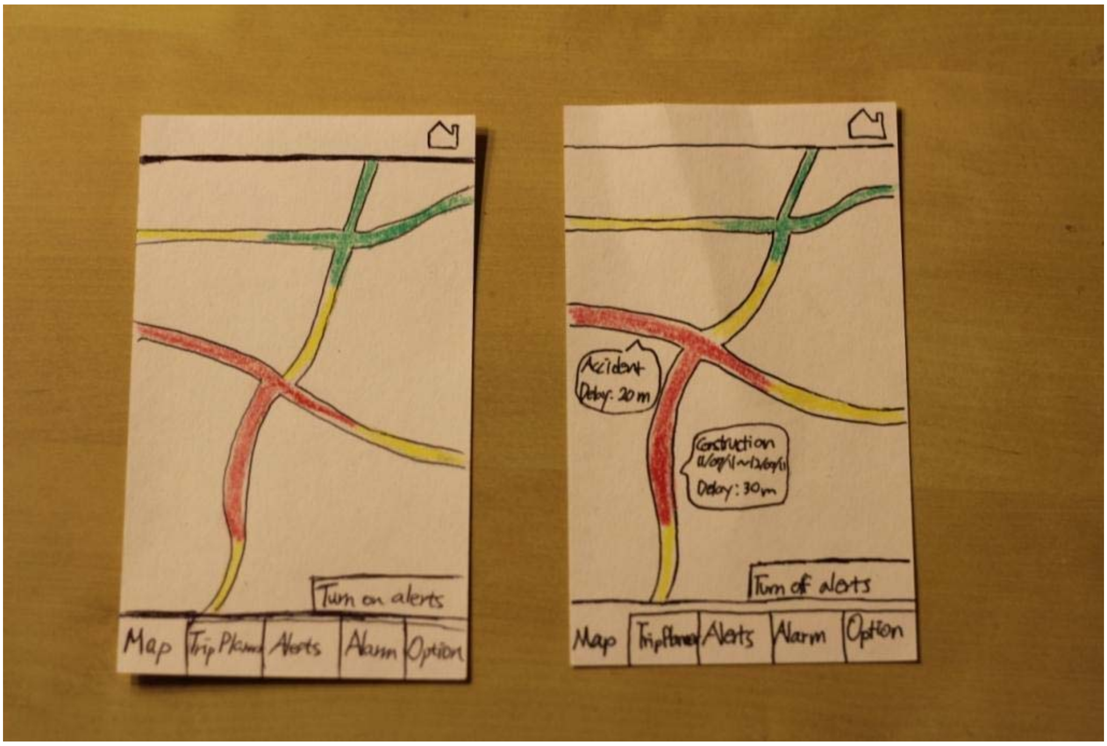

Figure 2a: Map with traffic condition [(left) alerts off & (right) alerts on]

Our interface consists of five different tabs: Map, Trip Planner, Alerts, Alarm and Option. The interface opens with a view of a map of the general Seattle area with traffic information overlaid, as shown in **Figure 2a,** and the user can turn the alerts on or off by hitting the button on the bottom-right of the map. The Trip Planner is shown in **Figure 3**, where the user can see a list of routes they created. User should be able to click on any route for more details. Also, the user can create new routes or check recent routes by clicking the corresponding buttons. The map would look like the ones in **Figure 2b** after the user plans a trip.

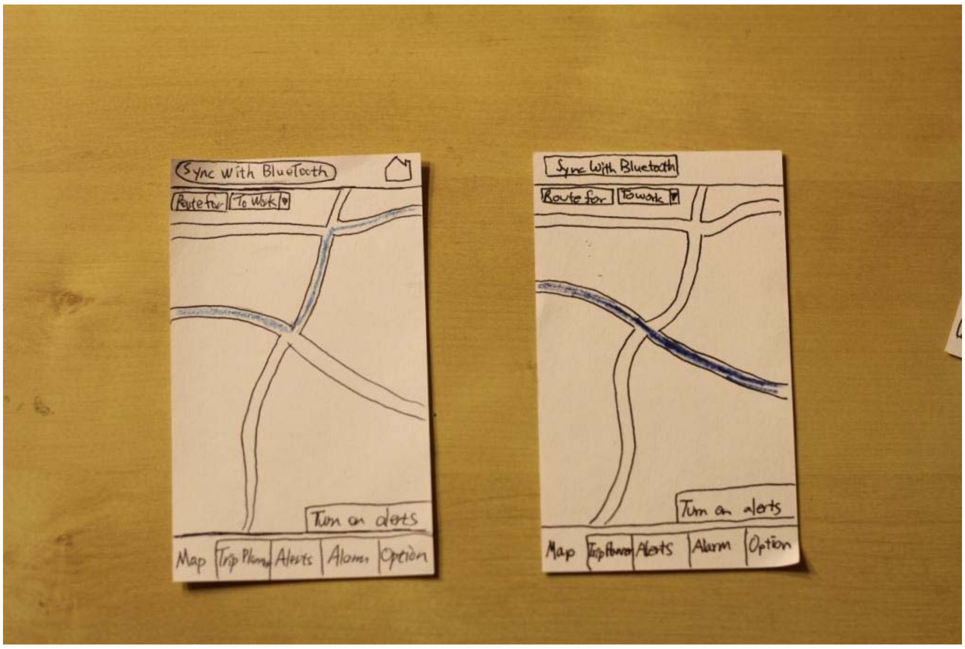

Figure 2b: Map with route

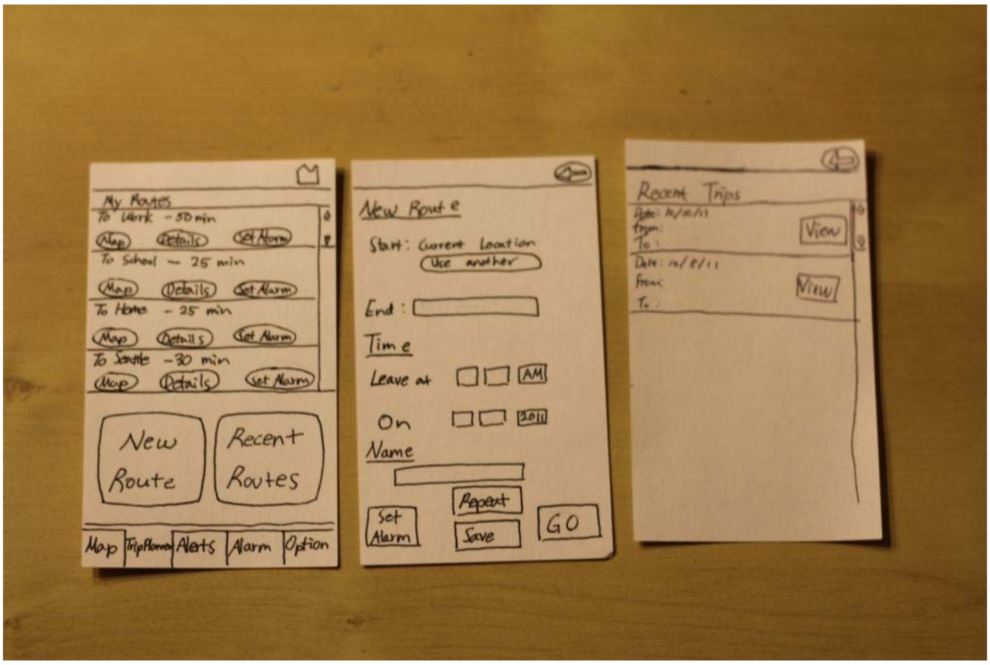

Figure 3: (left)Trip Planner [(middle)New Route (right)Recent Trips]

Figure 4 shows the alerts screen where the user can see news and alerts for their trips. When the user is currently on a trip, any alerts which affect their current route will pop up automatically. The Alarm screen is shown in **Figure 5**, where the user would be able to set the alarm for a certain route to get a notification when anything happens on that particular route that may cause a delay.

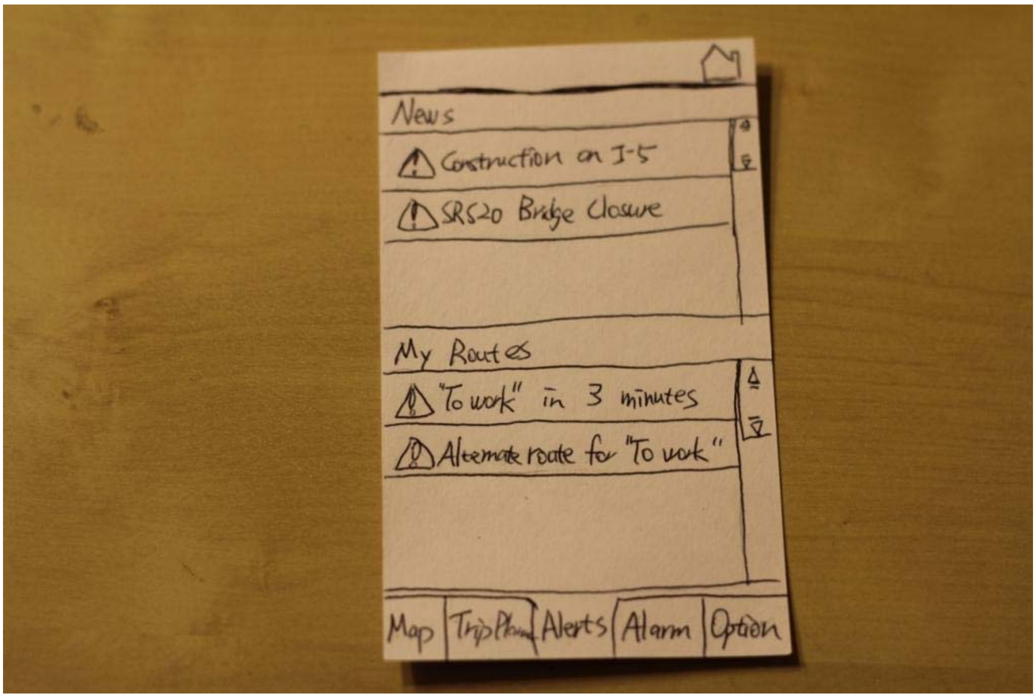

Figure 4: Alerts

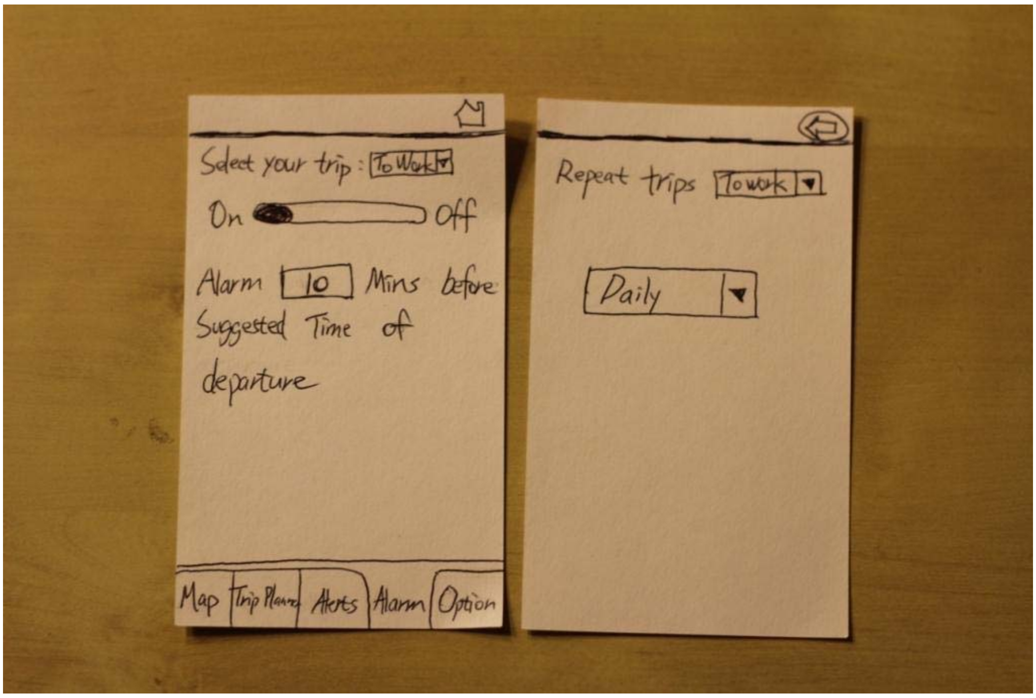

Figure 5: Alarm

The final part of our interface is some simple voice interaction. This is intended to allow the user who is currently driving to stay up-to-date with accidents and other traffic incidents. Our voice interaction currently is very limited. It consists generally of GPS direction style guidance. When the system detects a traffic alert, however, if voice alerts are enabled, the system says “There has been an alert on your trip. Say ‘More Information’ for more information, and say ‘Ignore alert’ to ignore the alert.” If the user says “Ignore Alert,” the alert is ignored, the travel times are updated, and that is all. If the user says “More Information,” the system then says something to the effect of “There has been a major accident on SR 520 on your route. Say ‘Alternate Route’ for an alternate route, and ‘Ignore Alert’ to use the same route.” If the user says “Ignore Alert,” the system does the same thing it did before, and if the user says “Alternate Route,” the system finds the best alternate route, and starts guiding the user on this route.

User Testing

Participants

We tested with a total of five different testers.

- **Participant A** is a 25-year-old male mechanical designer who commutes from Shoreline to Marysville everyday.
- **Participant B** is a sophomore, and a medical technology major. He commutes by car some of the time, although he says that he rides the bus most of the time.
- **Participant C** is a senior, and a neurobiology and psychology major. She commutes by car almost every day to school and to her part-time job.
- **Participant D** is a 32-year-old male who commutes to Bellevue from Tacoma.
- **Participant E** is a junior, and an economics and ACMS major. He drives sparingly, and never uses it to get to and from school.

We were able to therefore get quite a diverse group of participants. Most importantly, we found someone we'd consider an everyday user, an on-and-off user, and an occasional user.

Environment

We managed to keep the experimental setups similar for all of the test sessions. We always used a quiet place that the participant expressed he/she was comfortable in, and after the introduction, where we would describe the interface, the participant's role, and tried to make the participant feel comfortable, we'd begin testing. Other than our paper prototype, we simply had a notebook and writing utensil, and after the user selected a tab or button in the interface, we'd simply hand them the appropriate note card. If voice interaction was required, we'd simply say what the system had to say, and have the user respond vocally.

Tasks

The only changes we made were adding that the user has to save their trip in the second task and removing extraneous options that our interface no longer supports.

Easy task: *Checking daily commute route and setting up alarms.*
About to commute to work, and would like to make sure the route is clear. Then, set up alarms to get informed if anything happens to the traffic on your way to work.

Medium Task: *Checking traffic conditions and using the navigation feature.*
On Saturday, you and your family are planning a trip from Bellevue to Seattle today.

You want to get to Seattle no later than noon. Save the trip and have it repeat on Saturdays. It turns out that the Huskies are playing today, and so traffic is a big concern. Check the current and projected state of the roads, and then have the application get the best route given traffic, and have the application guide you while driving if the route is unfamiliar.

Hard task: *Getting an alarm from the application unexpectedly while driving.*
On the way to work in Seattle from the east side, like any other day, when unexpectedly an alert pops up from our application saying that the 520 bridge was closed because of an accident happened a few minutes ago, and that therefore you'll need to take another route. While driving, get the best alternate route.

Procedure and Measures

Unfortunately, because of limited availability of our group members (we only have three members), each group member had to found testers individually. By being very informal in the introduction and stressing that we are testing the system, not the participant, we (as far as we can tell) avoided the potential pitfall of having the participant being intimidated by the tester. In particular, we never used those release forms, to avoid this exact issue. Whenever a participant expressed a concern with the interface, by simply asking them to elaborate on the spot, not only were we able to get the participant to explicitly state their concerns and in many cases suggest improvements, but we were able to take notes while making the testing session feel natural. Finally, because we knew that we were going to do these sessions individually, going into these interviews we forced ourselves to be very conscientious of any non-verbal cues that the participant might do (such as almost clicking the wrong buttons), and so we still managed to obtain good notes when it came to this type of user feedback.

The tests demonstrate that the users were able to grasp the basic steps required to navigate through our interface and although there were definitely some hang-ups and errors that we'll try to rectify, they seem to be fairly straightforward to fix. In general, the participants found that the interface was clear and easy to use.

More concretely, we found that our testing sessions were much shorter than we anticipated. On average, we spent about 5-8 minutes running our tasks with our participants, although because we had to introduce the session and had a discussion about the interface afterwards, we spent usually about 15 to 20 minutes per testing sessions. Participants **C** and **E** each navigated to a page that we did not intend for them to navigate to, but other than that, all the participants did exactly what we expected. That is not to say that they did not give a lot of feedback, however.

User Testing Results

Alarms

This was one thing that came up every session: on the “Alarms” screen, there is no clear way for the user to know how the alarm has been saved or anything or to view the alarms for their trips other than by selecting the trip; in fact the only navigation we currently provide on the alarm screen are the tabs at the bottom of the screen. All of our participants found this confusing. This indicated that one of the core functions in the application, the alarm, is not visually and conceptually visible to the user in the current design. We believe that this is a major usability concern.

Saving Trips

On the “New Trip” screen, the option to name your trip and have it repeat is on the first screen, but you’d have to name it and have it repeat before you even select that you want to save the trip. Participants suggested that it might be easier to understand if we move these options to the “Save Trip” screen. Also, the repeat functionality is sometimes awkward when you consider that you have to specify the time and day that the trip is supposed to occur.

Voice and Visual Alerts

On the screen which pops up when a traffic alert is detected while the user is driving, the option to interact using the touch-screen is not available. While we were initially concerned about the safety issues that might arise, some participants noted that if there was another person in the car, this touch-screen interaction would let them help the driver. Some participants mentioned that they simply didn’t feel comfortable if they couldn’t interact with the application with the touch-screen. Also, the use of words ‘Alert’ and ‘Alarm’ is confusing.

Alternate Trips

Users seem to have little control over what options the user had over the alternate trip selected for them, especially if there was only voice interaction. Also, in order to select options for trips, the user has to go to the Options tab, which may be unintuitive. Some information such as the change in the total amount of time of the trip incurred by the change of route is not given and there is no easy way to undo after the user changed the route.

Interface Revisions

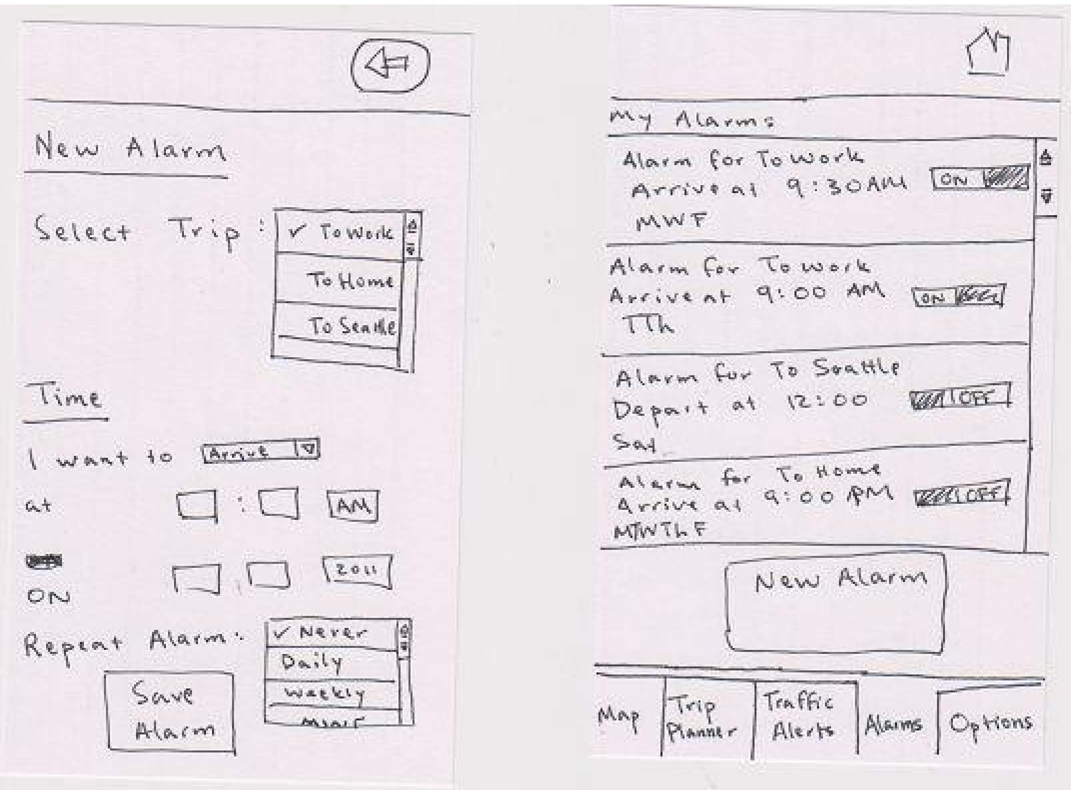

Figure R6: Revised sketches for Alarm

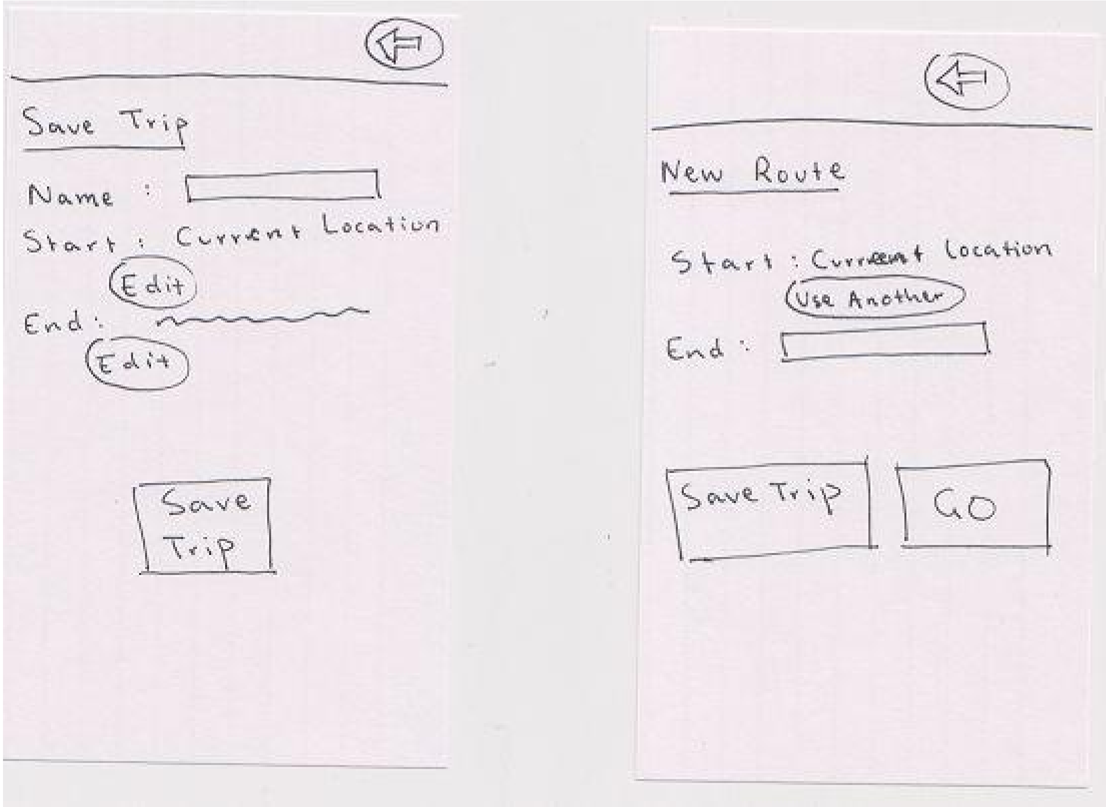

Figure R7: Revised sketches for Trip

To address the issues found in the alarms screen, the alarms screen now displays alarms, as shown on the right in **Figure R6**. There the user can see and edit all of the alarms for their trips, and to make a new alarm, they press the “New Alarm” button, which takes them to the screen which currently shows up when the user presses the Alarms tab, as shown on the left in **Figure R6**, with the added button at the bottom to “Save Alarm.” This way the user can set up multiple alarms for the same trip.

To address the first concern with saving trips, we did exactly what was suggested and moved Name field to the “Save Trip” screen, as shown in **Figure R7.** To address the concern about accessing trips from memory, our current solution is to remove time information from the trips themselves, but have the user to specify the time when they click on any saved route or the ‘GO’ button on ‘New Route’ screen, as shown below in **Figure R7.1**.

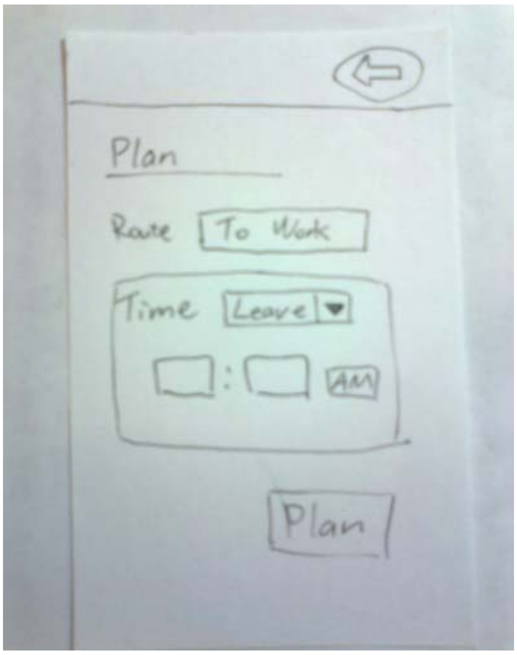

Figure R7.1: Trip Planner - specify time

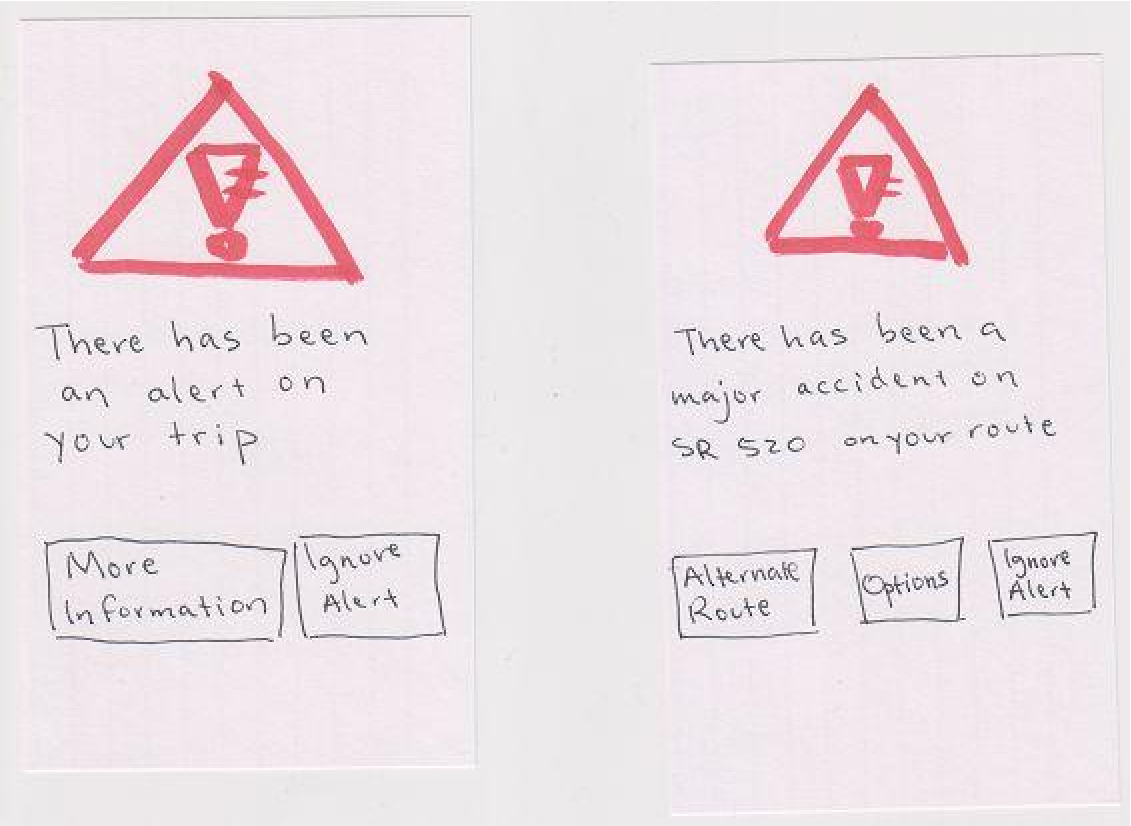
There has been an alert on your trip
More Information
Ignore Alert
There has been a major accident on SR 520 on your route
Alternate Route
Options
Ignore Alert

Figure R8: Revised sketches for Alert

To address the issues with the Alerts screen, we added the ability for the user to also touch buttons on this screen to follow the voice instructions, as well as having the voice instructions written out in text on the alerts screens. The alerts screen was also given additional buttons to view details about the alerts, as shown in **Figure R8**. Also, as suggested, we also changed “Alerts” to “Traffic Alerts.” This is visible on the revised “Alarms” screen in **Figure R6.**

To address the concerns around alternate routes, the application, after the user says “More information,” now says something to the effect of “There has been a major accident on SR 520 on your route. Say ‘Alternate Route’ for an alternate route, “Options” to change your alternate route options, and ‘Ignore Alert’ to use the same route.” If the user says “Options,” the application then says something like “Say ‘Trip Priorities’ to change your trip priorities, ‘Highway’ to modify your highway travel preferences, or ‘Back’ to go back to the previous menu.” If the user says “Trip Priorities,” the application then says something like “Say ‘Time’ if you wish to choose the fastest route, ‘Traffic’ to avoid traffic, ‘Distance’ to choose shortest route, or ‘Back’ to go back to the previous menu.” A similar intercourse occurs with ‘Highways,’ and the ‘Back’ options let the user go back to the previous menu.

Summary

Our application has really changed quite a lot from what we first envisioned it would be. We initially thought that it would a lot more all-encompassing than it is now, but quickly realized that such a thing was probably impossible, and we decided from the contextual inquiry to focus on traffic prediction and commute information. Although at this point we hadn't really decided on a design, through the task analysis and doing a bunch of heuristic evaluations, by our presentation we had basically settled on our current design.

The user testing was in particular very helpful in informing quite a lot of problems with our interface. After the user testing, a team member ran through a lot of scenarios and found that these scenarios were all very easy to navigate through, so although we can't of course say that we've found all the issues with our interface, the interface does seem quite clear and intuitive to use.

The process certainly did educate our design of the interface quite a lot, however to a surprising extent we came up with a lot of the details for the interface just by ourselves and considering what issues we saw could come up. It got to the point towards the end that most of the issues raised by the user testing were voiced as concerns by some team member at some point, which was certainly unexpected. We also noticed that a lot of our design decisions were based on other interfaces we had seen before for similar applications. In fact, whenever we tried to diverge with what a lot of other applications did, we found it to be less successful and usually reverted back.

We are quite satisfied with our final prototype. It seems to deal with the problems we initially sought to address with our application, and it would certainly be useful to people in the real world, assuming the technology is there. It has been and probably will continue to be quite a bit of work, but at last our prototype seems very solid and useable.

Appendix: Task Script

Easy task: *Checking daily commute route and setting up alarms.*
About to commute to work, and would like to make sure the route is clear. Then, set up alarms to get informed if anything happens to the traffic on your way to work.

Medium Task: *Checking traffic conditions and using the navigation feature.*
On Saturday, you and your family are planning a trip from Bellevue to Seattle today. You want to get to Seattle no later than noon. Save the trip and have it repeat on Saturdays. It turns out that the Huskies are playing today, and so traffic is a big concern. Check the current and projected state of the roads, and then have the application get the best route given traffic, and have the application guide you while driving if the route is unfamiliar.

Hard task: *Getting an alarm from the application unexpectedly while driving.*
On the way to work in Seattle from the east side, like any other day, when unexpectedly an alert pops up from our application saying that the 520 bridge was closed because of an accident happened a few minutes ago, and that therefore you'll need to take another route. While driving, get the best alternate route.

Appendix: Notes for Participant A

Profile: 25-year-old male mechanical designer, commutes from Shoreline to Marysville everyday

Task 1
-Checking the map
-Hit alarm tab
-choose work route
-set alarm

Task 2
-Hit trip planner tab
-Find it confusing to have specify a name for the trip
-type in start and end location
-hit repeat
-select weekly (on Saturdays)
-don't know whether to hit 'GO' or 'Save'
-hit save and go

Task 3
-try to find a button to click on for more options and details
-say "change route" <- not sure if it's the best route?
-want to know more details about the trip after changing the route

Participant **A** found it confusing to have 'repeat' and 'set alarm' buttons on the trip planner page. He thought it might be better to have them all on the alarm tab or something.

Participant **A** wanted to be able to repeat an alarm from the alarm tab. However, currently the user is only able to repeat the alarm by repeating the trip under the trip planner tab.

Participant **A** wanted to know more details about the trip after changing the route.

Appendix: Notes for Participant B

Profile: a sophomore, and a medical technology major. He commutes by car some of the time, although he says that he rides the bus most of the time.

Task 1

- Correct navigation for task 1
- Unclear how to finish task, not clear if alarm was set

Task 2

- Set name for trip without saving trip
- Set repeat for trip without saving trip
- Tried to interact with alerts, but failed

Task 3

- Wanted touch-screen navigation
- Navigated the voice interaction correctly

Participant **B** noted that it is unclear if the application thinks that you're trying to leave right now or if it thinks that you'll try to leave at the time specified for the trip if you try to access a trip in memory.

Participant **B** thought that options to view more details about the alerts are not present (they don't look clickable in our paper prototype), and that in general the screen needed more control structure.

Appendix: Notes for Participant C

Profile: a senior, and a neurobiology and psychology major. She commutes by car almost every day to school and to her part-time job.

Task 1
- Confused Alerts with Alarms
- Wanted additional control on alarm screen
- otherwise correct navigation for task 1
- Unclear how to finish task

Task 2
- Asked about name on the Save Trips screen
- Otherwise correct navigation

Task 3
- Wanted touch-screen interaction during alerts
- Correctly navigated through voice alerts
- worried about the lack of control on alternate trips for voice interaction

Participants **C** confused “Alerts” with “Alarms”, and suggested that we change “Alerts” to “Traffic Alerts.”

Participant **C** was worried about how little control the user seemed to have over what options the user had over the alternate trip selected for them, especially if there was only voice interaction.

Appendix: Notes for Participant D

Profile: a 32-year-old male who commutes to Bellevue from Tacoma.

Task 1

-Subject had a hard time understanding whether the "alarm" is inherent to the application or is referring to the phone's alarm.

-Probably because of this confusion, he also had a hard time understanding that you can set up alarm individually for each trip.

-Alarm function is not distinguished enough, even though it's one of the core functions

Task 2

-Asked "what is the name input for?"

-Complained about the position of the name input; he'd expect identifiers on the top of the screen

-Did not like the layout of the buttons in the new route screen.

-Did not know what the GO button was for.

Task 3

-Wondered why there's no way to interact with the alert screen with hand

-He told about carpooling; person riding shotgun will prefer direct control over voice commands

-Wanted to know about the change in trip time that will be caused by the route change

-Wanted to hear the options (including the time change) before making the decision to make the change

-Wanted to undo the change, and the function is not provided

Participant **D** had a hard time understanding the interaction between the trip planner and alarm. He took a substantial amount of time understanding that the set alarm button in the trip planner tab was inherent to the application; he was expecting the phone’s alarm screen to come up and was confused when he encountered the alarm interface.

Participant **D** had spent a lot of time understanding the trip planner in the first round of testing, so he had much less trouble figuring out the saving trips functions. However, he did not like the position of the trip name input box; he felt it is counterintuitive because for most of the forms he encountered in his life, the input box for identifier was always on the top section. Also, he felt the layout of the buttons in the bottom section did not follow the layout of the rest of the application.

Participant **D** was also concerned about the lack of user control in the alert screen. He mentioned that he is carpooling a lot, and most of the time the person sitting next to him plays the role of navigator; lack of direct interaction control would come uncomfortable in such situations.

Participant **D** wanted to know about the change in the total time of the trip incurred by the change of route. He also wanted to hear out the options first before making a decision to take alternate route. He also wanted to have a function to undo the change.

Appendix: Notes for Participant E

Profile: a junior, and an economics and ACMS major. He drives sparingly, and never uses it to get to and from school.

Task 1
- Confused “Alerts” with “Alarms”
- Otherwise correct navigation
- Also unsure how to finish the task; wanted an “OK” button on alarms screen

Task 2
- Tried to name trip without saving it
- wanted an OK button on keyboard
- Did not understand the suggested route screen, had to be explained

Task 3
- Tried to go for “Ignore Alert” when the alert came up
- Misunderstood the alert, probably
- Wanted to be able to read the alert
- Wanted to be able to interact with screen

Participant **E** pointed out there is no way for the user to set up multiple alarms for the same trip, if for instance on MWF the user wants to arrive at work at 9:30 and on TTh the user needs to arrive at 10:30, the application currently has no way to support this.

Participants **E** confused “Alerts” with “Alarms”, and suggested that we change “Alerts” to “Traffic Alerts.”