# TheHappyDriver

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Contextual Inquiry Report
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## Group

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## 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 your computer all the time. Thus, a mobile application that combines the benefits of different resources available to make commuters completely informed about their daily commute would solve the problem we currently have. The idea is to have a mobile application that not only provides the traffic information you need, but also includes the feature of monitoring your route for you and would notify you if there is a potential delay on your daily commute route.

## Contextual Inquiry Participants

Our first participant was **Gyu Bang**. He has been commuting to Maple Valley and Bremerton for the past 7 years. Whenever there was a severe storm attack or accident in the road, his trip would fall into a major delay. Kevin had a chance to drive through Gyu's usual trip route, which includes a number of early exits of I-405 and I-5 near Tacoma area. These are heavily congested areas during rush hour, and they easily get chaotic with bad weather or accidents. Gyo expressed a high expectation of the early alert function we have designed into the application.

Our second participant was **Li Li**. In the past, he did have to commute quite a bit to and from work, but he currently lives close to where he works. A team member (Jerry) was able to be in the vehicle with him while he was running errands which involved him driving throughout Seattle and the east side on a week-end. We were consequently able to observe how he anticipated and navigated through heavy traffic, and also get his concerns as a person who would use the application only on occasion.

Our third participant was **Dr. Mark Hallenbeck**. He works as a traffic engineer at TRAC with the WSDOT. All three members of our team visited him in his office and observed how he approached traffic as an engineer. As his work is focused primarily on traffic simulation (in particular in cases of unexpected traffic incidents such as crashes), he gave us an unique perspective on accountability issues associated with the limitations of any traffic simulation system. He also used to commute to and from work, so he also gave us insight into what a frequent user of the program would expect from a traffic application like ours.

We were therefore able to get the perspective of an everyday user, an occasional user, and someone from the WSDOT. We wanted the perspective of an everyday user for obvious reasons, but we also wanted to see what an occasional user wanted from traffic applications, because we foresee that they'll have very different needs than a regular commuter. We wanted to talk to someone from the WSDOT primarily because we wanted to understand how traffic simulation works, and how we could use what their experience with this kind of thing to our advantage.

## Contextual Inquiry Results

### Distraction

One common theme among users was the concern about the distraction that the application would cause the driver. In particular, Li mentioned that zooming in on a smart phone is a task that requires two hands, and so that would require the user to either

awkwardly position both hands on the steering wheel (or even worse, lift them off!) while not looking at the road, a particularly dangerous operation. In addition, Gyu was specifically concerned about if he will have to divert his attention (and therefore a hand) to the phone in order to access incoming feedback while driving. During Jerry's trips with Li, Li also suggested voice capabilities for the application as a way of avoiding having the user take his/her hands off the wheel and having the user look at a screen while driving. He compared this to similar functionality provided by GPS systems which he found to be useful and not very distracting. He expressed this wish in the context of trip planning while taking into consideration traffic, and mentioned that this was something that he wished the GPS would do.

Gyu also agreed that getting real-time incoming feedback in audio format was a way to avoid getting distracted. However, Gyu mentioned the possible issue with listening to any output from the application. If the feedback is coming in audio format, he was curious about how easy it would be distinguishable from the road noise. He expressed a concern about the sound quality too; raising the volume usually breaks the sound quality in the earlier generation of smart phones like in the one he has. He wanted something intuitive and easy to understand since he is not fluent with English.

## Latest information

Another shared thread between all the participants was the belief that on any application, traffic incidents, such as car accidents, lane closures/openings and construction, should be very clearly marked and extremely up-to-date. Mark also expressed the desire to have the application notify the user if there were large events occurring soon or nearby, and also about adverse weather on the user's planned route, as those things are known to really affect congestion as well as any predictions for travel time. For instance, Jerry noticed that Li took a very roundabout route back to Bellevue from Seattle (avoiding SR-520) because he wasn't sure if there was going to be a game at Husky Stadium that day, and he was certain that if there was a game, then the backlog on SR-520 would've been horrible. This suggests to us that such information could really be useful for users of this application.

## Decision making

Li and Mark both raised the basic belief that although the application can help users get traffic information, it should always leave the decision making to the user. When asked why, Mark mentioned that if the application is supposed to make all the decisions for the user, sooner or later the application's reliability will come into question. He brought up the scenario when the application projects no congestion along SR-520 because the traffic volume is low, so the application tells the user that everything is perfectly fine, and that he shouldn't start on his commute earlier than usual. Then later on a major traffic accident

occurs, and the user is then caught completely unaware, and subsequently blames the application. Mark emphasized that application should only advise the user, but that it must be made clear to the user that it is their responsibility to take into consideration the variance inherent in traffic.

One thing that we noticed while interviewing Mark that wasn't brought up in any other interviews was how important it was for the user to be able to specify a start time for a planned trip. This was immediately evident when he brought up the time a trip during rush hour versus a trip at midnight would take. Another thing that he mentioned was that because traffic is mathematically chaotic when traffic volume is sufficiently high, we'd have to let the user choose how much risk he/she wants to take when he/she undertakes a traffic simulation plan.

Our observations of Gyu, Li, and Mark reaffirmed a lot of our pre-existing notions for our application, as well as giving us many more ideas for our application. What we saw, especially the points above, we will definitely try to address throughout our design and testing process.

## Task Analysis

The basic things we'd like our application to let the user do are the following:

- Allow the user to check the current state of the roads, and projecting how bad they will be in the near future, and show this graphically on a map. For instance, a user either at home or on the road could see that congestion on the I-5 Bridge is horrendous because the Seahawks are playing, and change plans accordingly. This is something that the people at INRIX already do, and it is definitely a vital utility for both commuters and other drivers.
- Do route planning and navigation advice that takes into account projected traffic. If we know that the Seahawks are playing today, our application should adjust both the suggested route and estimated arrival times for a trip to Seattle accordingly. This has been implemented to a limited extent in some GPS systems, but no mobile application, to our knowledge, has tried to do this.
- Set up automatic alarms when unexpected traffic incidents occur. If a horrible pile-up in Montlake suddenly occurs, for instance, users would get a warning that would alert them to the situation, and allow them to either go around it or leave earlier in anticipation of longer times.

Currently, all of these things are available in some form or another; however, they are not presented together in a clean and accessible interface. Independently from our conceptual inquiries we know that users either already use, or would like to use, all three of these utilities while they are planning a trip and driving. Our tasks would combine these different

capabilities of our application to see how successfully our interface handles the above utilities.

An important issue that we need to encapsulate in our tasks is how to ensure that this information is passed safely to those who are currently driving. Li's suggestion of vocal commands seems to be the best we have so far for doing so.

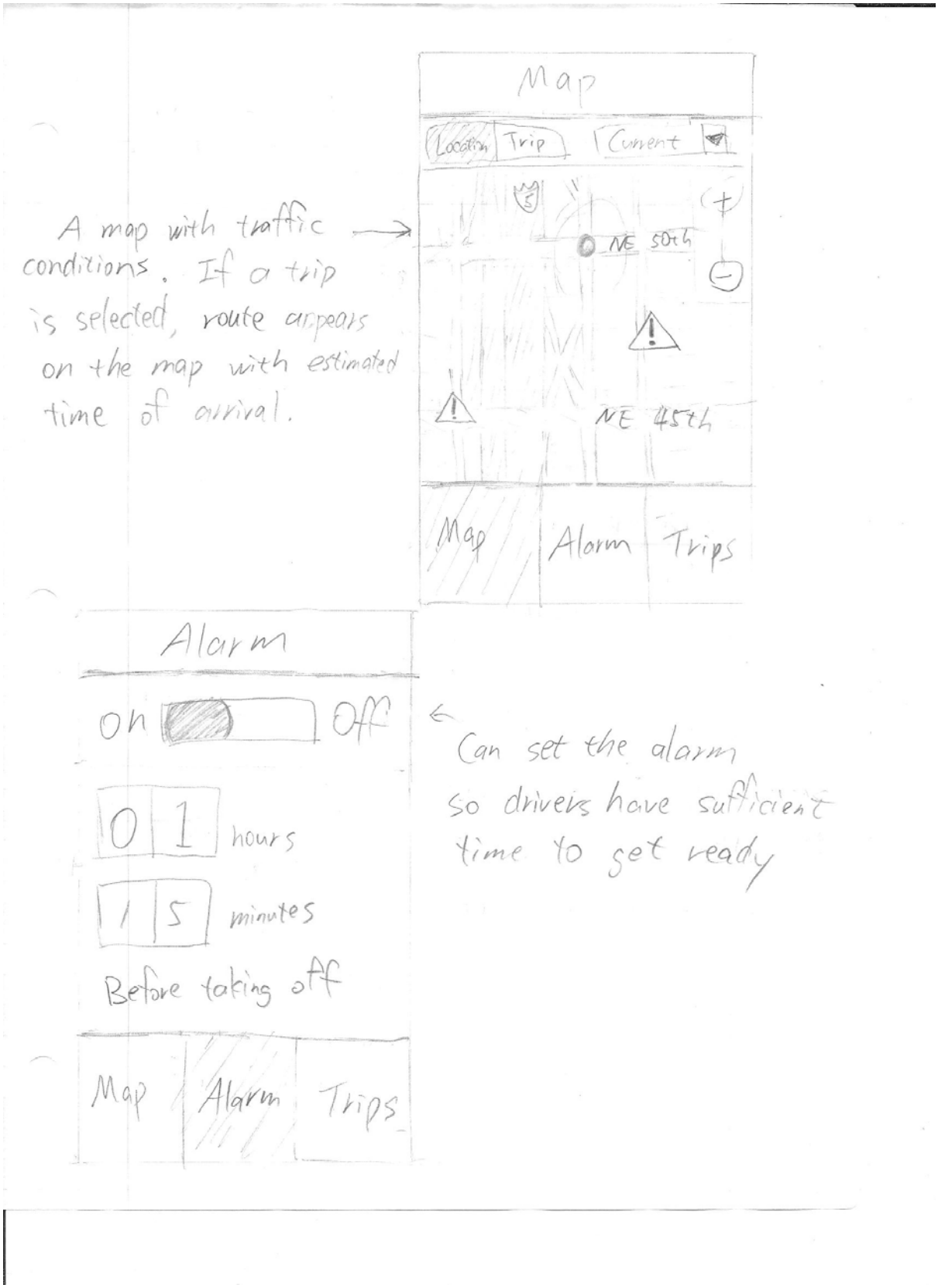
With these considerations in mind, we propose the following easy, medium, and difficult tasks for users of our application:

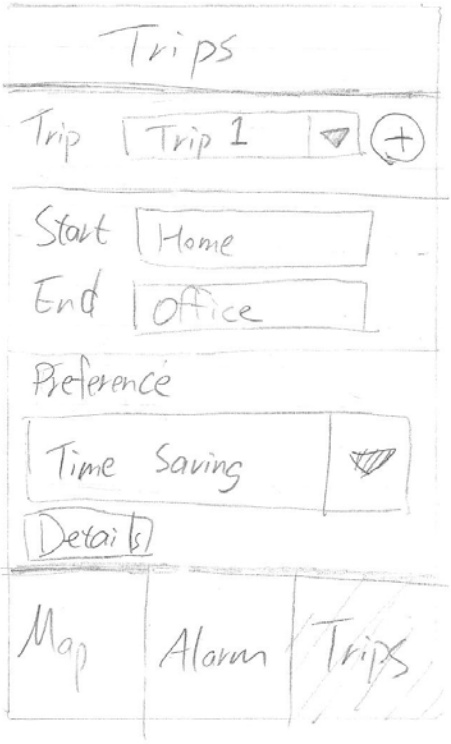
1. (*Easy / Everyday use*) You're about to commute to work. You'd like to make sure the route you take every day is clear. After you've done so, you'd also like to check your estimated time of arrival, just to make sure you're not late, and set up alarms to inform you if anything happens to the traffic on your way to work.
2. *(Medium / Occasional use)* You and your family are planning a trip to Seattle today (it's Saturday). You want to get to Seattle no later than noon, but you're willing to take some risk of arriving late so that you can leave later. As it turns out, the Huskies are playing at home today. You'd like to check the current and projected state of the roads, and then you'd like to get the best route given traffic, and have the application guide you while you're driving if the route is unfamiliar.
3. *(Difficult / Exceptional use)* You're on your way to work in Seattle from the east side, like any other day, when unexpectedly you get an alarm from our application telling you that the 520 bridge has been abducted by aliens, and that therefore you'll need to take another route. While driving, you'll need to find the best route, and have the application direct you.

The first task we think is straightforward because there are no surprises and the task is basically all done at home. Given any good interface, it should be pretty clear how to proceed. The second task is slightly more difficult because the user has to put in input to the interface, and the application also has to interact with the user while the user is driving. Finally, the last task is difficult because it requires a lot of computational work on the part of the application, and because the application has to do all of its interaction with the user while the user is driving. As far as we know, with current applications, the third task would be nigh impossible without putting the driver and therefore everyone around him/her at risk.

## Design Sketches

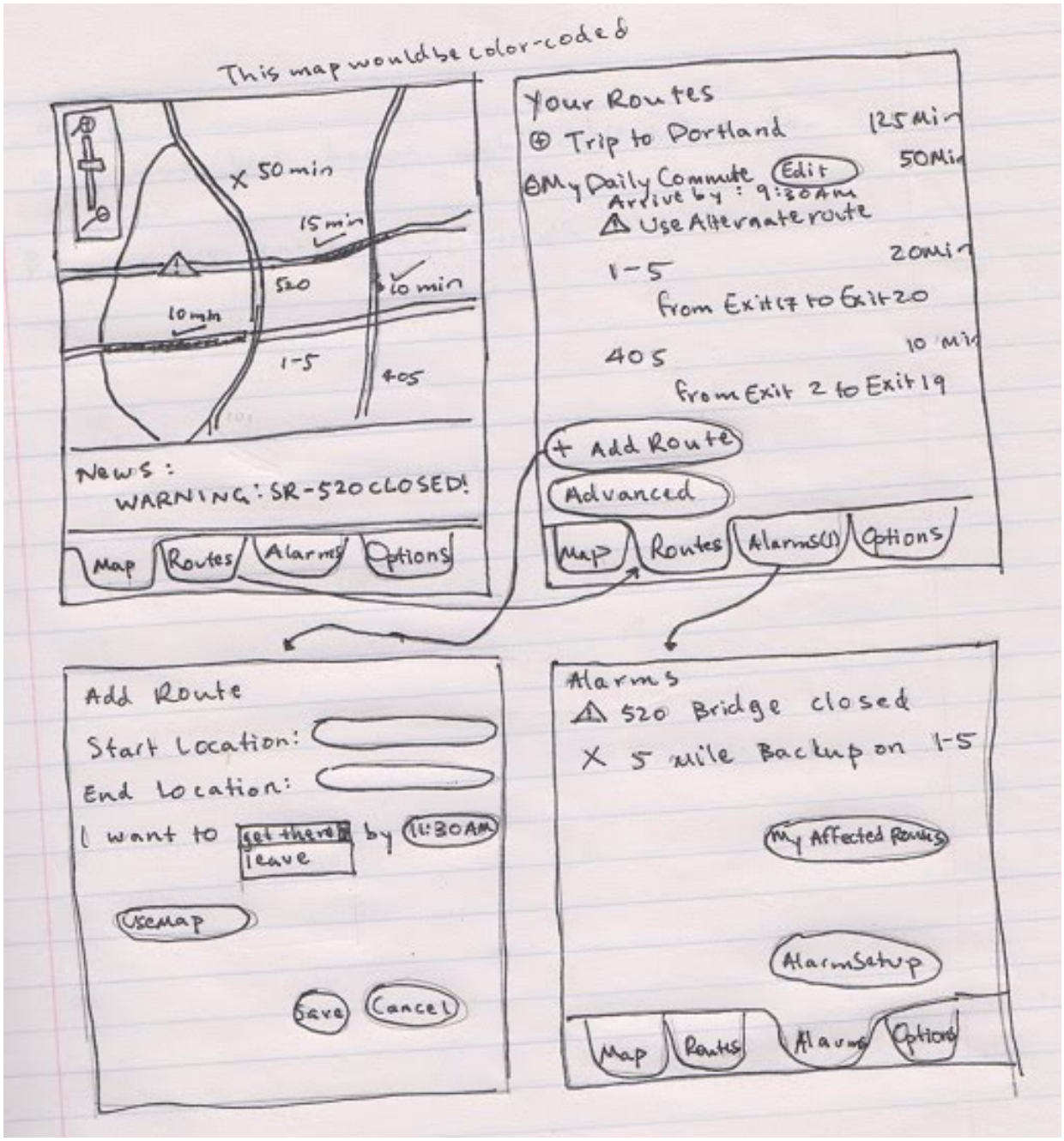
**First Design:**






← User can select a trip

**Second Design**



**Third Design:**