SHOTGUN

Your smart driving companion

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Summary and Values

Driving is dangerous.

1.3 million people lose their lives in road crashes every year, and over 20 million sustain some type of road-related injury.

Shotgun is here to reduce those numbers drastically. With intelligent and unintrusive notifications, Shotgun prevents drivers from exceeding safe speeds and keeps them alert at the wheel.

The application has a simple and intuitive design that allows users to understand which notification they are receiving without taking their attention off the road. Our application is targeted towards commuters, travelers, and truck drivers, as Shotgun is most useful for long distance drivers who are prone to fatigue.

BRAINSTORMING

This idea was chosen out of over fifty ideas from different categories, including education, money management, navigation, security and dining.

We thought about building an application to help you find misplaced things. Or an application that notified you when something you wanted went on sale. Or something that discreetly helps you come up with things to say on a first date.

Ultimately, we chose to build something that had meaningful implications and could find powerful function in the smartwatch's unique capabilities.

Shotgun warns the user when they are going above a safe speed and when to take take a break from driving. Drivers can stay aware of their speed without taking their attention off the road.

PERSONAS + SCENARIOS

Our personas were initially commuters, travelers, and truck drivers in general, but we developed them more based on our contextual inquiry to make them more realistic. They have a broad range in competency with technology and with age (~20s-~50s). They all drive for different reasons, but but they are all in need of something to keep them accountable to safe driving practices.

Commuter

Andrew, a 25-year-old recent UC Berkeley grad and self-proclaimed tech-junkie, drives about 2.5 hours a day commuting from Berkeley to his work in South Bay. He usually has trouble staying awake during the early morning and after work when he's stuck in traffic. His friends have cautioned him to be more careful when driving, but Andrew has always just brushed it off. After recently getting a smartwatch, Andrew has been on the lookout for all the cool apps he can integrate into his life. Upon a friend's suggestion, he downloaded Shotgun and started using it. To his surprise, it has helped him be more alert on the road, so he decided to keep it as one of his holy grails.

On the Monday morning after Thanksgiving, Andrew opens Shotgun for his daily commute, which remembers the settings from his previous use of the app. He adjusts the sleepiness notification to 10 minutes because he's feeling extra tired today. Then, he presses "Start" and proceeds to drive to his workplace, getting notifications every ten minutes and whenever he speeds. After 40 minutes of driving, Andrew feels fairly awake and changes his sleepiness notifications to every 20 minutes with just two easy taps on his phone. Thanks to Shotgun, Andrew arrives safely at his workplace feeling awake and ready to take on the day.

PERSONAS + SCENARIOS

Truck Driver

Fred is a 46 year old truck driver who has been faithfully hauling products for his company for 18 years. He is constantly on the road, whether he is transporting items between his company's regional distribution centers in the Bay Area or making his bi-weekly trip to Indianapolis. Fred loves his job, and he downloads Shotgun because he wants to continue to reliably deliver large loads and avoid driving recklessly in order to maintain a good driving record and a good name for his company. He doesn't usually use a lot of technology when he drives and he has no need for navigation since he knows the routes wellbut he acknowledges that he forgets to take breaks and goes hours without even thinking to do so. Because of the pressure to meet deadlines for deliveries, he usually feels guilty about taking breaks unless he absolutely needs to.

On his bi-weekly trip to Indianapolis, Fred opens Shotgun and sets his speed tolerance to 5% and his sleepiness alert for two hours. He makes it a point to set the speed tolerance low since he is driving a truck, which usually has a stricter speed limit on the road. At the two hour mark, Shotgun reminds Fred to take a break. He feels the vibrations and sees the bright green notification, but forgot what alert it stood for. With a quick glance at the image of the person falling asleep, he remembers that it is the alertness notification. Fred is feeling pretty alert and thinks he could last another two hours, so he just ignores the notification. After another two hours, Shotgun reminds Fred again to take a break. Fred usually only takes a break after six or eight hours, but he decides to do so anyway with his family in mind. Throughout his first trip using Shotgun, Fred is more cognisant of his alertness and safety. He feels like he can confidently tell his family that he is actually taking care of himself on the road, and that there's no need to worry about him.

PERSONAS + SCENARIOS

Traveler

Natalie is a 3rd year at UC Berkeley who has the luxury of having a car. Although she is busy like any student, she makes time to drive home often. She's always homesick, so the 7 hour drive down to LA is worth it. Like most people her age, she is extremely engaged in social media. She is getting notifications from Facebook, Twitter, Tumblr, Snapchat, and other apps at least every 5minutes.

One Friday afternoon, Natalie makes a spontaneous decision to drive down to LA. She feels a bit uneasy driving after only getting a couple hours of sleep the night before, but she can't refuse the change to go home. She can't stand the thought of being unplugged from the world for 7 hours, so she blocks all other notifications besides texting. Since she's feeling a bit sleepy, Natalie sets her sleepiness notification to every 20 minutes and her speed threshold at a generous 20% since she knows that the freeway will be empty. Every so often, Shotgun reminds her that she's going over the speed limit, but she ignores the notifications since it would be more dangerous for her to slow down and block the flow of traffic. At a particularly empty part of the 5, Natalie accelerates a little since she's feeling sleepy and wants to get home as soon as possible. Shotgun immediately notifies her that she is going above the threshold she had set, so she slows down after considering how much a speeding ticket is. She fights with her sleepiness, but Shotgun's sleepiness notification jolts her awake every twenty minutes just as she is about to nod off. Throughout her drive, she gets text notifications from her smartwatch, but she can differentiate them from Shotgun notifications since the vibration patterns are different. She makes a mental note to check her texts when she gets to the rest stop she always stops at. Thanks to Shotgun, Natalie is able to get home safely even though she was sleep deprived and in a rush to get home.

COMPETITION

Waze is a crowd-sourced navigation application that updates drivers about real-time traffic conditions and if there are cops spotted nearby. Shotgun keeps drivers safe from speeding in the first place to keep them safe.

AUTOMATIC

Automatic has a hardware component that plugs into your car to track driving efficiency and speed to review after a trip, whereas Shotgun gives real-time feedback regarding driving speed.

Speedometer is a mobile application that displays when you are going above a preset speed limit. Shotgun automatically updates speed limit to minimize driver-to-device interaction.

USER STUDIES

We ran user studies by conducting contextual inquiries on a commuter, a traveler, and a truck driver. It was hard to do accurate contextual inquiries because our app is targeted towards long distance drivers, and we had to trust our interviewees to give us honest information about their driving tendencies.

Our interviews covered most of our target user groups except for travelers, but we assumed that a traveler would have the same tendencies and goals as the third interviewee. All of our drivers were pretty confident in their driving and seemed to be okay with breaking the law to some extent. The commuter in particular seemed to be very nonchalant about his obvious inattentiveness to the road, and he was only using technologies to improve his speed to his destination, not to be safe. The second interviewee also seemed to want to use technologies (Google Maps and cruise control) for personal comfort and faster journey to his destination even while almost risking safety (trying to use music to stay awake and cruise control for speed). Although the truck driver showed some personal dedication to being safe on the road by trying to be well rested and following the speed limit, he still showed some dangerous behaviors.

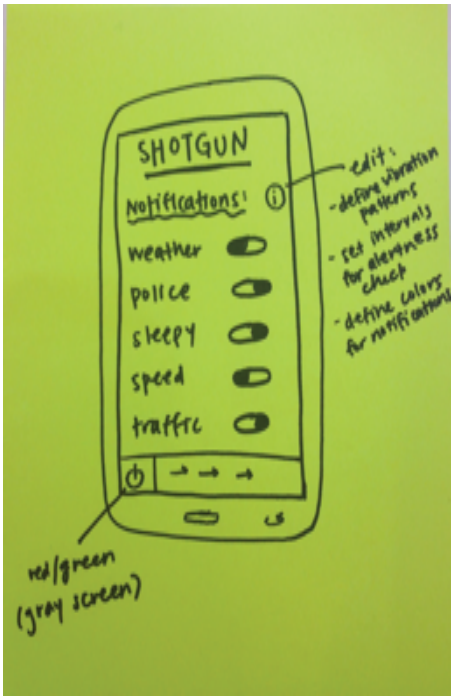
Generally, all the users demonstrated at least some unsafe driving tendencies and seemed like they could benefit greatly from a multi-purpose app like Shotgun.

SKETCHES AND VARIATIONS

Intermediate sketches

navigation

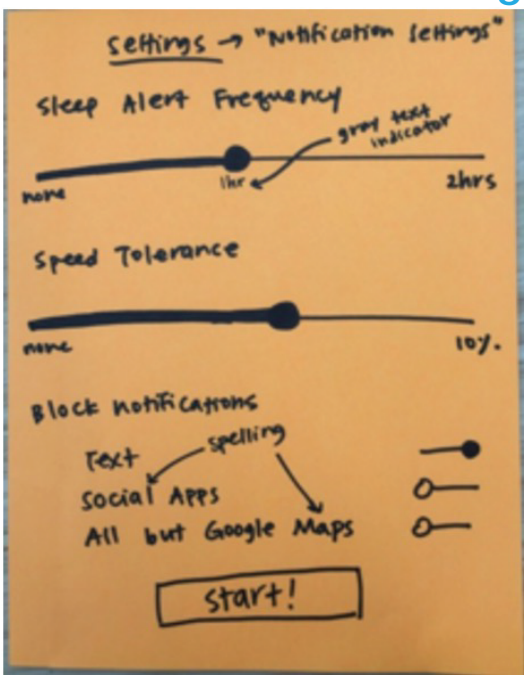
setting



voice interaction

Final sketches

setting



home-landing

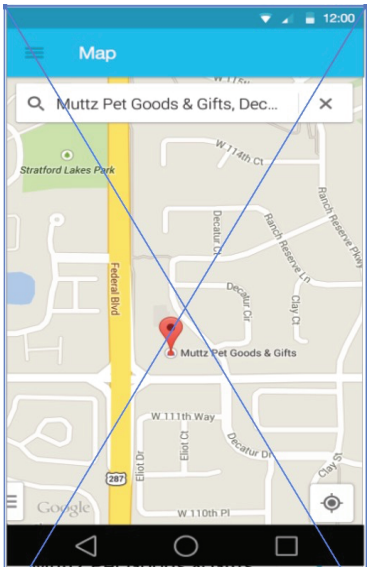
speed alert

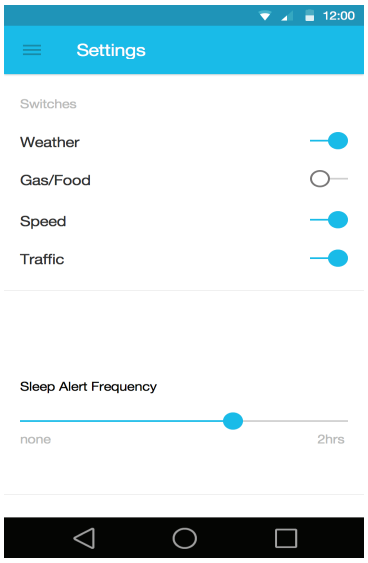
weather alert

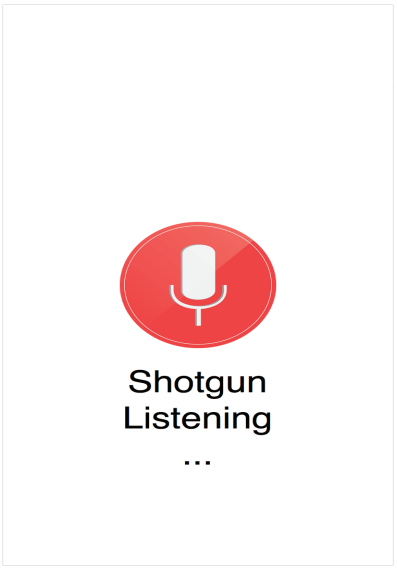
traffic alert

WIREFRAMES AND VARIATIONS

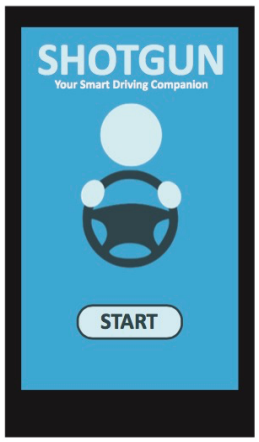
Intermediate wireframes

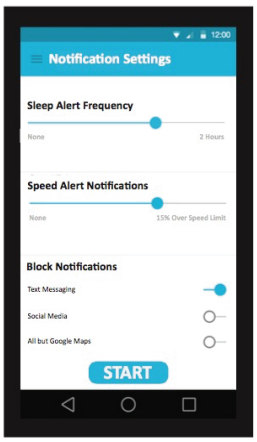


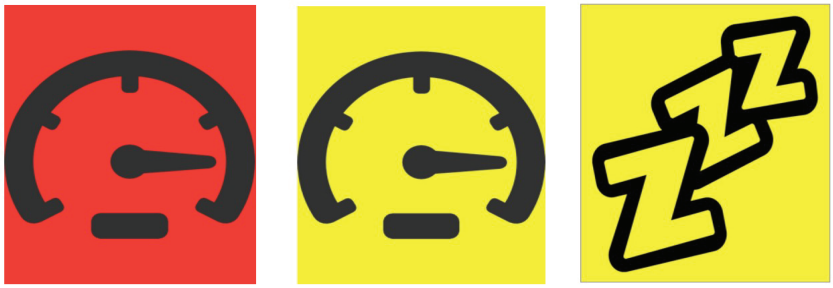




Final wireframes







REASONS FOR CHANGE

We conducted two user tests and had our interviewees perform three major tasks. We then drew conclusions based on our observations with their interactions with the app. The three major tasks were:

1. Pre-travel app setup on phone: with this task, the user sets up their desired notifications, namely:
    a. Sleepiness alert with user-set frequency
    b. Speeding alert with tolerance
    c. Blocking external notifications from other apps
2. Dismissing the speeding notifications by slowing down.
3. Dismissing the sleep notifications by interacting with the watch

Our conclusions:

1. The slider bar is not the best UI choice for setting a number. It prevents users from getting an exact number. A better alternative would be to let the user input the value they would like or choose from a list of preset values.

2. A worrisome effect of shaking the watch to dismiss a notification is that it isn't intuitive and can distract the driver.

3. Users don't know what each of the settings mean (e.g. "Speed tolerance"). We need a way to explain what the settings mean in the screen so that they are aware of what notifications they will be receiving.

4. The users didn't want to necessarily block out notifications from other applications, so we need a way to differentiate Shotgun notifications from notifications from other apps.

WHAT WE CHANGED

We made several changes from the intermediate to final sketches/wireframes based on feedback from user studies and contextual inquiry.

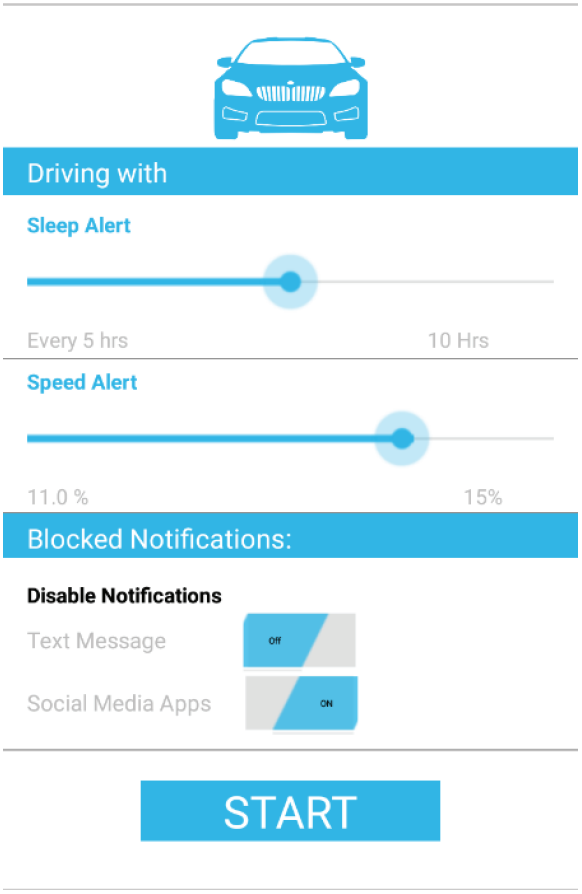
We got rid of the voice and map functionalities on the phone and made modifications to the "notification settings" page. First, we changed the title of the page from "Settings" to "Notification Settings" to be clearer about the functionality of the screen. We also got rid of the weather and gas/food alerts entirely based on the feedback we received from the contextual inquiries. There are signs on the highway indicating which exits have gas stations and restaurants, and weather isn't usually a major concern for driver, especially in California.

We also expanded the speed alert functionality by allowing the user to choose a speed tolerance. At first we made the speed tolerance unit miles per hour, but we later changed it to a percentage in order to make it more accurate. For the speed alert tolerance and sleepiness alert frequency, we added gray text below the blue circle indicator ("1.5 hrs") to indicate the current speed alert frequency.

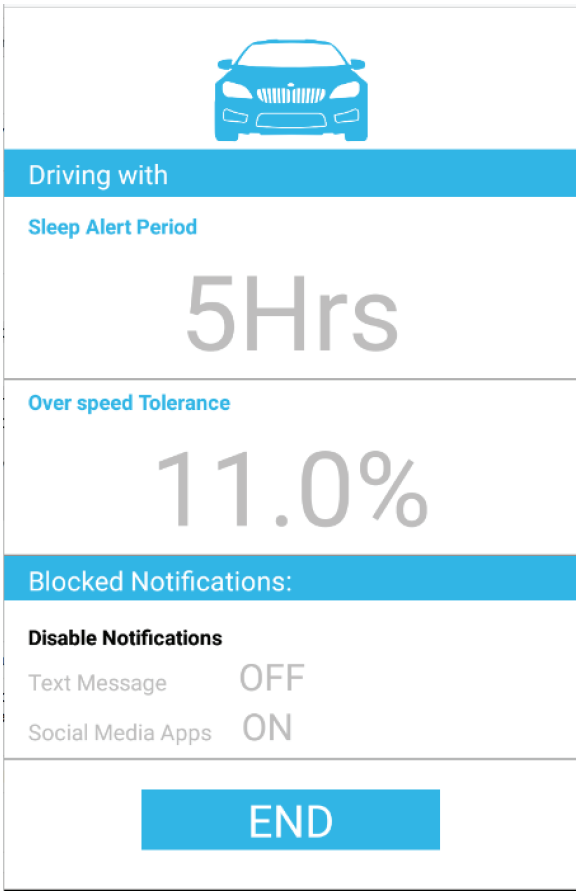
Another new feature we added is notification blocking. We give users the freedom to choose what type(s) of external notifications they want to block - "Text Messaging", "Social Media Apps" and/or "All but Google Maps". Finally, we added a start button so that when the button is hit, the mobile app will start calculating the current speed, querying the speed limit at the current location, and start the timer for the sleepiness alert. The watch will also start to listen for the notifications pushed from the phone.

FINAL DESIGN + TASKS

settings screen



driving screen



Before driving, users launch Shotgun and set safety notifications. They customize how frequently they want to be reminded to take a break and at what threshold above the speed limit they want to be reminded that they are speeding. Users can also choose which notifications to block (or not) while driving. Then, they hit the start button which starts the speed detector and timer for the app and changes the view to the driving screen.

FINAL DESIGN + TASKS

Alerts while driving

extreme speeding *speeding* *take a break*

Extreme speeding
When the user is driving above the threshold over the speed limit they initially set, the user is reminded to slow down with intense vibrations and a red notification on the watch.

Speeding
When the user exceeds the speed limit, the user is reminded to slow down with moderate vibrations and a yellow notification on the watch.

Take a break
When the time set for the sleep alert has elapsed, the user is reminded to take a break with slow vibrations and a green

TECHNICAL CHALLENGES

On this project we faced two major technical challenge in which our attempt to overcome them was rather educating.

Our first technical challenge was how to **determine the speed limit of specific location**. After a few different attempts, we eventually found a suitable api called OpenStreetMaps. Open-Street-maps is a crowdsourced endpoint that stores speed limit of major highways and residential area by location.

The second technical challenge we faced was **how to determine a user's current speed**. Initially, we thought this part would be easy if we used Google Maps. However, only a paid version of Google Maps offers this functionality, and we knew that this would be a deterrent to prevent the potential adoption of the app. Moreover, we wanted the app to be standalone and not require navigation, as we specifically wanted to focus on safety, not navigation. Eventually we decided to solve this problem by implementing it on the phone. To do this, we queried the Google api at short, regular intervals for location (latitude and longitude) and calculated the speed. We also ensured that the interval is short enough to prevent errors due to the natural curvatures of roads.