

Lo Fi Prototype Assignment Writeup

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Introduction

HealthMap - Drive safely and accountably.

We've all been there - at one point another, everyone has been a bit too tired, ill, or under the influence to drive. Though it may seem easier to just get in the car and drive regardless, those actions can have a wealth of negative consequences for you and your fellow drivers. So, we've created HealthMap, an intuitive and easy health verifier that tests your motor skills and makes sure you're in a safe position to drive - if so, you're good to go but if not, the app keeps you off the road.

Sketches

We made 22 sketches ranging over our 5 different modalities.

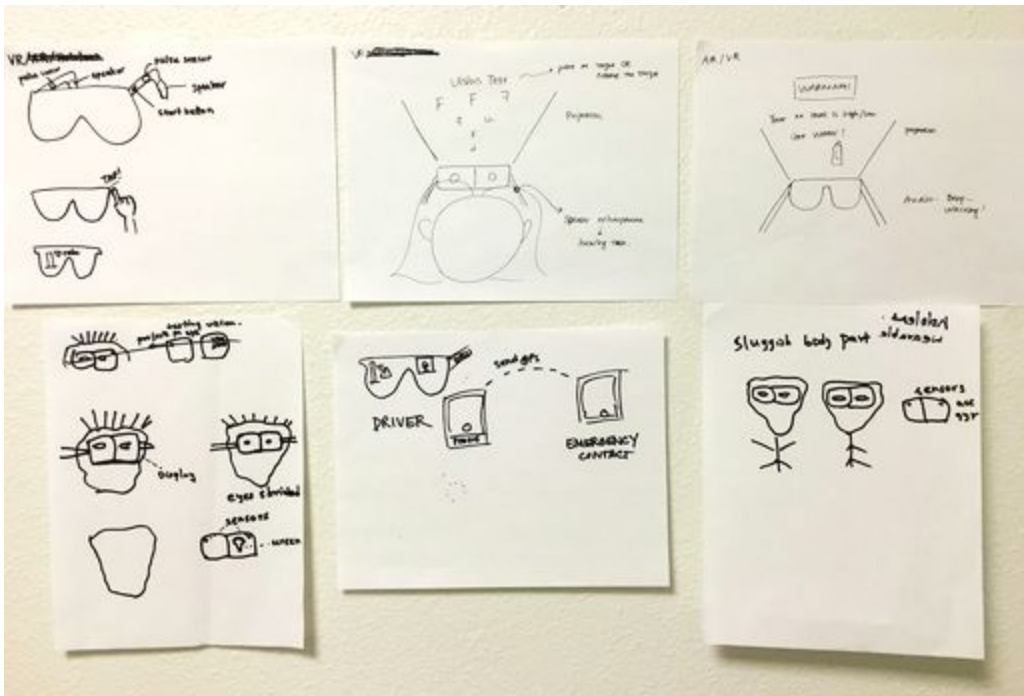


Fig 1: Virtual reality modality

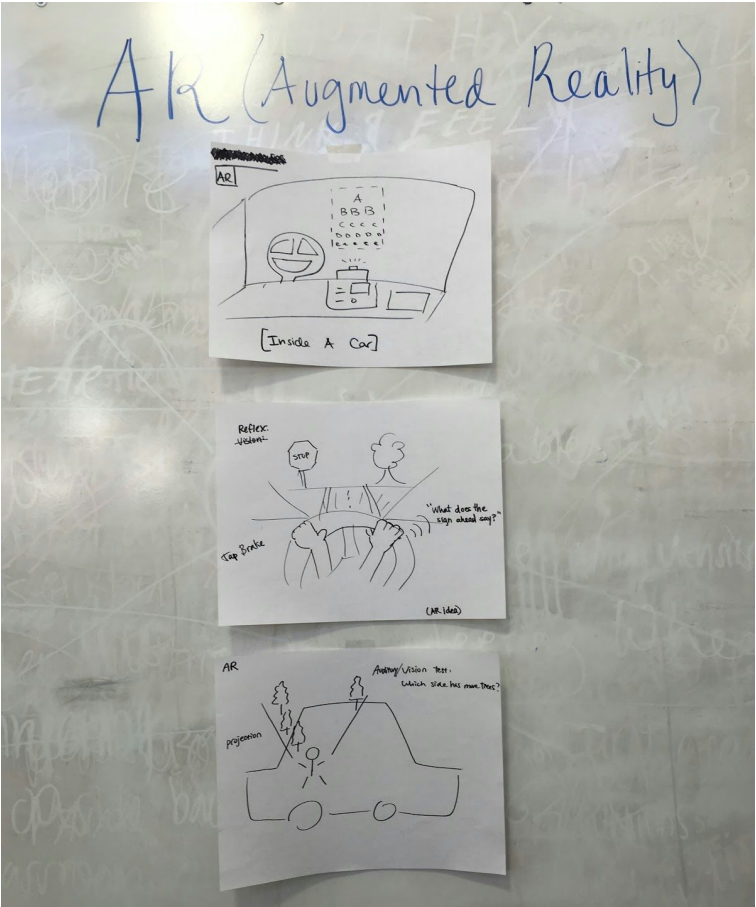


Fig 2: Augmented reality modality

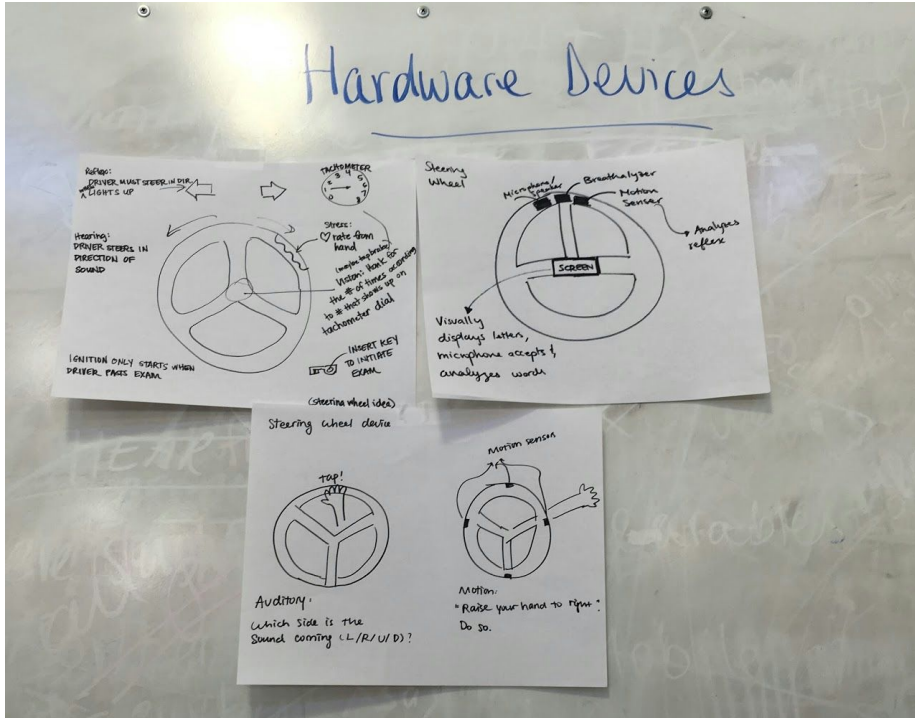


Fig 3: Hardware modality

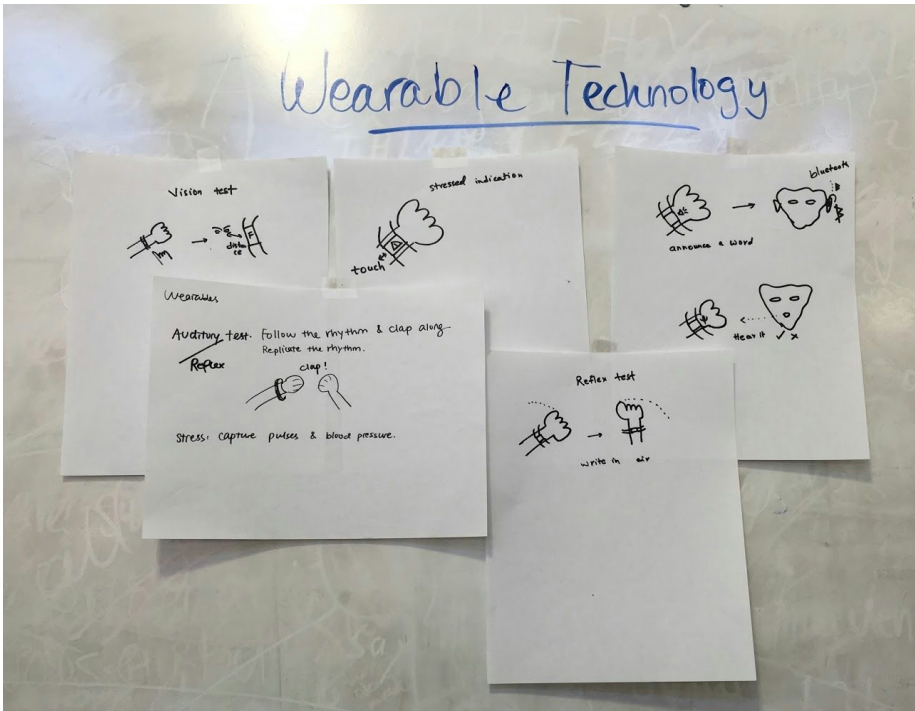


Fig 4: Wearables modality

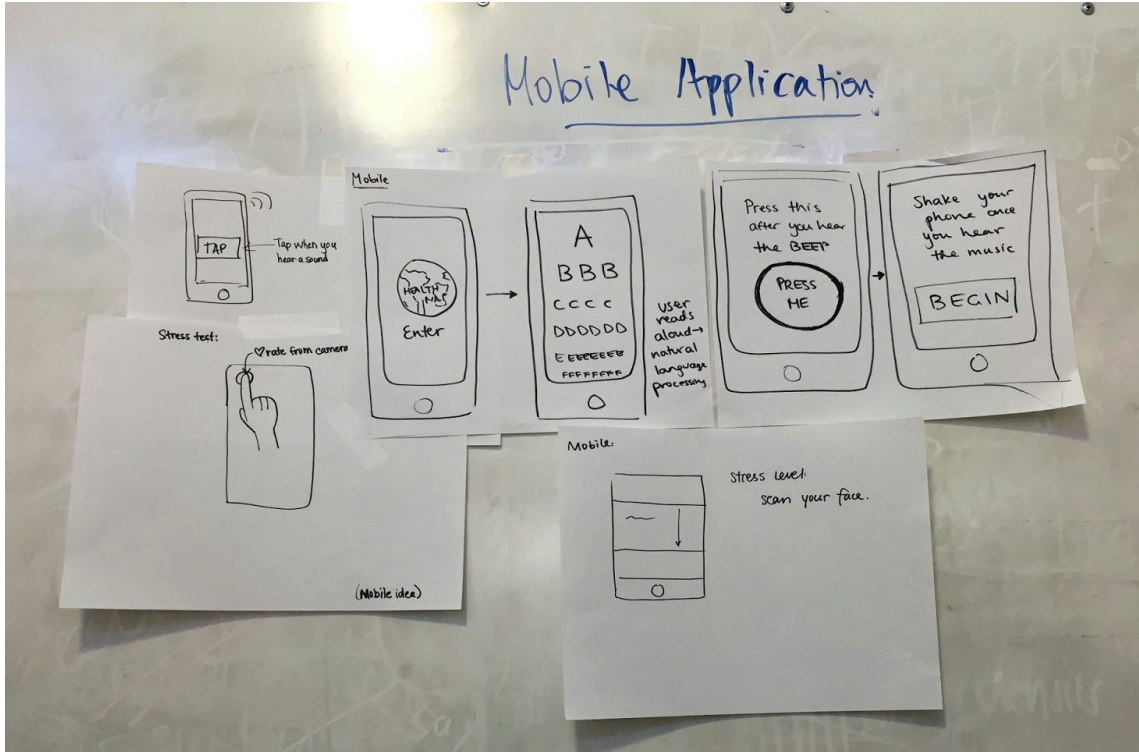


Fig 5: Mobile application modality

We then storyboarded our top two modalities, a mobile application and a VR headset.

Mobile Application

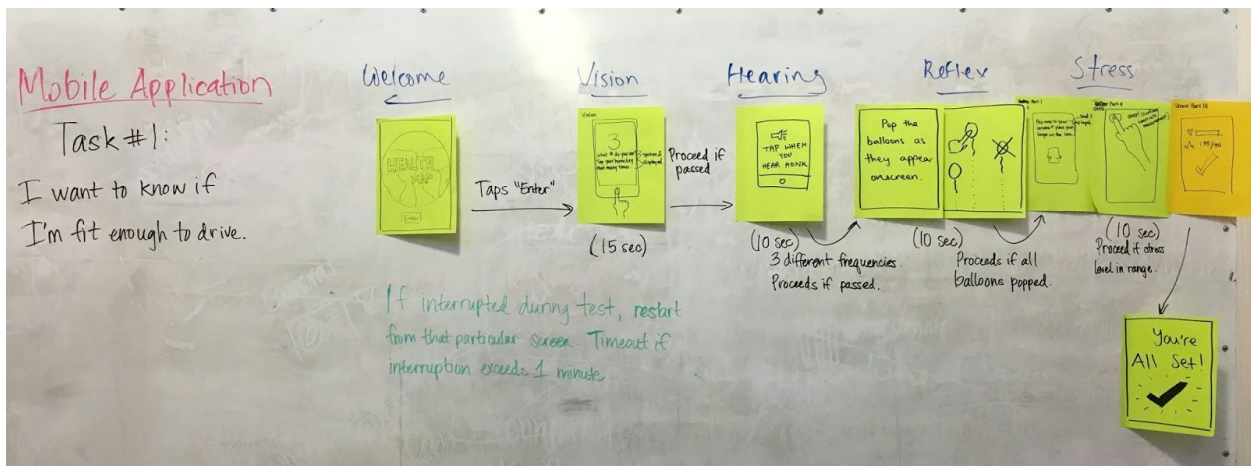


Fig 6: storyboard - mobile - Task 1

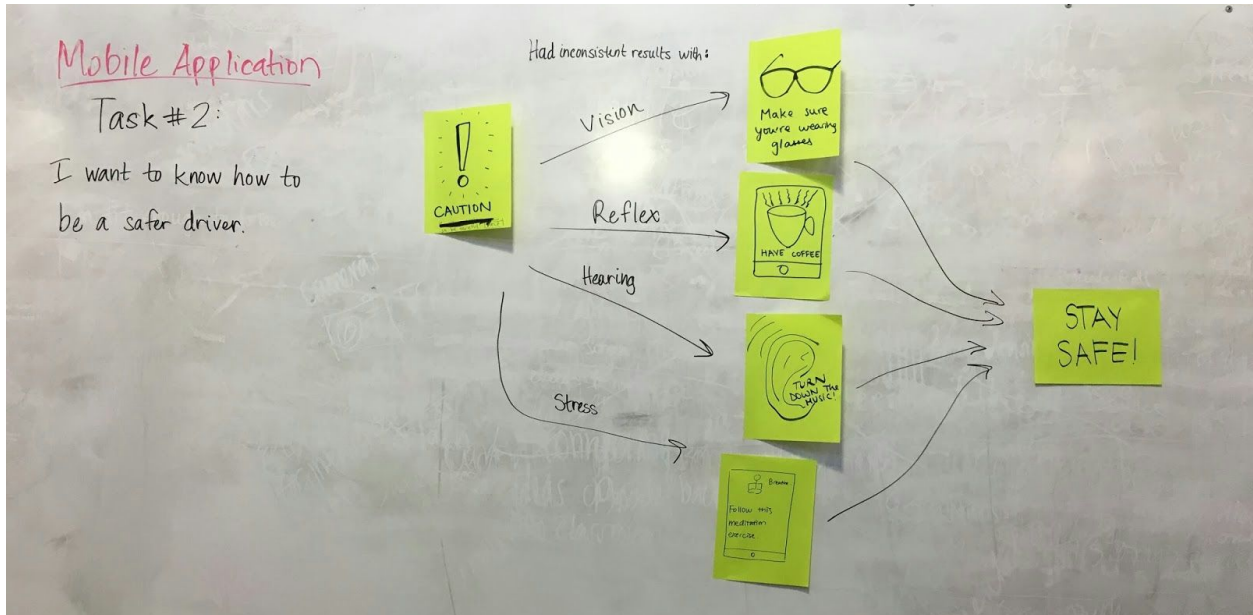


Fig 7: storyboard - mobile - Task 2

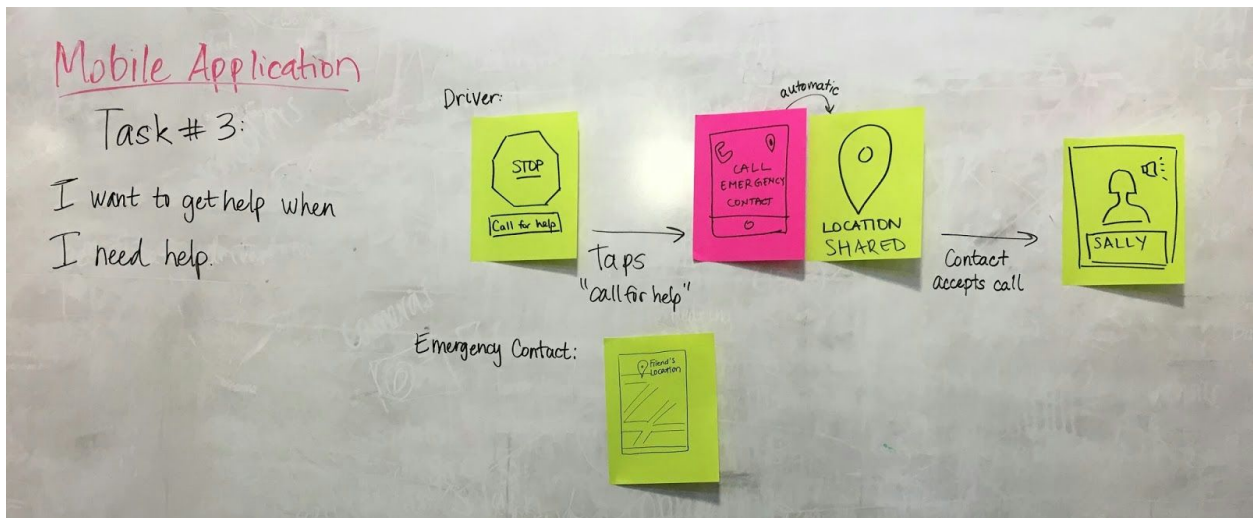


Fig 8: storyboard - mobile - Task 3

Storyboard for the VR headset experience

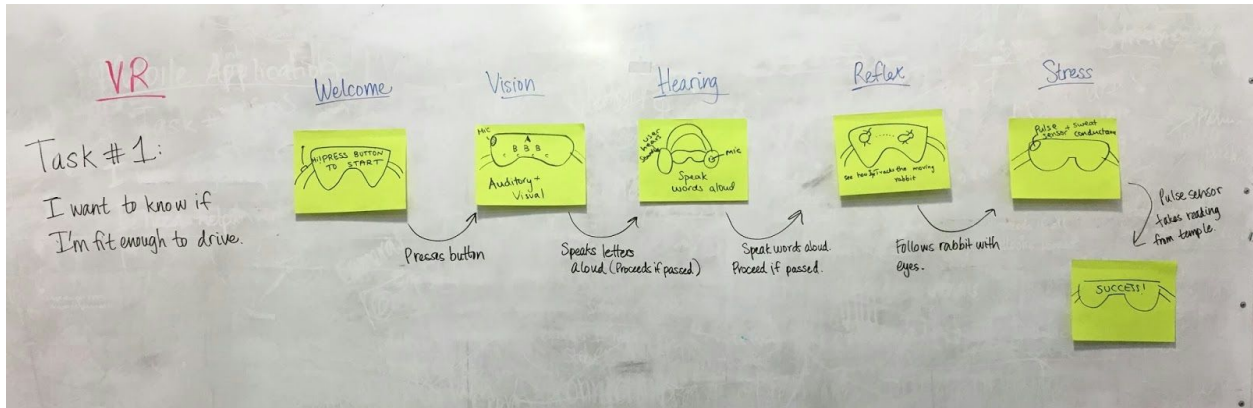


Fig 9: storyboard - virtual reality - Task 1

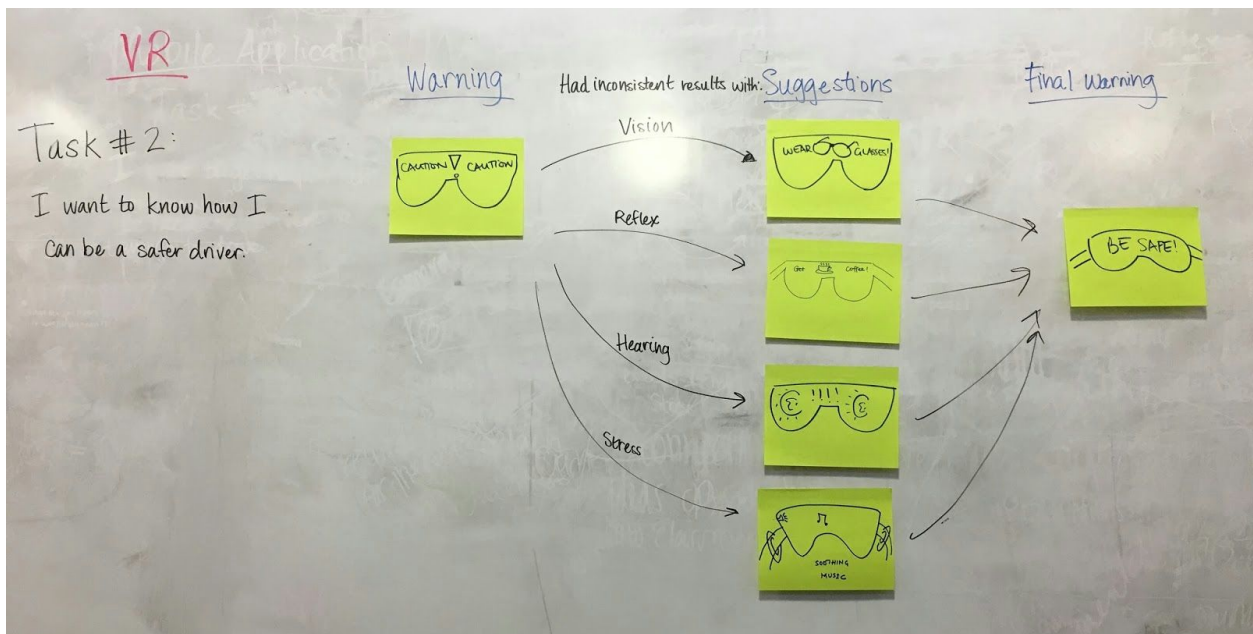


Fig 10: storyboard - virtual reality - Task 2

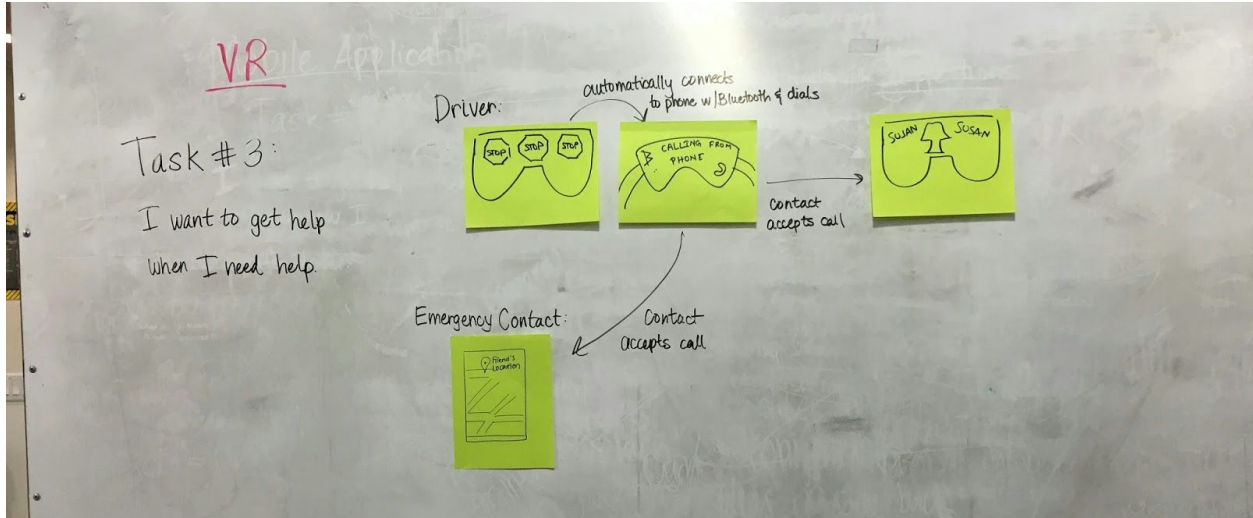


Fig 11: storyboard - virtual reality - Task 3

Selected Interface Design

We selected a mobile application for our prototype due to the core value add of our product - we want this to be something users can quickly and efficiently whip out each and every time they enter their car. Though a VR headset would have been an immersive experience, we want to make sure this product appeals to people slightly altered health-wise. With the current quality of VR imaging, the blurry visuals could cause an already ill person to become even queasier, confused, or addled.

In addition, a mobile application allows for much greater ease of use. Ideally, we want this experience to last for under a minute, and the very act of taking out, setting up, and using the VR headset would extend the process beyond that desired range.

Prototype Description

When the user first enters the app, they have two options. If this is the first time a user has entered the application, they are prompted to enter 3 emergency contacts. Otherwise, the app automatically detects whether the user has entered emergency contacts, and will move directly to the test.

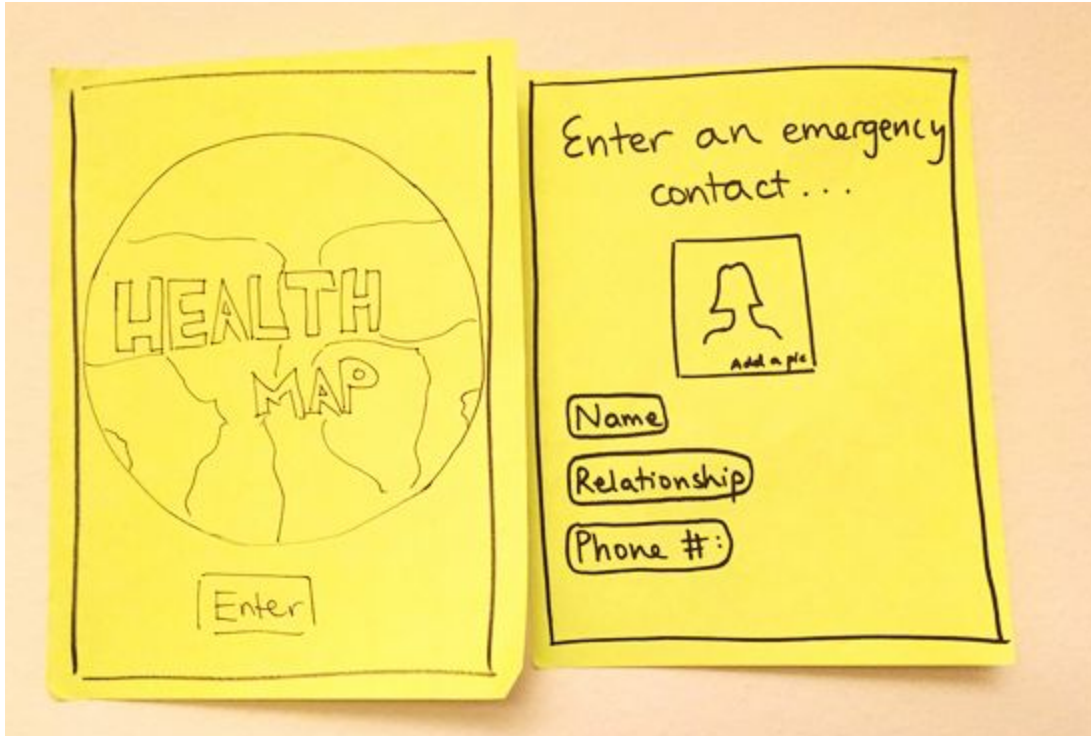


Fig 12: onboarding

The test is split up into four different parts - a vision test, a hearing test, a reflex test, and a stress test. The first screen the user sees is the vision test - they have to tap the screen the same number of times as the number displayed on screen. This repeats 3 times - the number on the screen changes and becomes smaller with time.

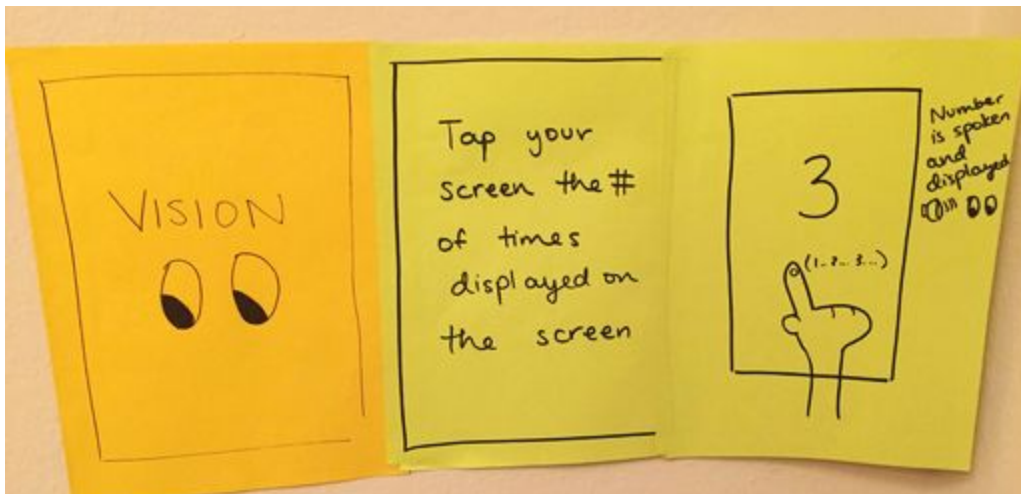


Fig 13- Vision Test

If the user passes, the next part is the hearing test, which asks the user to tap the screen when they hear a sound. The sounds increase in frequency, which make them harder and harder to hear as the test progresses.



Fig 14- Hearing Test

If the user passes, the next part is a reflex test, which involves the user popping all the balloons. Once all the balloons have been popped, the next step arrives.

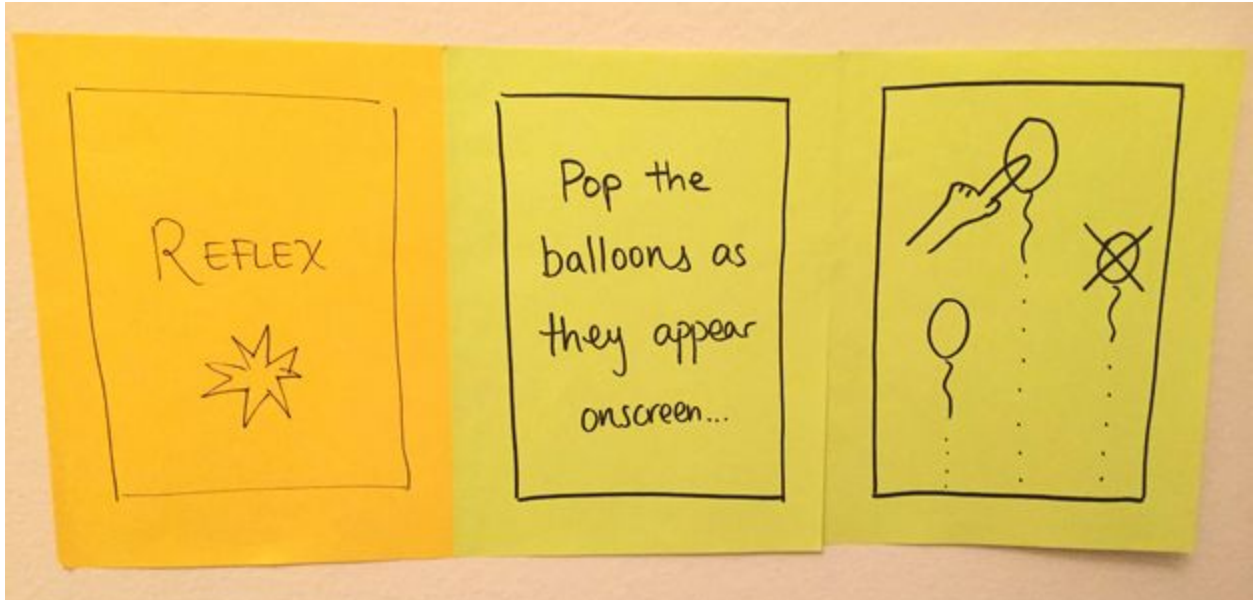


Fig 15 - Reflex Test

The last element is a stress test, using software that is currently available on the web. The user has to press their finger to the camera, and the software will determine their heart rate, sweat conductance, as well as other stress related metrics.

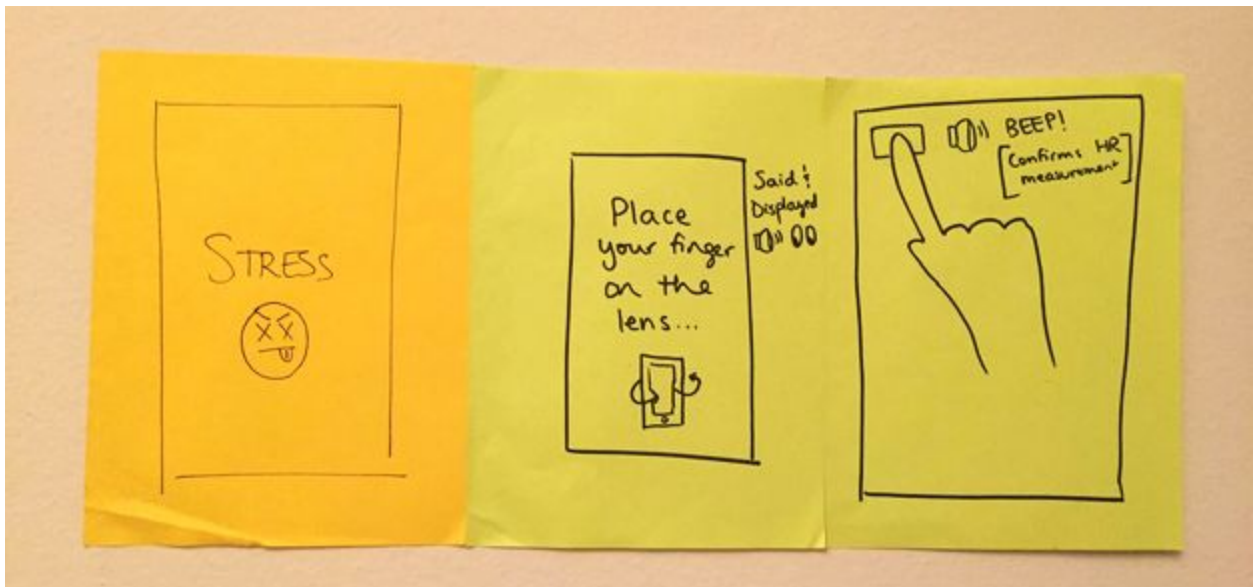


Fig 16 - Stress Test

Then, the user gets their result. If all their results have passed, they are told they are all good to go

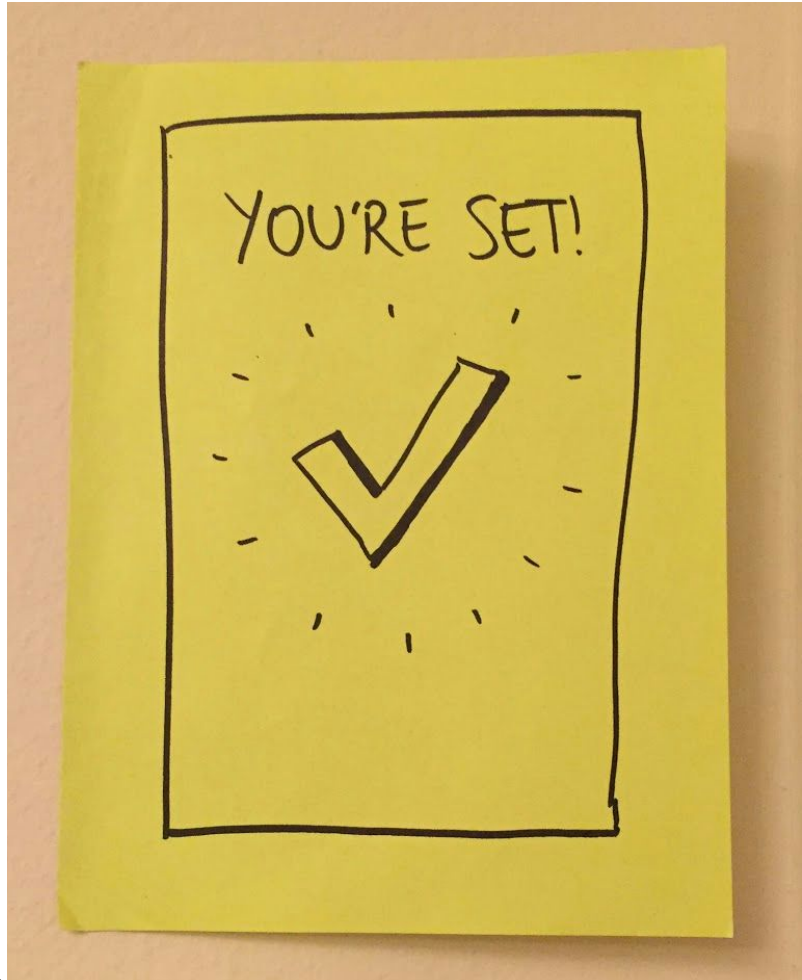


Fig 17 - Success!

If there is something to be worried about, the user is cautioned, and given some advice about how to perk yourself up. These preliminary pieces of advice include putting glasses on, turning down the music, drinking some coffee, and meditating to calm down.



Fig 18 - Potential screens if a user is told to be cautious.

If the tests fail at any point, it goes to the fail screen, where it immediately calls an emergency contact as well as shares the location. Then, it displays the contact being called as well as their ETA.



Figure 19 - Emergency Contact Reached

Method

Participant Recruitment & Testing Environment

We recruited participants by approaching people in Tresidder Union and asking them if they were interested in a short interview intended for a course project.

We made sure that the participants belonged to different age groups, as we were interested to see how people of different backgrounds and use cases would interact with the application. Specifically we interviewed three participants whose demographic information is provided below. We refer to the three participants as Participant #1, Participant #2, and Participant #3 in rest of the report.

Participant #1:
19 year old
Male
Works at Panda Express
Commutes daily in car
Has been driving for three years
from Palo Alto



Participant #2:
64 years old
Male
Entrepreneur
Commutes daily in car
Has been driving for 40 years



Participant #3:
36 year old with kids
Female
Teaching staff at Stanford
Commutes daily in car
Has been driving for 20 years
From southern California



Tasks

The detailed script we created for the interviews has been added to the Appendix for reference. We conducted our interviews in Tresidder and the surrounding area, including Treehouse and the Black Community Services Center. We first introduced our participants to the high-level goals of the application and the interview. Then, since we had crafted scenarios around our three tasks, we handed the corresponding prototype to each participant, stated the situation, and asked them to work through it.

The three tasks we intended to test on our participants are as follows:

Task #1: “I want to know if I am fit enough to drive”. This is a complex task. The paper prototype corresponding to this task aims at taking the user through all the tests that HealthMap conducts to assess whether it is safe for the user to drive. We asked the participants to imagine that they are about to start a car and that they are using HealthMap to make sure that they are fit enough to drive. Then, we provided them with the corresponding prototype.

Task #2: “I want to know what I can do to be a safe driver”. This is a simple task. This paper prototype is aimed at providing tips to the user if the test results from Task #1 suggested that the user should be cautious while driving. We asked the participant to assume that he performed poorly on one of the tests (ex: stress test). Then, we asked the participant to work through the prototype corresponding to Task#2. At the end of the test, once the user was done working through all three tasks, we also revealed the tips that would have popped up if he performed poorly in other tests.

Task #3: “I want to get help if needed”. This is a moderate task. This paper prototype aims at calling an emergency contact for help if the HealthMap decides that results from Task #1 are alarming and it is not safe for the user to drive. We asked the participants to imagine one of the tests (ex: reflex test) failed. Then, we asked the participant to work through the prototype.

Procedure

While conducting our user experiment, each team member took on a particular role. Phoebe was the greeter who gathered the background information about each participant; Karen was the facilitator who gave initial instructions and encouraged our users to vocalize their thoughts while testing our prototype; Niharika served as the computer to simulate the transitions according to the user’s input; and Manikanta recorded, photographed, and observed our user’s interactions throughout the experiment.

We requested the participants to think out loud as they interacted with the prototype. We explained that they are encouraged to ask questions or raise concerns, but that we would only be answering them at the end of the tasks.

Test Measures

During our experiment, we looked for quantitative data such as how long it took for our participants to complete the tasks, as well as the number of confusing moments they experienced, which could be indicated by a verbal question or even a quizzical facial expression. With respect to process data, it was important for us to gauge whether the phases of the health check appeared relevant to users in the scenario, as our complex task is to help the user determine not if he is healthy, but rather if he is healthy enough to drive.

Results

We summarize the results from the interviews of each of the three participants below.

Participant #1:

- Identified the intention of each test (whether is it is for vision, hearing, etc)
- Appreciated the relevance of the tests for driving
- He himself queried what would happen if one of the test fails - he himself led us to the next prototypes
- Confused by the text description of the vision test
- Suggested including a confirm button when user input is necessary. For example, what if

a user accidentally taps slowly during the vision test?

Participant #2:

- Was excited about the reflex test (with balloons) and stress test
- Assumed that the car fires up only if the user passed the tests. When we explained at the end of tasks that the application doesn't have that power, he was surprised and mentioned that it was interesting.
- Suggested that people may not be receptive to a machine telling them not to drive - they may drive anyways
- In the vision test, suggested that as we make the size of the numbers smaller, we also change the numbers
- Would prefer calling 911 instead of preset emergency contacts. Quote of the year: what if I get drunk at my girlfriend's house and the app calls my wife?

Participant #3:

- Reflex test with balloons is funny
- Impressed by the stress test and liked the stress part
- Liked the feature that HealthMap automatically dials for help
- HealthMap is easy to set up
- She would like to have an emergency call button without going through the tests (for example, if the driver gets in an accident or something)
- It will be useful if the health information of other family members is also fed into HealthMap so that the paramedics have the necessary information to attend to both driver and passengers in the vehicle (e.g. known allergies, medications)

Discussion

We gathered some important design insights from our interviews. We will make changes to our prototype based on the user feedback we collected from this test and validate the modifications in future studies.

Text Instructions for the Tests

We observed that Participant #1 was unwilling to read the text for the tests. As a result, he became confused about how to interact with the app. For example, Healthmap provides a visual cue stating that a vision test is about to begin, followed by text instructions for how to perform the test. We found that Participant #1 only skimmed the instructions, and so was confused what

to do when presented with the vision test screen.

From this, we realized that a very useful addition would be the introduction of audio cues as well. We could also reword our instruction to make it a bit more concise and direct.

Emergency calling bypassing the tests

Participants wanted to be able to rapidly call for help during an emergency, and bypass the rest of the tests. This is a particularly useful insight for the “third” task we intended for HealthMap - “I want to get help when needed”. We realized that users may themselves determine that they are not capable of driving without needed an application to determine it on their behalf. Then, it is logical that we provide emergency call button without having the user to go through the tests.

HealthMap history

Participant #3 wanted to be able to feed health information into HealthMap. This information includes allergies and health histories, and is aimed to help paramedics or health professionals in emergency situations. This is an useful insight for the “second” task - “I want to know what I can do to be a safe driver”. It would be helpful to provide users with their recent history along with tips to improve health safety.

Miscellaneous

Participants mentioned that numbers for vision test should change along with their size on the screen. Users mentioned confirm buttons would also be helpful. Another interesting insight we found was that if people were familiar with the action of popping balloons from previous games or experiences, then they barely needed to read our text instructions. As we consider how to redesign our prototype, we want to focus on extremely intuitive interactions that will be familiar to most, if not all, users.

We conclude with summarizing the user interface problems and the possible solutions.

Problems detected	Severity*	Possible fixes	Task #
Confusion about test instructions in text	4	restructuring text; test instructions through audio	1

do not realize 911 emergency can be added as one of the emergency contacts	4	show 911 as default contact	onboarding
History of user tests	2	have history button at start	2
user confirming that he is done with tapping in vision test	3	add a conform button on a vision test screen	1
direct emergency call bypassing tests	2	have a button for direct calling at the start of test screen	1

*

Appendix

Testing Script

Greeting

Hi! We're in a computer science and d.school class, and we're doing a project that requires some user input. Do you have a few minutes to spare so that we can test our product on you?

Ask for consent

Thanks so much for agreeing to be a part of this study. Before we begin, we just need you to sign a quick consent form so that Stanford won't be liable for any of the questions we ask you during this study.

Demographic Info

Before we start the testing, we'd like to collect some demographic information about you.

- 1. What is your age?*
- 2. What is your occupation?*
- 3. Where are you from? (Where did you grow up?)*
- 4. Do you drive?*
- 5. How often do you drive?*
- 6. How long have you been driving?*

Brief description of the overall product

We're making an application to help drivers get a measure of their health before starting the car. Our prototype involves a few health tests, and will let you know whether or not you're ok to be on the road.

Onboarding

When you first open the application, it prompts you to enter 3 emergency contacts. These are important so that if you're ever unable to drive, these people will be contacted to come pick you up.

3 tasks: *now imagine it is your 2nd time opening up the app.*

Task#1 – “I want to know if I'm fit enough to drive”.

1. College student: *Imagine you are a college student after a night out - though it has been a few hours since you had your last drink, you want to make sure you are truly fit enough to drive. (show the corresponding section of the prototype to participant).*
2. Elderly: *Imagine you have just returned home and are rehabilitating after a surgery. Before you get in your car, you want to test to make sure your health is stable enough to drive. (show the corresponding section of the prototype to participant).*

Task#2 – “I want to know how to be a safer driver”.

1. *Imagine that you just finished a big project and you want to drive home. However, you are really tired so you want to use this product to see if you are in a good shape to drive. If not, you want to know what you can do be a safer driver.*
2. *Looks like you did poorly on vision/hearing/reflex/stress, now it will pop up the following screen. (show the corresponding suggestion page)*

Task#3 – “I want to get help when I need help”.

- *Imagine that our health metrics suggest that you are unable to drive. It will pop up the following screen. (show the corresponding section of the prototype to participant)*

Consent Forms

Consent Form

The HealthMap application is being produced as part of the coursework for Computer Science course CS 147 at Stanford University. Participants in experimental evaluation of the application provide data that is used to evaluate and modify the interface of HealthMap. Data will be collected by interview, observation and questionnaire.

Participation in this experiment is voluntary. Participants may withdraw themselves and their data at any time without fear of consequences. Concerns about the experiment may be discussed with the researchers (Niharika B, Phoebe F, Karen T, Manikanta K) or with Professor James Landay, the instructor of CS 147:

James A. Landay
CS Department
Stanford University
650-498-8215
landay at cs.stanford.edu

Participant anonymity will be provided by the separate storage of names from data. Data will only be identified by participant number. No identifying information about the participants will be available to anyone except the student researchers and their supervisors/teaching staff.

I hereby acknowledge that I have been given an opportunity to ask questions about the nature of the experiment and my participation in it. I give my consent to have data collected on my behavior and opinions in relation to the HealthMap experiment. I also give permission for images/video of me using the application to be used in presentations or publications as long as I am not personally identifiable in the images/video. I understand I may withdraw my permission at any time

Name Aderis Williams

Participant Number #1

Date 10/20/15

Signature [Signature]

Witness name Carmen Tameo

Witness signature [Signature]

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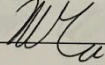
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Name Gerard McHale

Participant Number #2

Date 10/20/15

Signature  ~~Gerard McHale~~

Witness name _____

Witness signature _____

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Name Melissa Dabiri

Participant Number #3

Date 10-20-15

Signature Melissa Dabiri

Witness name _____

Witness signature _____

Raw Data

Participant#1

Task 1

Age 19

from east palo alto

drive daily and sometimes to work

3 yr driving experience

identified vision test

asked what is meant by this text description for vision test?

Identified balloon popping as the task for reflex test

Taks 2

scenario where reflexes were bad

comfortably glanced

Task 3

asked himself if he was drunk and the reflexes were very bad

asked if it gives out his location to a friend

asked what if no friends

At the end

instructions are confusing

put conform button

what if I ignored the app

Participant#2

Task 1

asked what is meant by spoken and displayed in vision test prototype

said good to balloons test

said nice to stress

everyone will go bad on stress

at the end of test, asked if the car fires up and goes

Task 2

scenario where reflexes were bad

Task 3

people may not be receptive to machine telling them what to do

I don't want to call people I know in some situations

not call preset contacts

Overall

Interesting

who are the target consumers/ what is the market

useful when vehicle stopped

vision also testing cognitive

Participant#3

Task 1

thought out loud

balloons funny

for stress, ah...ok reaction

said "I like stress part"

Task 2

scenario where reflex test went bad

she said app notices if you are alert

Task 3

oh... it automatically dials for help

want to call emergency without tests

want to include family information

paramedics

accident

Overall

useful. she said "I would use such app"