

A decorative graphic consisting of five horizontal black lines of varying lengths. Each line has a colored circle at its right end. From top to bottom, the circles are: orange, light blue, reddish-brown, light blue, and olive green.

Wearable for the Blind

Human Computer Interactions - 315

Eunki Chung

Fall 2016

Daniel Cheon

Shabi Kashani

Clarissa ter Maat

1

Research

Problem Statement
Steps / Methodology
Background Information
Umbrella
Social
Navigational
Informational
Center for Blind & Low Vision
Blind Tests - Home and In-Class
Framed Questions & Insights
Relevant Technology
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Experience Maps
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Research
Development
Movie

Who are We?



Daniel Cheon

Seoul, Korea
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Phillipenes

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Service Design



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Design



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Industrial Design



1

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Background Information

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Solution Statement

The Problem

Individuals with low vision or blindness are missing a valuable biological component for their daily lives

Their disability causes social, navigational, and informational impairment

Steps / Methodology for Research

Secondary Research
Articles
Videos
Websites
Apps
Clinical Articles

Field Research
Savannah CBLV
Interviews
Documentation
Field Notes

Primary Research
P.O.V. Study
Apps
Voice Over
Role Play

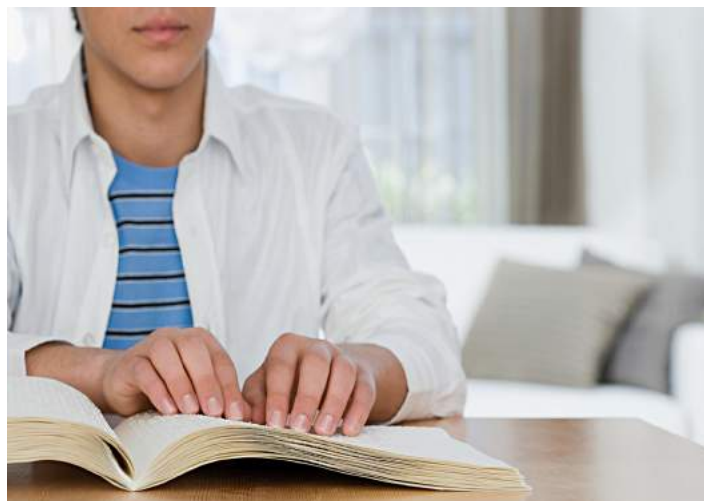
We categorized down some of our research into **three** pillars



Social Impairments



Navigational Impairments



Informational Impairments

Social Impairments

Verbal communication is the primary means of interpersonal communications. There are some difficulties due to inability to intake facial expressions and body language

Many express the feeling that society does not recognize the blind as human

Blind people don't want to be pitied or randomly helped, but like anyone else, if they seem to need help, help

Many find difficulties in making new friendships or romantic relationships

**"...One of the really horrible things is being on a date... in about half way through, you have to ask her,
'Hey, you know where the bathroom is? Maybe could you take me there?' because you know, even if she told me, I wouldn't know because I'd have never been there!"**

Navigational Impairments

There are two types of Travelers:

Those who always take the same route to go to the same places

Those who are willing and able to venture towards different places

It's the little things, special knobs help identify different appliances such as washing machines, dryers, microwaves, etc.

Canes and GPS are the most commonly used and reliable navigational tools

Some have anxieties when going to new places or populated public areas

Mental mapping helps the blind identify where objects are

Use of auditory and tactile cues to understand where objects are

"Walking into the airport, for example, it drives me nuts! I'll just have to sorta stand there for a minute and try to figure out where the counter is to check in."

Informational Impairments

The blind rely on other senses, particularly auditory and tactile to acquire information

Congenitally blind tend to code spatial relations in a small space drawn within their mind, and use their own body as the reference point

The blind have to pay attention with their ears to acoustically locate objects in their surroundings - particularly to footsteps and moving objects

Information intake is slowed down because hearing words cannot be as fast as reading

Some never attempt to learn braille

“My image of the table is exactly the same as the table... It has height, depth, width, texture; I can picture the whole thing all at once. It just has no color.”

Savannah Center for the Blind and Low Vision

We were given a tour of the facility, performed interviews, documented our time and took field notes

We learned about different levels of vision, available technology, psychology, different programs, building a future, navigation, systems and living life

"Hearing a voice benefits some"
- Kaleena Coyle

"It's a rewarding job to make
a difference and to see their
growth from day one to when
they graduate"
- Kim Hamner

"So much thought process goes into
everything when you're blind"
- Kim Hamner

"...very individualized
treatment that's personal to
each patient"
- Fabian Hinostroza

**"They've lost their
sight, not their vision"**
- Anika Futch



Blind Test

Our team blind folded ourselves and others for a period of time while doing every day activities

The faculty at CBLV came to our class and spoke about the center and showed the class some technology that's out in the market for the blind



So we asked ourselves...

How can we create passive affordances for the blind?

How can we create something that caters to as many different kinds of visual impairments as possible?

What is more needed, a tool for coping, or a specific task?

So our Insights are..

Mind mapping is key into navigating and interacting with any object

The technology is there to help the blind in so many ways, but they are mostly expensive

Any day-to-day activity involves so much brain power, and it is easy for the blind to get mentally exhausted

Affordances - particularly for mobile experience - are difficult to facilitate for the blind

The ultimate goal of aiding the blind should be helping them integrate to the society better

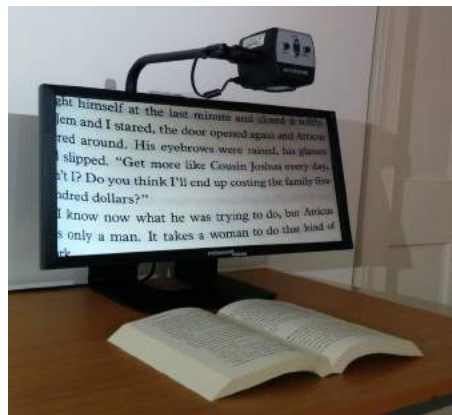
Relevant Technology



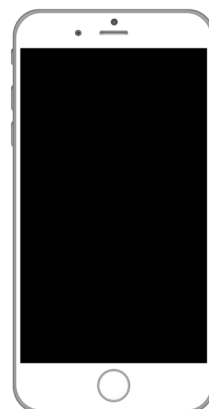
Amazon echo



OrCam

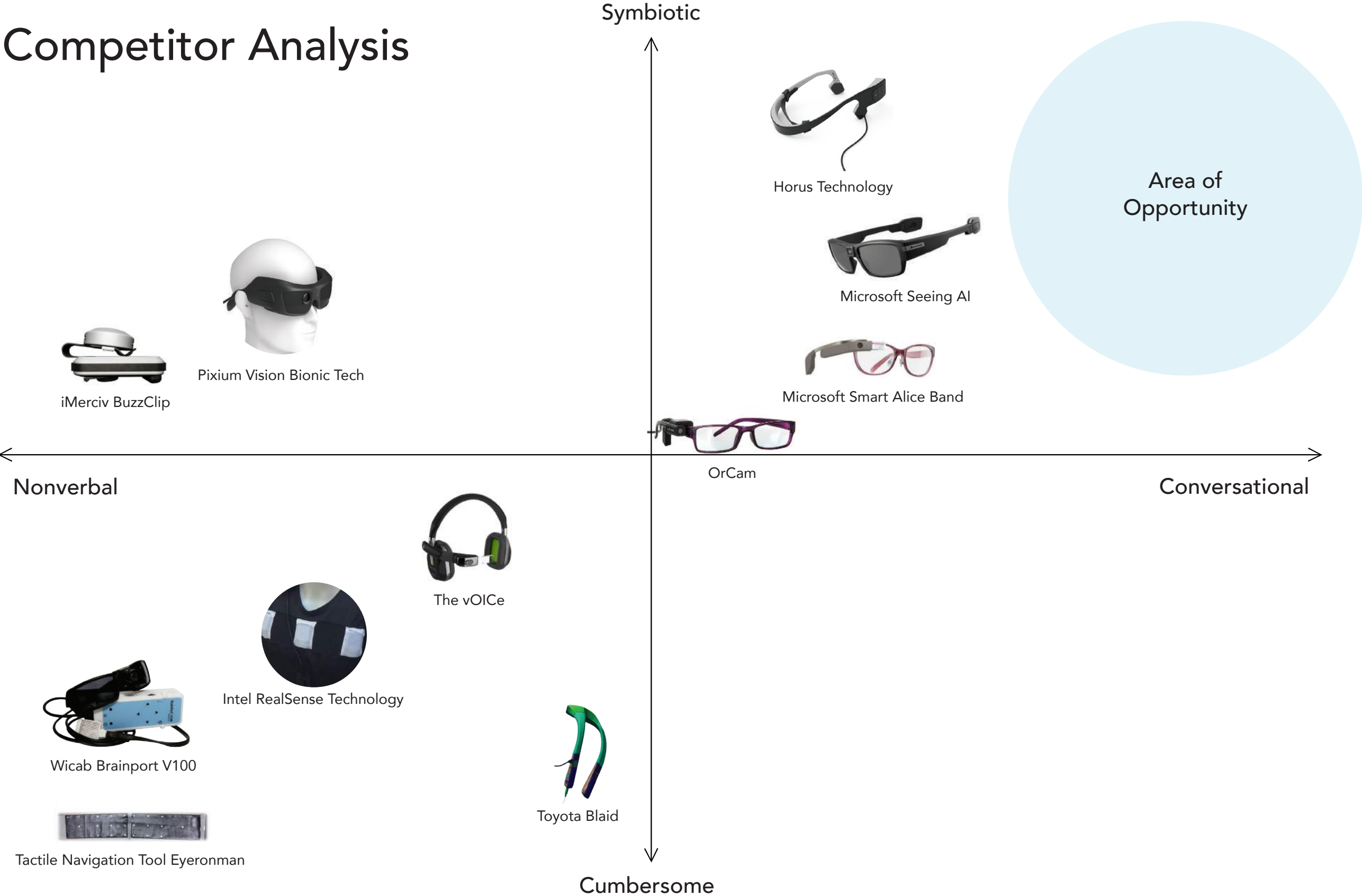


Enhanced Vision Machines



iPhones

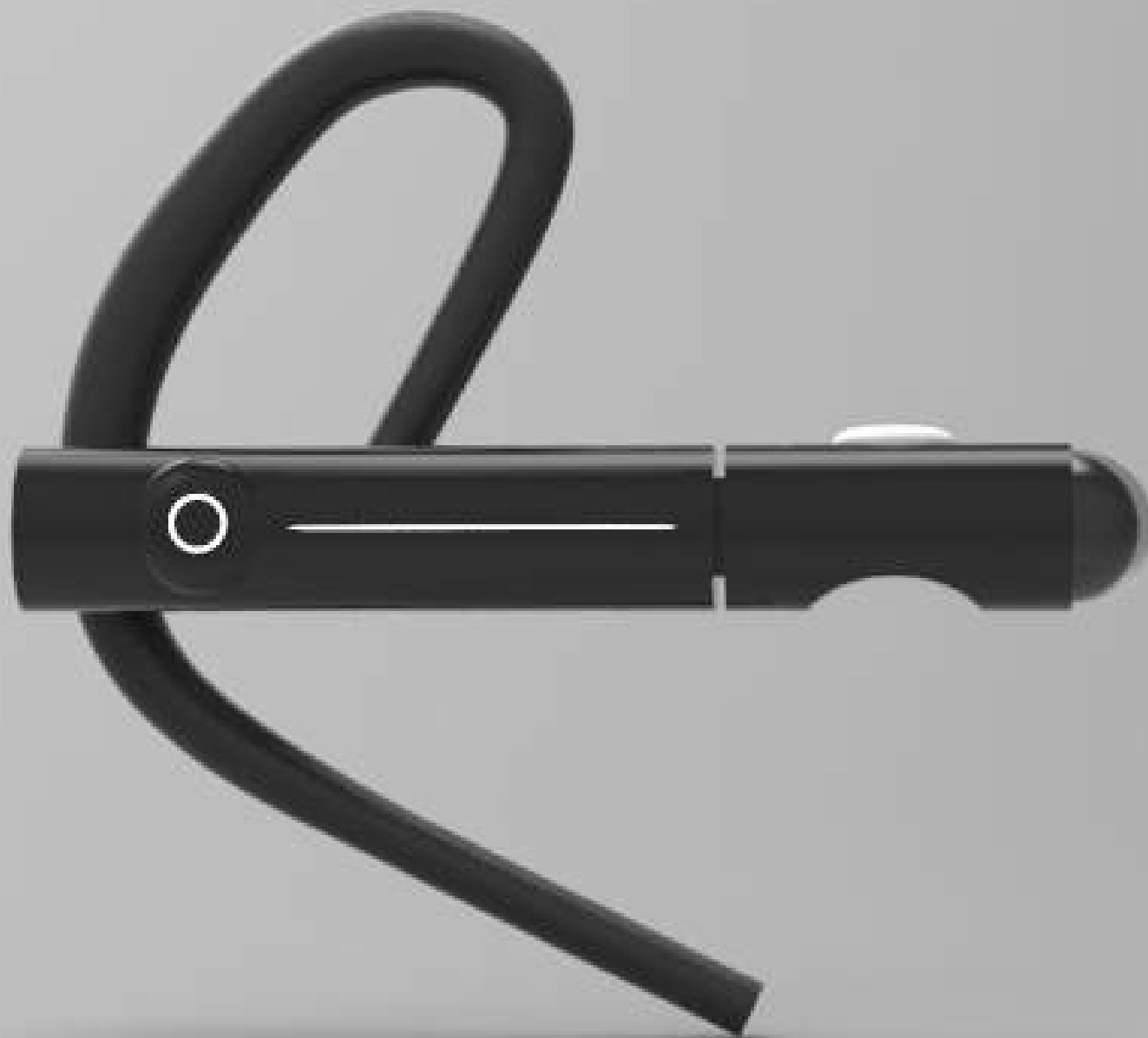
Competitor Analysis



The Solution

Our design will aid the visually impaired by improving their quality of life through a wearable and mobile interactive solution

Our design will ultimately **enhance** its users' **confidence** in achieving day-to-day tasks, and **allow** them to feel more **integrated** within their communities



2

Aida

Overview Statement

What?

How?

Features

Design

Mockups

Aida

Aida is a wearable assistant for the blind and visually impaired. It describes the world and guides the user through it. It recognizes faces, objects and obstacles. It's recording device, camera and storage unit all in one

Aida is meant to be not just an AI, but a companion that grows and learns with its user

What?

Aida is a wearable device with a companion cloud computing mobile app. It observes, understands and describes the environment to the user, providing useful information with the right timing and in a discreet way. Aida is able to read and scan texts, recognize faces, objects and much more

How?

Aida is powered by a cloud computing app downloaded to the user's smartphone. The wearable earpiece is connected to the mobile device via bluetooth. The wearable is a combination of state-of-the-art optics and power efficiency

The user can activate each functionality through simply speaking. The headset has two buttons: a customizable button and an awareness button

Machine Learning

Aida's database is constantly growing through the use of big data and machine learning.

Aida is able to remember its user's frequent locations, and patterns in navigation. Aida is connected to the Internet where it can search the web in order to understand the signs and symbols around it, and use Google's 3D maps to create a 3D model of the space it's within. It is able to understand pedestrian-safe zones and spatial data in order to offer the user detailed GPS turn-by-turn navigation.

Machine Learning

Aida can recognize faces and add a name to a face by understanding when the user addresses someone. Aida then is able to add recognized faces to images taken by the user through a facial recognition algorithm. If Aida does not immediately learn a face, the user can simply introduce he or she to Aida.

Aida is able to describe a photo its user by using Facebook's DeepMask, SharpMask and MultiPathNet software. This allows Aida to be fed huge amounts of data until it can autonomously recognize other data.

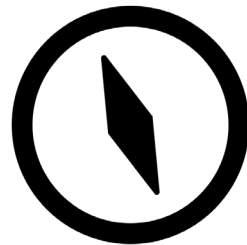
Device Features



Personal Assistant



Learning / Growing Capability



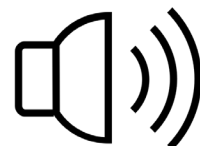
GPS and Navigation



Record Images, Audio, Video

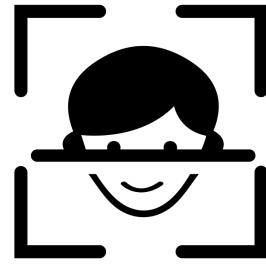


"Hot" Button

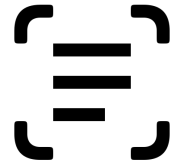


Light & Sound Omit

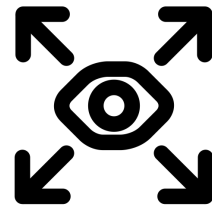
Device Features



Face Recognition



Text Recognition



Spatial Awareness



Object Recognition



Spatial Awareness Button

App Features



Find Wearable



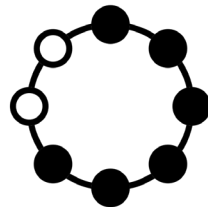
GPS and Navigation



Save / Edit Locations



Determine Voice of Wearable
(speed, language, gender)

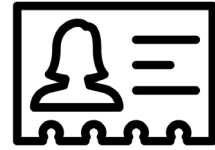


Level of Assistance



Keyboard Options

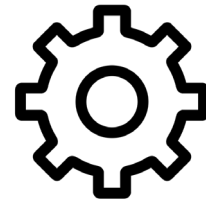
App Features



Customize your device name



Fingerprint Security



Customize "Hot" Button



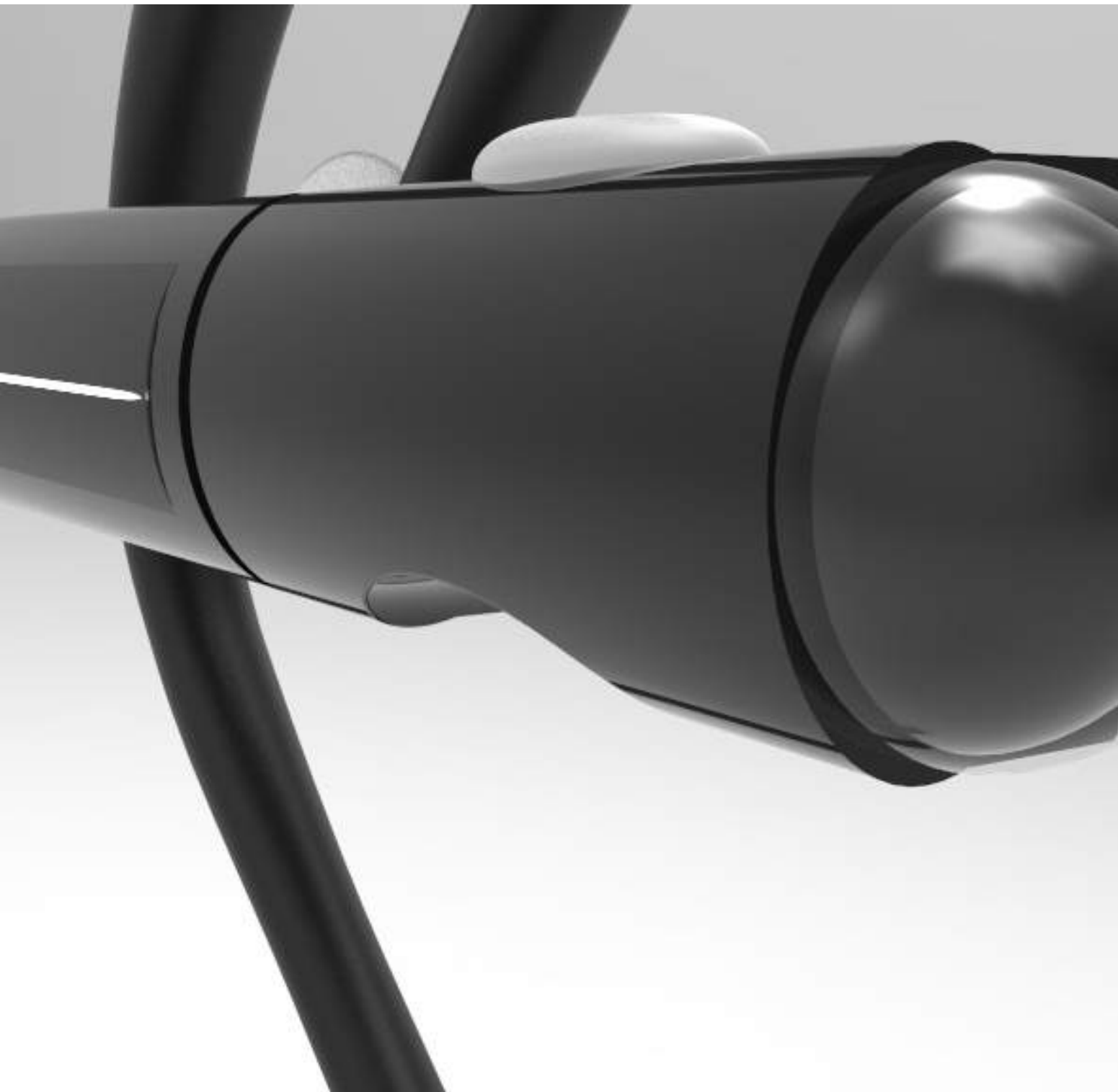
Add / Edit Fingerprint Security



Save Identities (add, upload)



Save and Send all Records

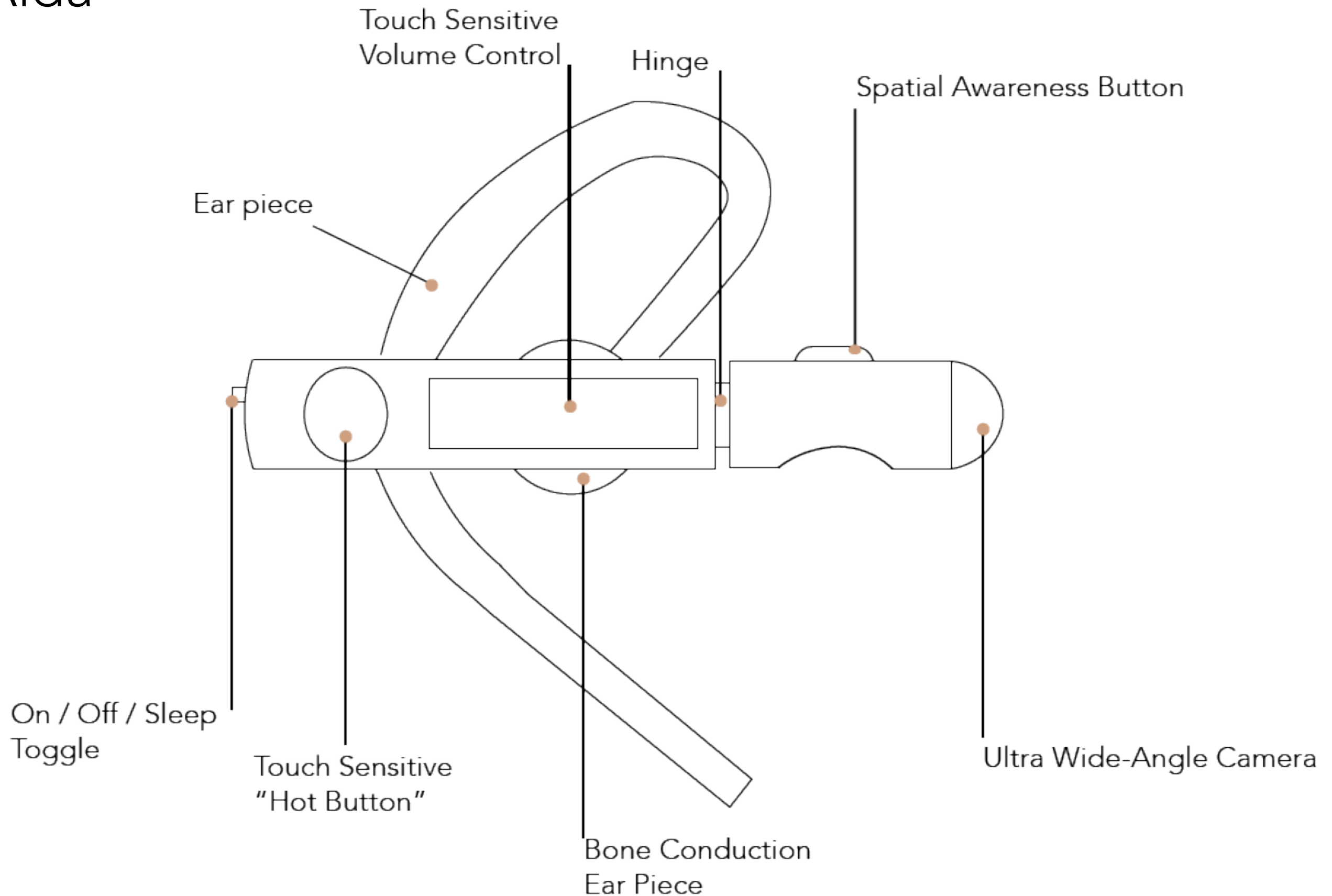


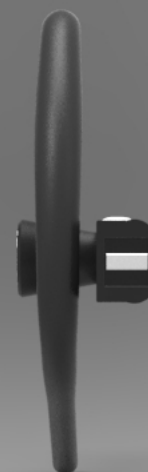
Design

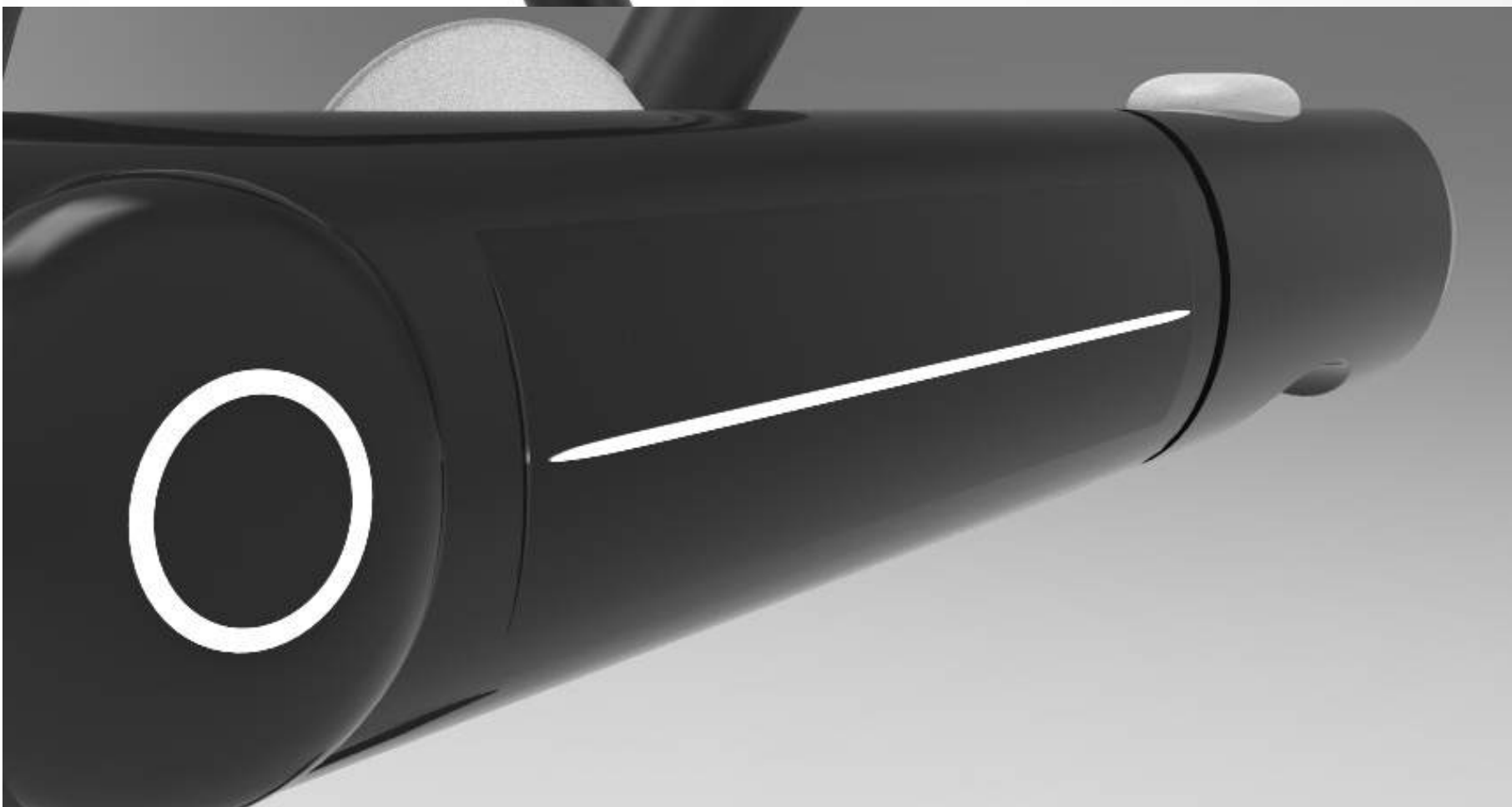
Aida is composed of a wearable headset and a downloadable app that is iPhone and Android compatible.

The headset sits comfortably on one's ear. The device holds the camera and the small speaker, while the app contains all your personal information. This includes all the images, audio and video that you take with Aida.

Aida



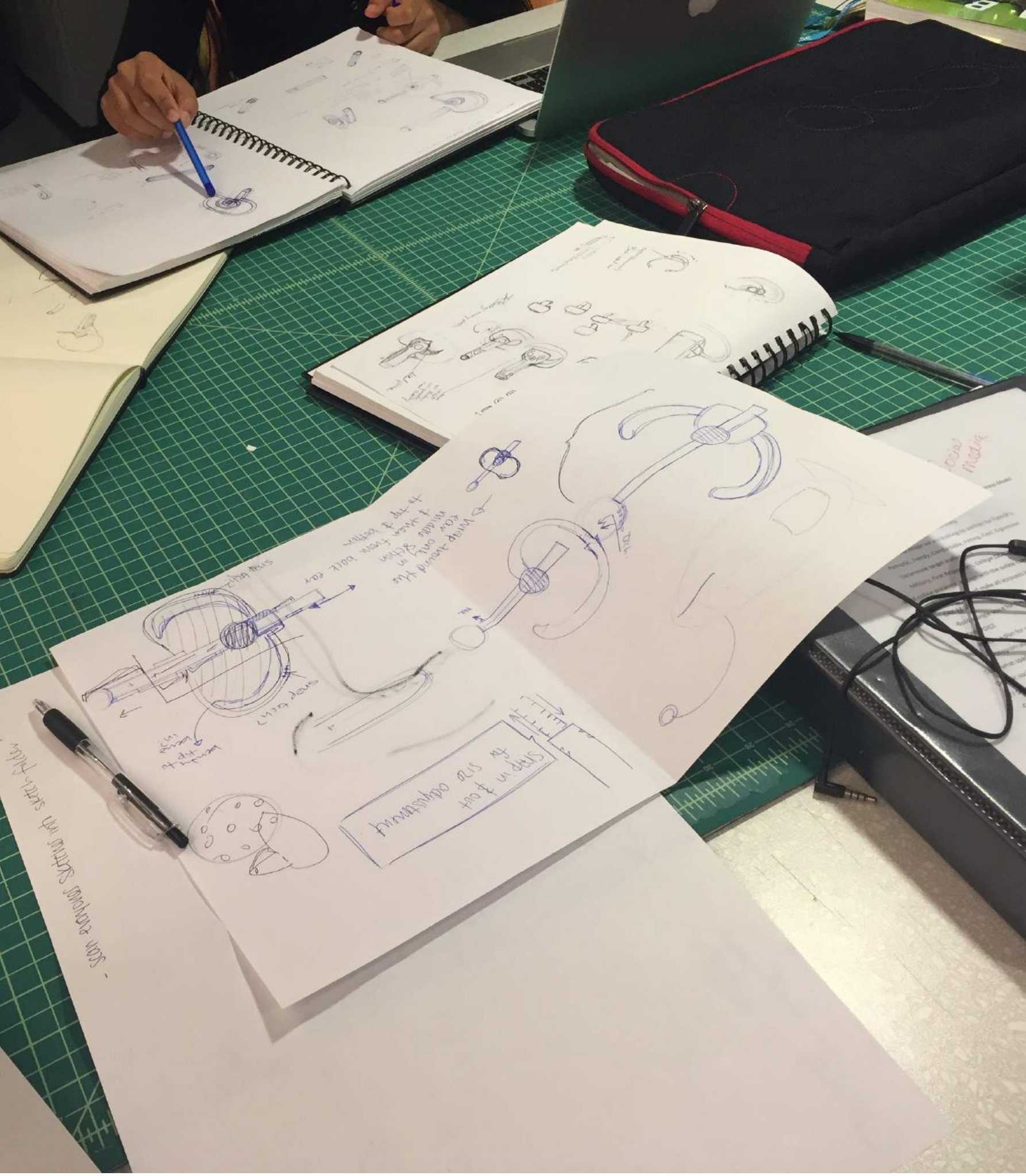




Mockups







3

Development

Focused Needs

Sitemap

Flowchart for App

Flowchart for Wearable

Personas

Experience Maps

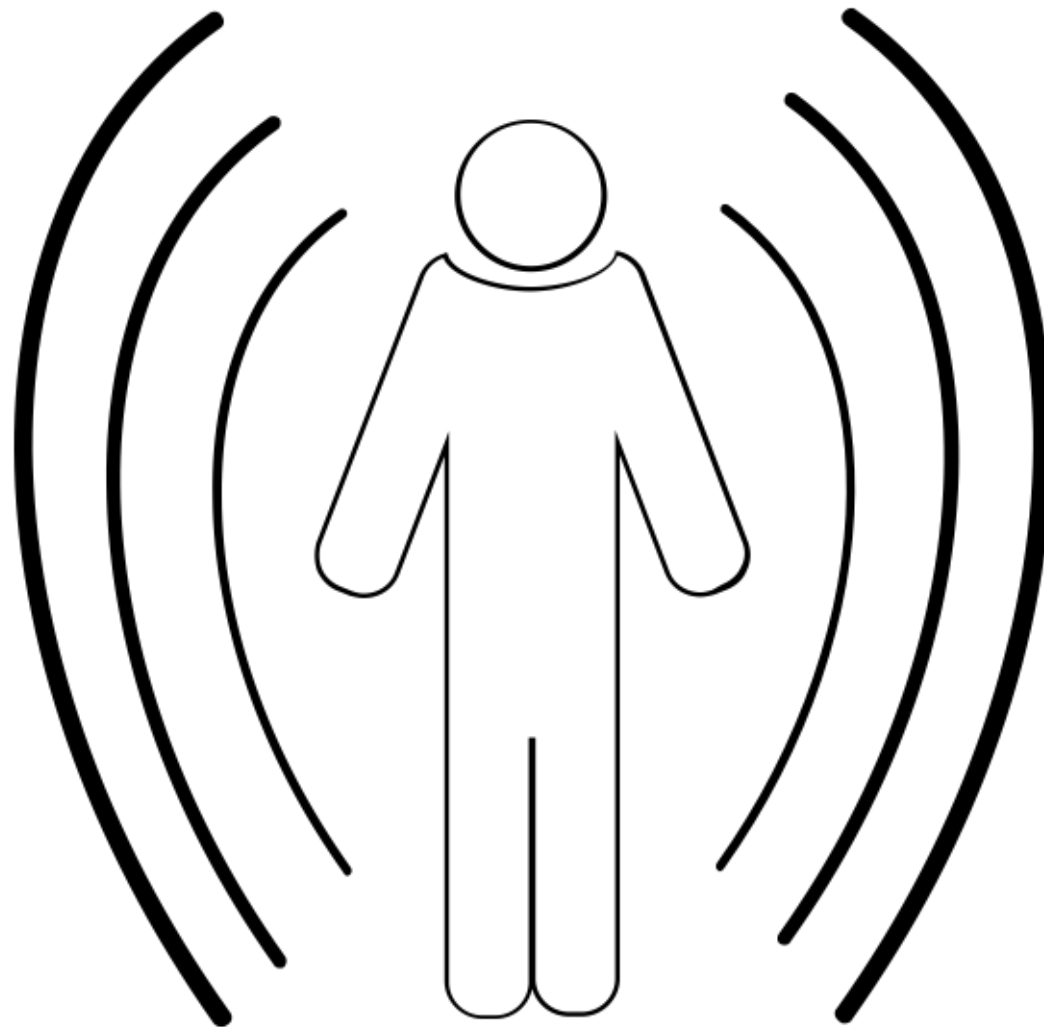
Wireframes

Wearable

Focused Needs

Social
Relationships

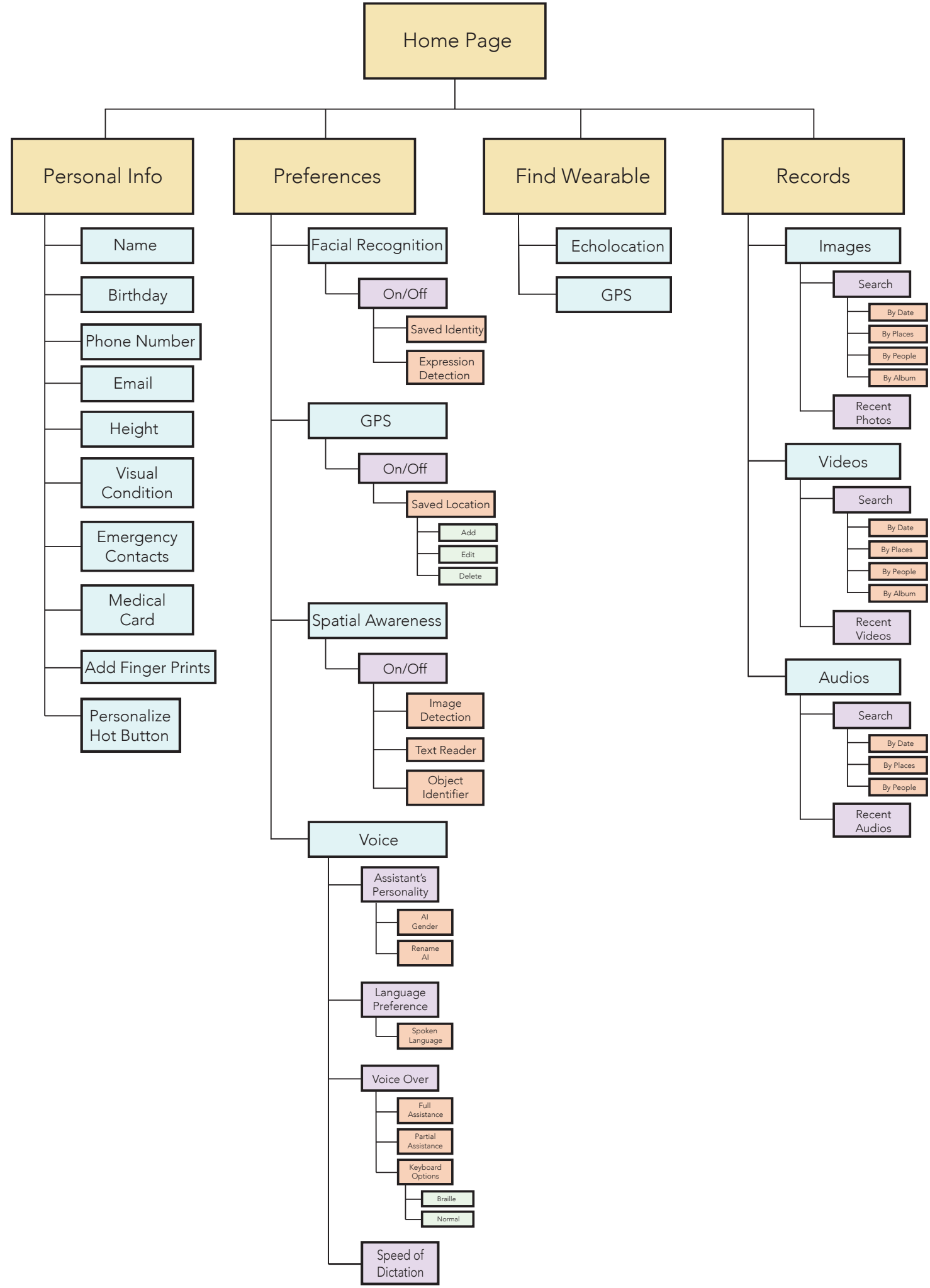
Easy
Navigation

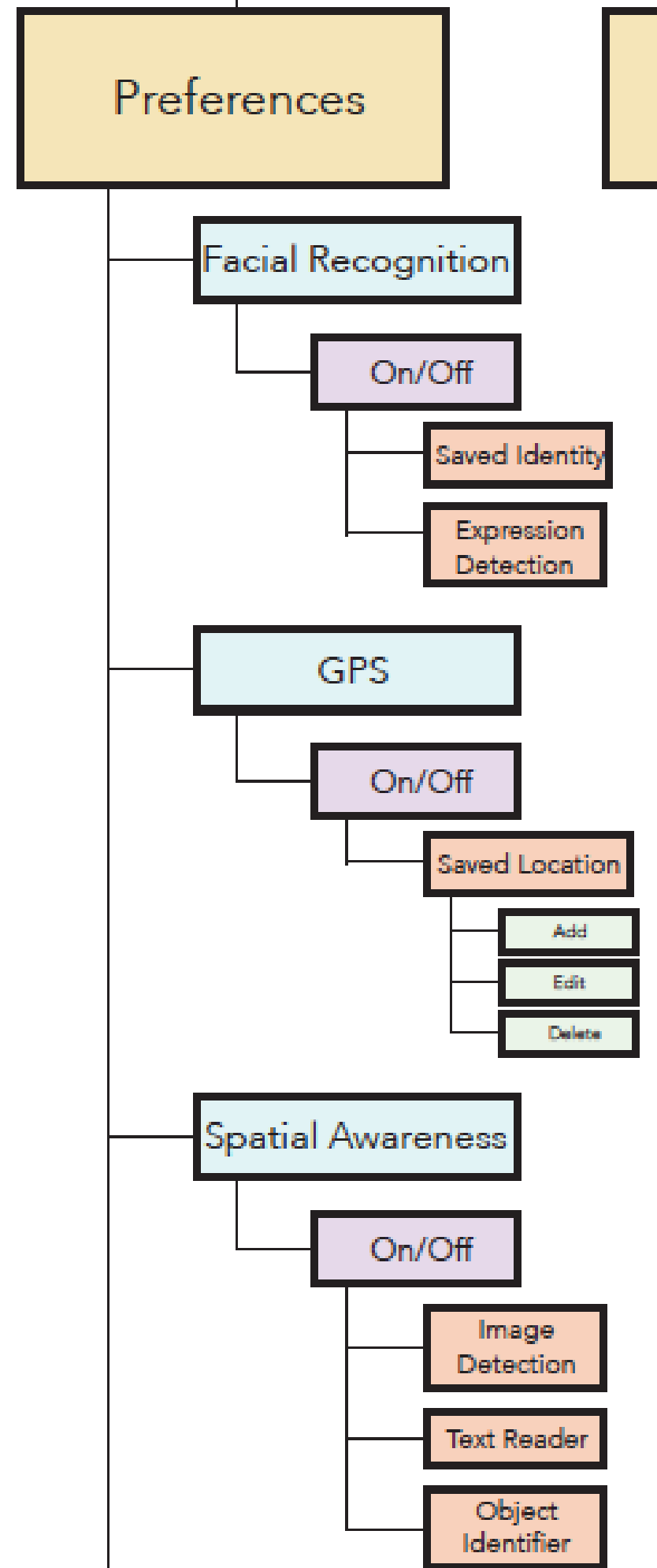
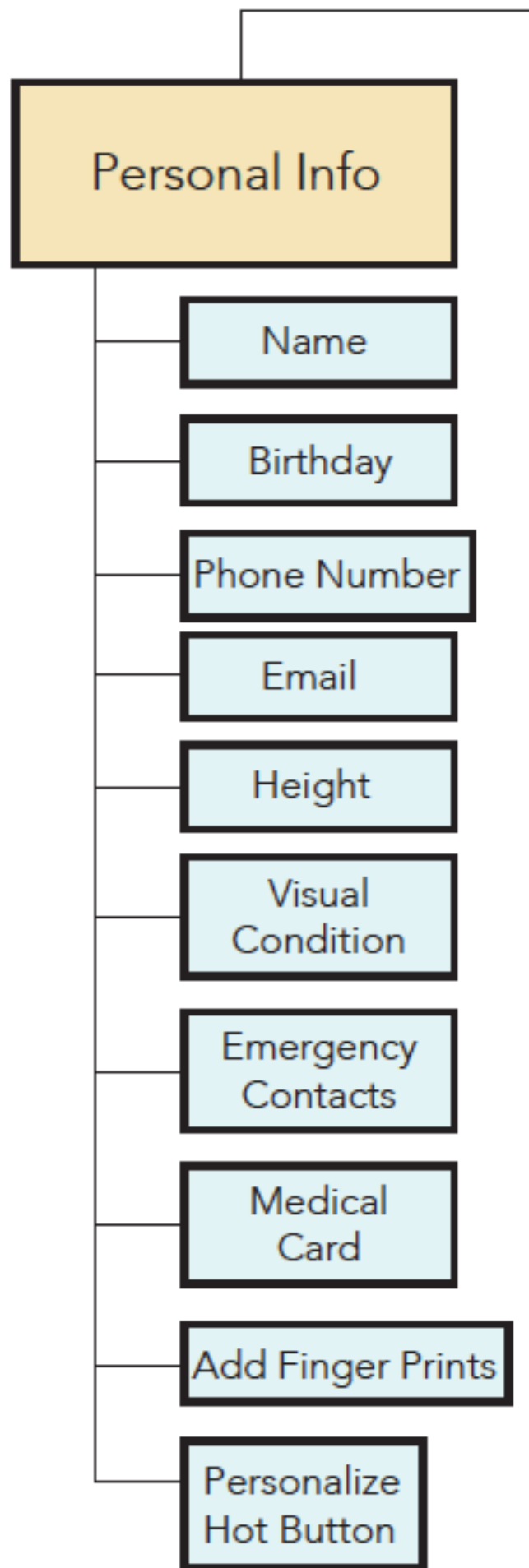


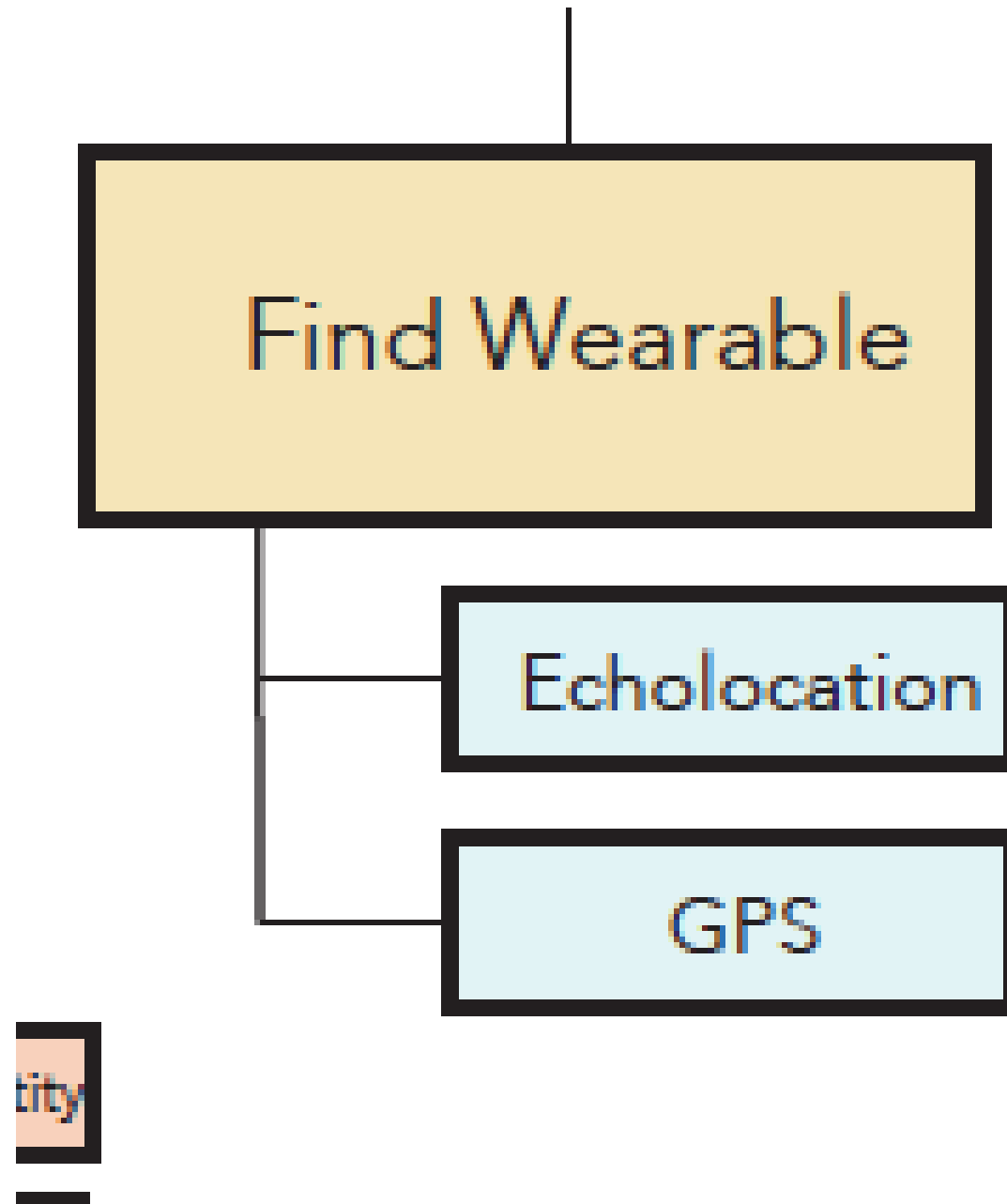
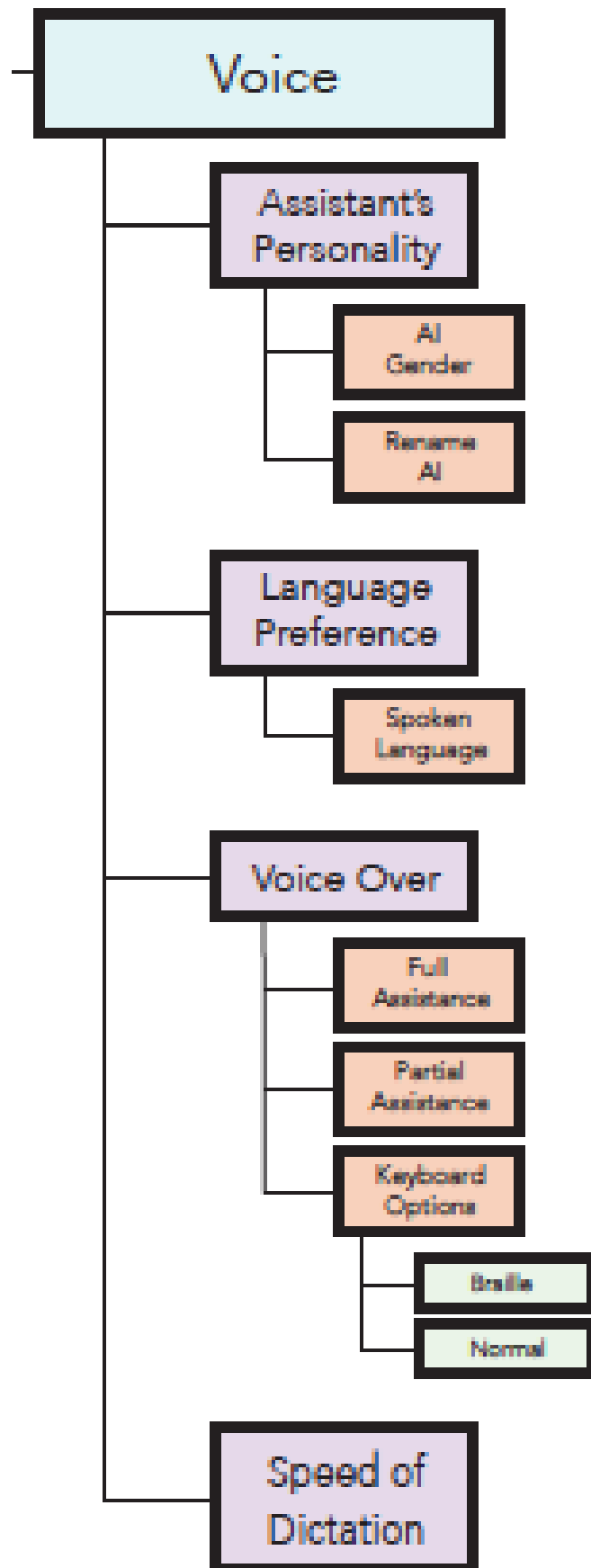
Spatial
Awareness

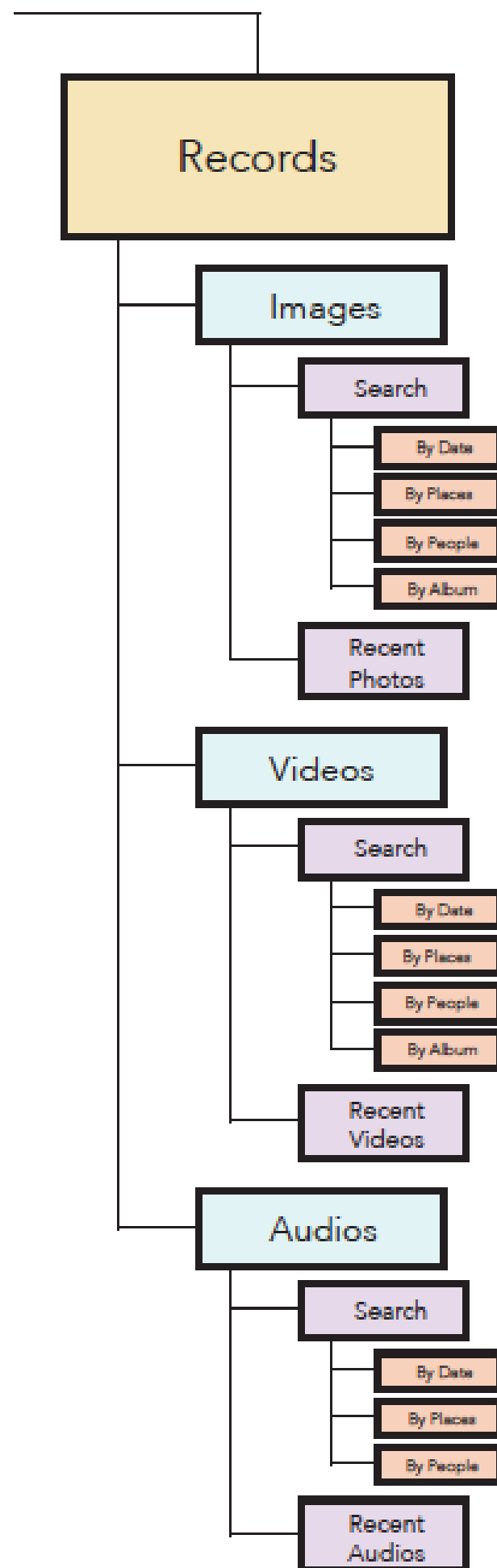
Technology

Site Map

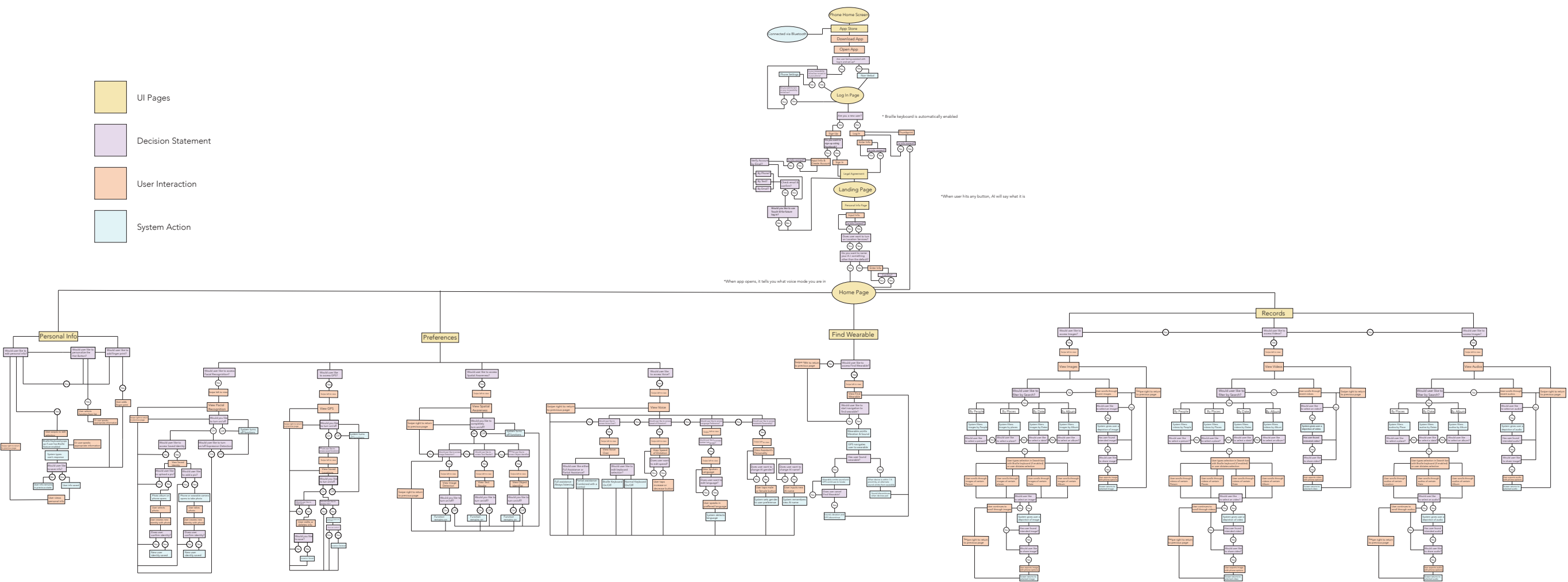






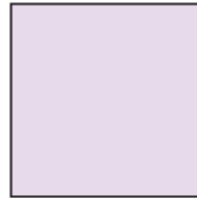


Flowchart for App

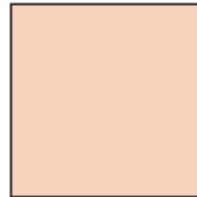




UI Pages



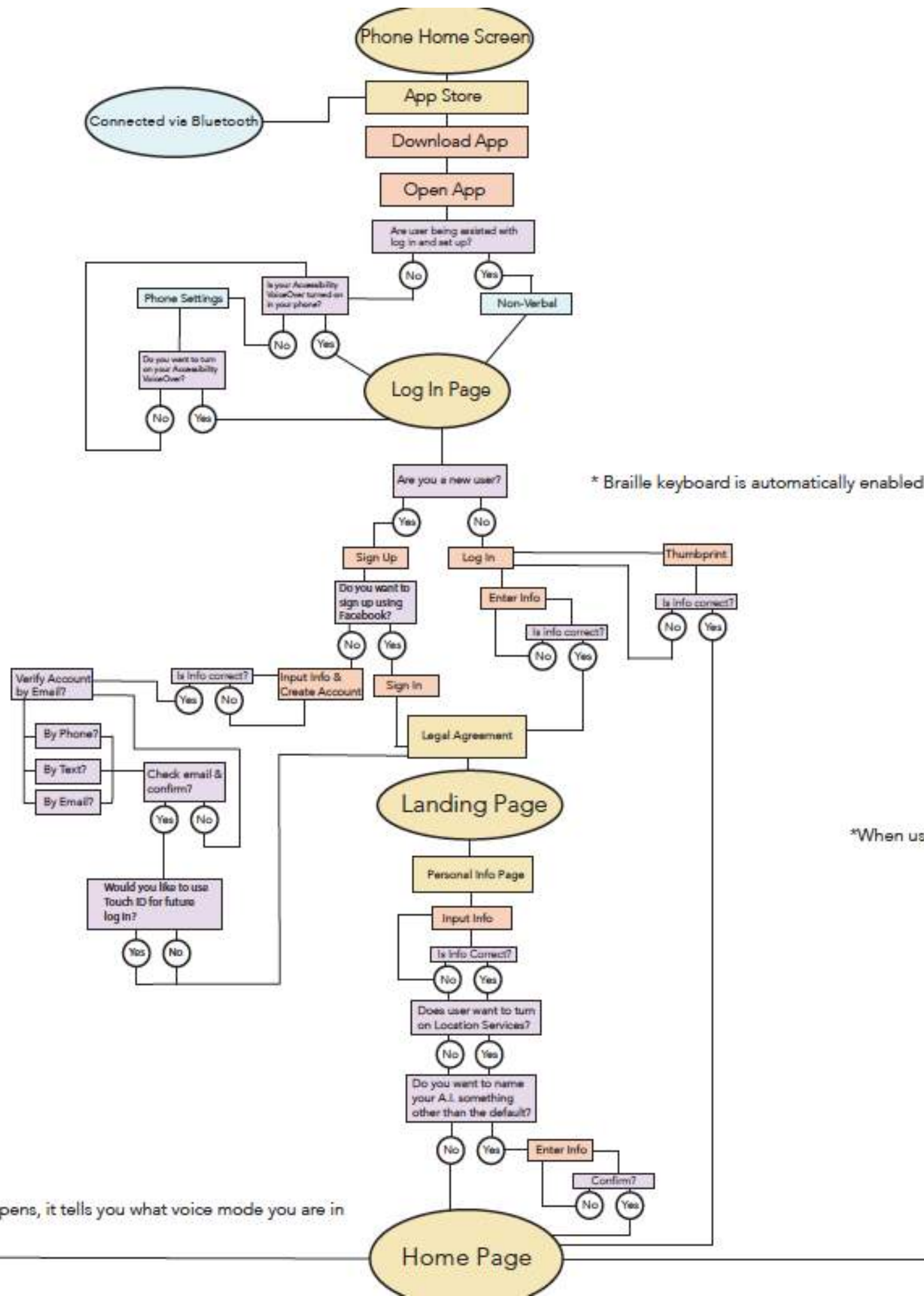
Decision Statement



User Interaction



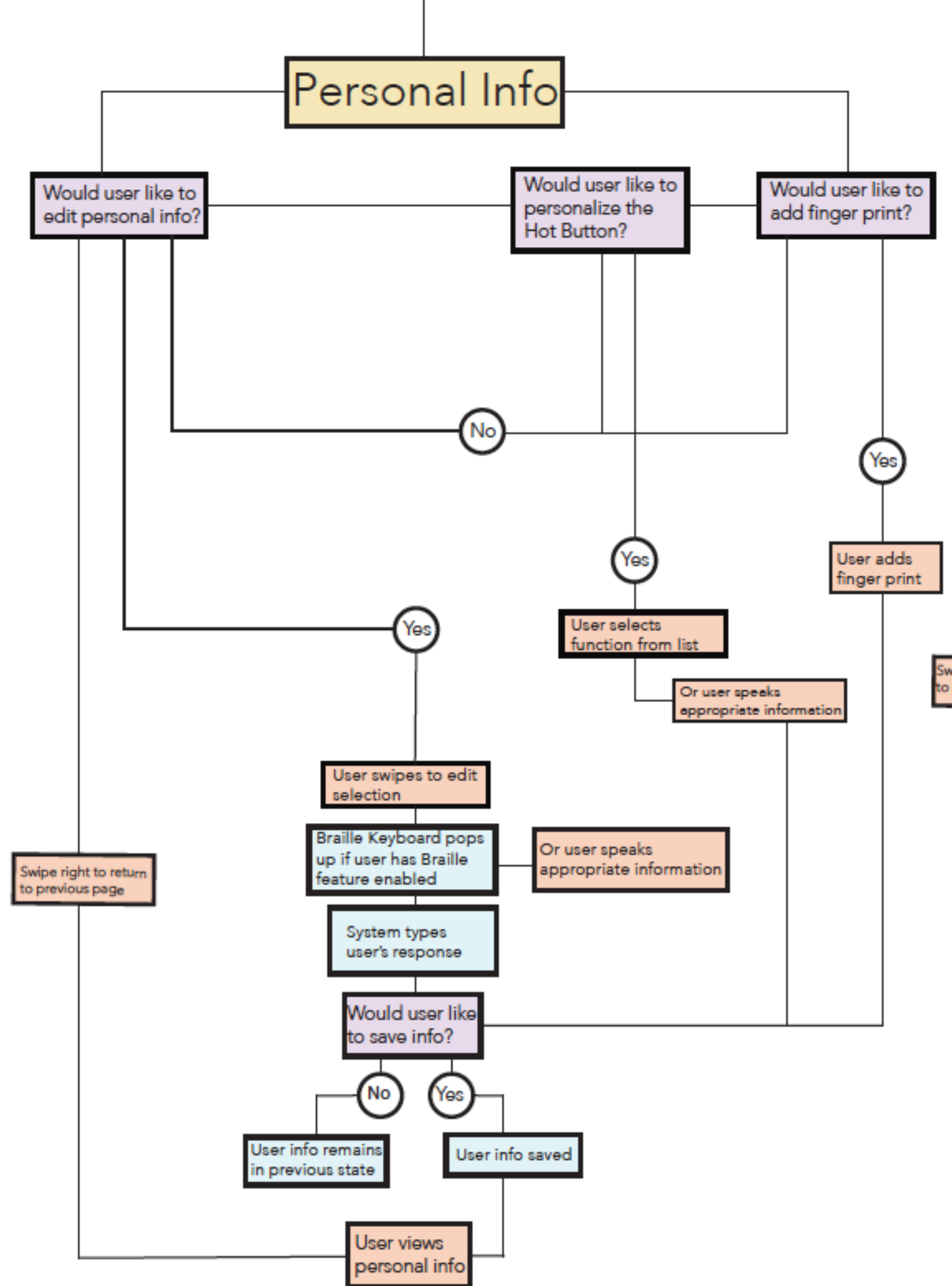
System Action

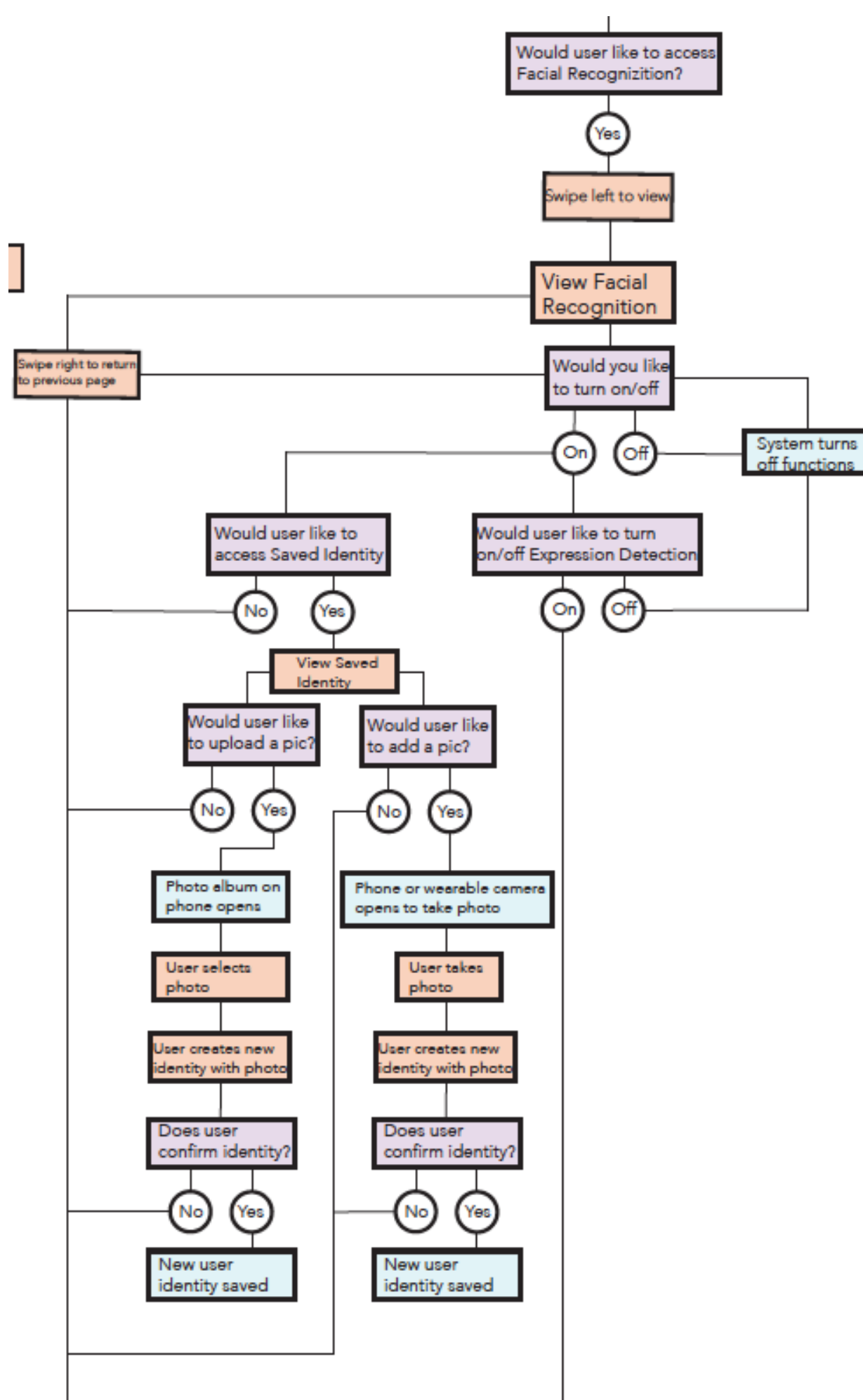


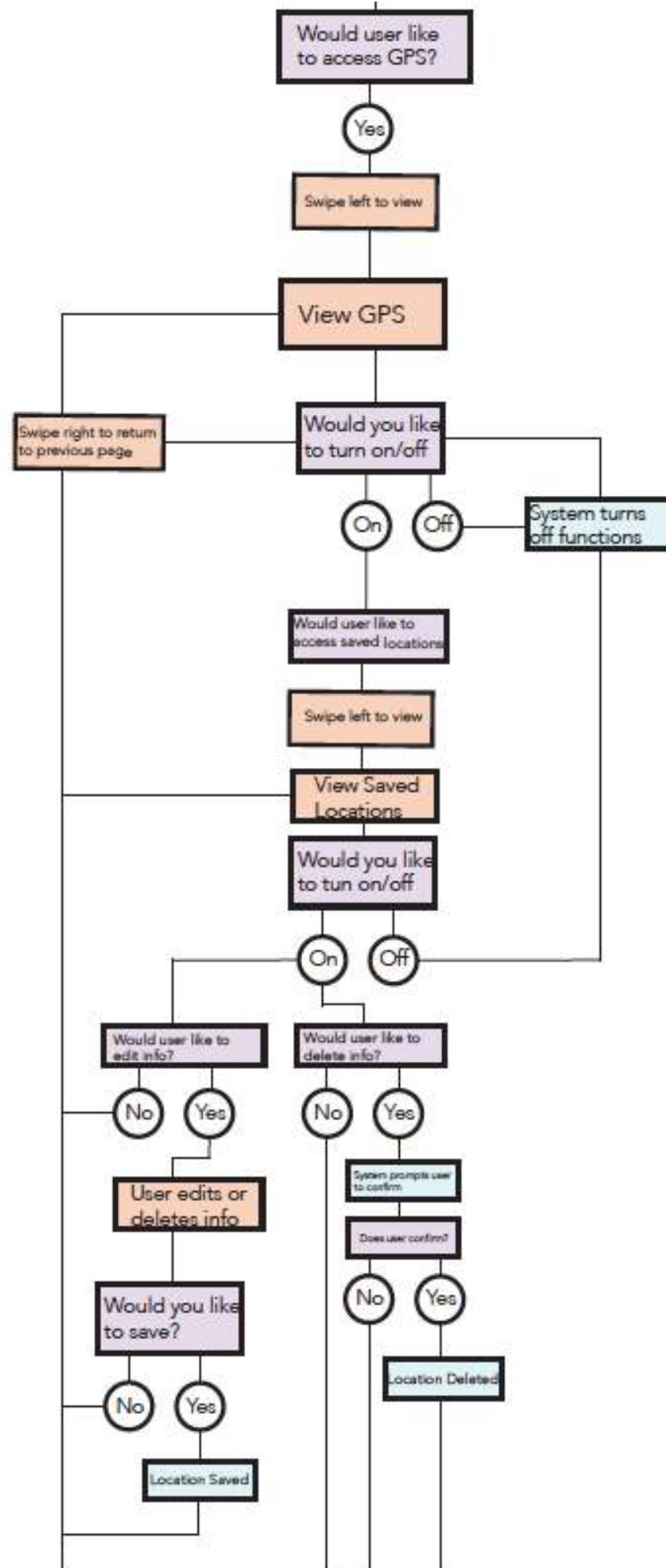
* Braille keyboard is automatically enabled

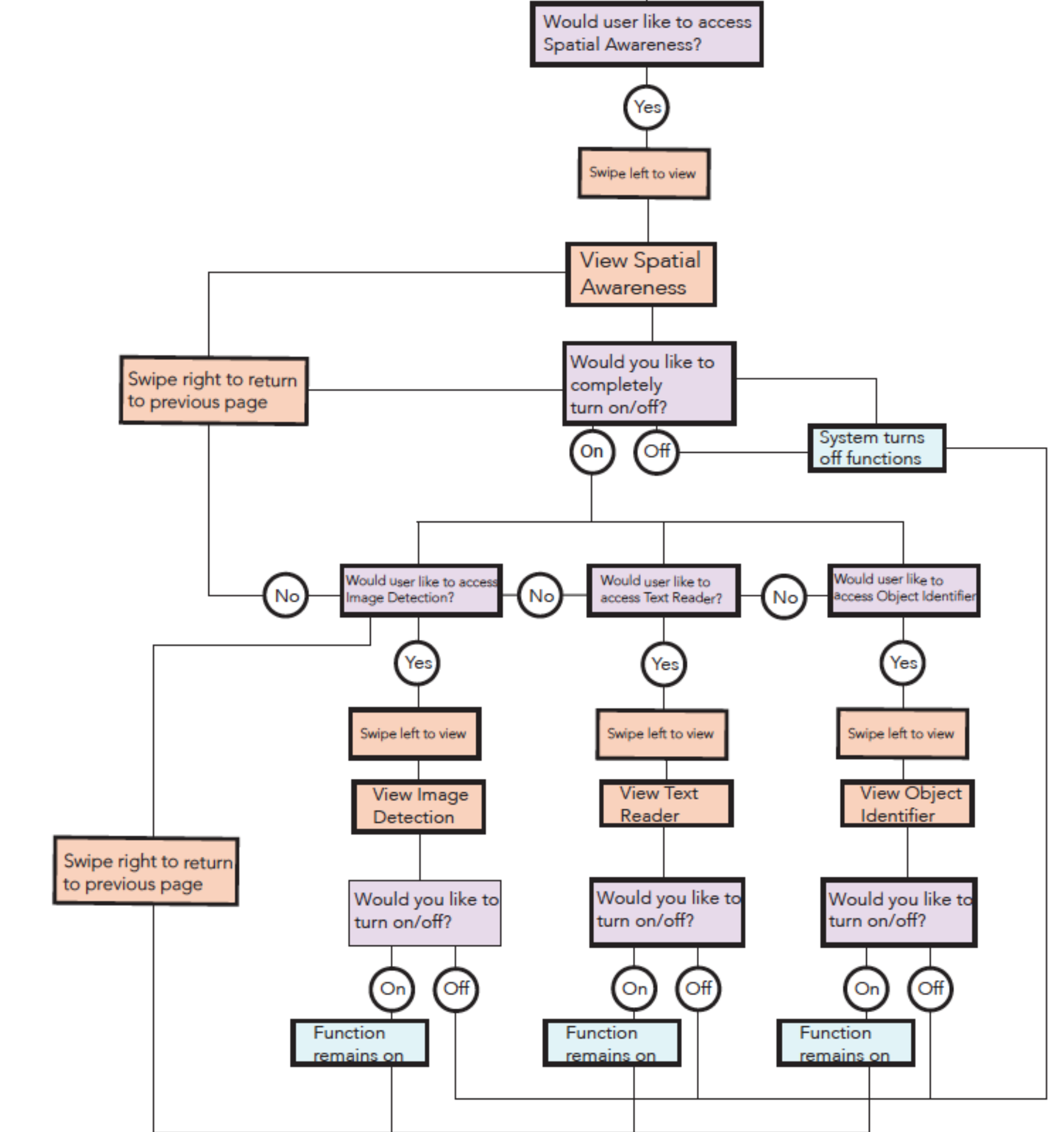
*When user hits any button, AI will say what it is

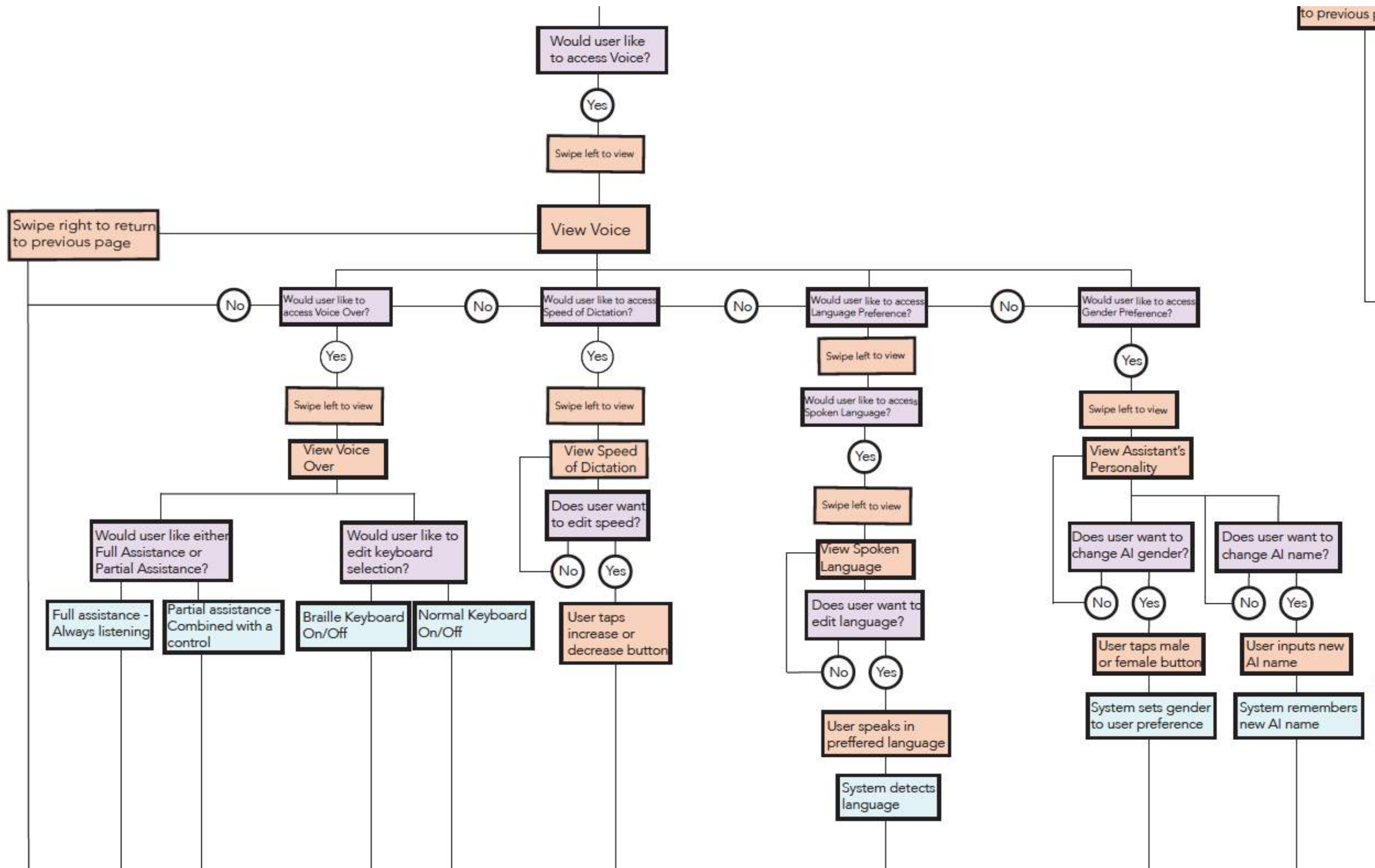
*When app opens, it tells you what voice mode you are in

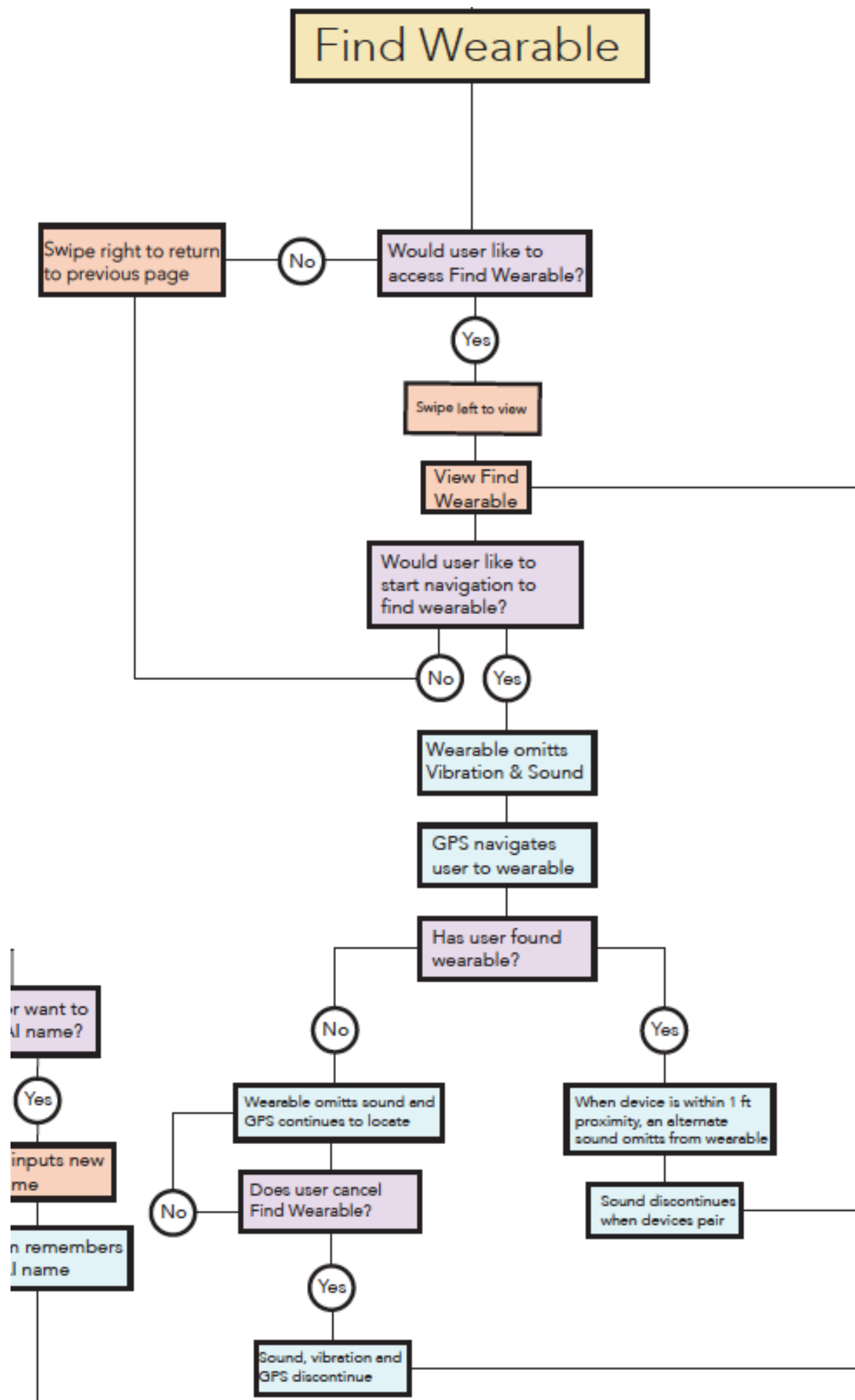


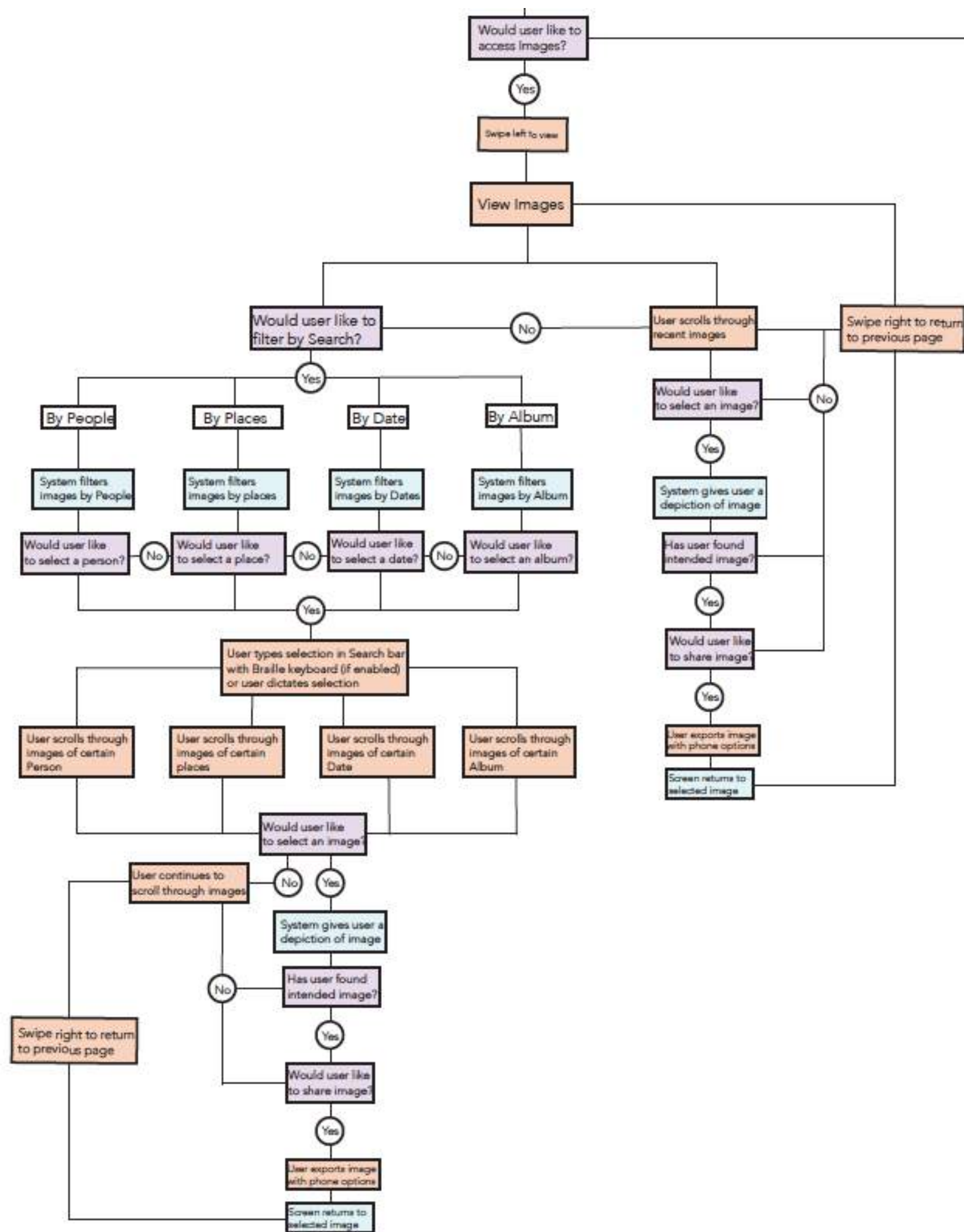


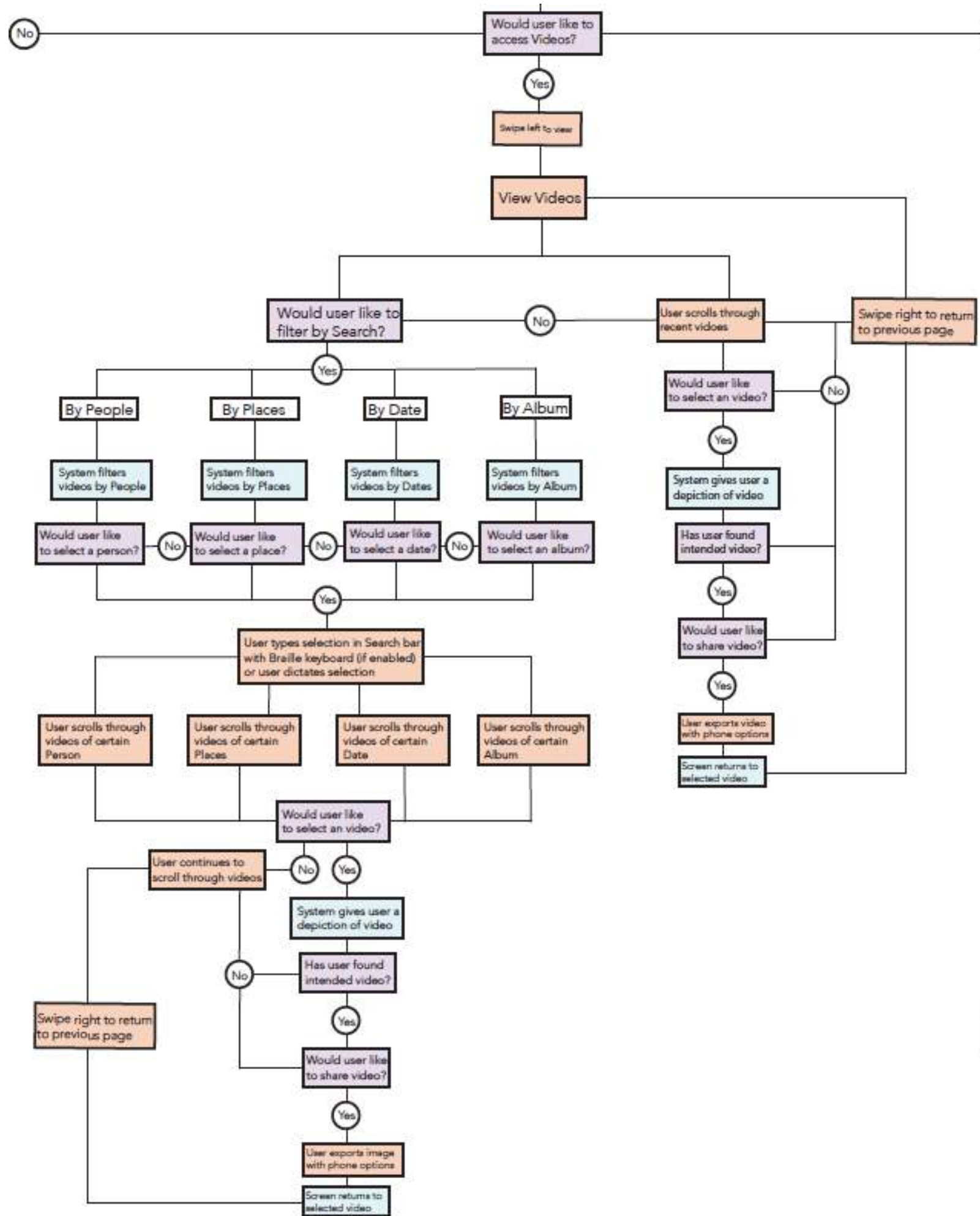


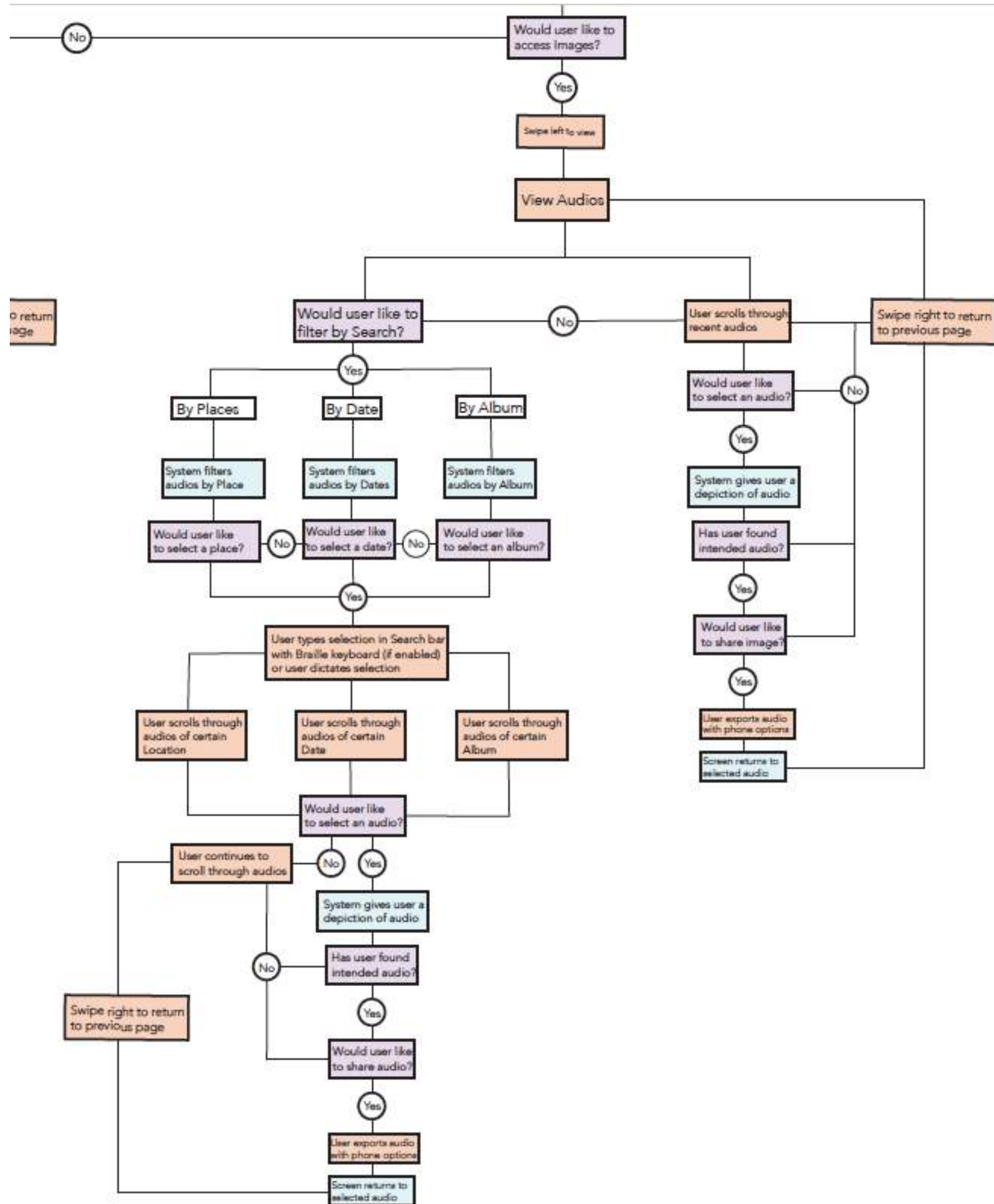






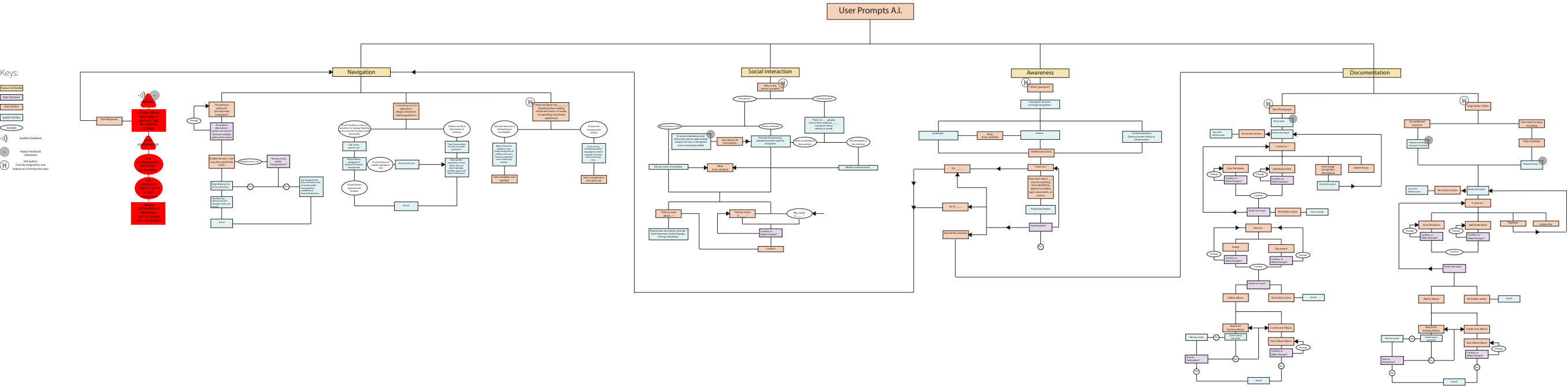






Flowchart for Wearable

Wearable AI:
Conversational User Interface (CUI) Flowchart



Keys:

Feature Umbrella

User Decision

User Action

System Action

Variable



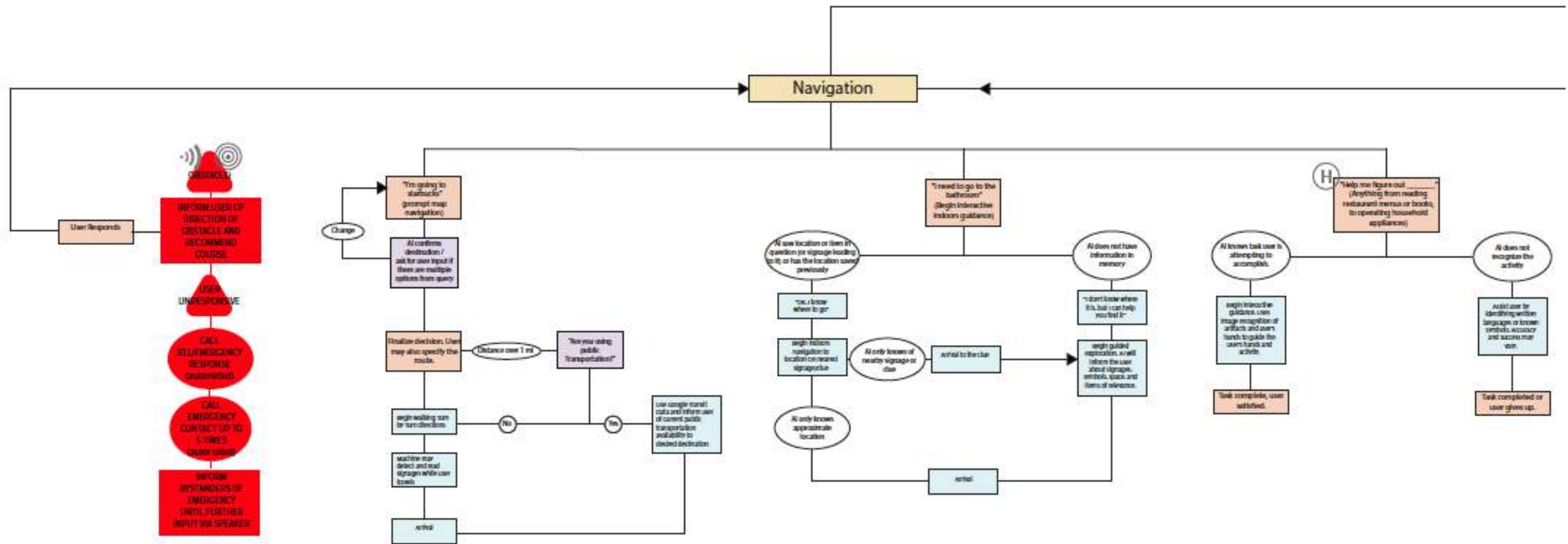
Audible Feedback

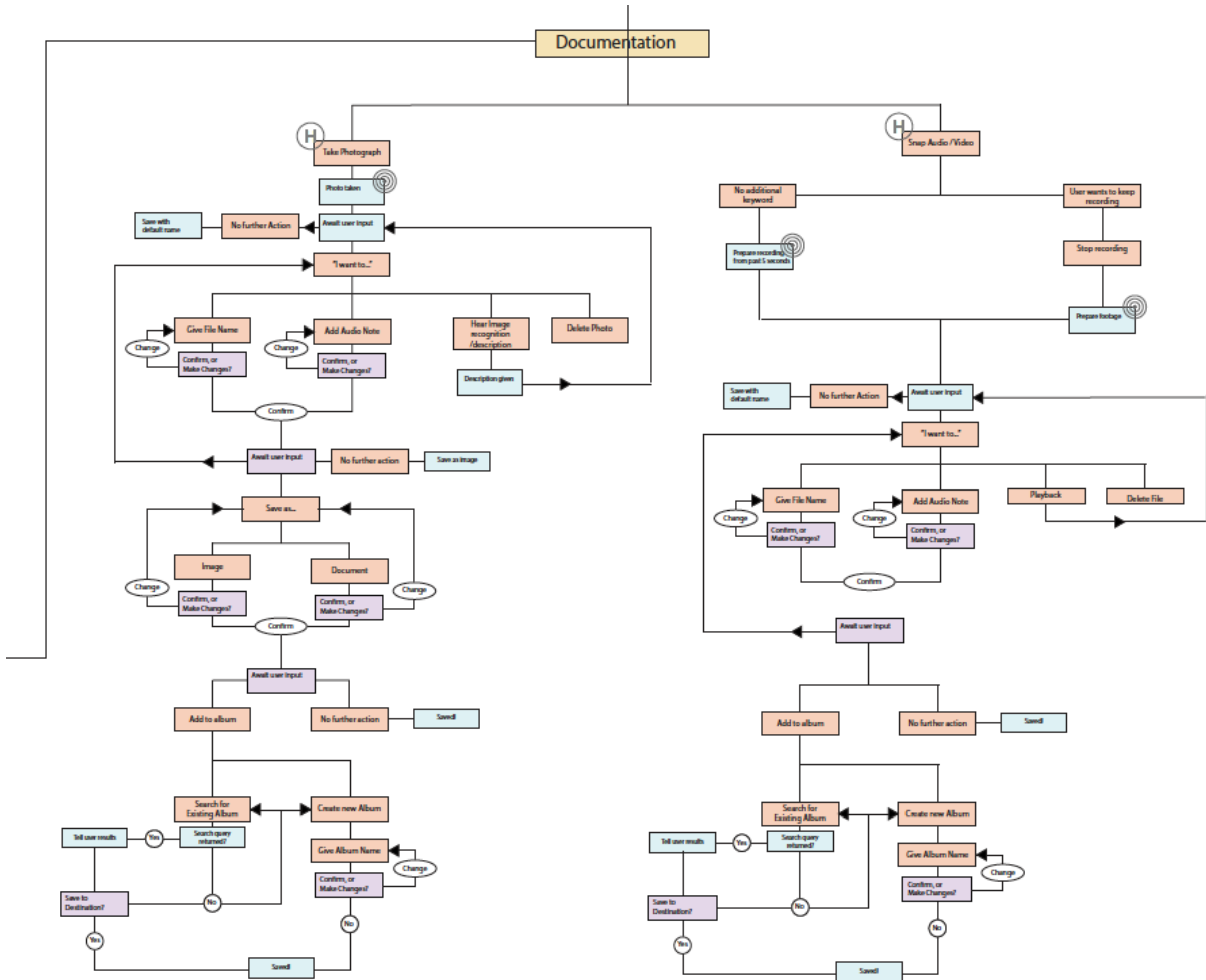


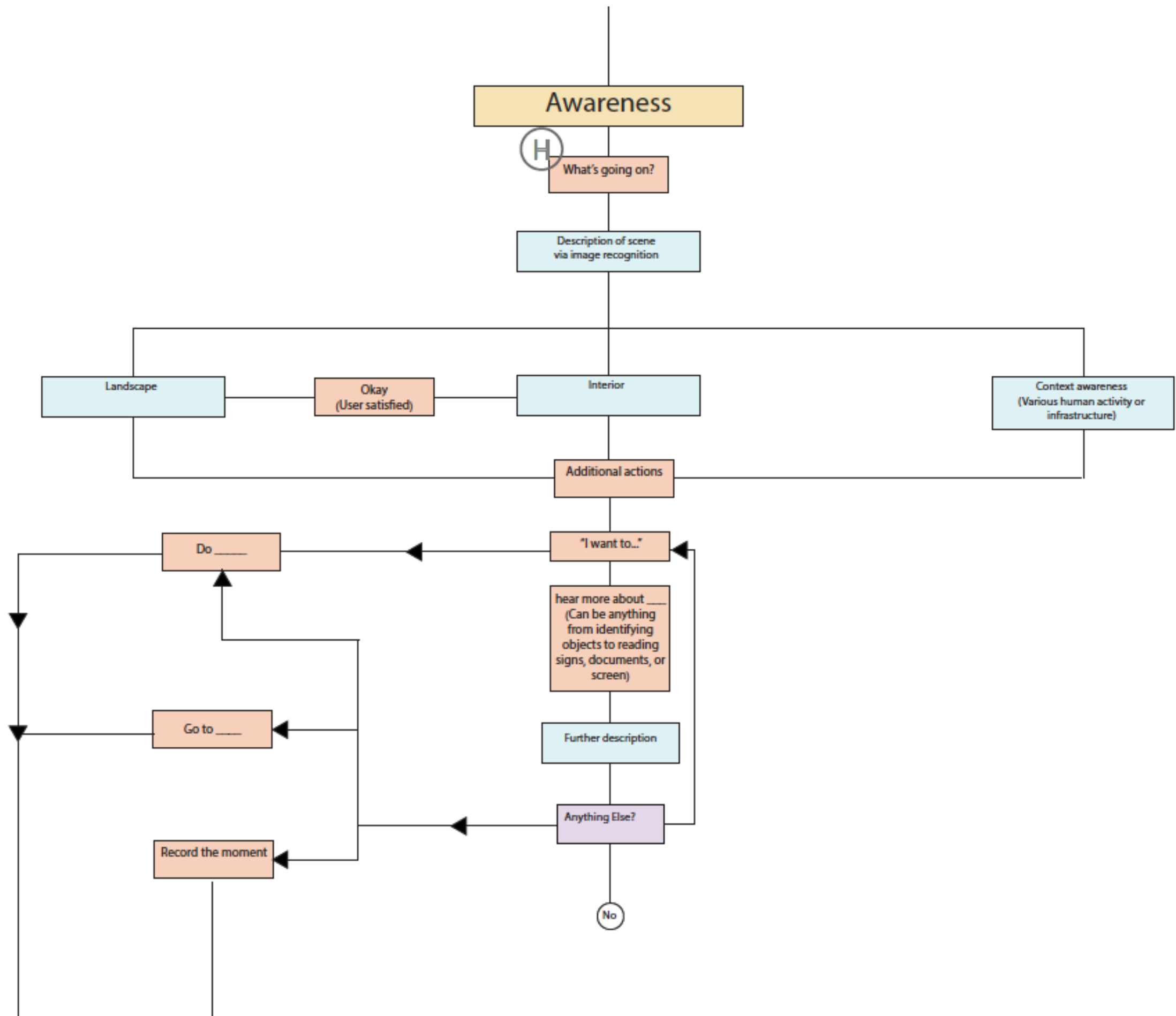
Haptic Feedback
(Vibration)

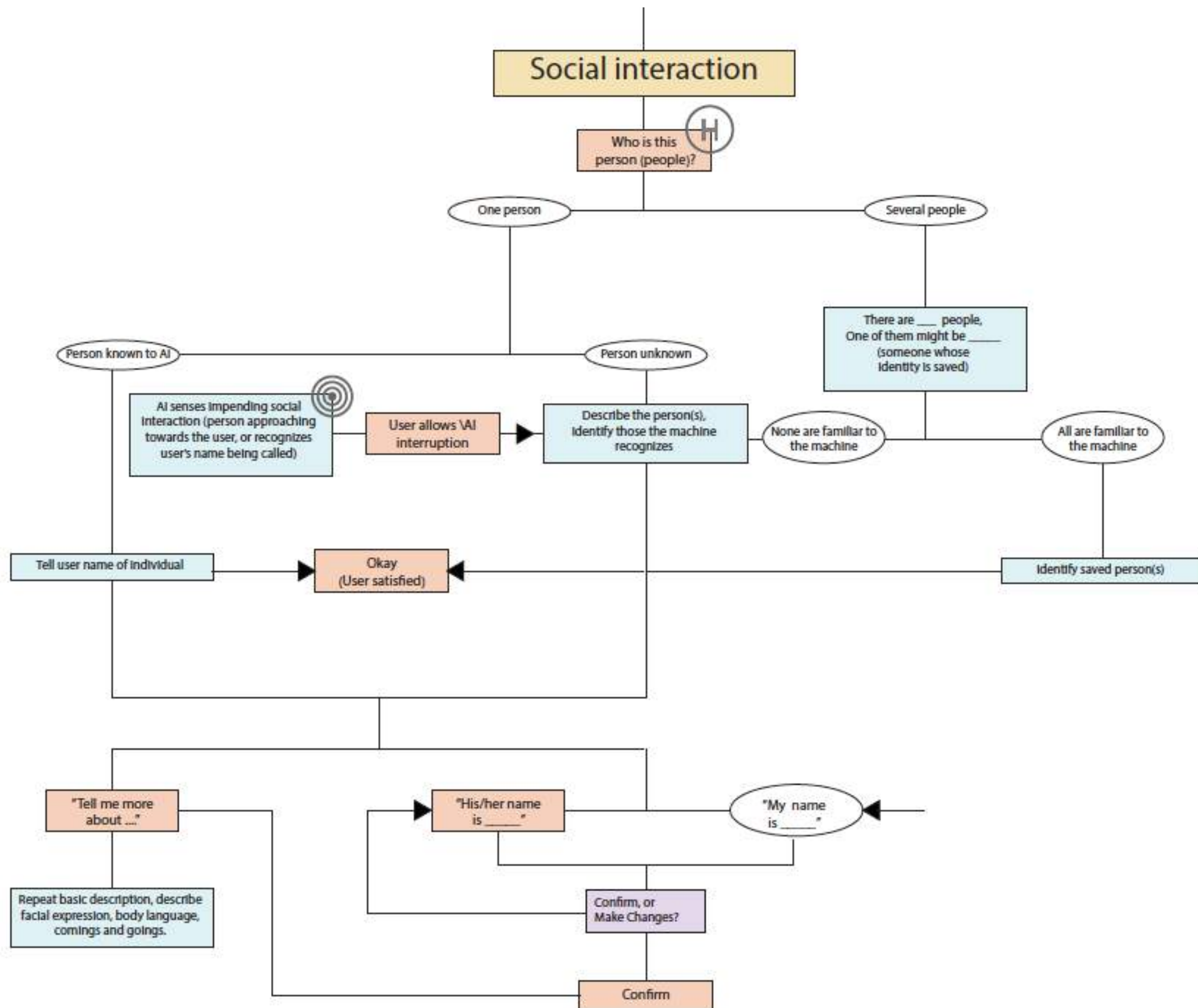


Hot button
(Can be assigned to one
feature at a time by the user)







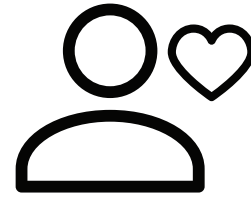


Persona 1



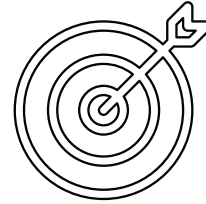
Maria Susana Jimenez

“ I know my physical surroundings as well as my career were vital to my beautiful life, but I didn’t realize how much I depended on my visual sense. ”



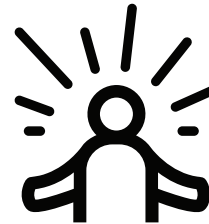
Values

Family
Husband’s work ethic
Nature
Literature & History



Goals & Motivation

Getting back to her active lifestyle
Dogs and kids and husband
Being able to read or write again
Wanting to write an autobiography
Learn braille



Personality & Interest

Outgoing
Playing and surfing at the beach with her dogs
Physical collecting memoirs and taking photos
Reading, writing and language



Frustration

Not being able to enjoy the California views or lifestyle
Her interests are harder to achieve
Her retirement plans and savings have to take a pause
She was in the midst of writing a bilingual book

Age



62 years old

Visibility
Level



Recent accidental
Able to see form
and space

Location



Santa Barbra,
California

Ethnicity



Hispanic

Occupation



Was a magazine
editor
Now holds a
book club

Income



High Class,
Husband,
government
& savings

Marital
Status



Married

Assistance



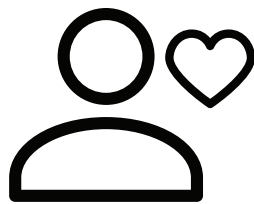
Guidance stick

Persona 2

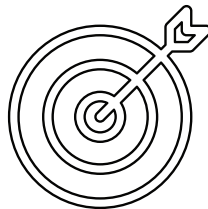


Marquis B.

“My favorite quote is: ‘Living well is the best revenge’ by George Herbert”



Values
Family
Honesty and genuity
Acceptance



Goals & Motivation
Finish high school and go to college
Move away from home and start fresh
Being Independent in all aspects
Start his own record label



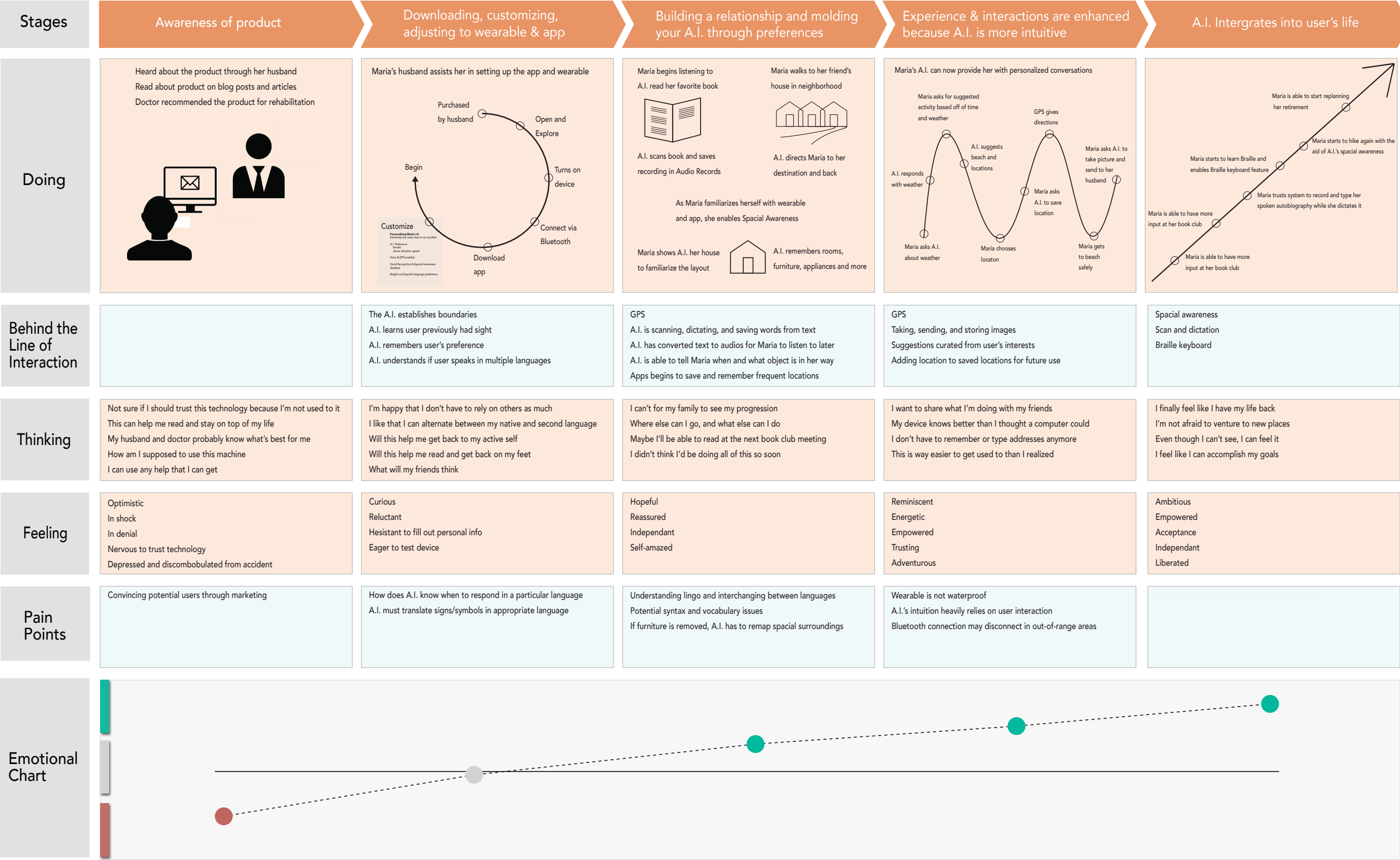
Personality & Interest
Introverted
Family oriented
Hot tempered
Sports
Music
Self expression art



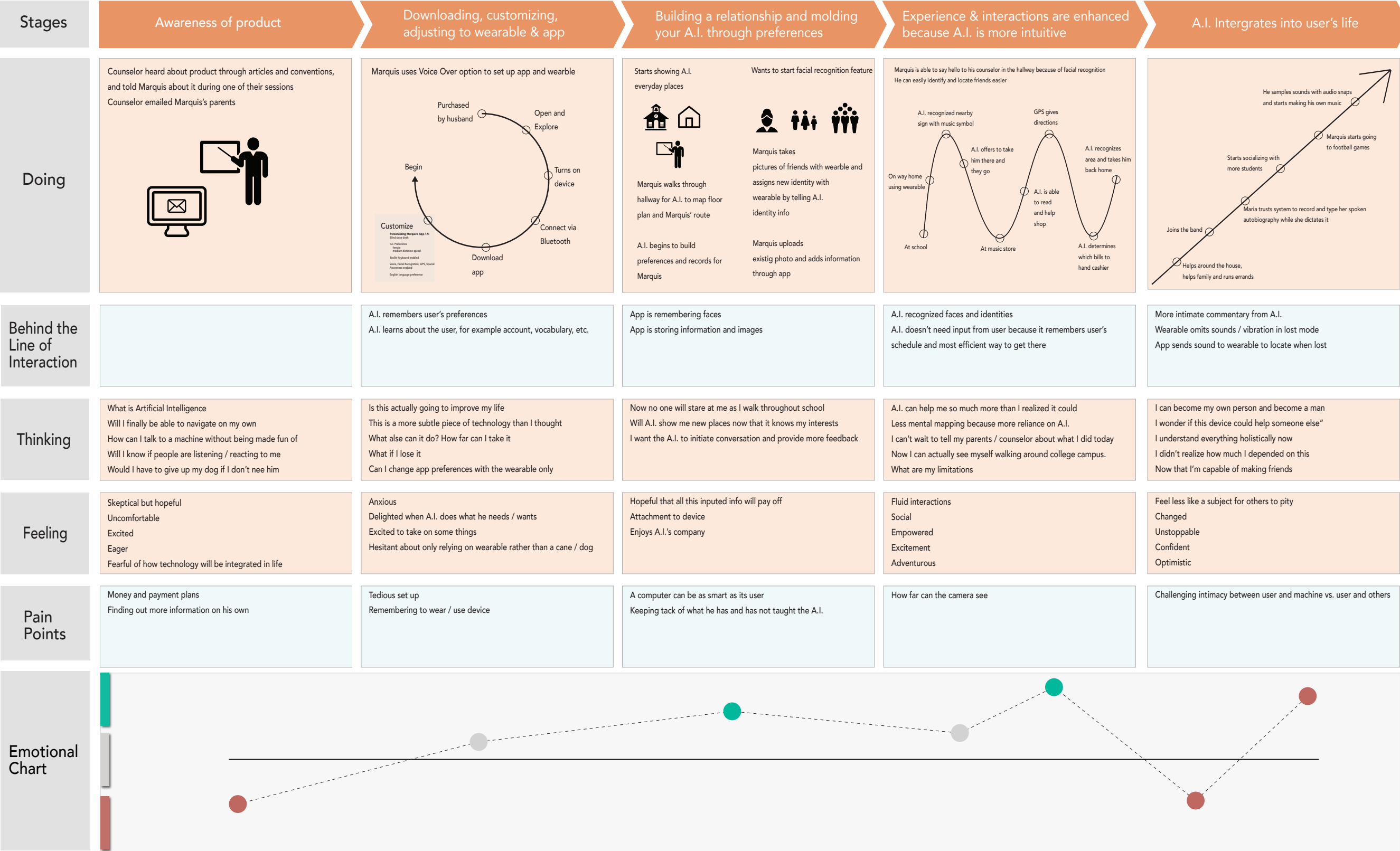
Frustration
Bullied by piers for being blind
Always depending on others for transportation
Lack of social life

Age	Visibility Level	Location	Ethnicity	Occupation	Income	Marital Status	Assistance
15 years old	Born blind No form or shape Light & some color	Fairfax, Virginia	African American	Student (ADA) implemented in public school	Low-middle class Allowance	Single	Guidance stick & Assistant dog

Experience Map: Maria

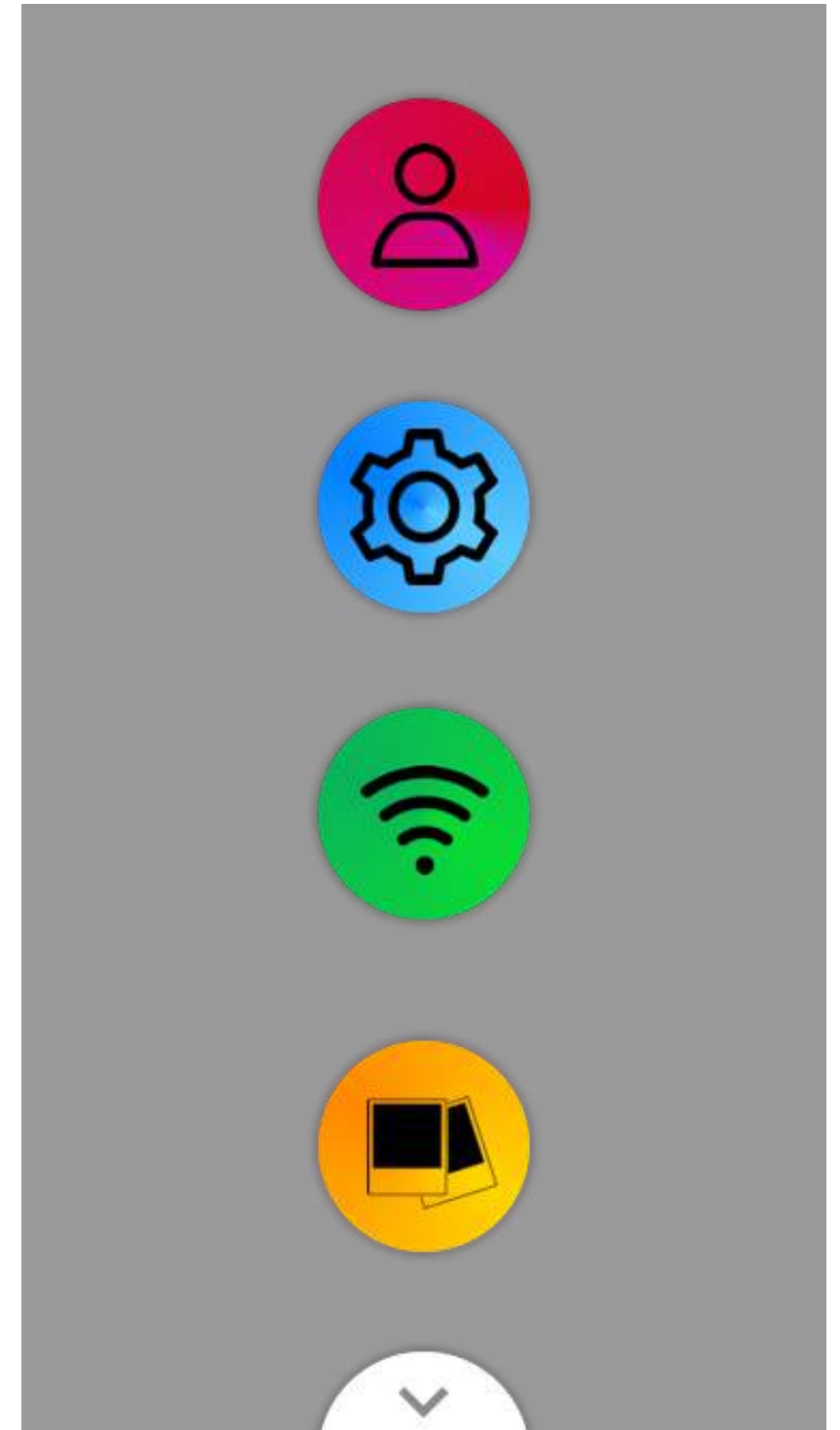
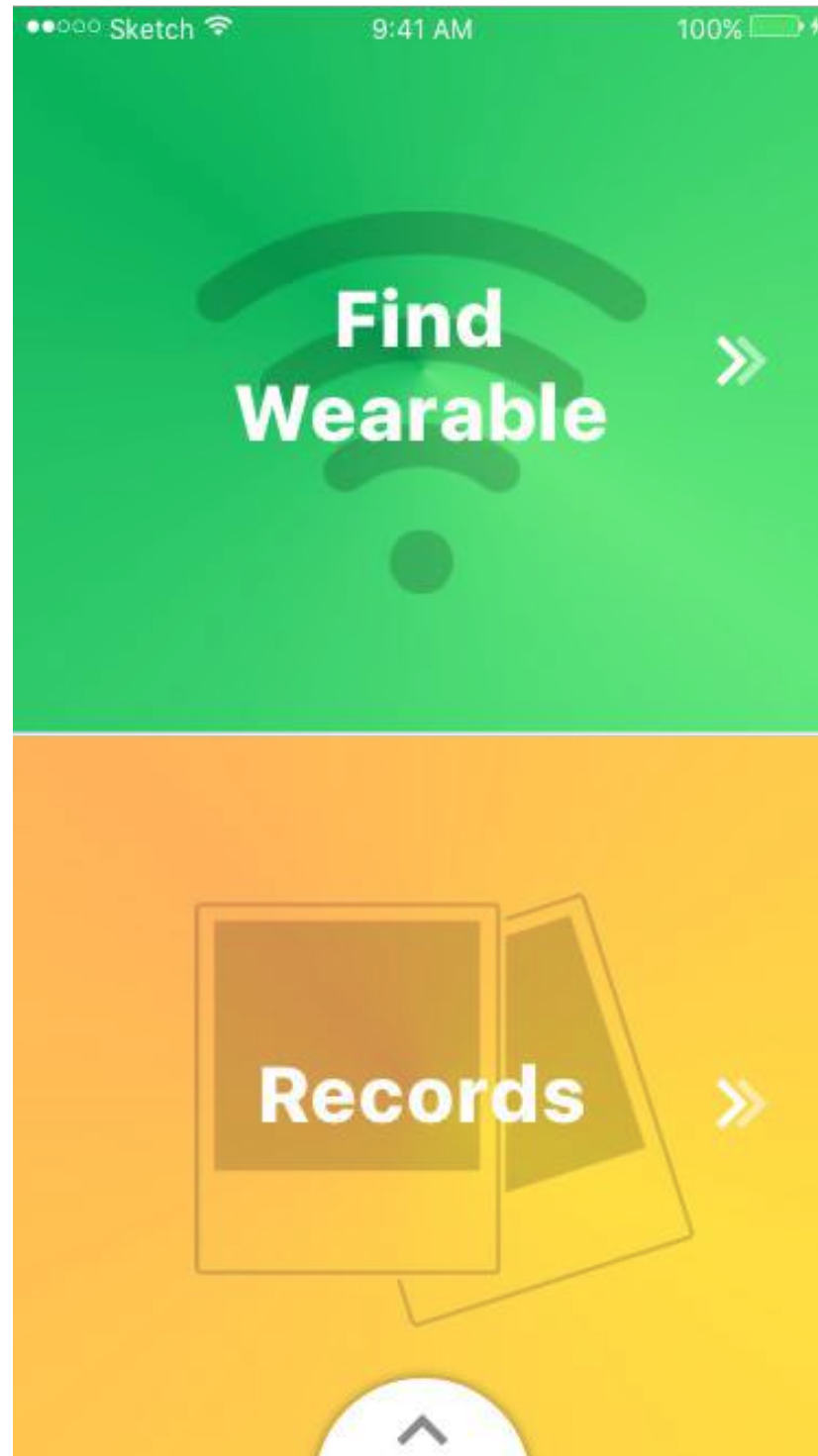
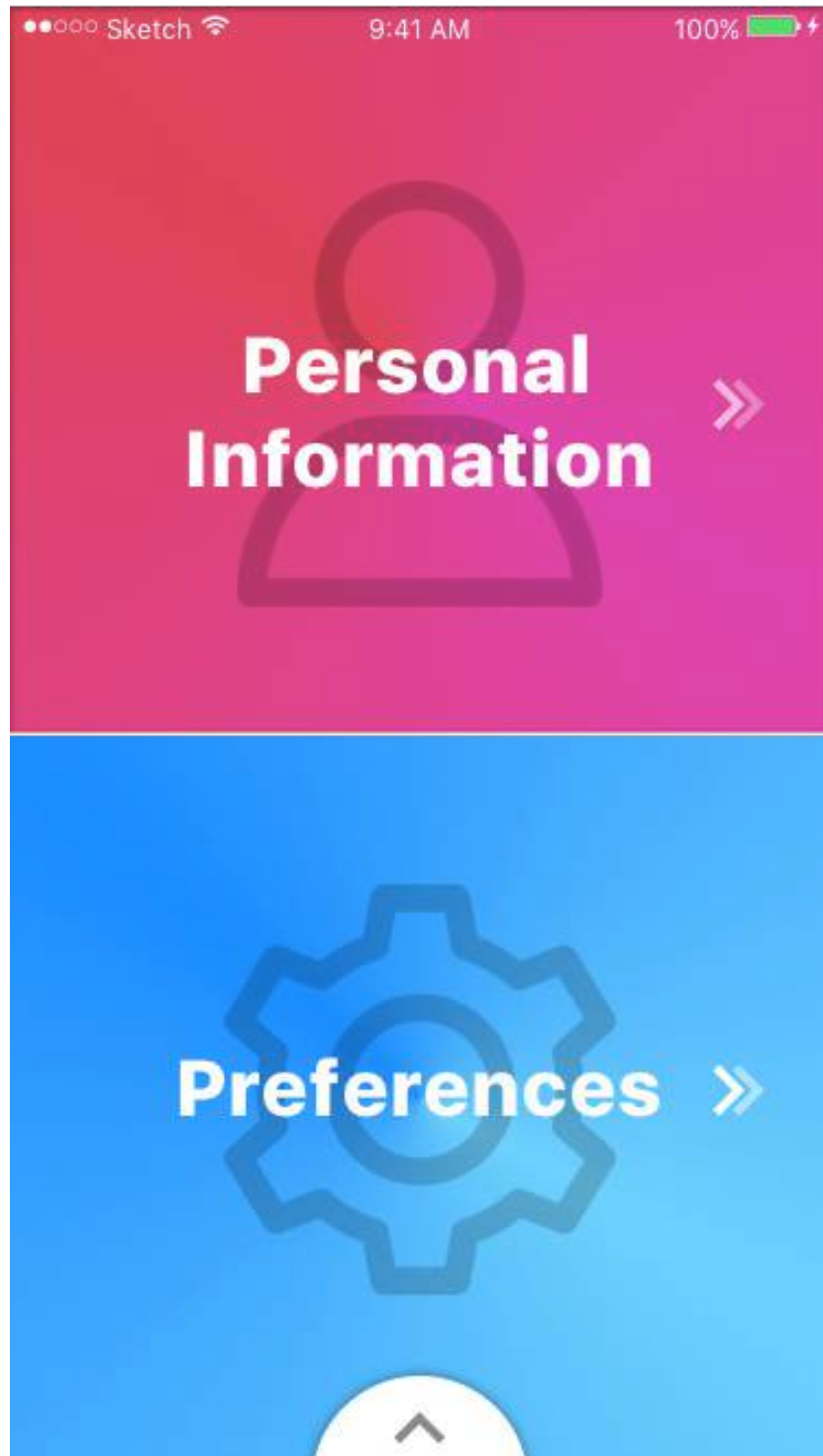


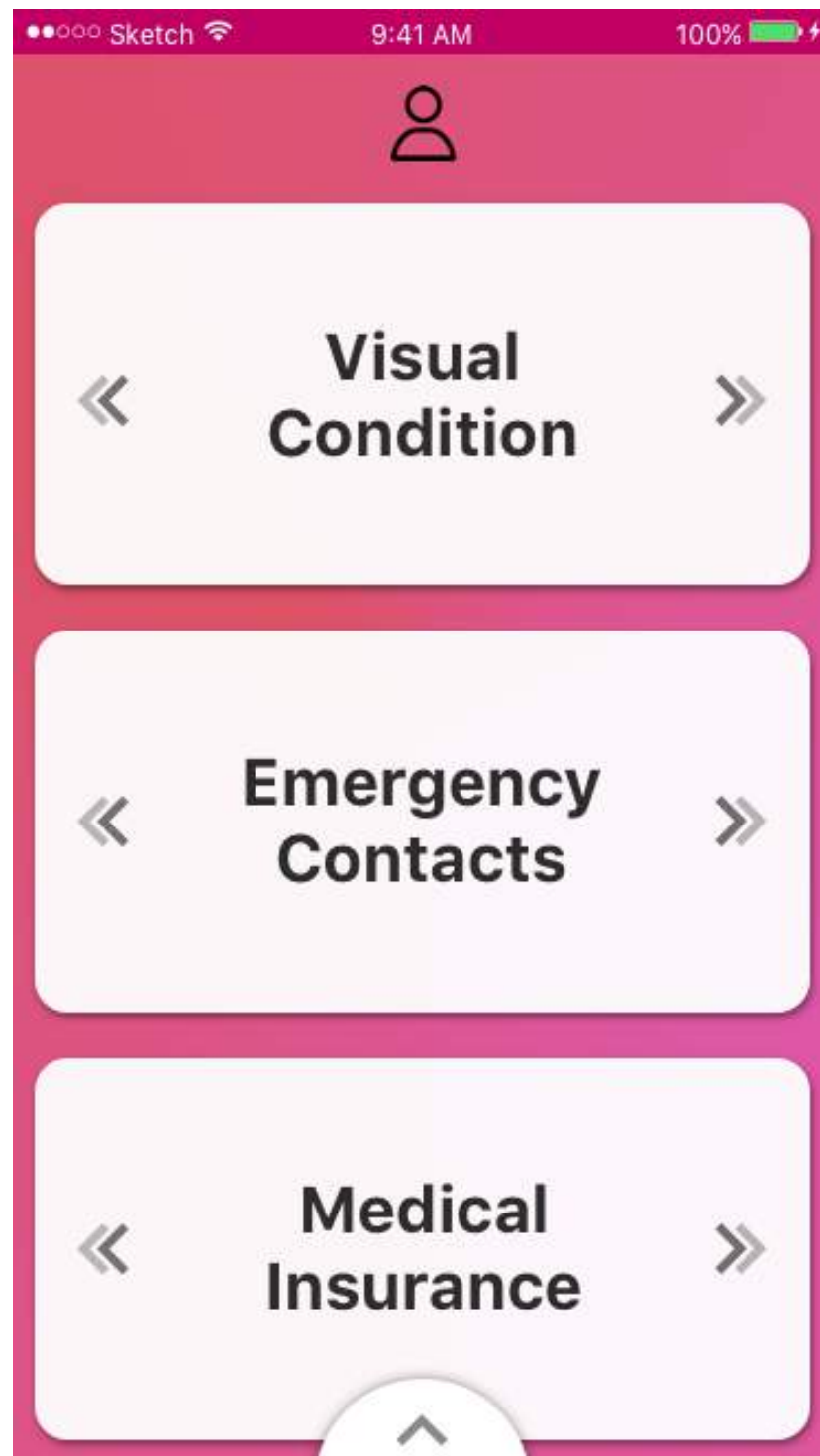
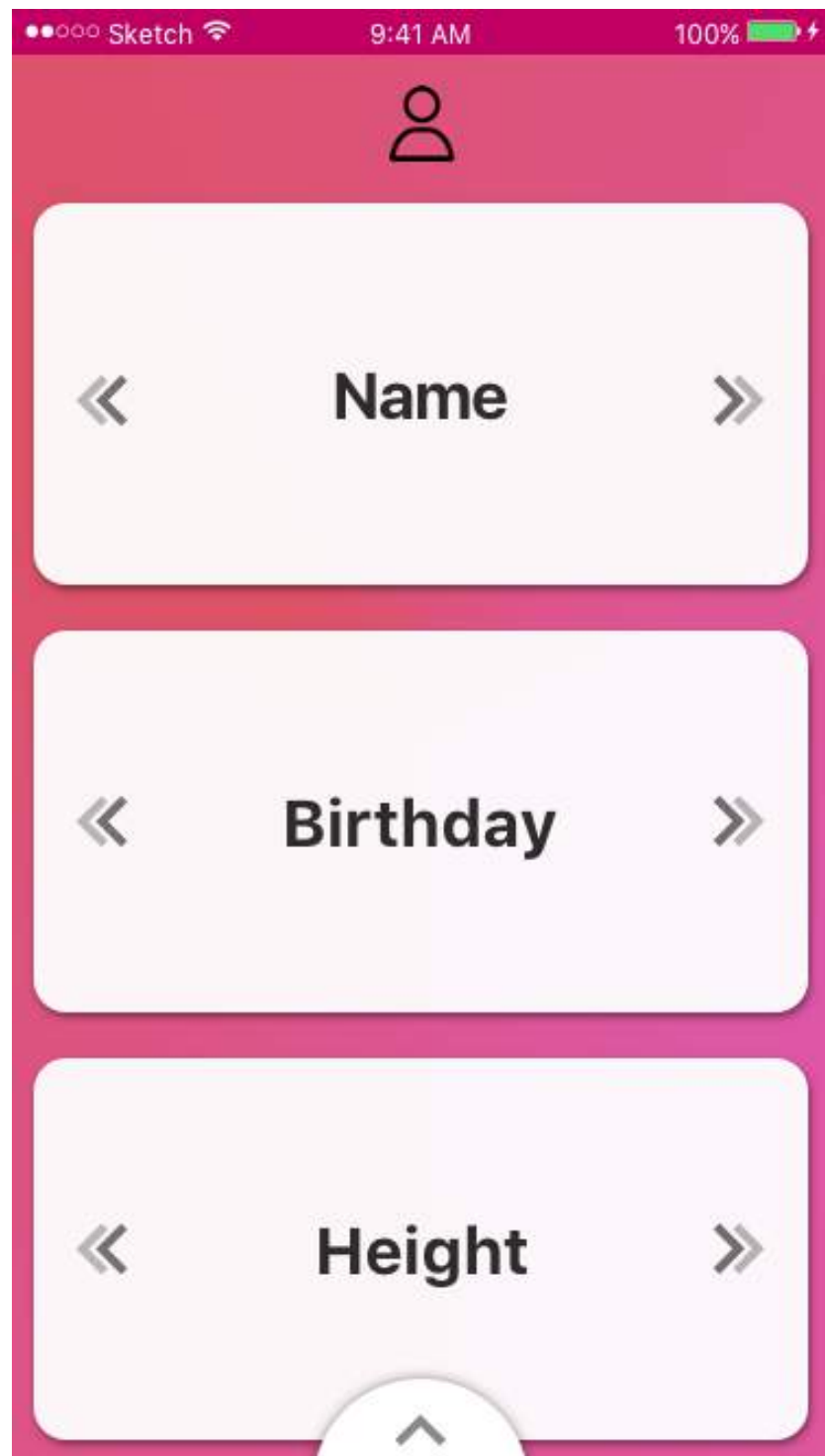
Experience Map: Marquis

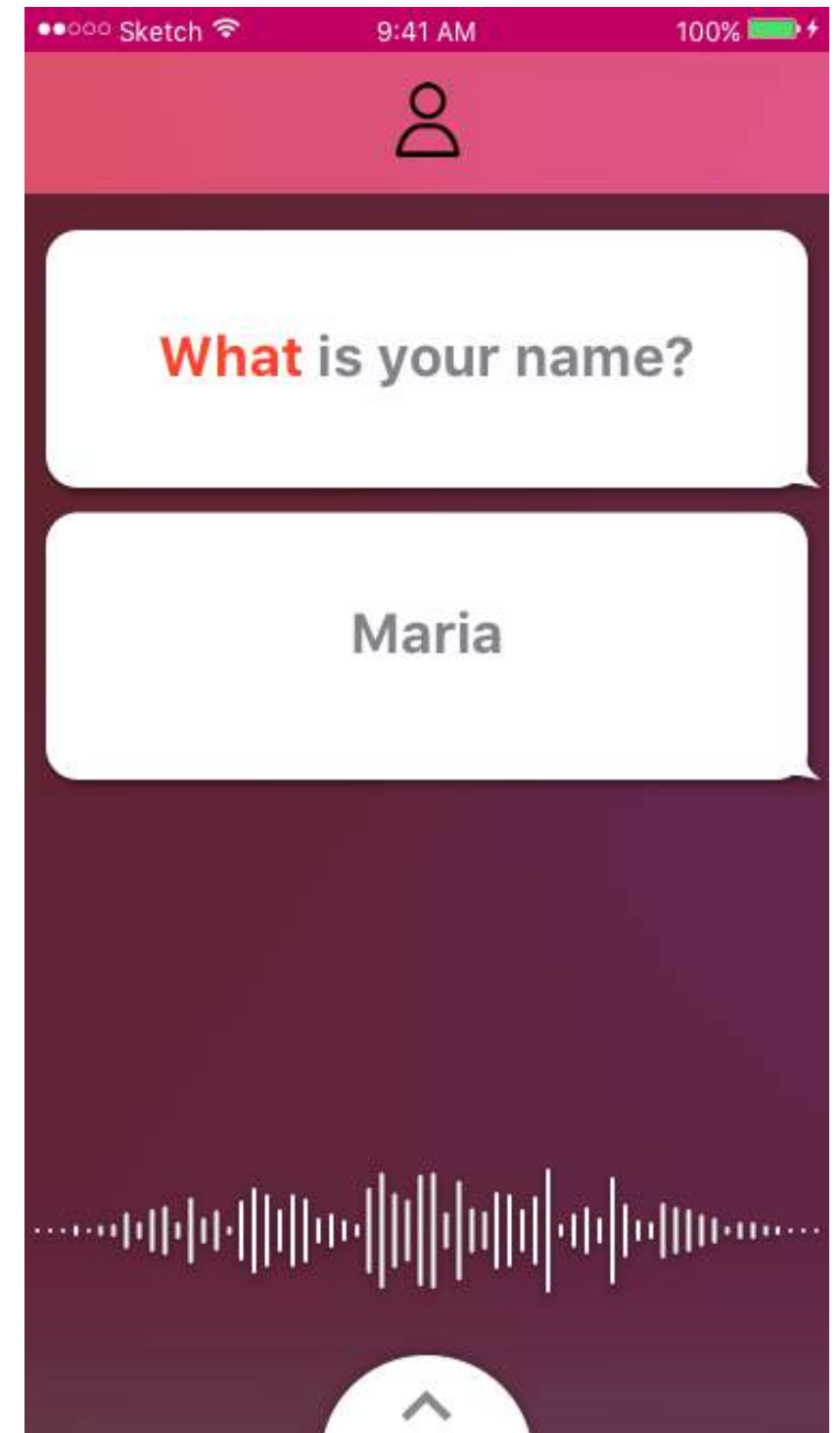
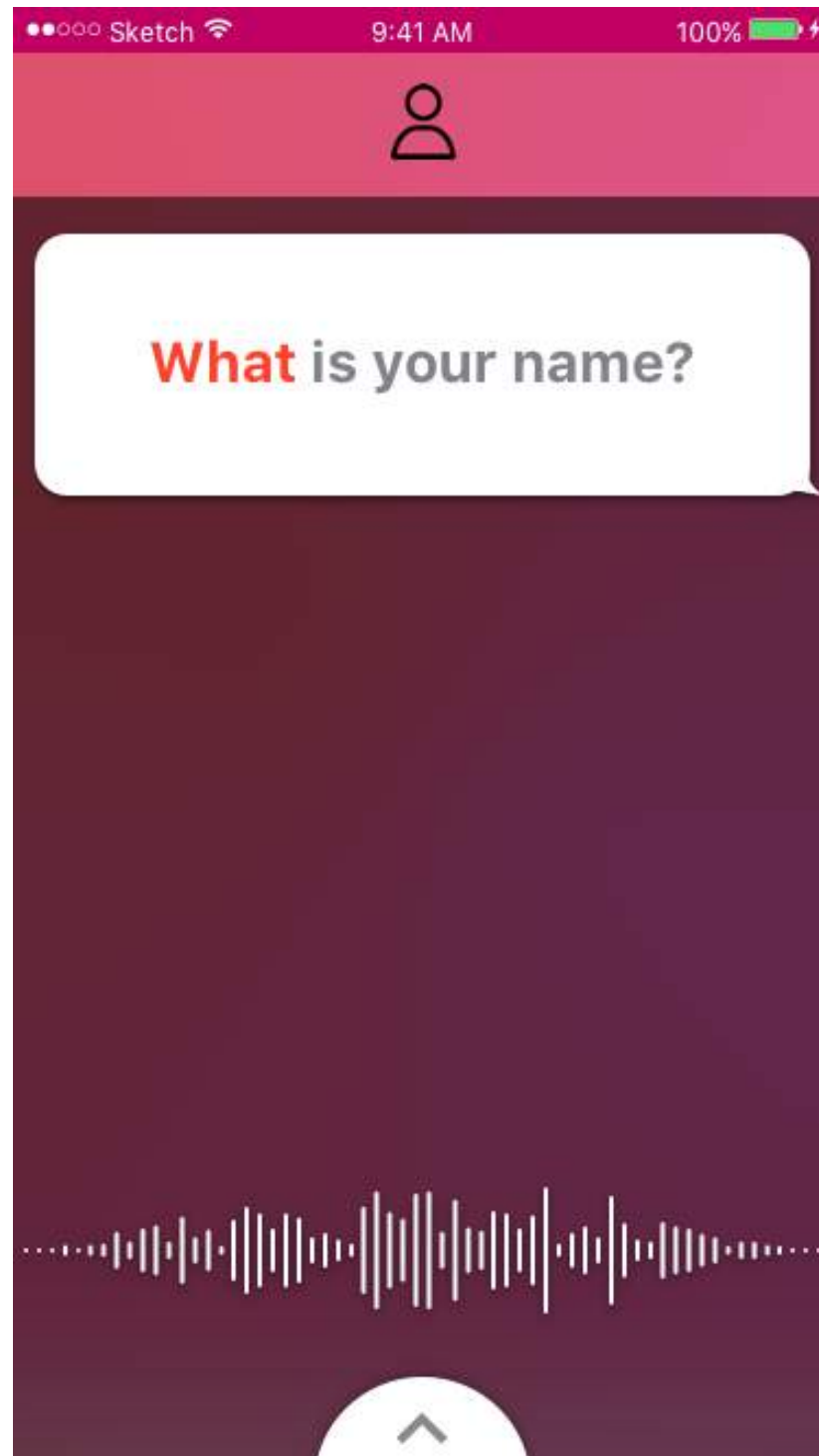
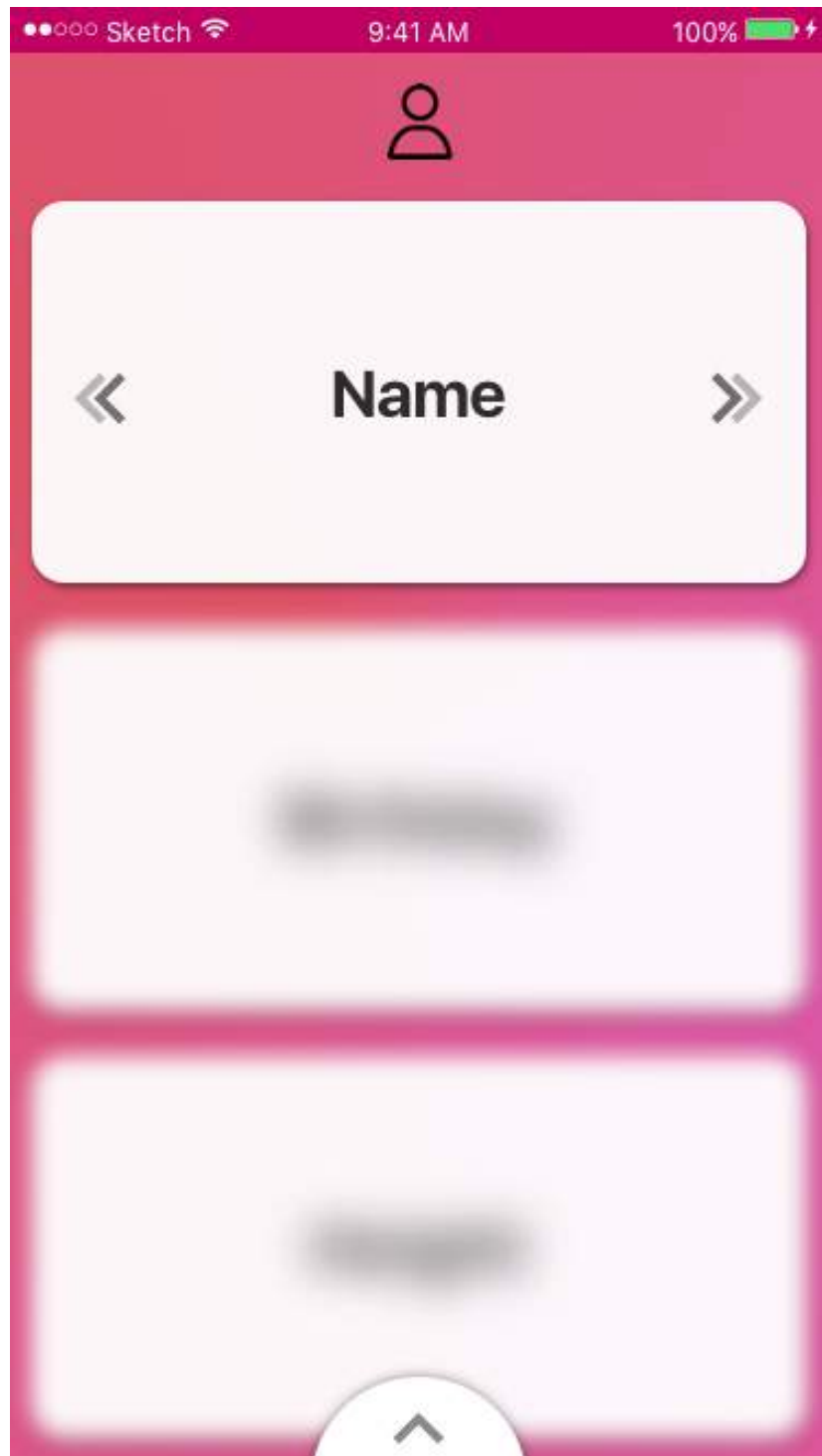


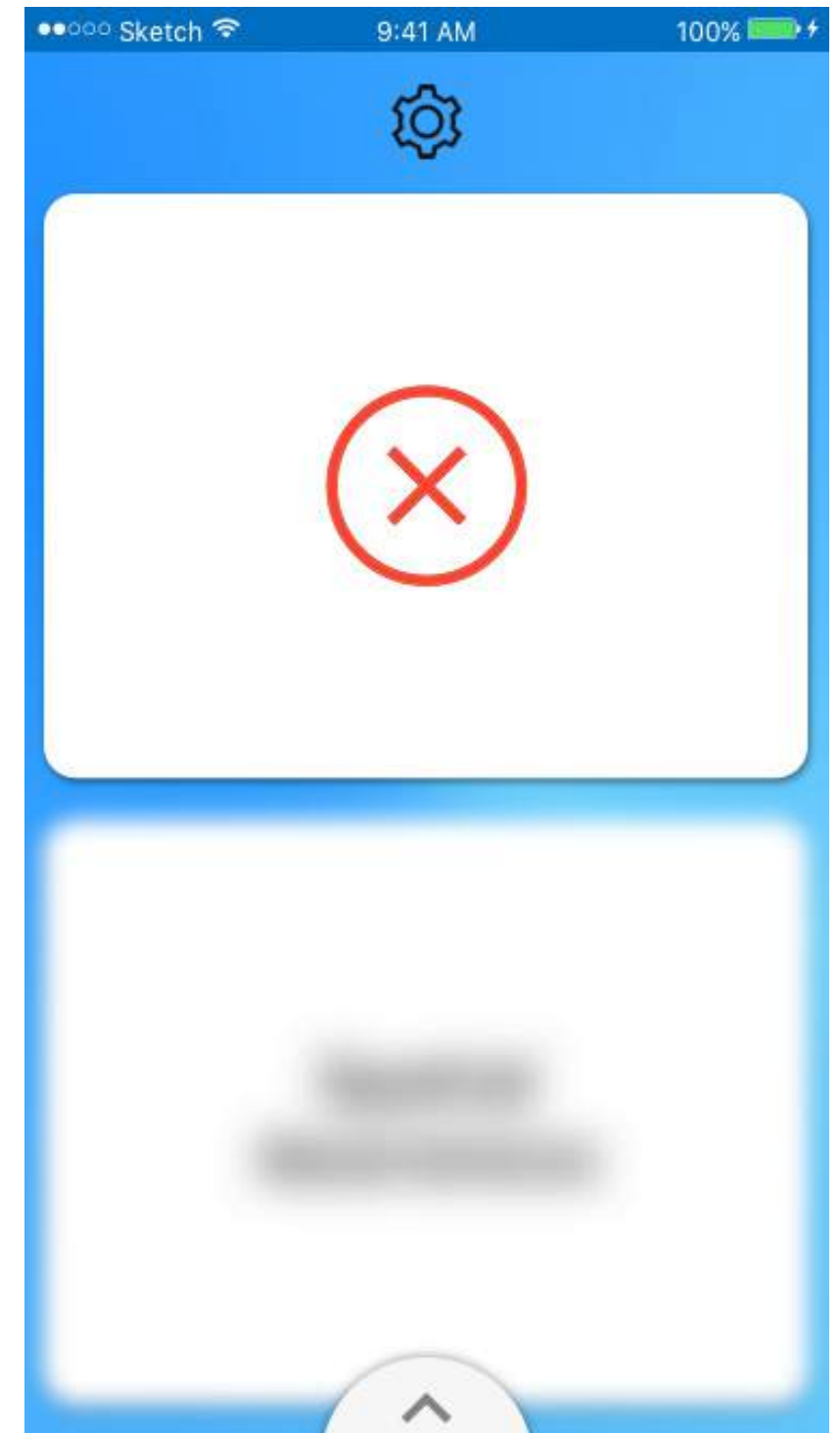
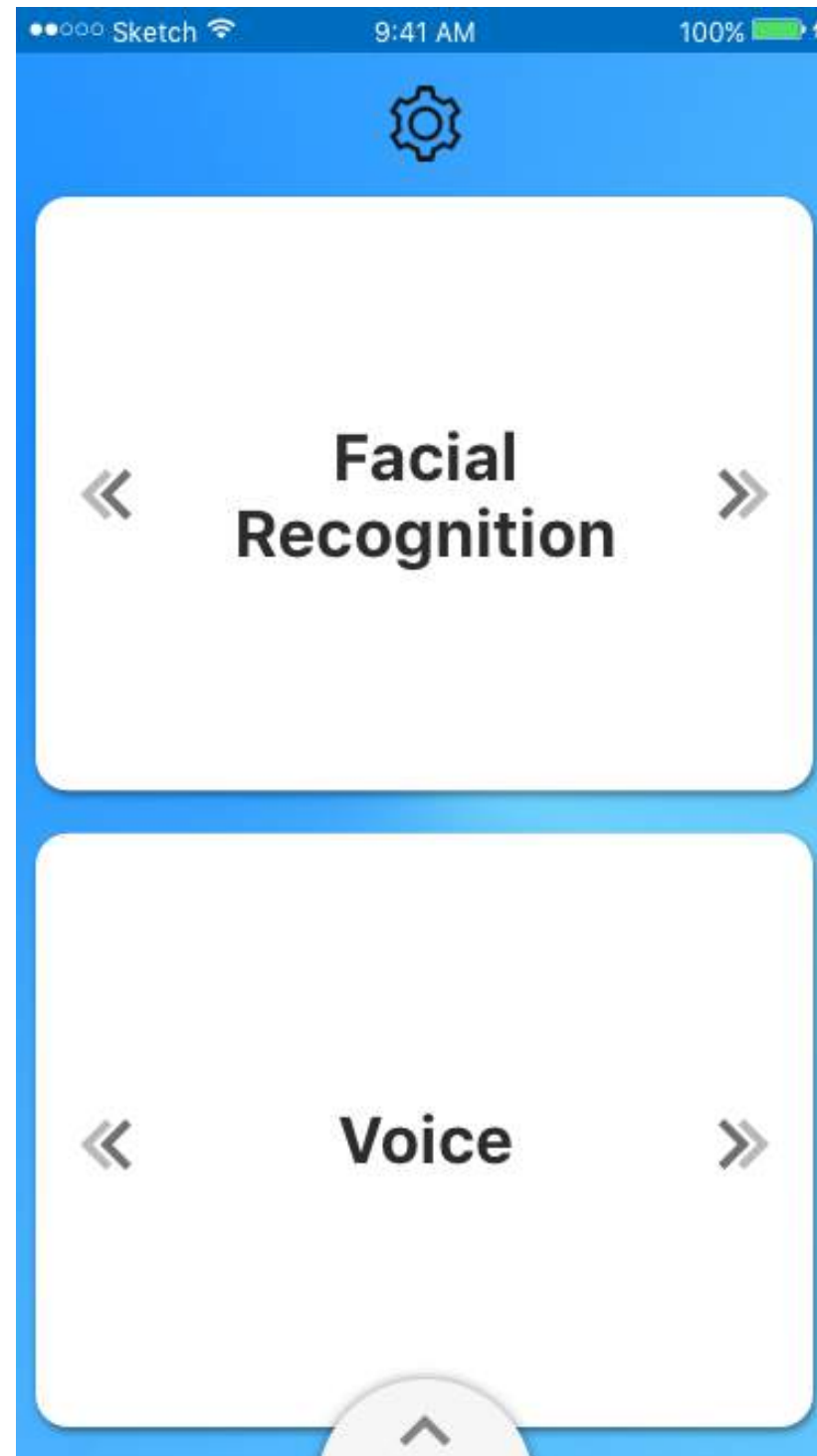
Wireframes

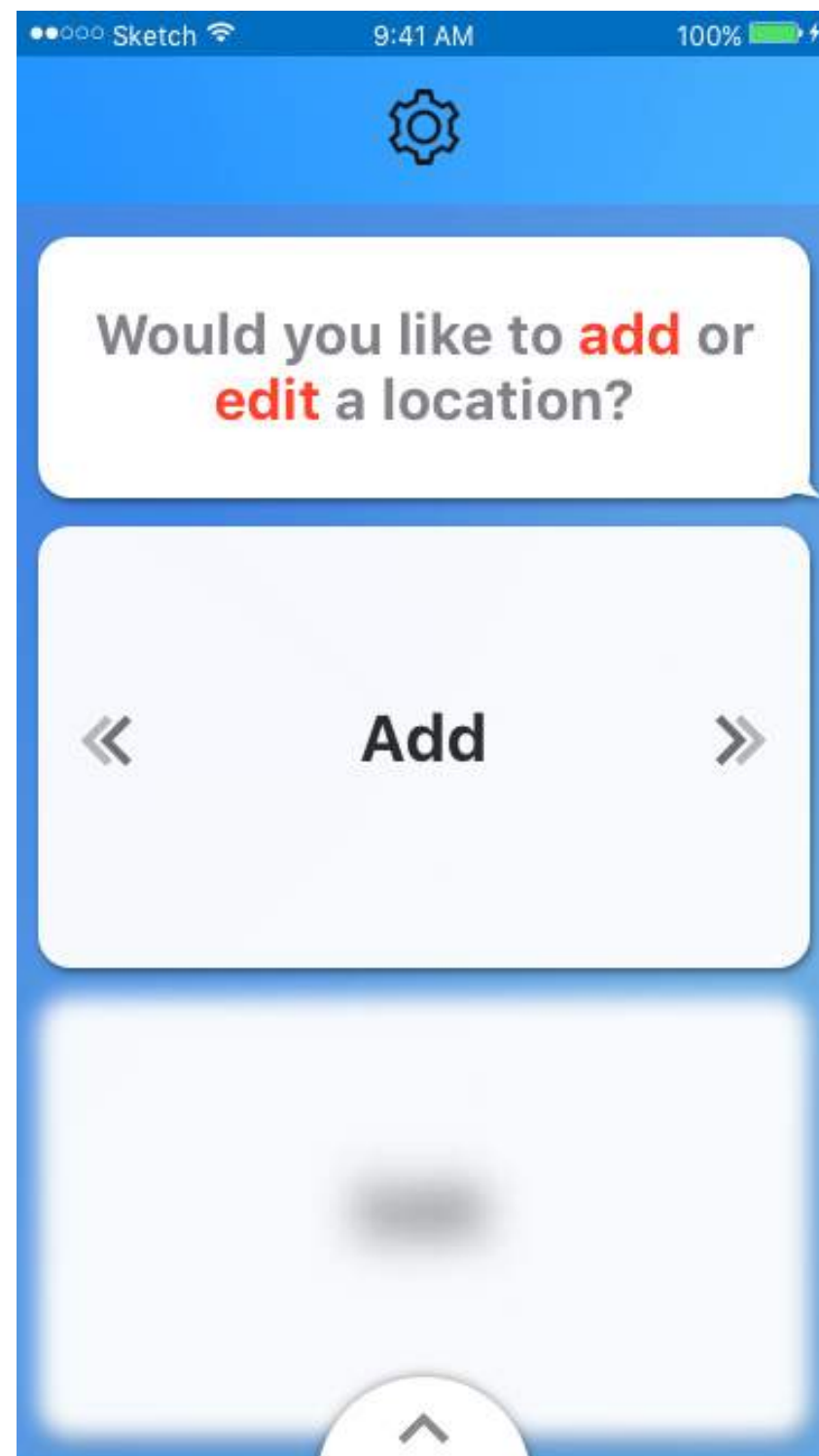
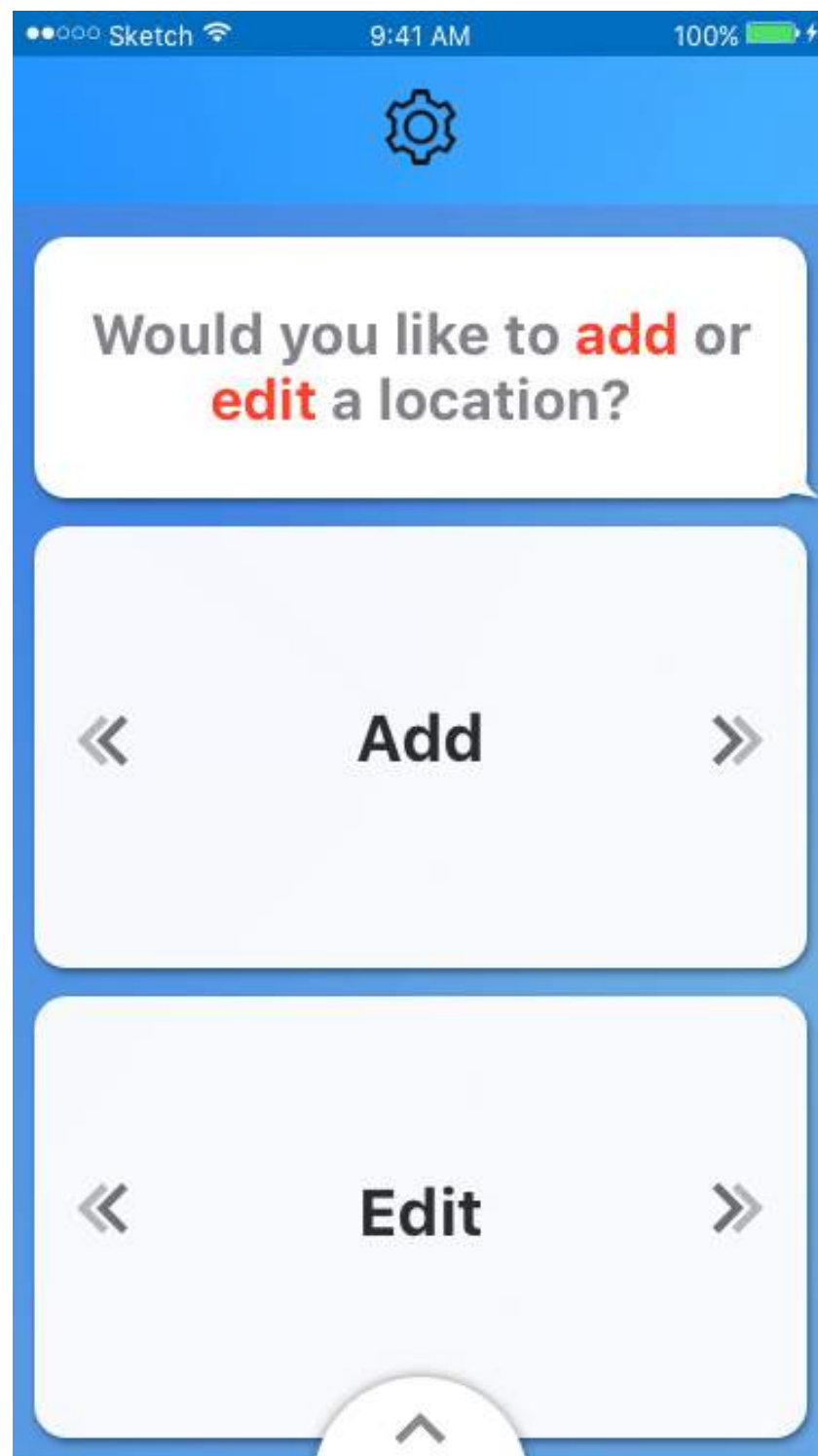
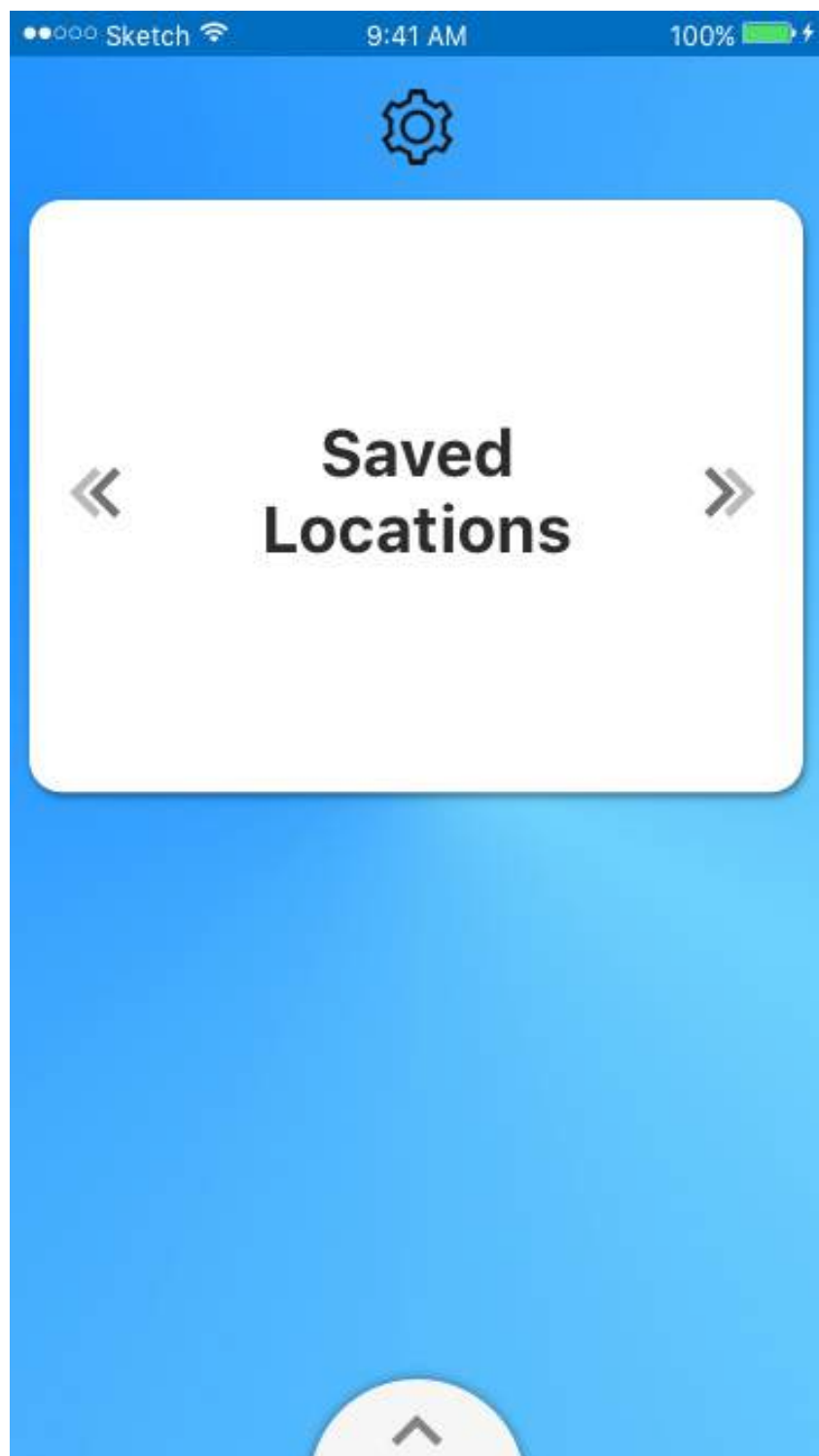
Designing with the specific needs of our users' in mind, we aimed to create a bold and bright conversational user interface that uses key interactions to navigate. Some challenges included simplifying the appearance of complex information, and choosing intuitive and meaningful interactions that were easy for the user to learn.

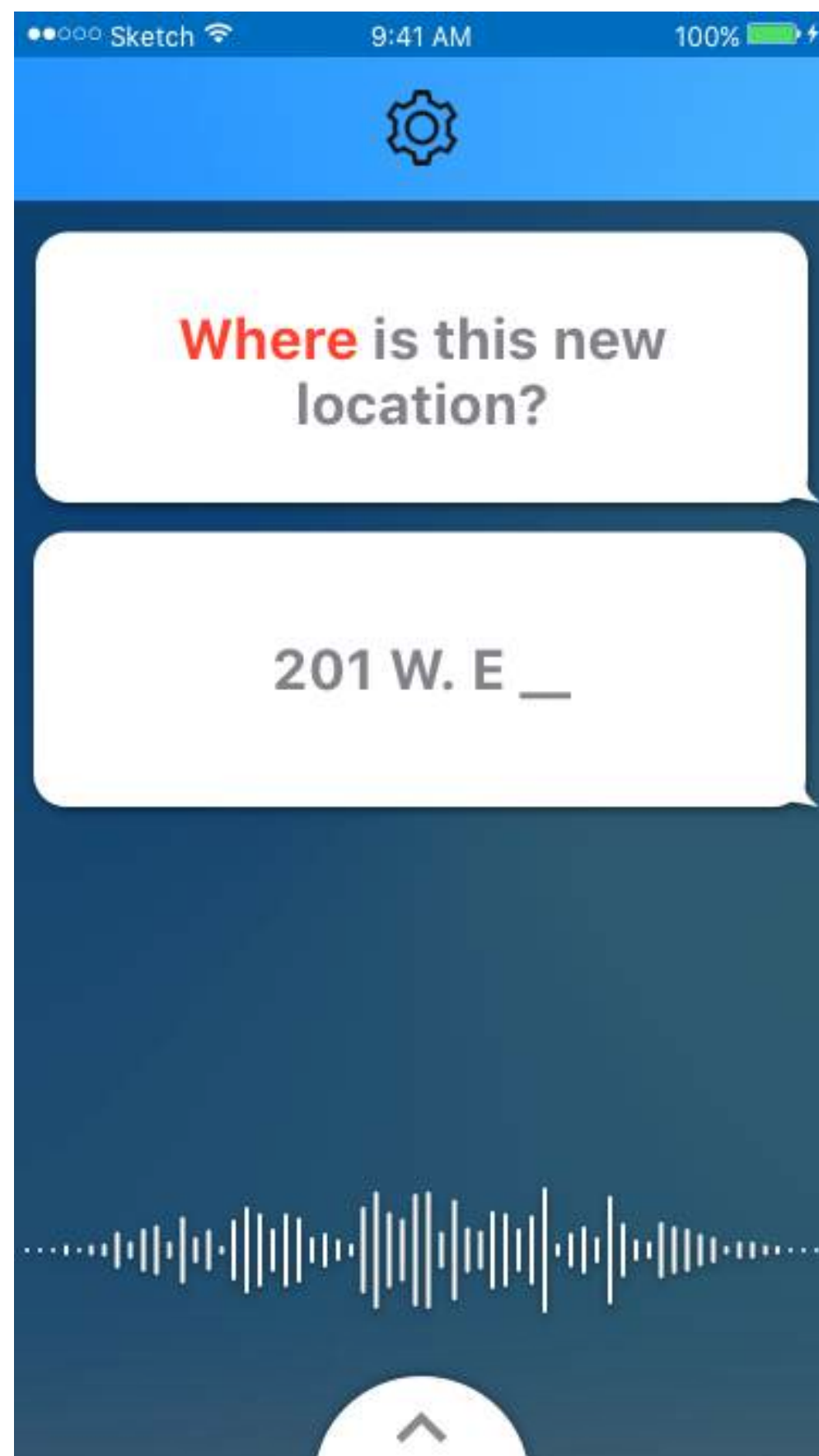
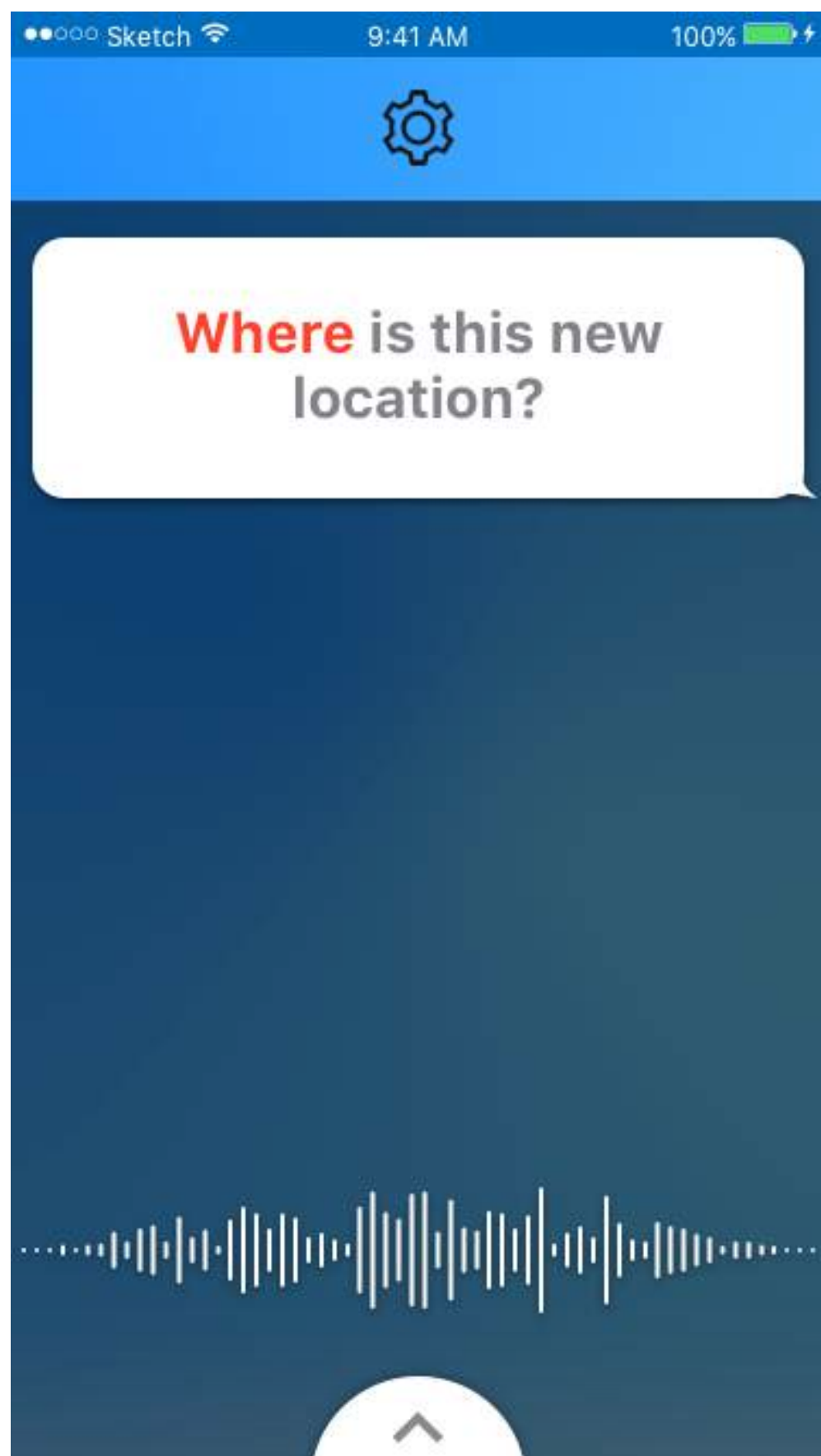


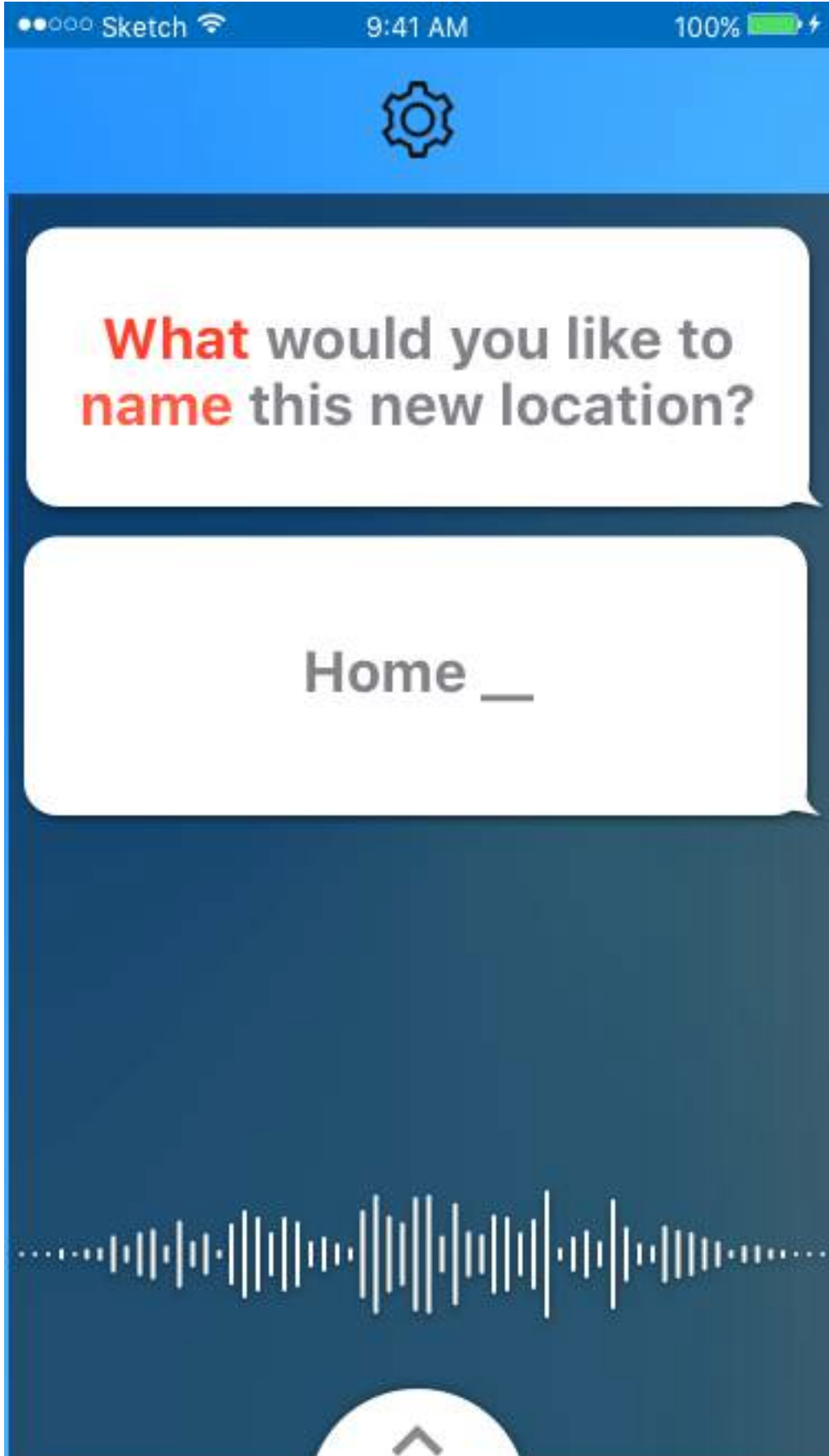
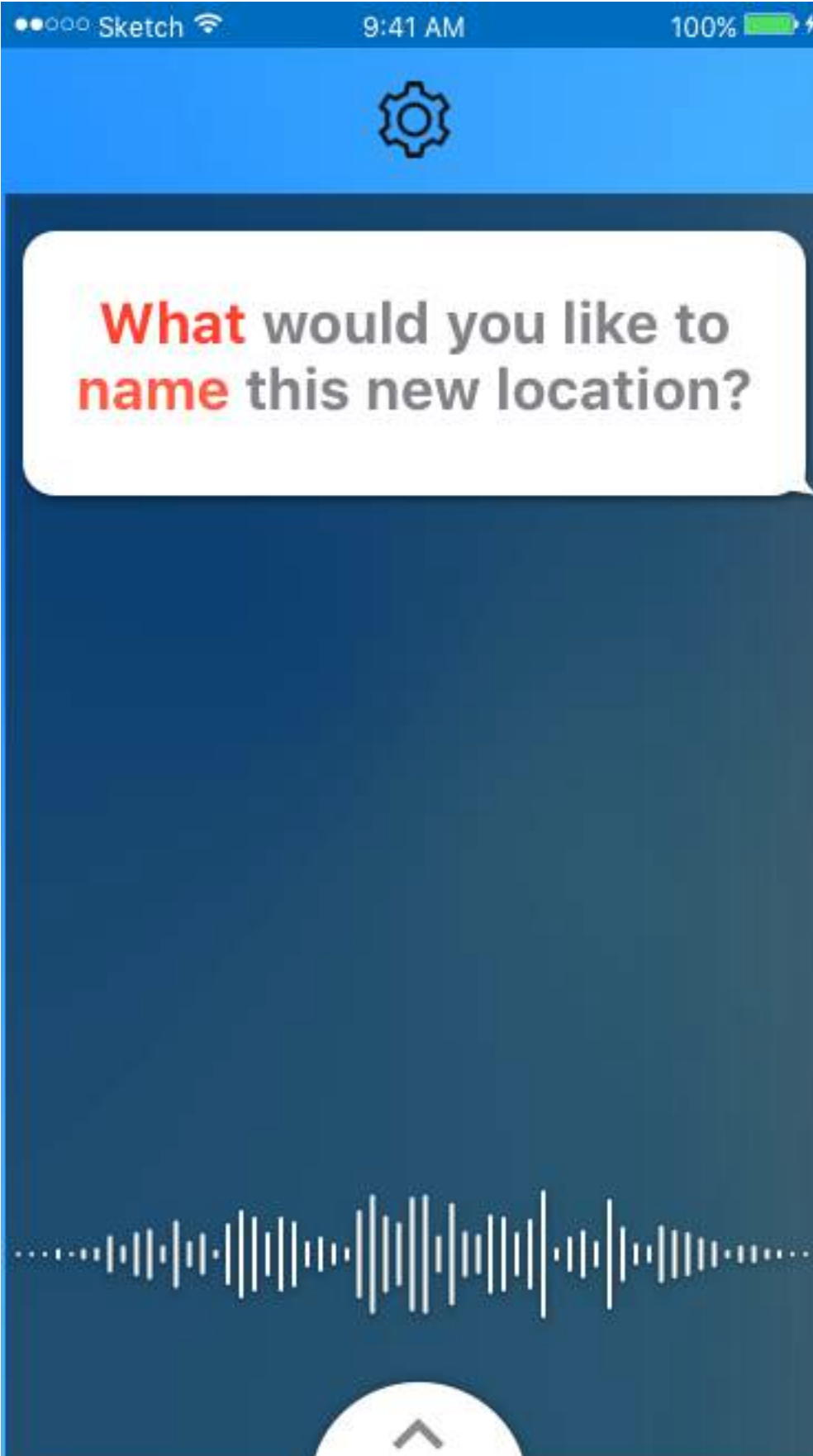


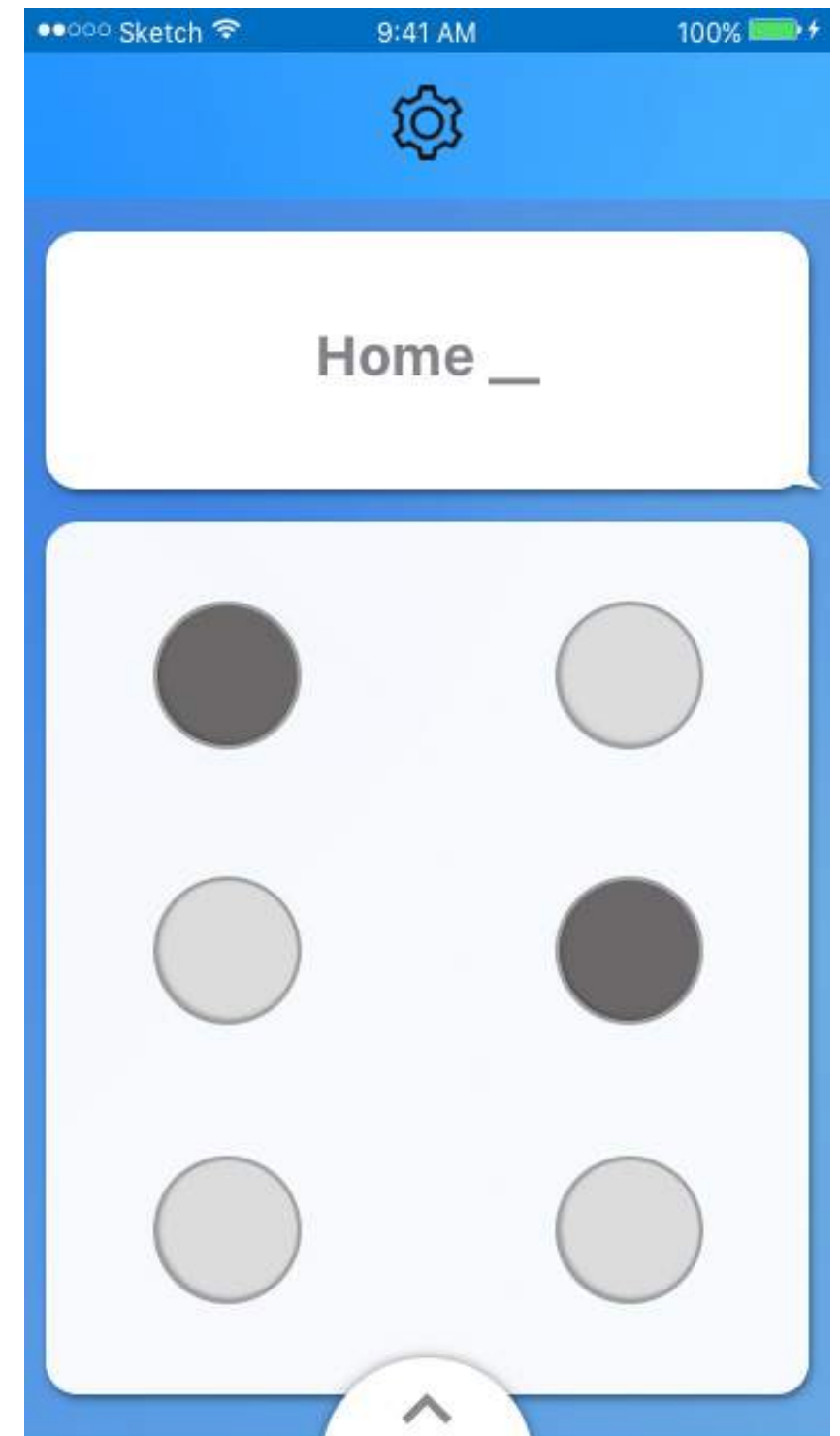
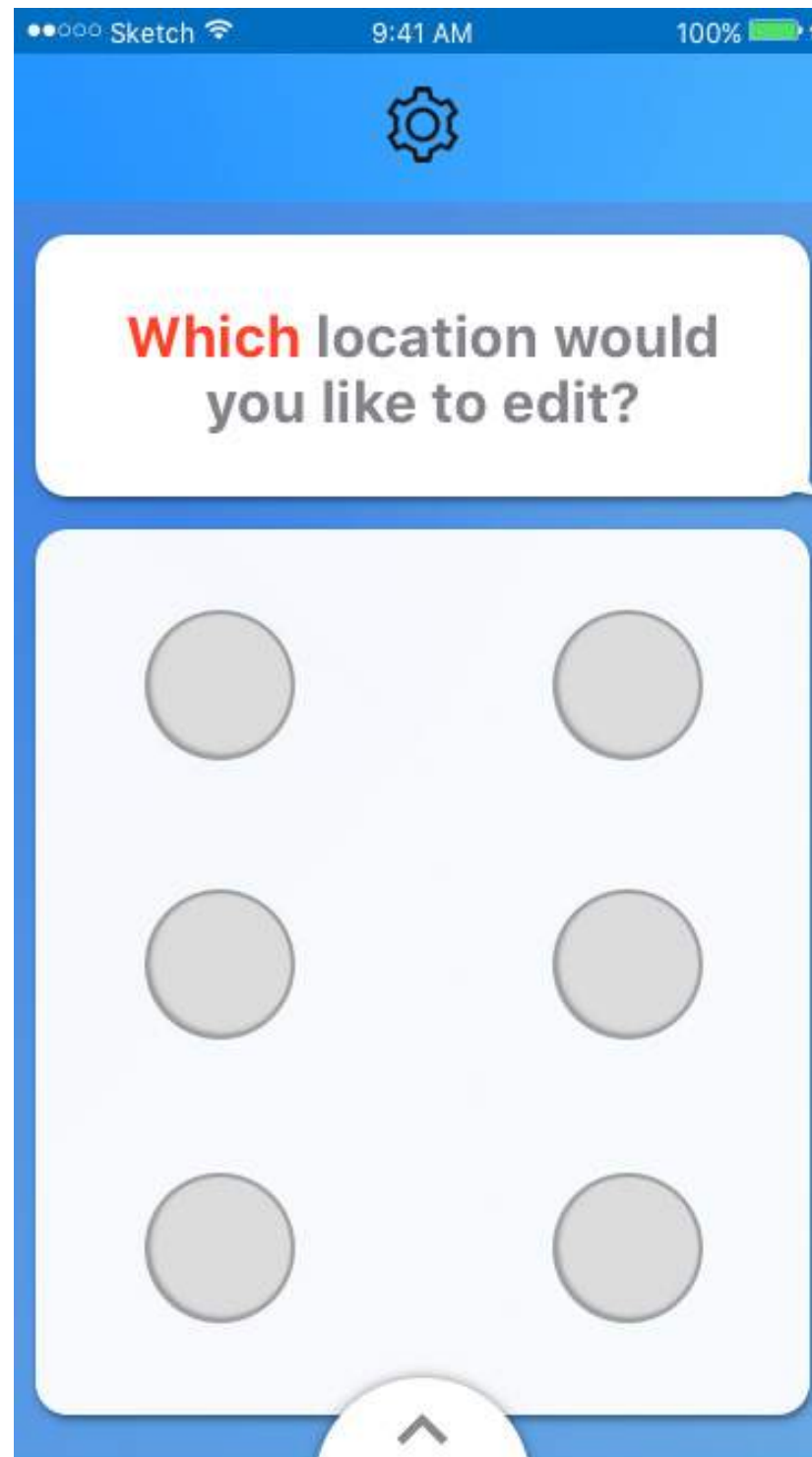
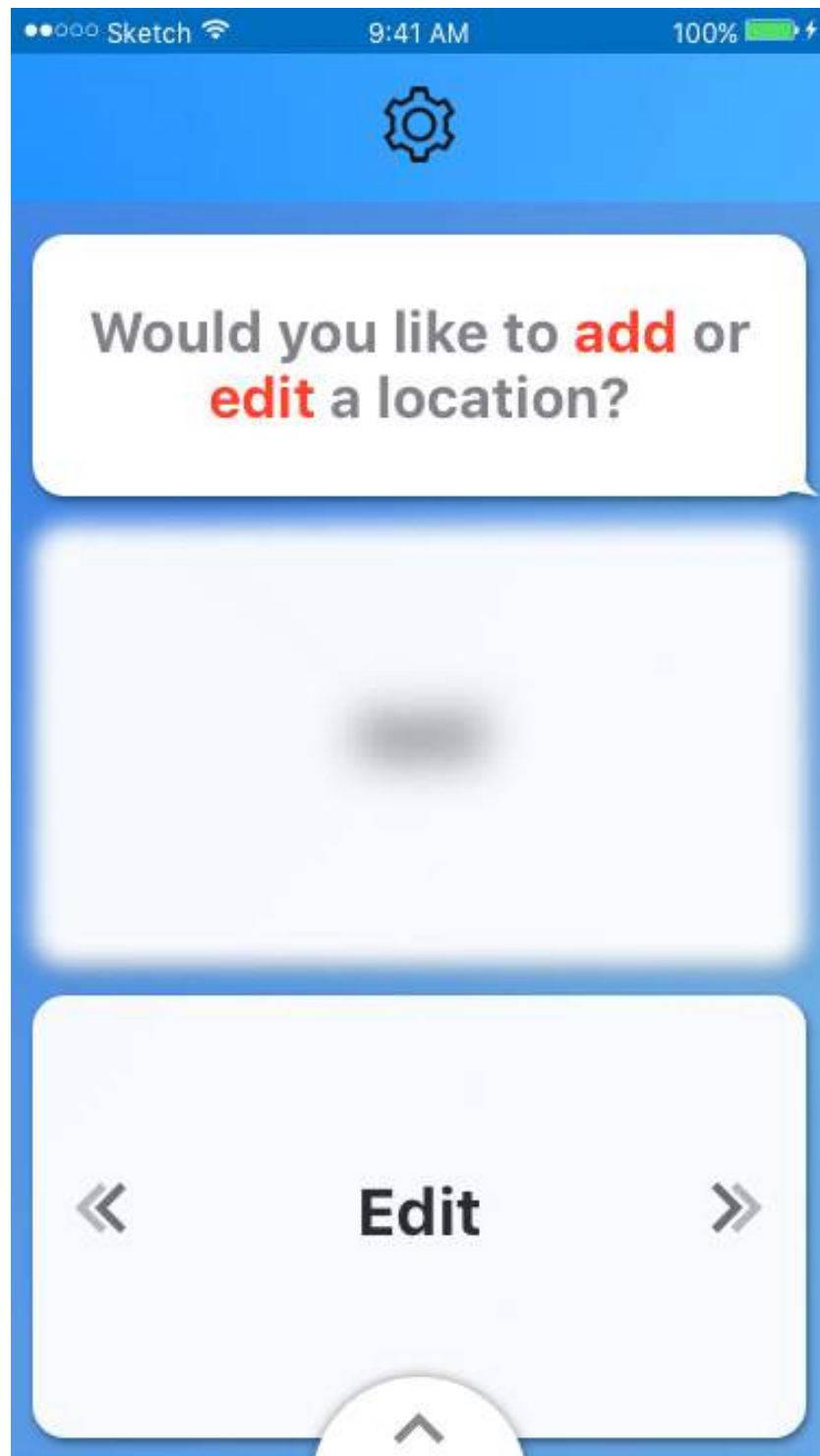


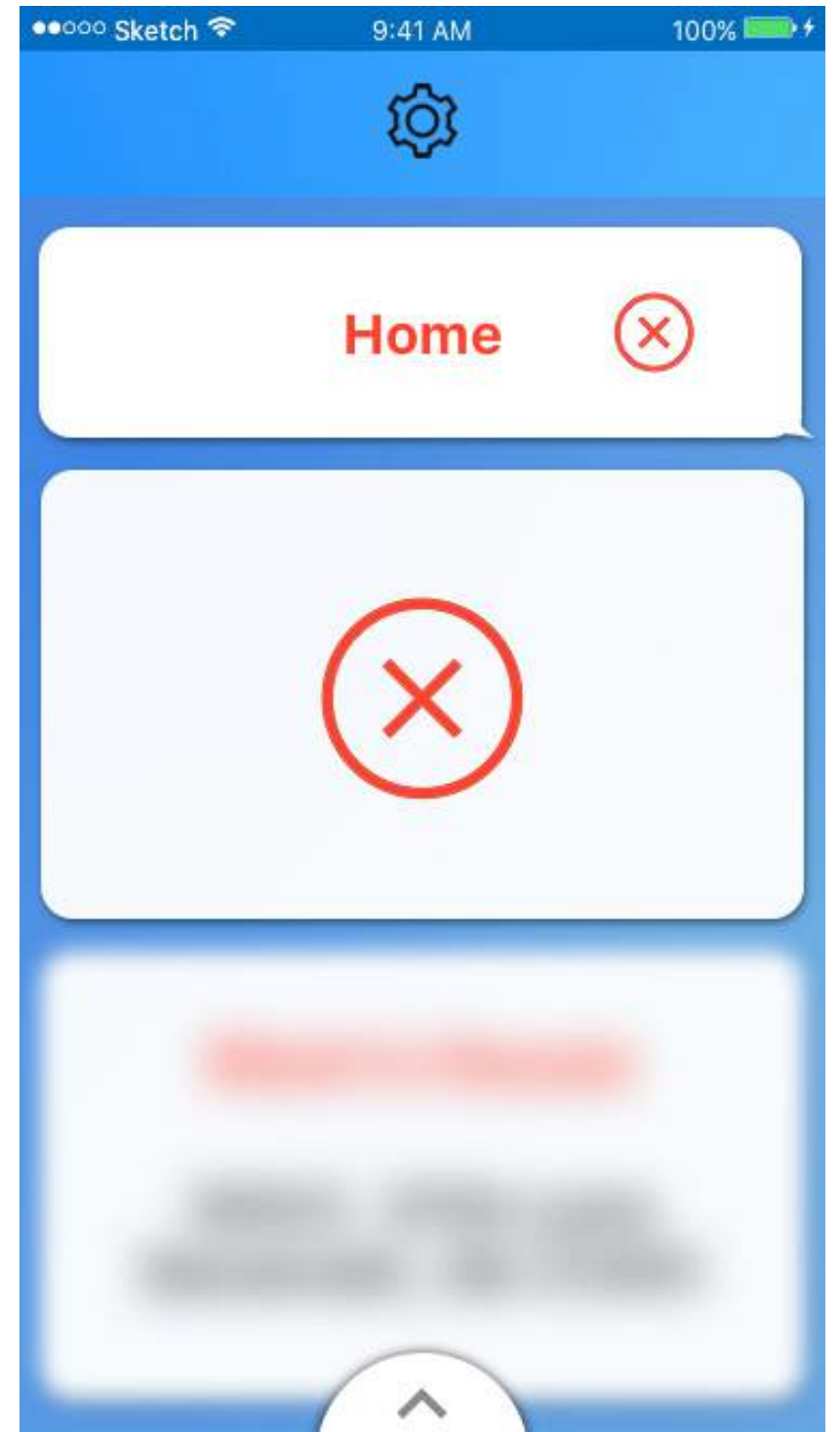
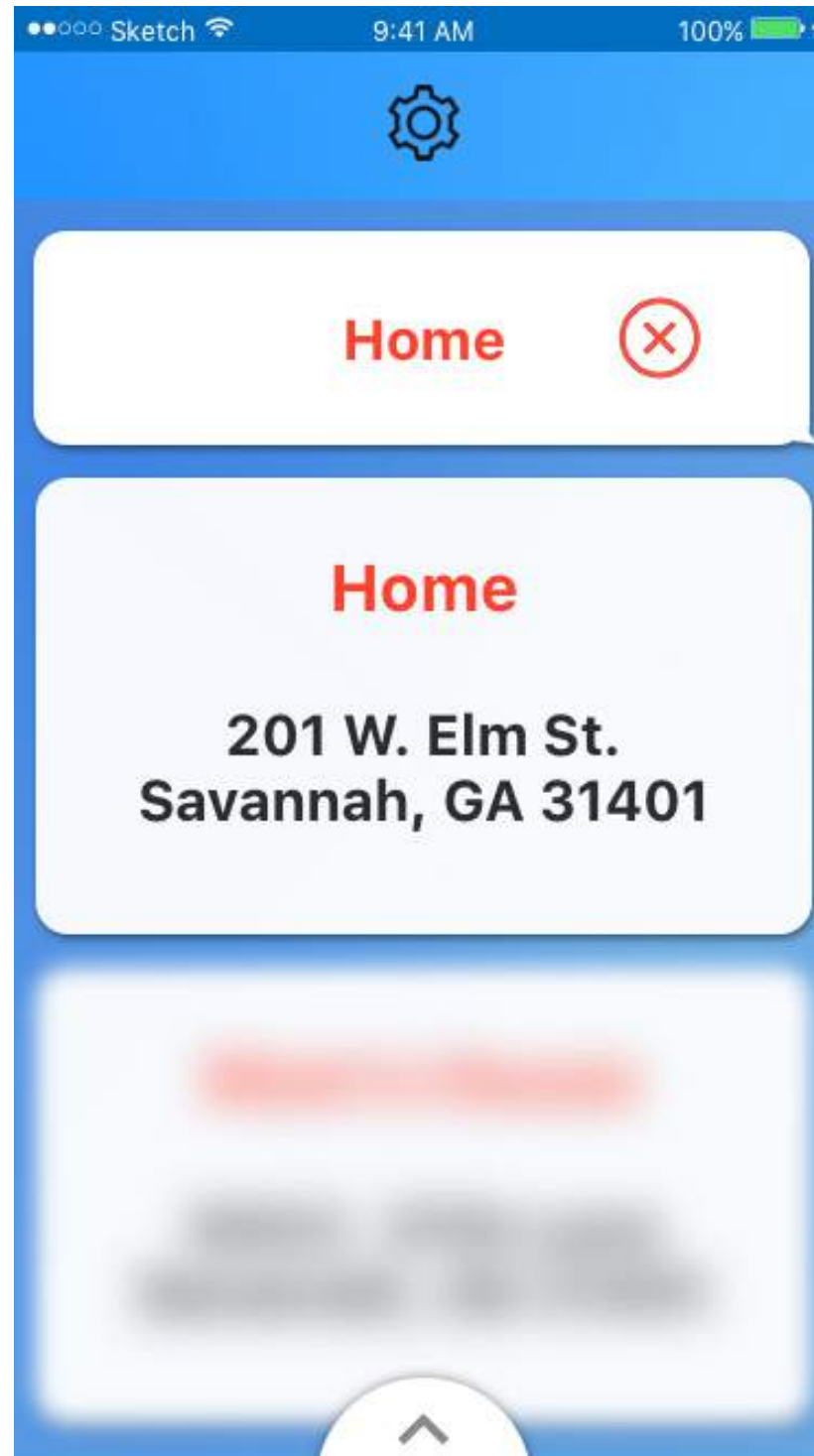
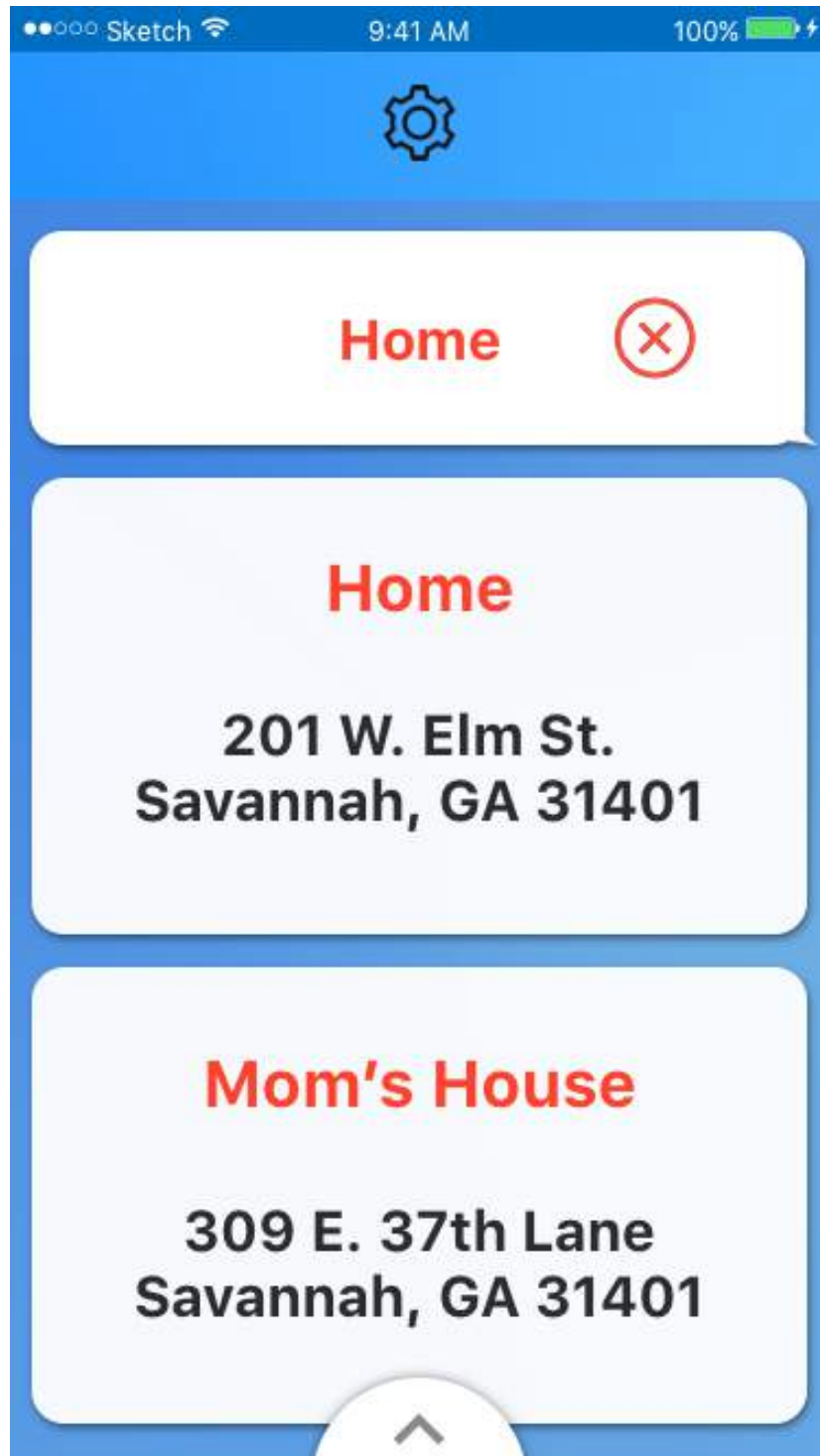


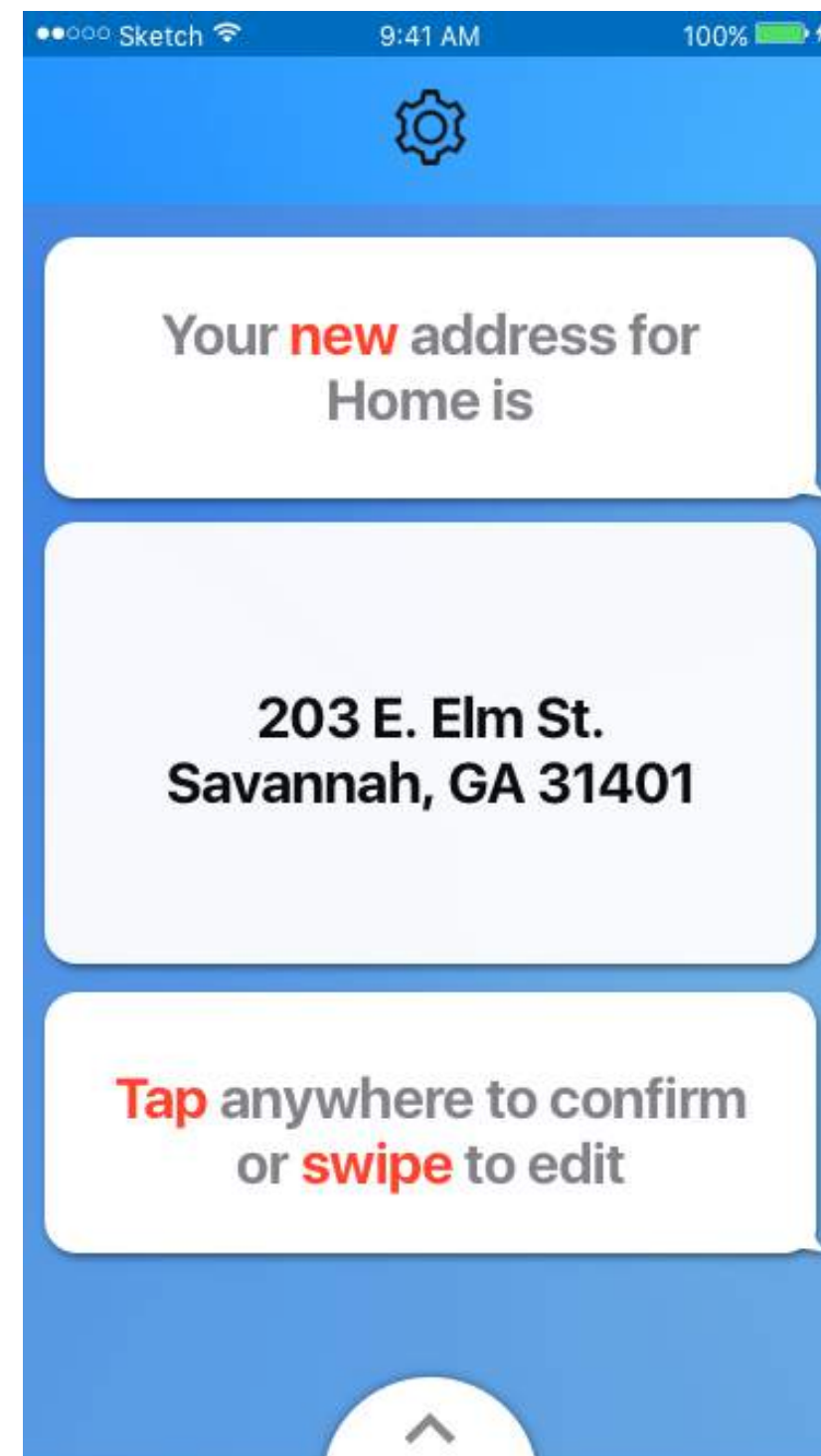
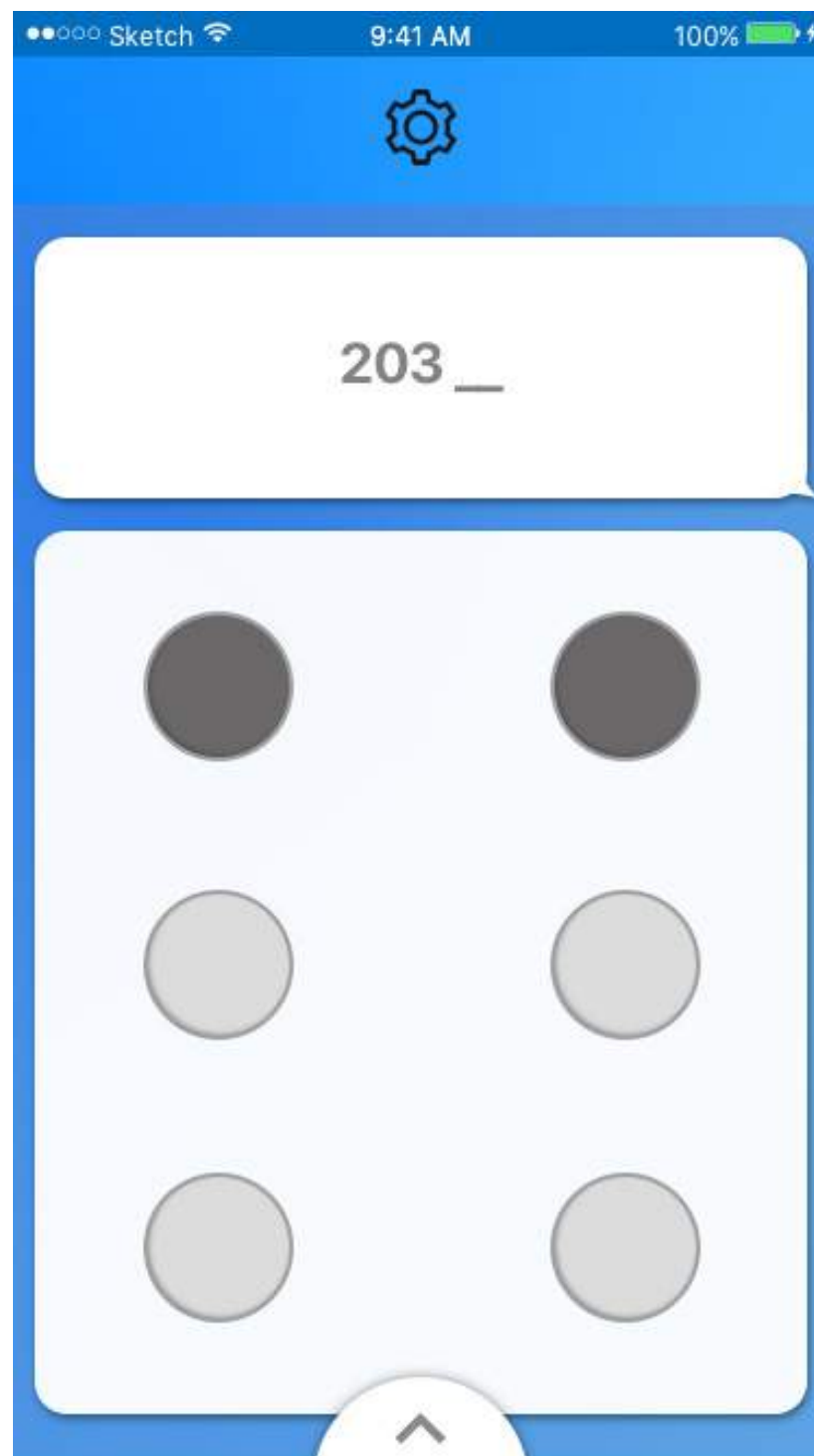
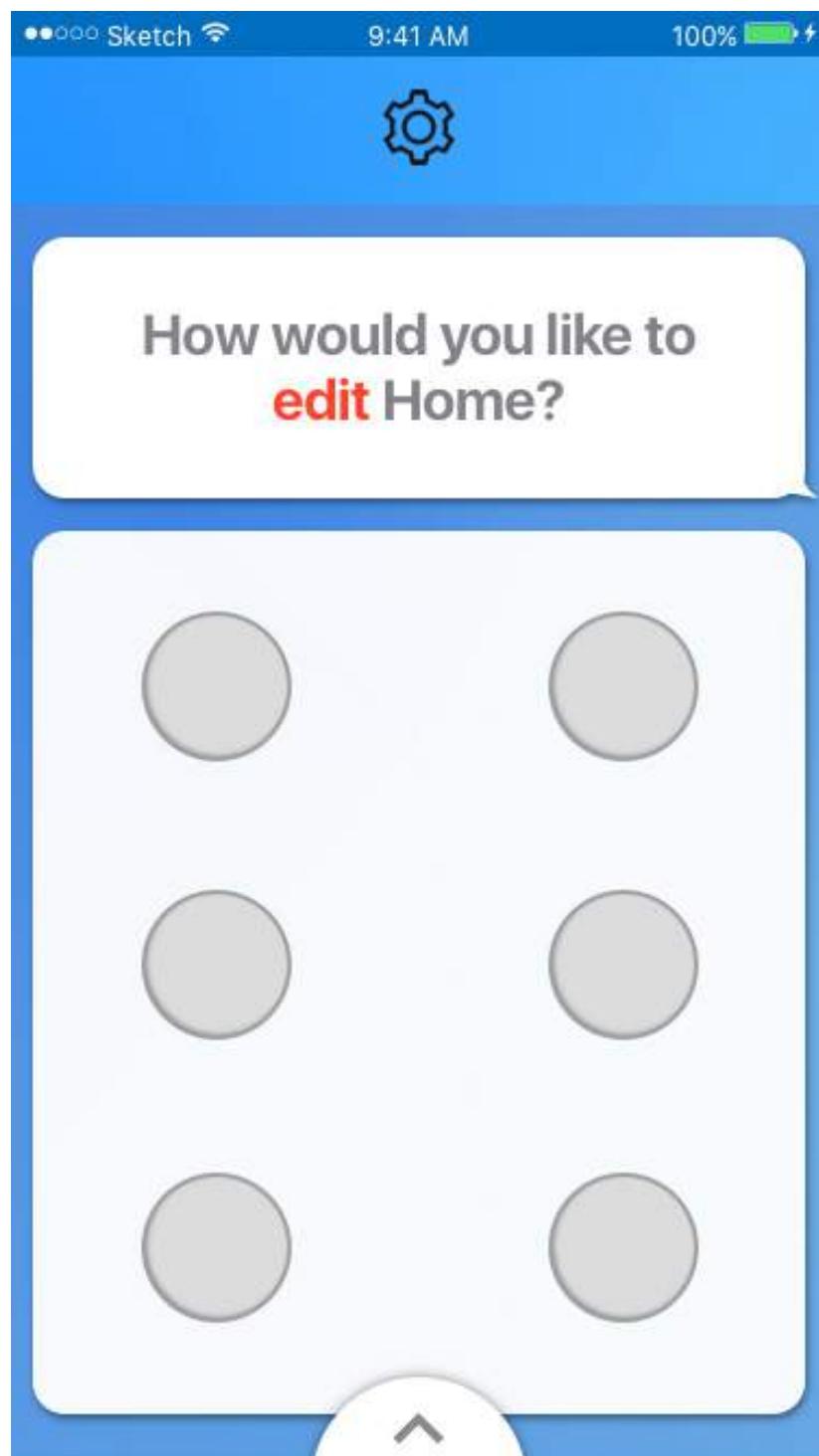


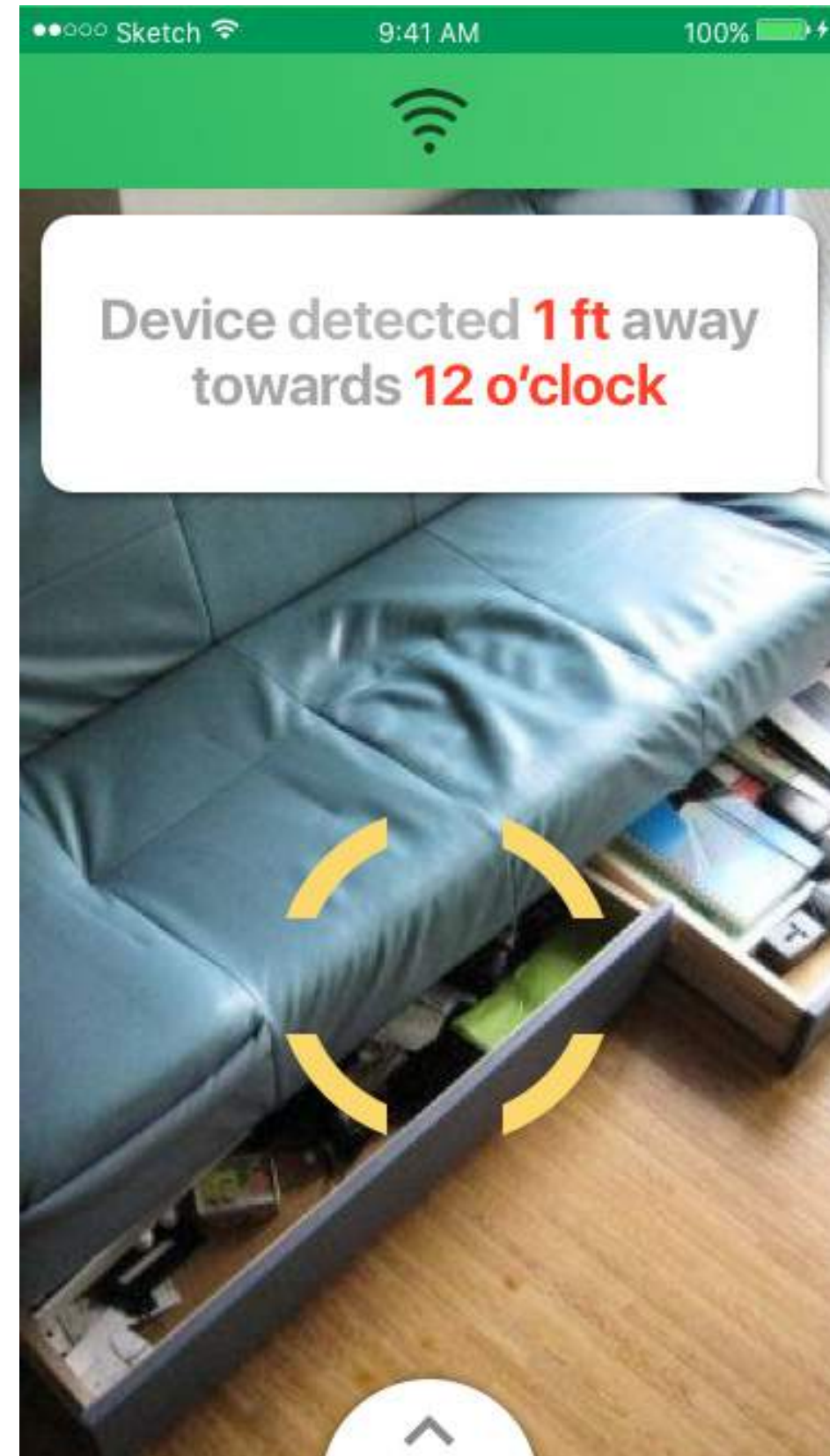
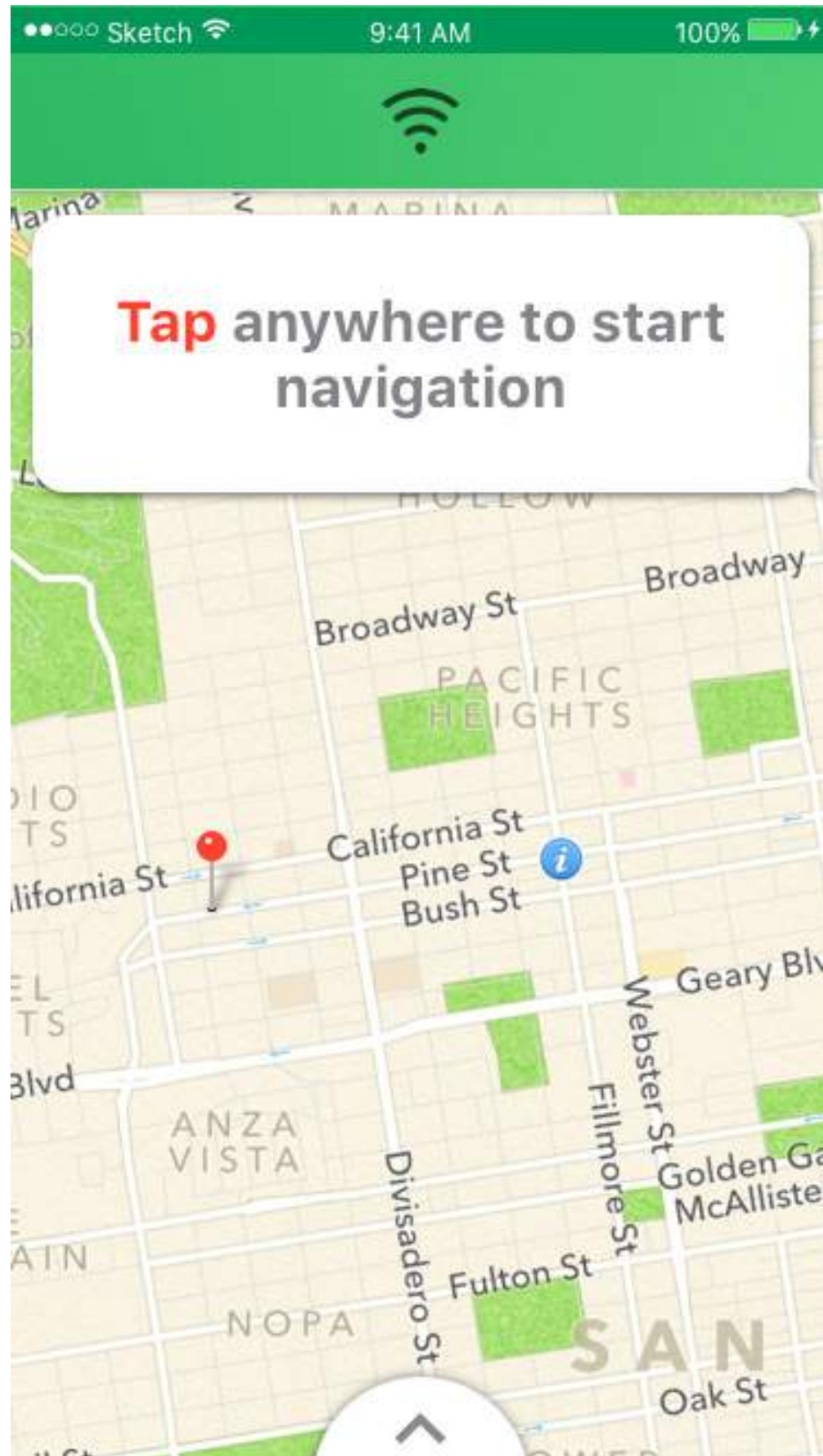


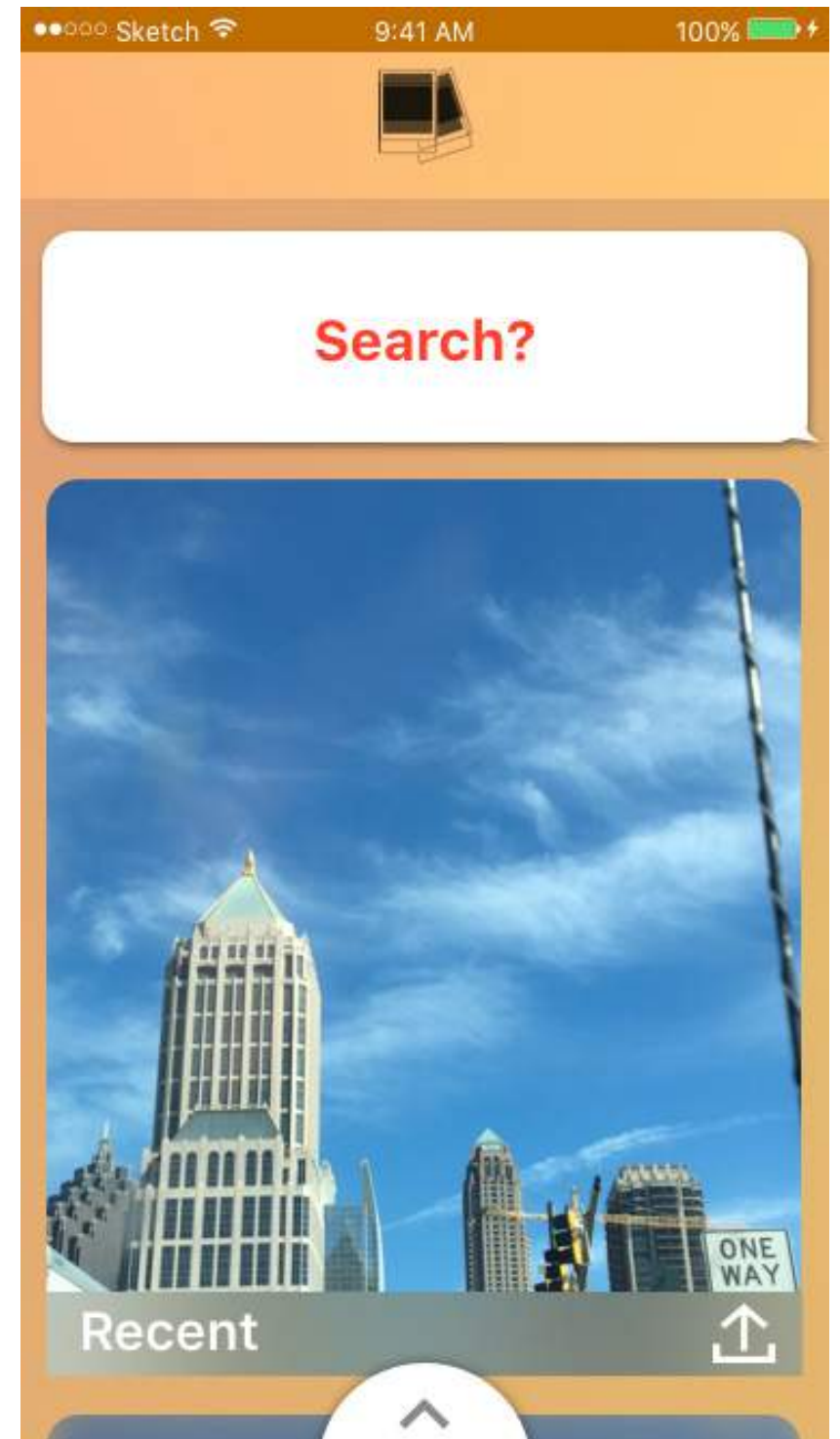
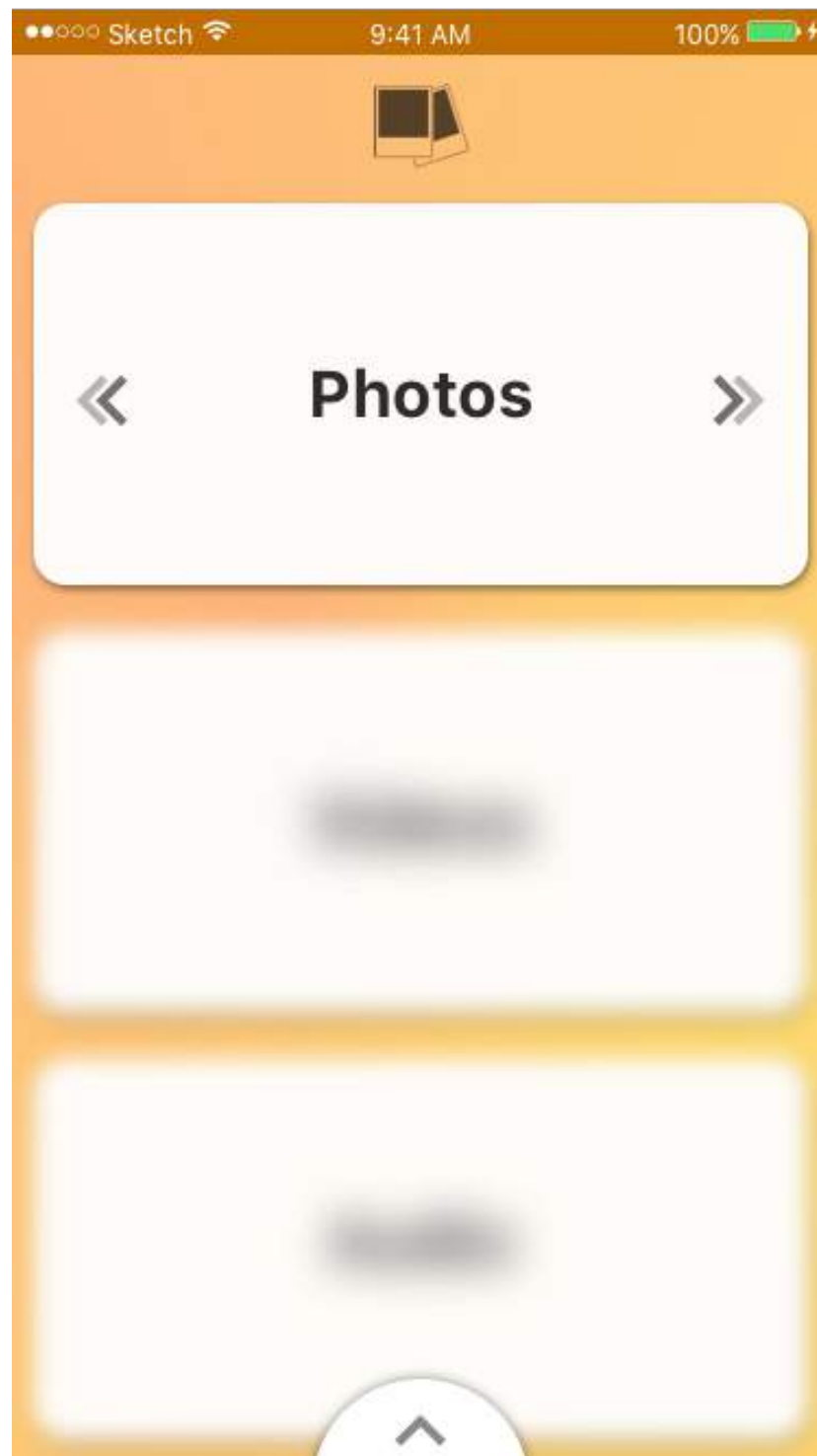
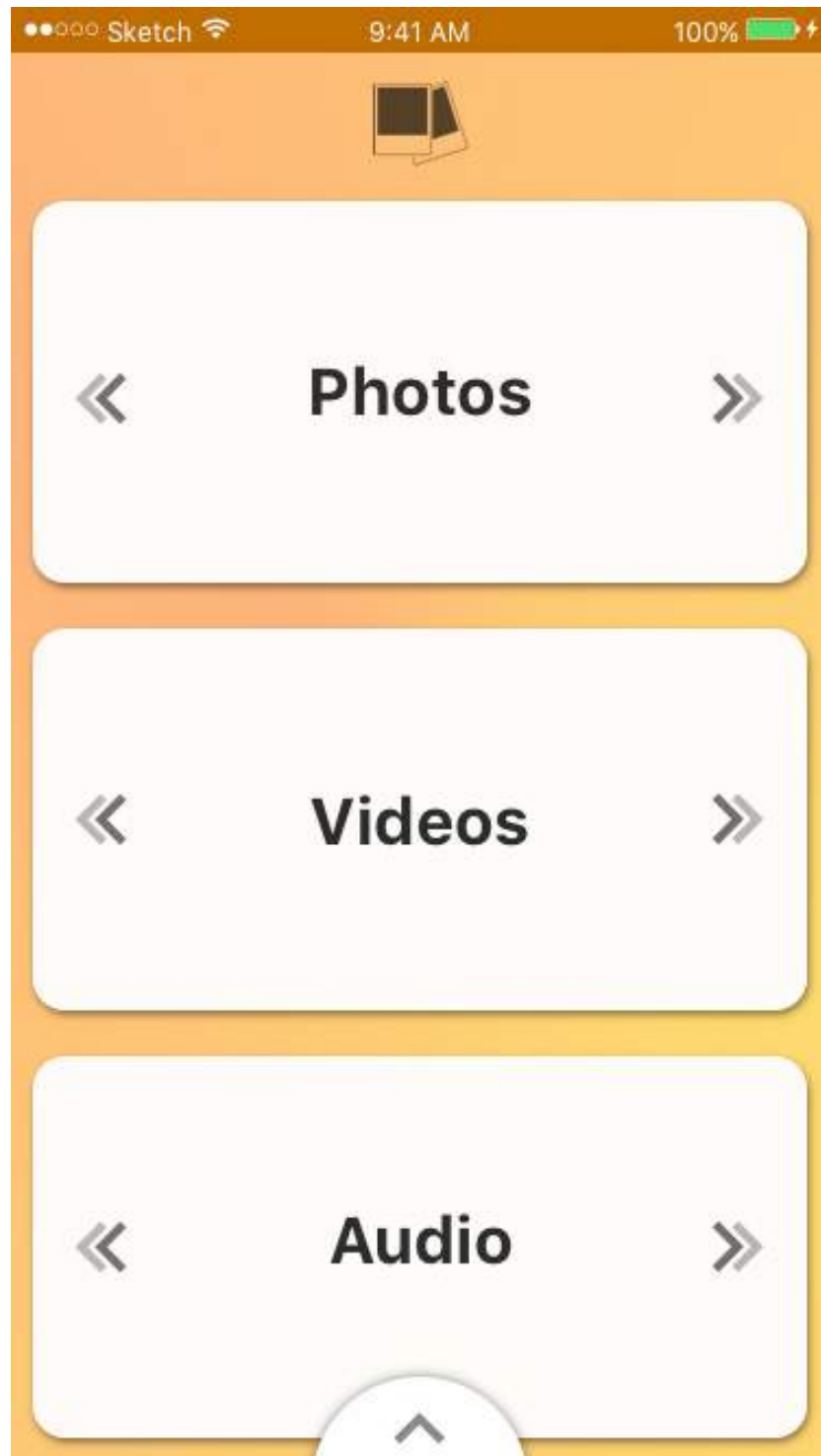


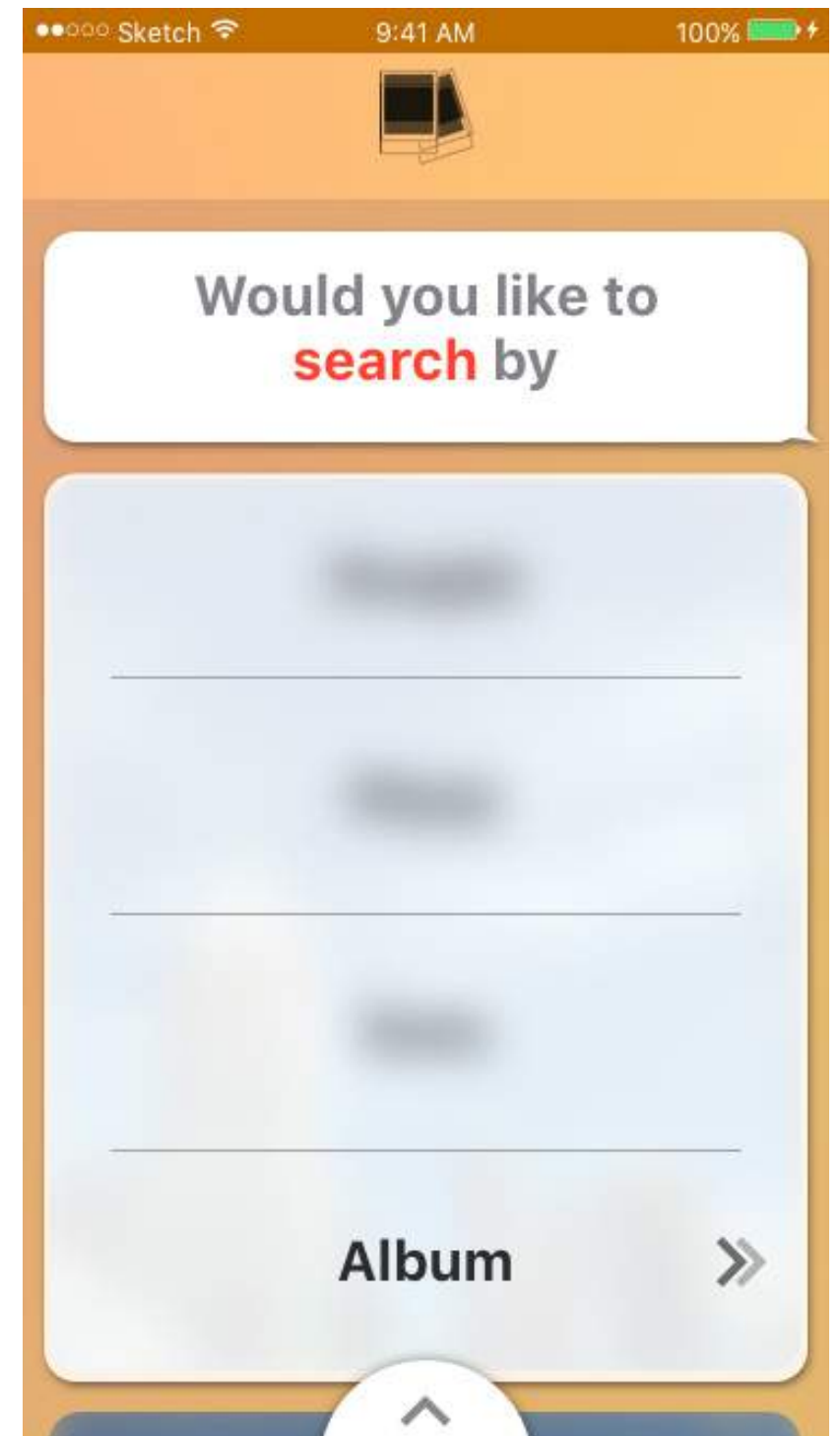
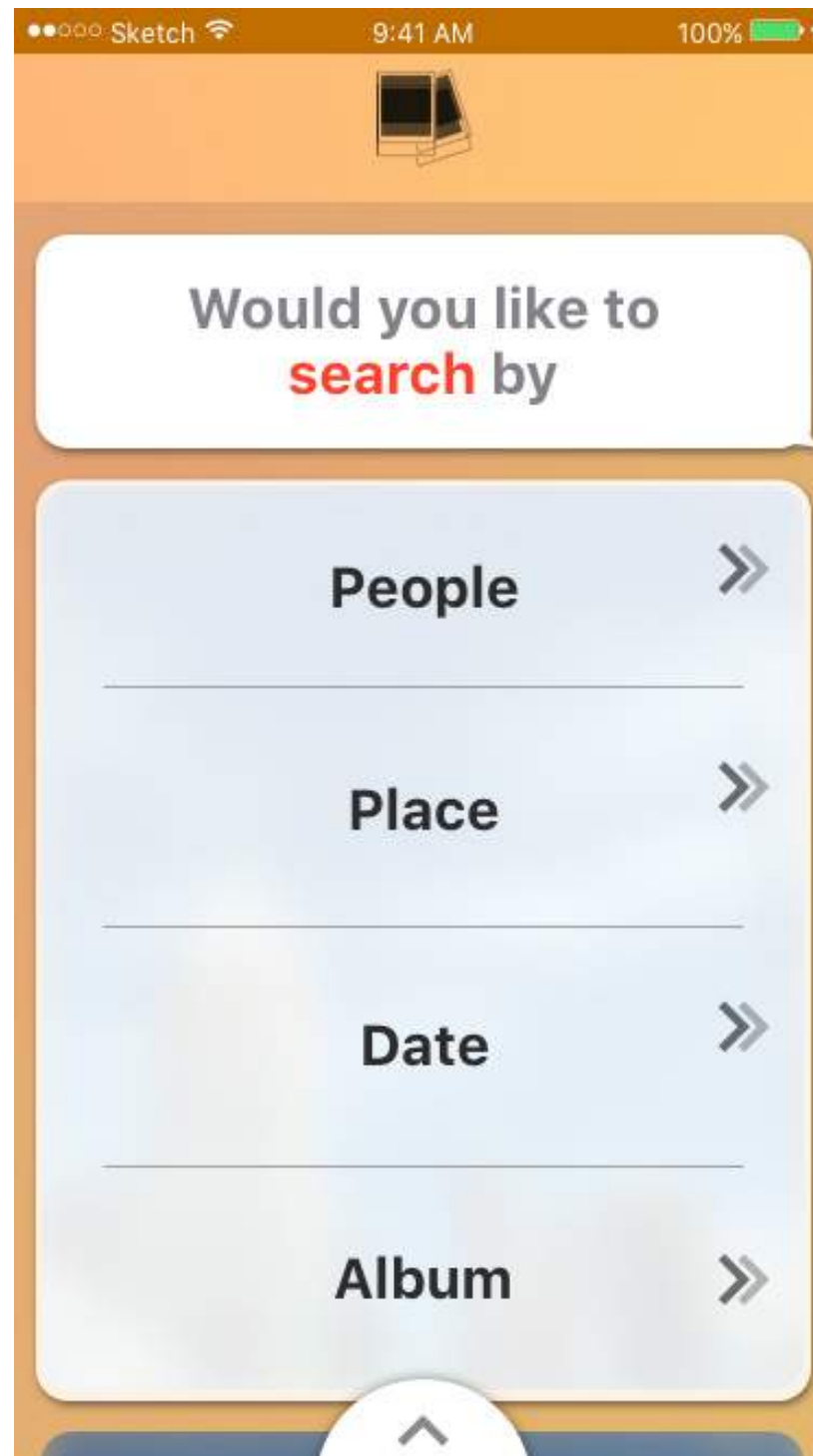
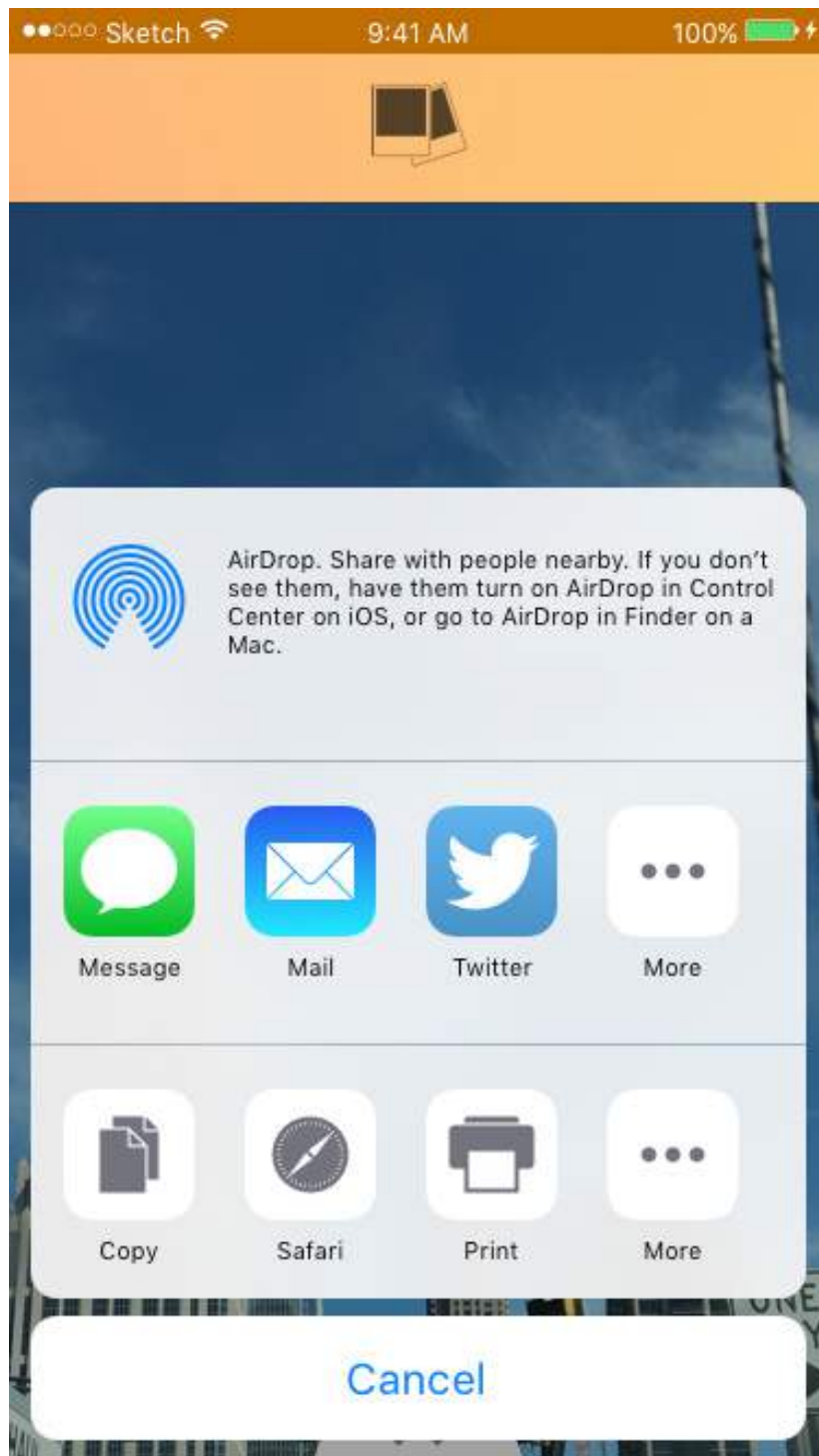


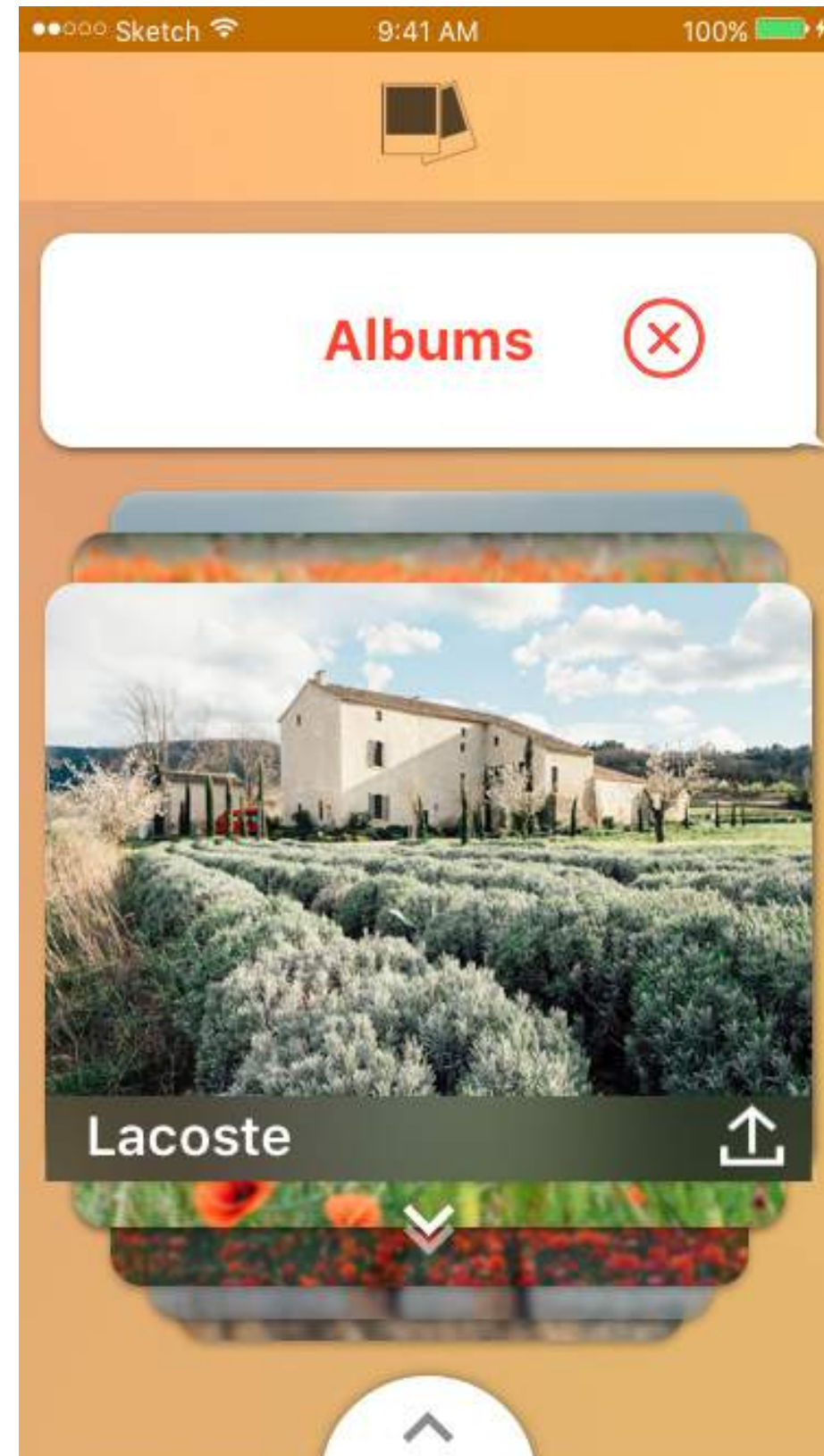
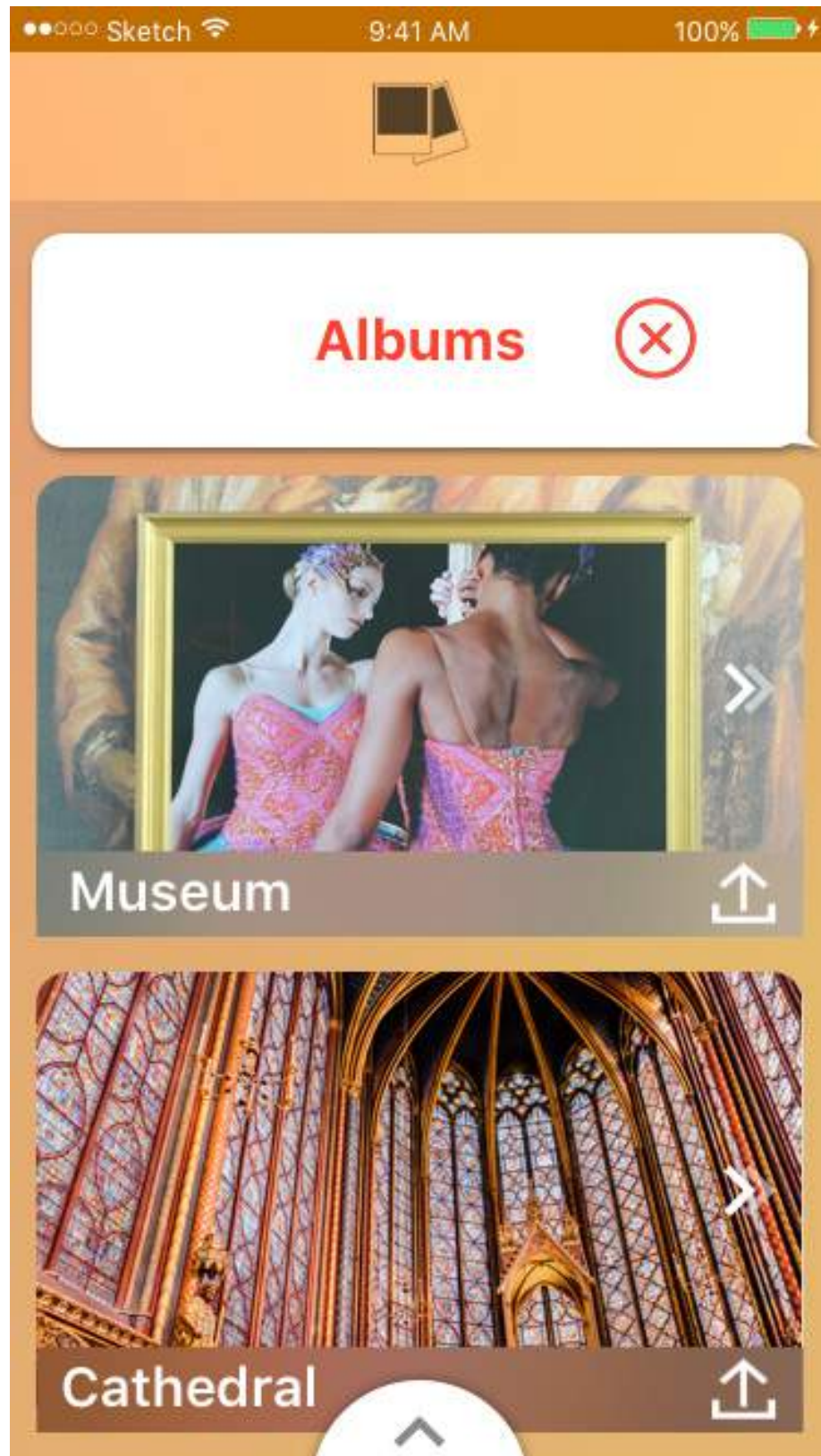




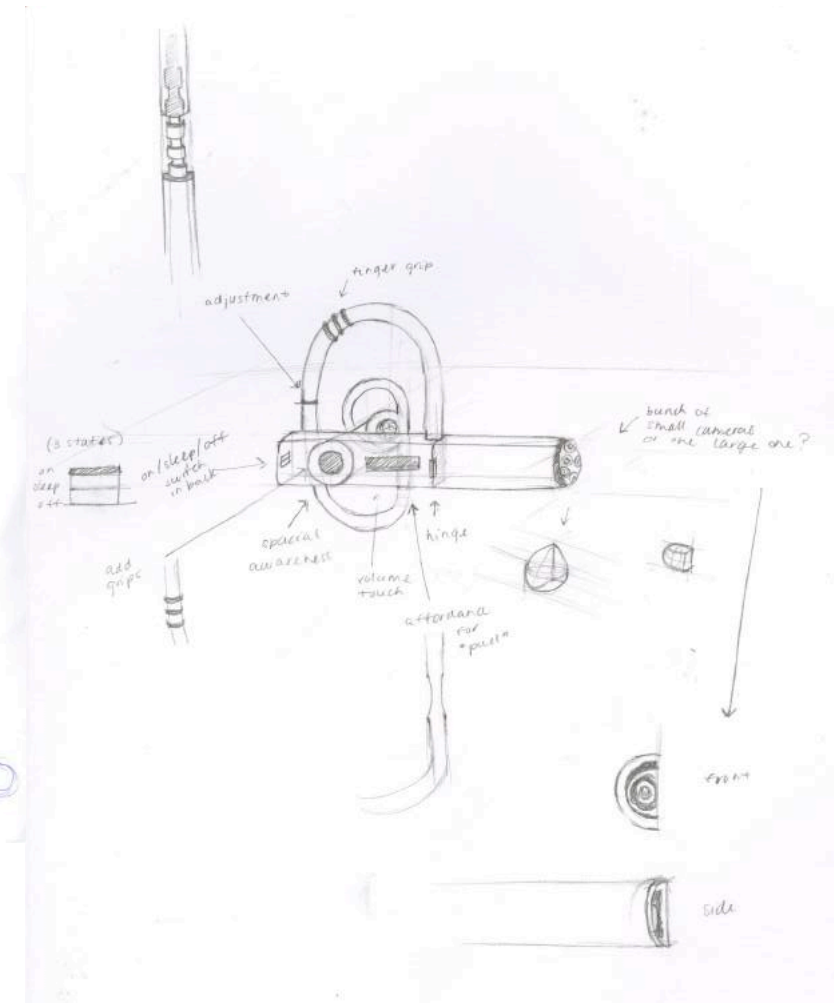
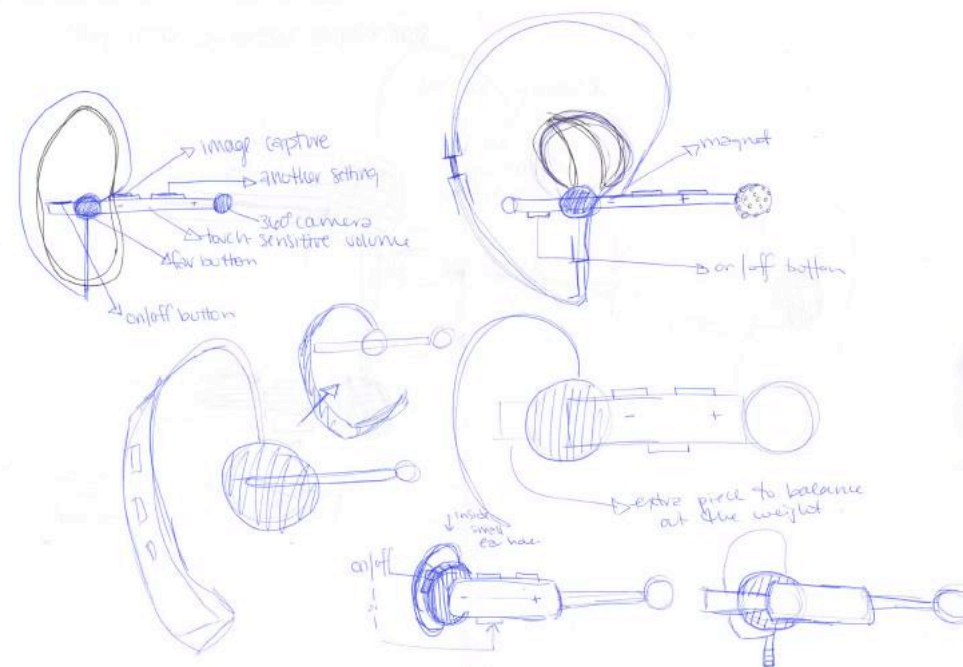
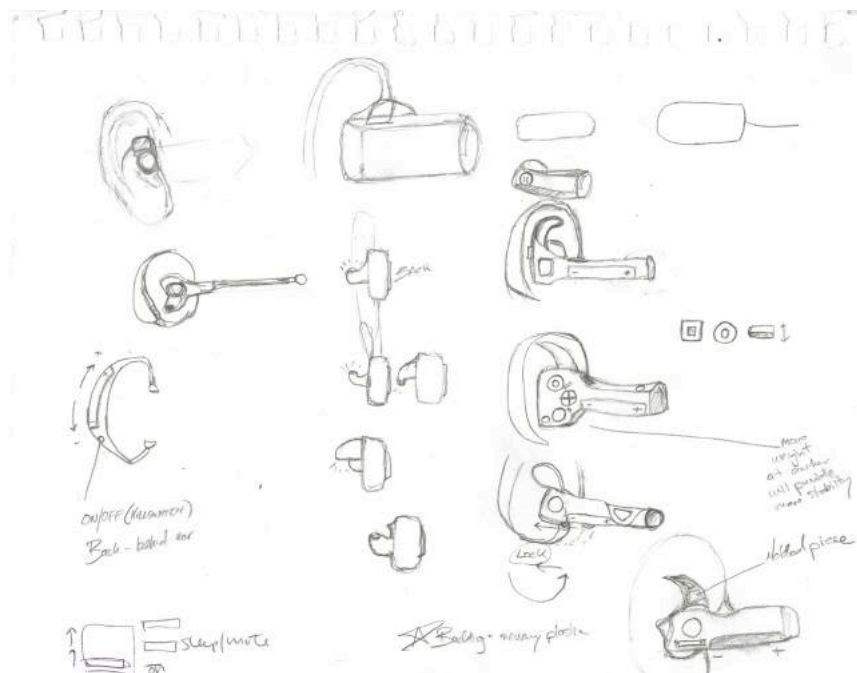


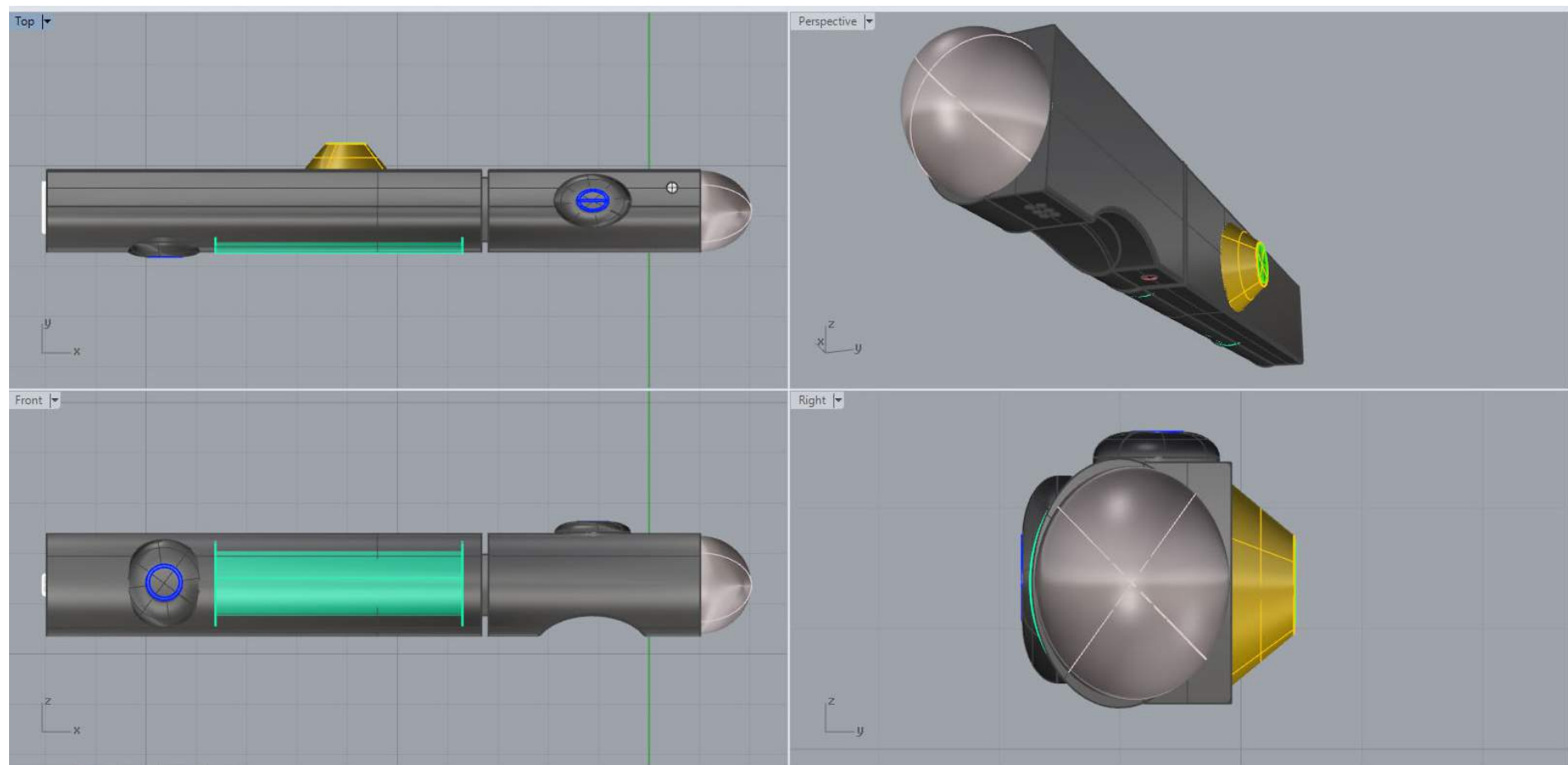
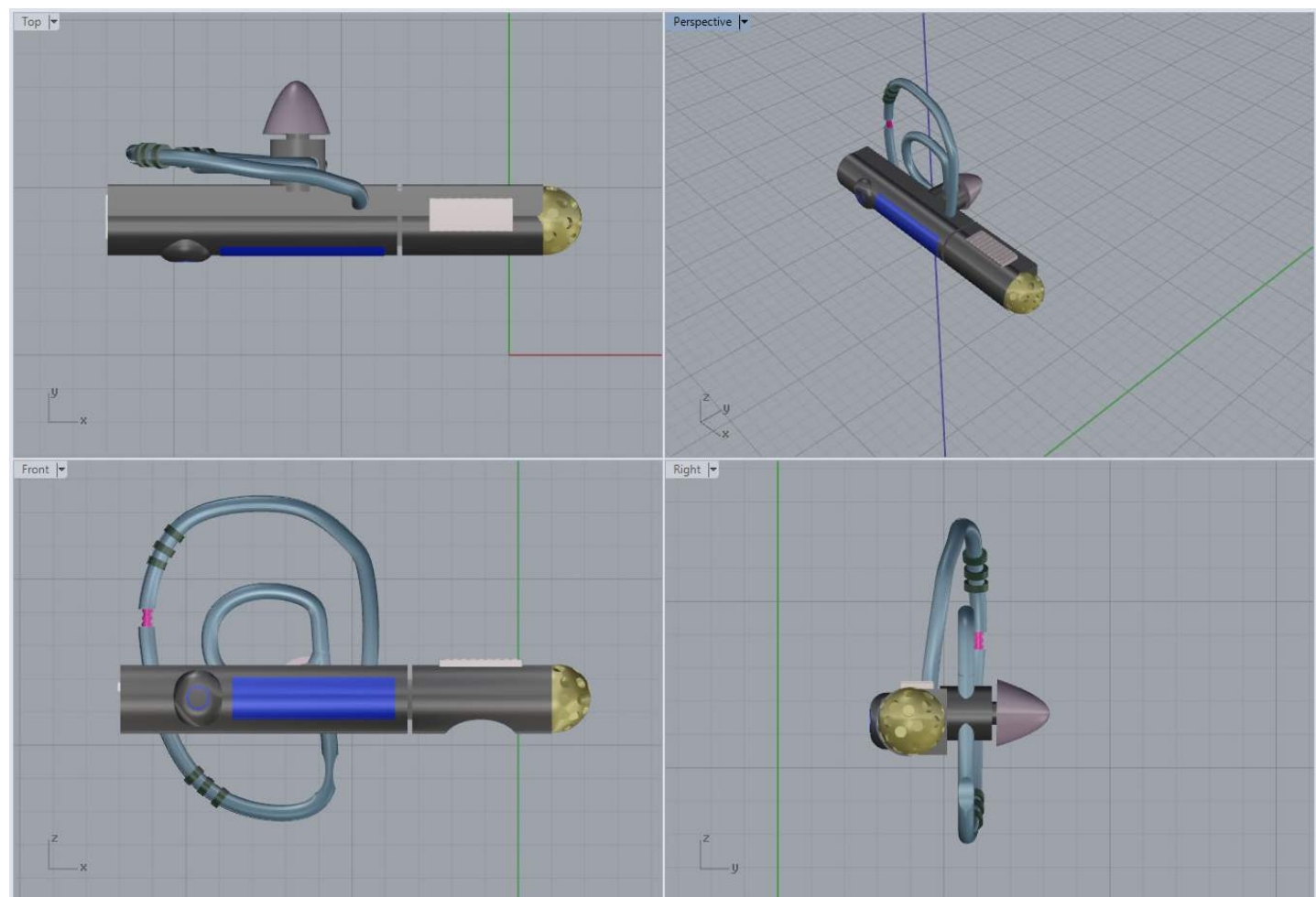






Device









4

Movie

Overview Statement

Storyboard

Movie



What?

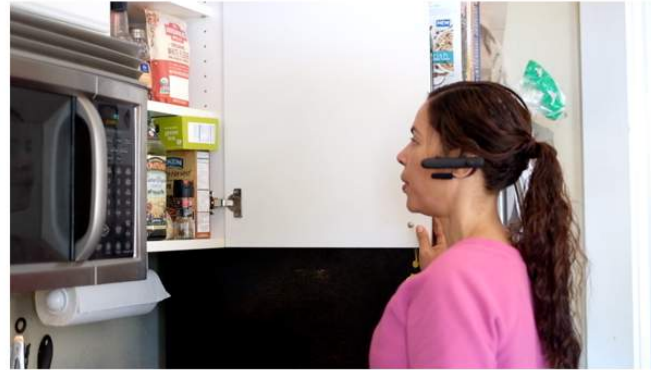
Our intention is to make a heartfelt Movie Sketch to illustrate our product's features while capturing the audience's attention

Our team created a model and 3D printed a mockup version of the headphone to use during the movie sketch





Storyboard





5

Conclusion

What Next?

Whats Next?

Moving onto the IxDA competition

We would also like to:

- Prototype the hifi screens in Origami

- 3D Print the Rhino model and include it in the video

- Add a discussion about Aida to our Video Sketch

We found it very rewarding to learn about, help educate, and design for people that are blind and visually impaired.

People that are blind or visually impaired are just like you and me. They have lost a sense and some have even lost themselves. We took it upon ourselves to make their lives a little bit better.

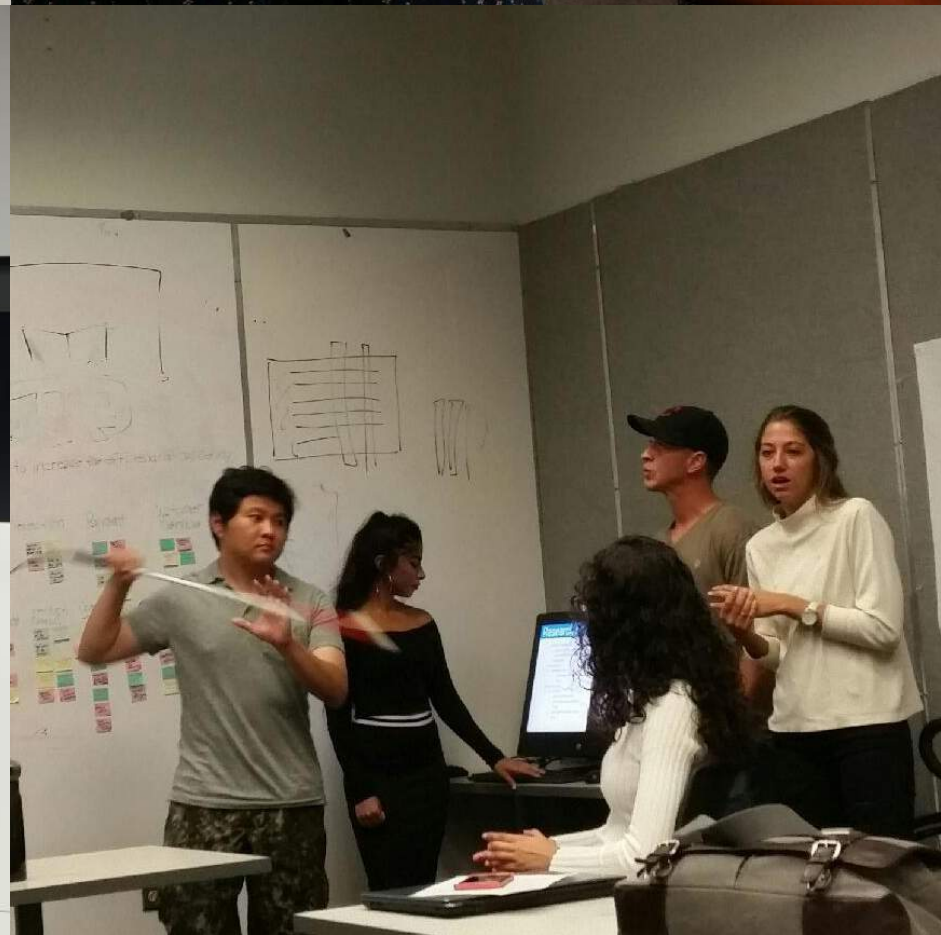
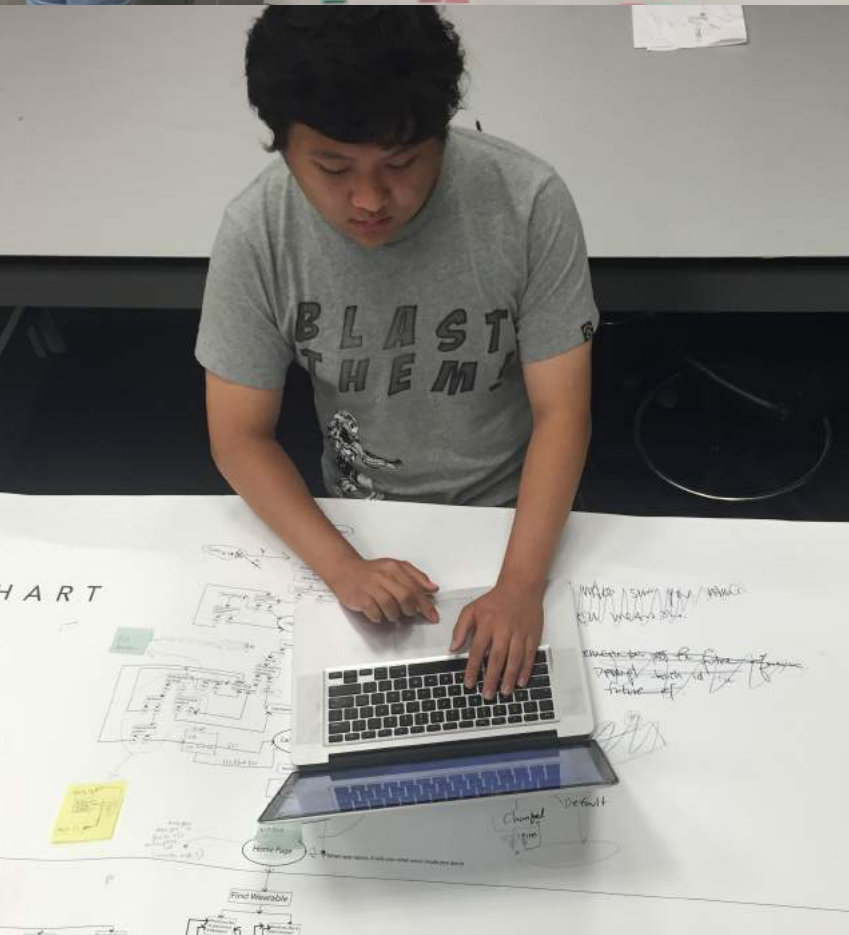
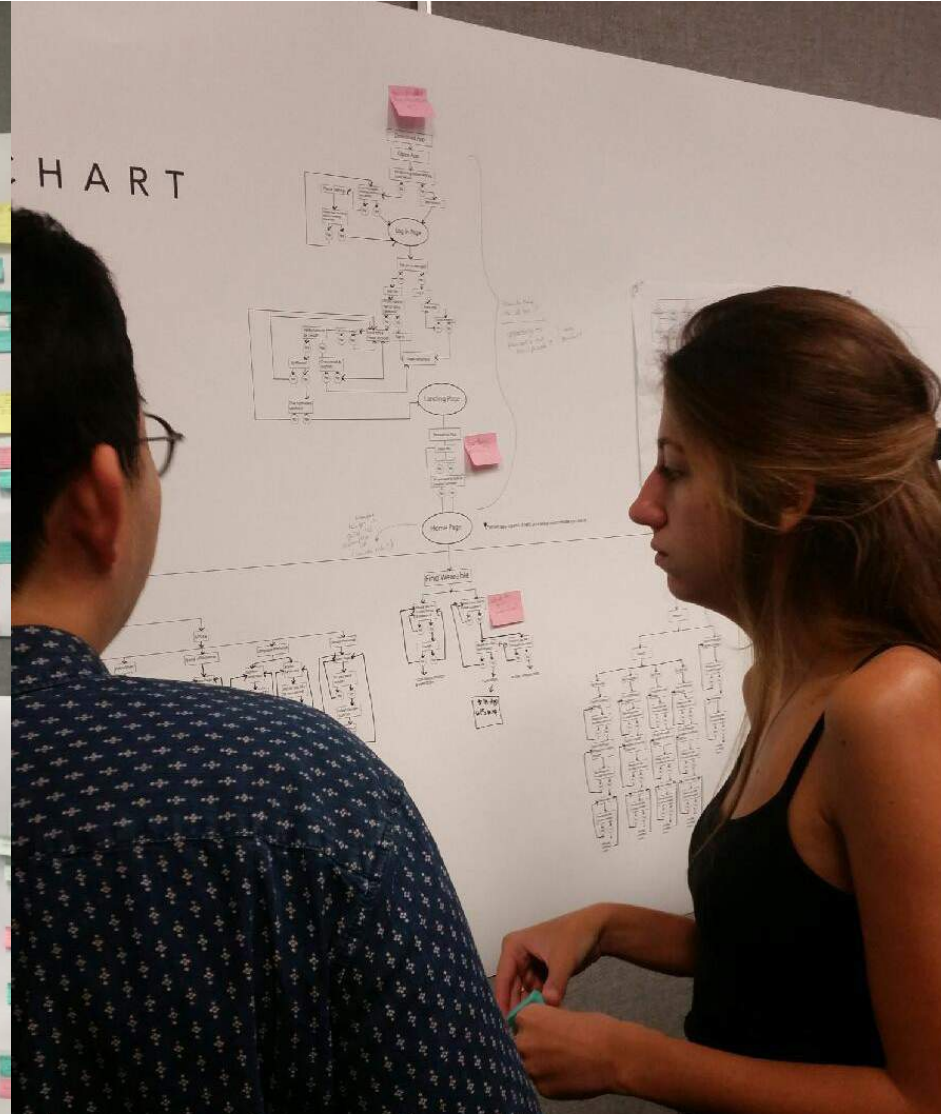
"They have lost their sight, not their vision."

the future...

Designing, creating and integrating technology in our every day lives.



Thank You!



6

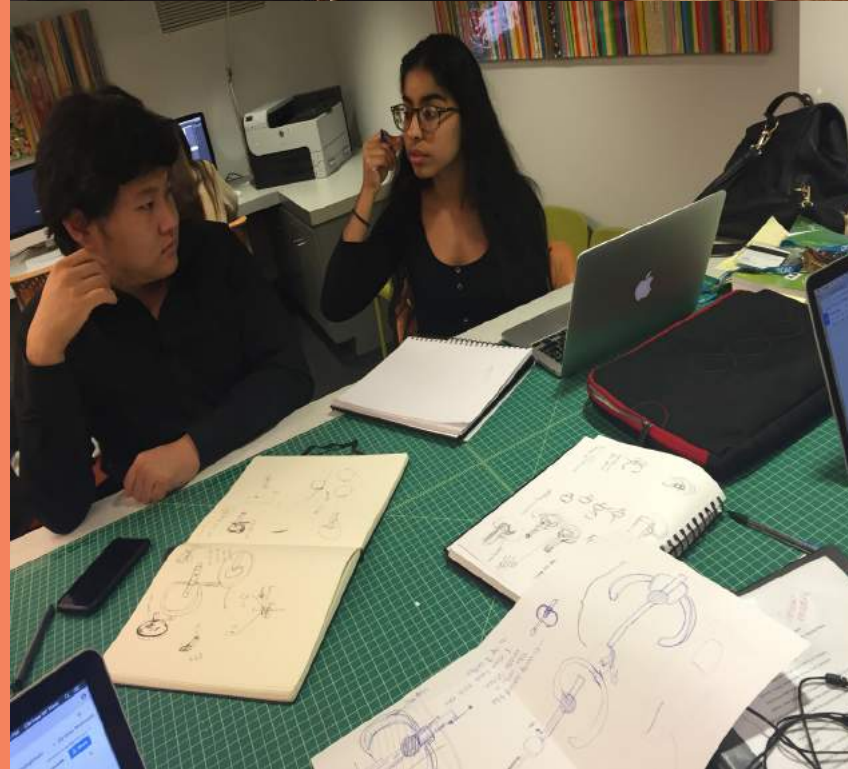
Appendix

Research

Development

Movie

Research



Findings

Causes

There are about 23 ways someone can become blind. The main 8 ways are:

Cataracts (the eye's lens becomes cloudy)

Glaucoma

Diabetic Retinopathy

Inheritance (weak genes)

Retinal Cancer

Accidents

Misconceptions

Their other senses are heightened when visually impaired

Most blind people are totally blind, (fact: lightness or darkness varies with every person)

All blind read braille

Blind people go to centers and special schools for help

People with visual impairment don't like to explore

*And now here are four main categories that we organized our research into

Social

They use mostly verbal communication with the blind but sometimes it's not enough because people naturally use facial expressions and body language.

During group sessions, they talk about how society talks to them like they're not even human anymore

By principle, they don't want pity or help, but realistically, they sometimes need help.

Many find it difficult to make new friendships or romantic relationships.

"This system could allow someone like me to focus on social interactions versus environmental aspects," he said. "It would lessen the tradeoffs I have to make whenever I'm multitasking." (Intel Realsense Technology)

Navigation

Two types of travelers:

Route Travelers who go to the same place and same route to get around

Home to the grocery store and back

Others who can find where they are in new spaces

They use the sun, compass or iphone

It's more complex to figure out where you are

Use special knobs to learn how to use the washer, dryer, microwave

Relies on the cane majority of the time and GPS

Some have anxieties on going to new places or populated public areas

Mental mapping helps the blind identify where objects are

Use auditory and tactile cues to understand where objects are

If one is looking for the door, they'll tap the tile floors until they hit the mat which is a different sound and texture

Information

They rely on all other sense for consuming information, primarily hearing and tactile senses

People with little or no visual experience (congenitally and early blind) tend to code spatial relations in small-scale space by reference to their own body coordinates

Information intake may be delayed because auditory information is processed slower than conventional reading

Acoustic location, the deciphering the location of objects by reflected sound (cane)

Some visually impaired people may never attempt to learn braille

They encode spatial information with their haptic system, or sense of touch.

“My image of the table is exactly the same as a table,” he said. “It has height, depth, width, texture; I can picture the whole thing all at once. It just has no color”

Light is the brain making up for the fact that it no longer receives any pictures

Relate colors to objects

Red = fire = hot = warm tone = nice

Brown = muddy = dirty = dark = not so pretty

Relevant Technology

Savannah Center for Blind Tech

Some use Amazon Echo because hearing a voice benefits some

The don't tend use talking microwaves because not everyone can afford the technology, but they help those who can afford it

iPhone should be more affordable but it is the most widely used device in the Savannah Center for the Blind and Low Vision

Be My Eyes

They use keyboard shortcuts (F keys) to interact computers (no mouse)

Use PC over Mac due to cost

Zoom Text: zooms info to screen to make larger

They first learn how to use the keyboard

They have a keyboard that's yellow with large black letters. The contrast helps the low vision user, but the facility doesn't encourage starting with this keyboard

They have tech that allows the user to read any library book through audio

There's a braille printer directly from the computer

There are group meetings to learn how to use Macs on Thursdays

Enhanced Vision Machine has different modes for different eye conditions

It allows you to have full range of where you're looking on the paper

Zooms in to the point where you can lose track of where you're reading

About \$1800

Optelec: Portable scanner/reader that's still a little pricy

However, there's always some sort of funding to help the blind get their low vision aid

Part of this information are from personal experience AND training while serving in a community rehabilitation center as a service agent in behalf of the Korean government:

When you initiate a conversation/interaction, it is good to say your name, so they can remember you by your voice, and identify/keep tabs on your general location by hearing.

In a group situation (or even one on one), some people prefer that people say that they are leaving when they are, so the blind person knows that they don't have to keep the mental picture going. Some people can tell my footsteps/breathing/etc.

Don't touch them first. It is not only rude but it can really throw them off. Imagine someone you do not know touching you from your blind spot. (Slightly different if you are friends with a blind person and they know that you're there.)

They can usually tell who's who by voice, but it's nice to say that "hey it's ____ I'm right here".

Most blind people are afraid of crossing streets on their own - especially if they were able to see before.

Do not touch their stuff. If you move something that belongs to them, they will not be able to find it.

Not all of them can do echolocation. In fact, most can't.

The iPhone is surprisingly good for blind people. Setting it up at the first time is still difficult.

This is in fact true for a lot of things. Once they set things up and running, it's easy for them to get by, but setting the things up in the first place is very difficult. IE: Moving furnitures/ moving in to a new place.

If they have to sign a paper, they will really appreciate it if you can set the pen on the spot where the signature goes.

One thing that is annoying with smartphones, however, is dialing. The blind assist does make it manageable though.

There is nothing wrong with pitying them. Just don't pity them simply because they are blind. Pity them for specific they can't do certain things they would like to do because they're blind, which varies from person to person. (This is what I was told most often when interacting with people with disability)

Their walking sticks are good for telling if there is an obstacle, but it's still not magic that tells the blind person which way is the right way.

They don't have superpower hearing, but they can probably make out the difference between your footsteps and mine.

Some of them have a fear of going to new places. Some of them love adventures. Just like normal people.

"When I go to the airport, I have to step in, listen in for a little bit to figure out where the check-in counter is at"

Public places are terrible for blind folks in general because they can't freely roam around to figure out where things are at. The yellow blocks we saw earlier (They are at most public areas, too) are helpful, but restricts their motion. Imagine: How do blind folks figure out where the bathroom is at?"

They hate cash because they can't always tell which is which (depends on currency) The Korean won, for instance, the number of the note's value is bulged out so the user can count the 0's.

Existing devices for blind

Ultracane: a cane with sensors

Some apps used include optical reading with camera, color detectors and money identifiers

Microsoft 'Seeing AI'

Toyota BLAID

Horus by Horus Technology

Pixium Vision Bionic VRS

OrCam

NovaVision- Vision restoration therapy (VRT)

Intel RealSense technology

Savannah CBLV

The facility helps kindergarten and up aged people

Younger people are more prone to using tech

Older people have trouble understanding computerized tech

Blind Test & P.OV.

We blindfolded ourselves and others and did day to day tasks, this was to see the surface struggles. We also used apps that were designed for the blind, and used to help the blind socially, and we tried voice over setting in our phones to see and understand the formatting and system.

Thoughts and Insights:

Context of where things usually are and where I left things last

Mind mapping

I'm worried about breaking dishes

Am i using too much dish soap?

Is the water running too hard for what I'm doing?

I have to be extra careful with washing the wine glasses - almost like if I couldn't see it I couldn't tell how gentle I am

I forgot to put the dry dishes away before cleaning new dishes and so I had to figure out where on the dry rack should I put these dishes

How do I know that the dishes are completely clean?

Thinking of the future constantly

Will they fall and break because I put them in the drying rack incorrectly?

What if I drop dishes? How will I clean it?

Phone Accessibility

No help turning it on

Iphone doesn't teach you how to use it once it's on

You can double tap anywhere to open something that is highlighted

It should read out all your apps and then you double tap anywhere to open it

If you don't use your Iphone for a bit, you'll forget what's highlighted, no way of knowing unless you start tapping around

Voice for when it's selected and for when it's clicked doesn't have enough of a difference

When you click the home button it should say "home screen" instead of just saying what app it's hovering over

Doesn't tell me where things are on the screen - do I have to touch everything in order to get it to tell me things?

Iphone doesn't explain noises so you have to just figure it out as you go

You can't swipe

You have to tap the two tiny dots on the bottom of the screen to switch home pages

Technology

Existing Wearables for the Blind

<https://www.wearable-technologies.com/2015/07/out-of-sight-out-of-fright/>

Microsoft 'Seeing AI'

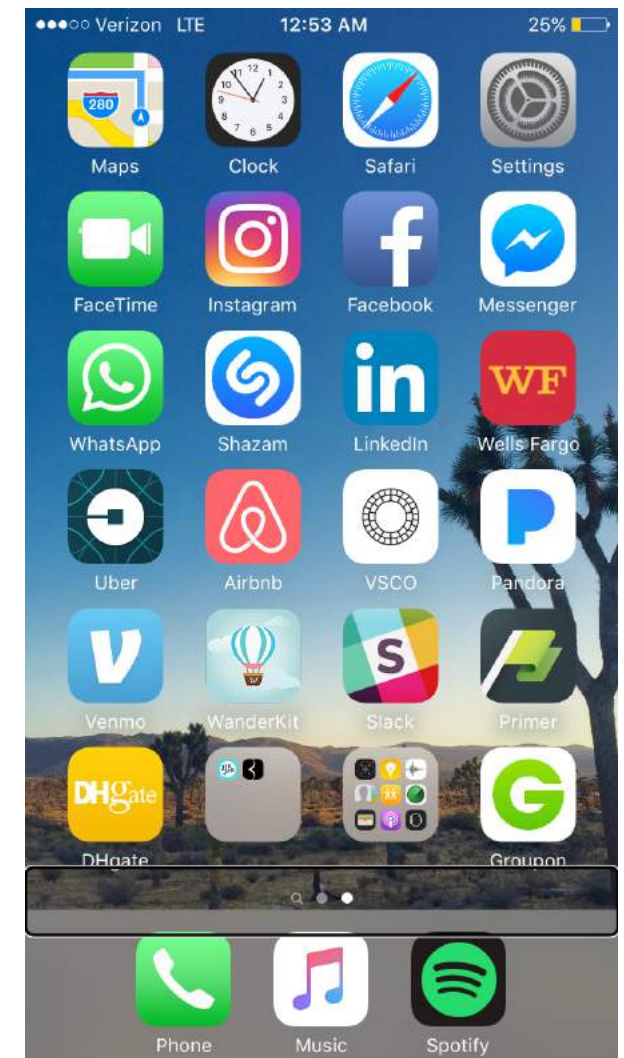
- virtual assistant can describe the apparent moods and level of engagement of the people around the table
- In a restaurant, the app can help him take a picture of the menu, and then narrate the different options for him
- <https://www.youtube.com/watch?v=R2mC-NUAmMk>
- <http://www.geekwire.com/2016/microsoft-prototype-visually-impaired/>

Toyota BLAID

- The gadget is worn on the shoulders and uses cameras to recognise surroundings, such as signs, then directs the wearer with speakers and vibration motors.
- plans to introduce mapping, object identification and facial recognition technologies
- <https://www.youtube.com/watch?v=sNoPV0epfHA>
- <http://www.bbc.com/news/technology-35753978>

Horus by Horus Technology

- headset that detects objects, reads text, detects faces, provides a spoken interface, and provides mobility assistance
- <https://www.youtube.com/watch?v=SrpDIgXPJJc>
- Horus observes, understands and describes reality to the wearer, providing real-time information
- uses bone conduction, therefore not obstructing the hearing of the person
- <https://horus.tech/en/horus.php>



Pixium Vision Bionic VRS

- Intelligent tactic of redesigning the camera to only capture and send data just like the human retina
- SMART BIOINSPIRED NEUROMORPHIC (EVENT-BASED) CAMERA
- Mimics the human retina; eyes see changes in environment (contrast, intensity, luminance, etc) and photoreceptors are activated independently
- Pixel circuits encode transient (light change) information from the scene into the precise timing of spikes while sustained (light intensity) information is encoded using a simple spike rate coding scheme. The output of Pixium's ATIS sensor is a continuous-time stream of spikes encoding transient and sustained visual information in a language the brain could directly interpret.
- IRIS®II
- first bionic vision system
- http://www.pixium-vision.com/file_bdd/dynamic_content/file_pdf_pdf_en/1469398551_Pixium_Vision_CEmarkIRISII-ENG-FINAL-FINAL-CLEAN.pdf
- <http://www.pixium-vision.com/en/technology-1/iris-vision-restoration-system>

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- <http://www.pixium-vision.com/en/technology-1/iris-vision-restoration-system>

OrCam

- Connect a smart camera to the frame of your glasses, and place a micro-processor into your pocket
- Uses Artificial Vision to give people a sense of sight with an audio earpiece; wearer just points to an object and OrCam responds! It can read, recognize faces and objects.
- https://www.youtube.com/watch?v=__qk7RX74r4

Sensory Wearables for the Blind

AppResearch:

Microinteractions book chapter 4:

Sound can be a powerful cue that arrives quickly in our brains

More quickly than visual feedback

Any audio clue should pass the “Foghorn Test” - is this action important enough that users would want to become aware of it when they cannot see it?

Since it provides such strong reaction, audio should be used sparingly

Two types of audible feedback

Emphasis

Alerts

2 kinds of audio feedback

Earcons

Words

Earcons

sounds that take the place of a word or phrase

“Ping” VS “you’ve got mail”

Abstract noises

People should relate these sounds to other sounds they have heard or made connections / associations with

No longer than a second - ¼ of a second is good

Haptics

3 purposes

Enhance a physical action

Alert when audio isn’t available or wanted

To create an artificial texture or friction of surfaces such as touchscreens

AKA Vibrotactile feedback

Faces & hands are the most sensitive

Newer technology - majority only experience with pagers or mobile phones

Can be embedded in furniture for extra sense experience

Sense of touch is much more limited than vision and hearing because of our brains, not our skin

We can get 1% of what we’re hearing by touch

Best used for microinteractions because of their need for subtleness and disruptive alert

* middleground when used for specialty devices

Like those for musicians or surgeons where varying levels of haptics can provide more physical feedback while doing an action like performing surgery

Example for Mobile App : Setting an alarm

Goal = to set an alarm

Rules =

User selects a time for an alarm to go off

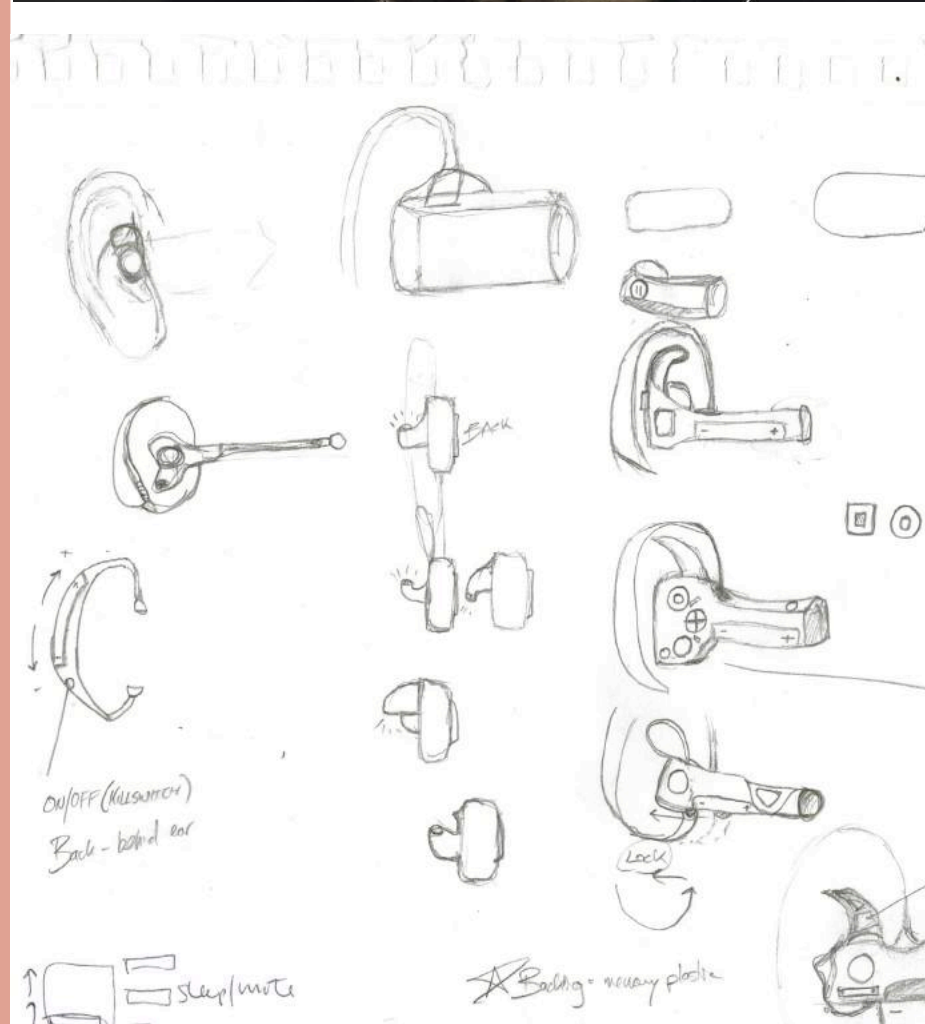
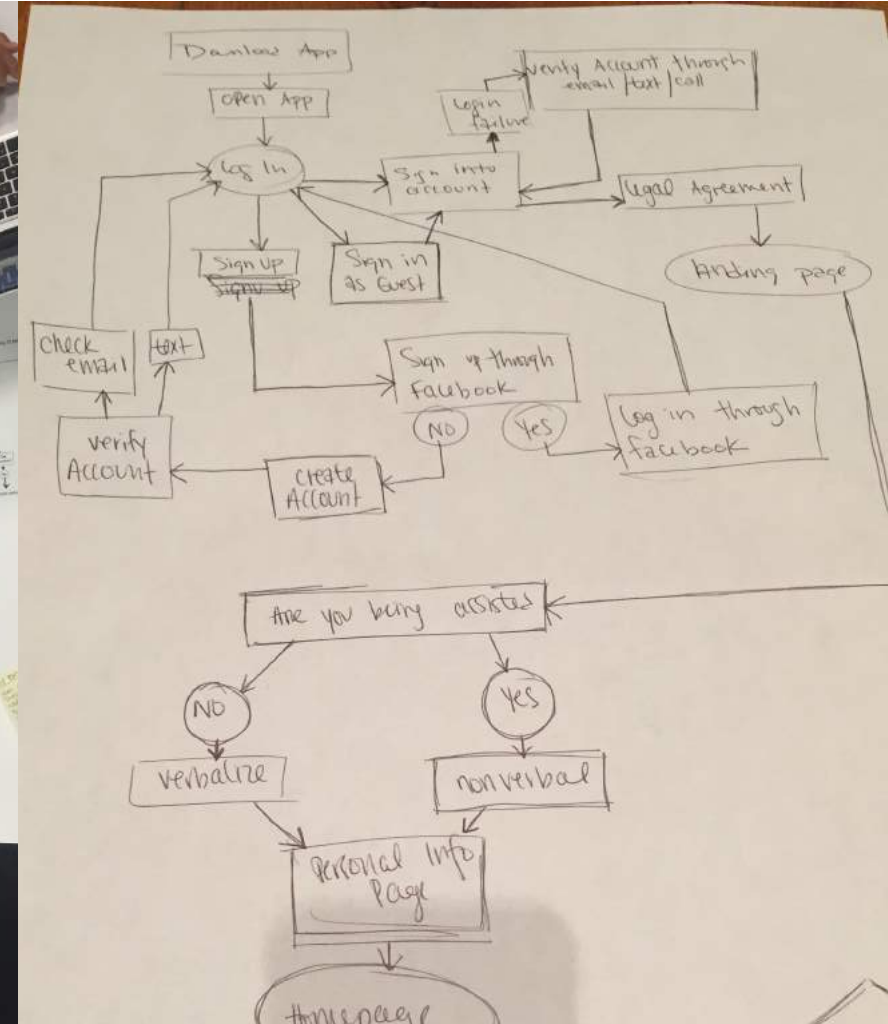
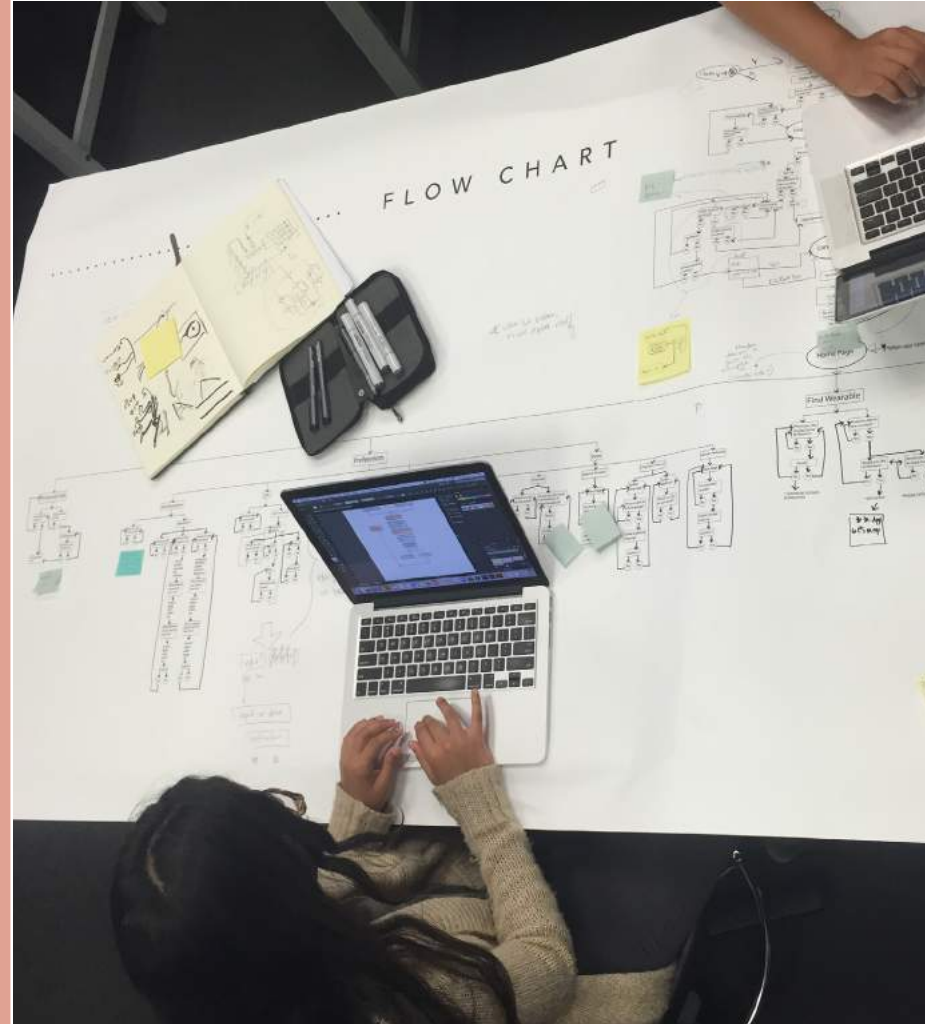
The alarm goes off at the specified time

The user turn off the alarm

Trigger = it will be a standard icon that lives of the iphone home screen

Badges = showing inside information of the app

Development



Device Features

Learning / Growing Capability

This is the future of smart learning technology. Humans are no longer programming and coding machines but teaching machines. Aida will grow with their user and remember activities, hobbies, likes, dislikes, favorites, friends, family and dates. The device will understand and therefor grow with the user over time. This device will only get better and more useful the more it is used.

Personal Assistant

This device is a personal assistant.. a secretary. It will remember things one asks it, it will help one through their day, it will get one to where they need to go and it will help them read and write. It will help the user socialize and interact with others.

Face Recognition

The wearable device is capable of recognizing the people the user is standing near. It will scan it's database for saved faces or search through any social media platform the user has synced to the app. The device can also detect facial gestures and emotion. The user always has the option of turning this feature on or off at any given time by accessing the app.

It was pretty hard for our team to come up with the features for both the app and the wearable device. It was hard to choose what feature and what technology to apply and those that we shouldn't. When all the options seem dire, how do you judge? We did our best to make a complex problem and device as simple and innovative as possible.

Device Features

Save Faces

This device will automatically save faces that it sees. The user can decide which faces to remember and Aida will also ask the user if he / she wishes to save a certain face. This saved information will transfer automatically to the app.

Spatial Awareness

This device has the capability of understanding the world around you. If asked, the A.I. is also able to scan your world and tell you everything that is going on, from weather to how many people are around you to facial gestures and objects. The user always has the option of turning this feature on or off at any given time by accessing the app.

Text Recognition

This device is able to scan any given text and dictate what the text says to the user. It is also able to save any texts that the user wishes to save to the app.

Device Features

Find my Wearable Capability

The user is able to locate the device through multiple mediums. The device will omitt noises and the app can give the location and guide you to it.

Record Images, Audio, Video

The user is able to record images, audio and videos by simply asking the A.I. to record for you. That information will be saved to your app immidiately.

GPS and Navigation

To use the GPS and navagation with your wearable, the user must simply ask the A.I. to take them somewhere. You can then ask it to save that certain location which will immidiately be saved to the app.

Object Recognition

The wearable device is scanning your world and your path 100% of the time, unless switched off. The device will then let the user know if he / she needs to be aware of something ahead of time or right before if need be. The A.I. will only interrupt the user if it feels it is a dire situation. The user always has the option of turning this feature on or off at any given time by accessing the app.

App Features

Customize your device name

The given name for the device is Aida. In the app, user is able to rename the A.I. to anything he / she wants.

Voice of Wearable (speed, language, gender)

Customize the voice of the A.I. In addition to the name, user is able to change the speed, language and gender.

Fingerprint Security

Because there is valuable and private information in the app, it is locked. To enter the app, user must unlock with his / her fingerprint.

Add / Edit Fingerprint Security

User is able to add multiple fingerprints or change fingerprints for the app's security.

Customize "Hot" Button

User is able to personalize the "Hot" Button on the wearable device to any feature he / she chooses. The user always has the option of not customizing this button which will result in nothing happening if the user accidentally presses it.

App Features

Level of Assistance

User is able to determine the level of assistance on the app.

Partial Assistance - Voice over paired with control

Full Assistance - Conversational user interface (CUI)

Find Wearable

In case the user loses the wearable device, one is able to track where it is using the app. User has the option to send the location of the wearable to someone or have the app navigate user to the wearable. The wearable will be omitting noise until it senses that it is found by the physical movements from the user. When user is about 100 ft from the device, the GPS automatically turns into a camera and uses VR technology to locate exactly where the device is.

Keyboard Options

The app has a braille keyboard and a normal keyboard option for the user. The user always has the option to have neither on.

App Features

GPS

The app sends the wearable (through bluetooth) GPS information and navigation. It also uses GPS within the app when the user is trying to locate the wearable device.

Save / Edit Locations

The app stores locations that the user tells the A.I. (Aida). Within the app, the user is able to create and delete saved locations.

Save Identities (add, upload)

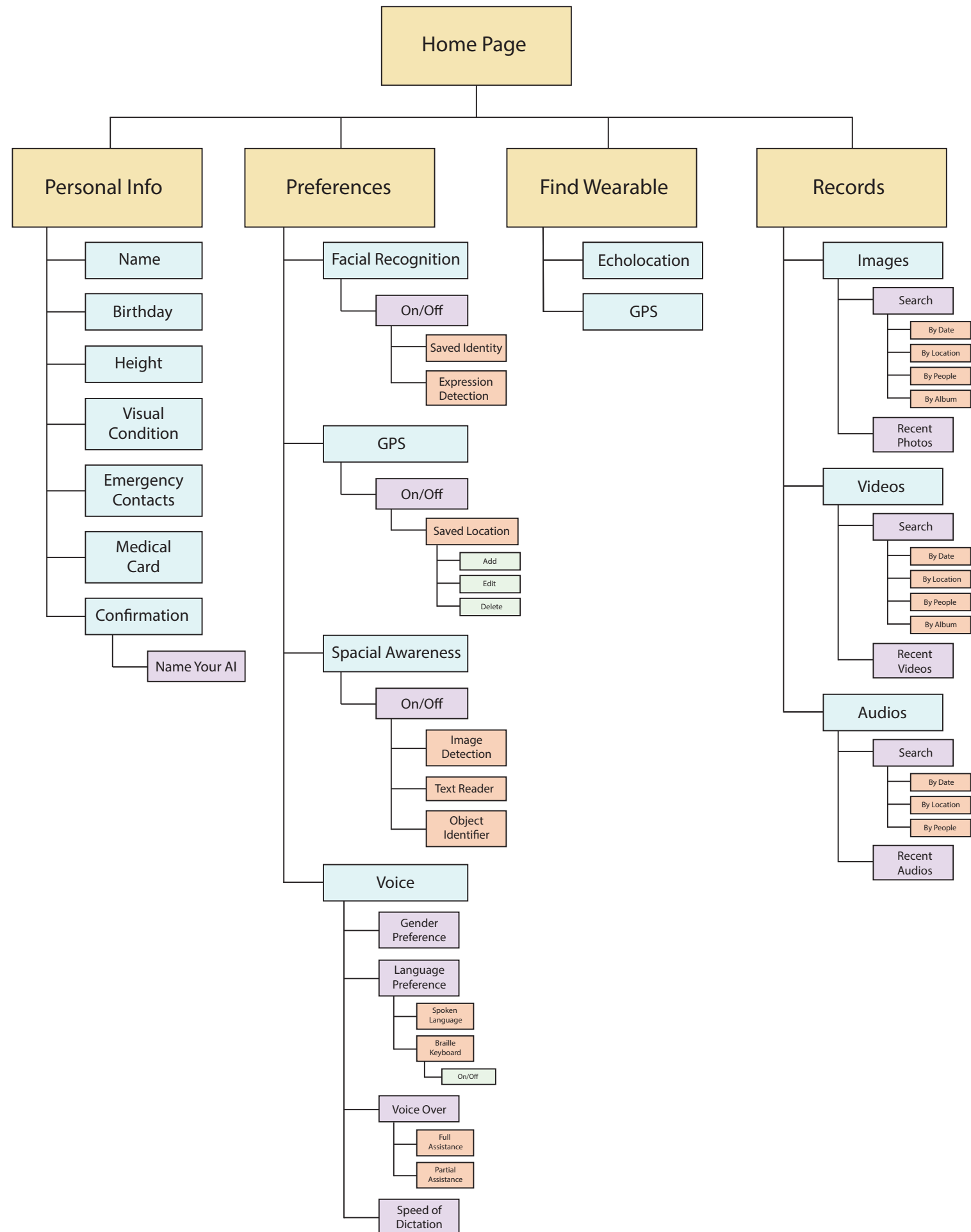
The app stores identities that the user tells the A.I. (Aida). Within the app, the user is able to add and upload images of people for the A.I. (Aida) to recognize in future encounters

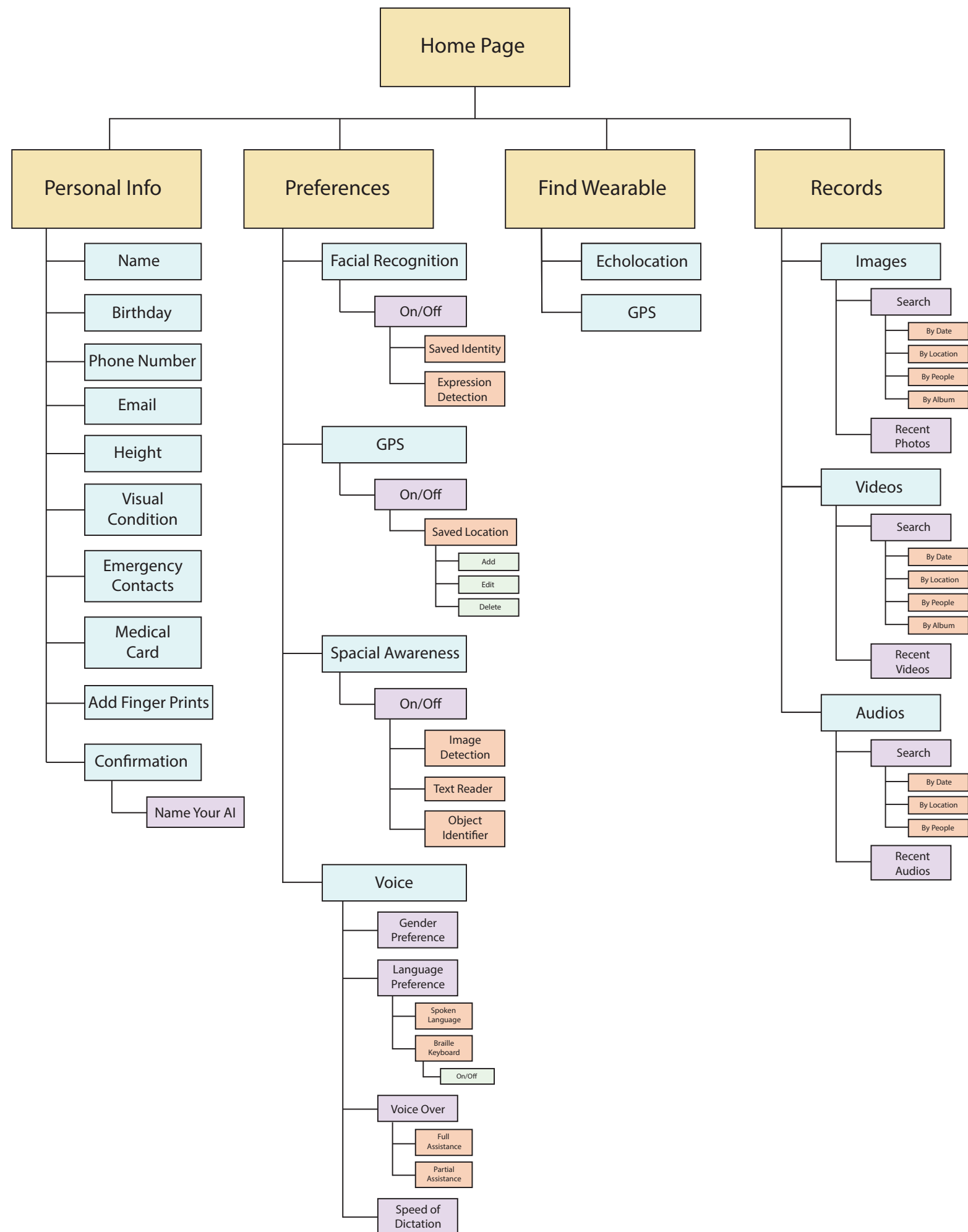
Save and Send all Records (Images, Audio, Video)

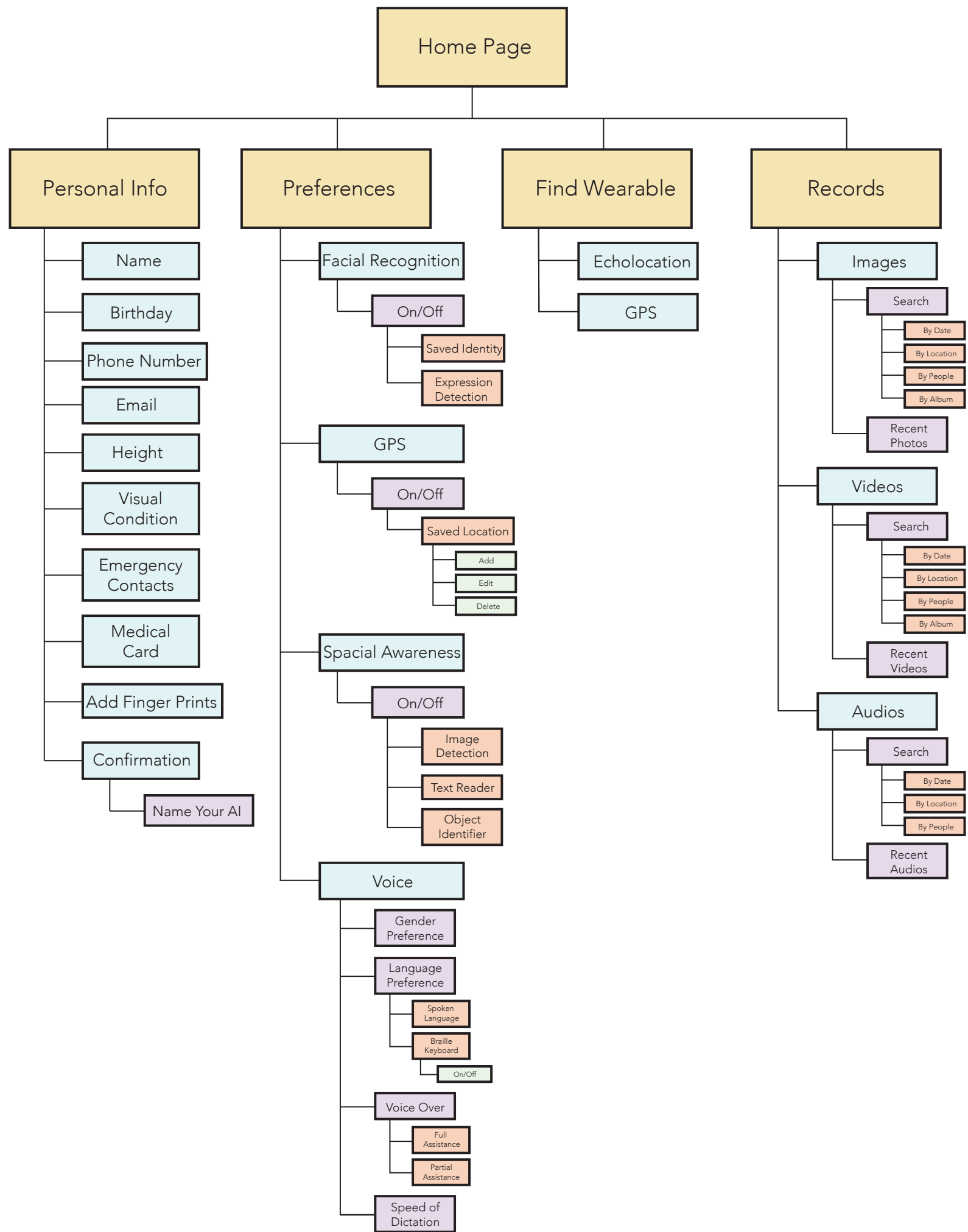
The app stores all records that the user tells the A.I. (Aida) to capture. Within the app, the user is able to view and send any and all records through their phone.

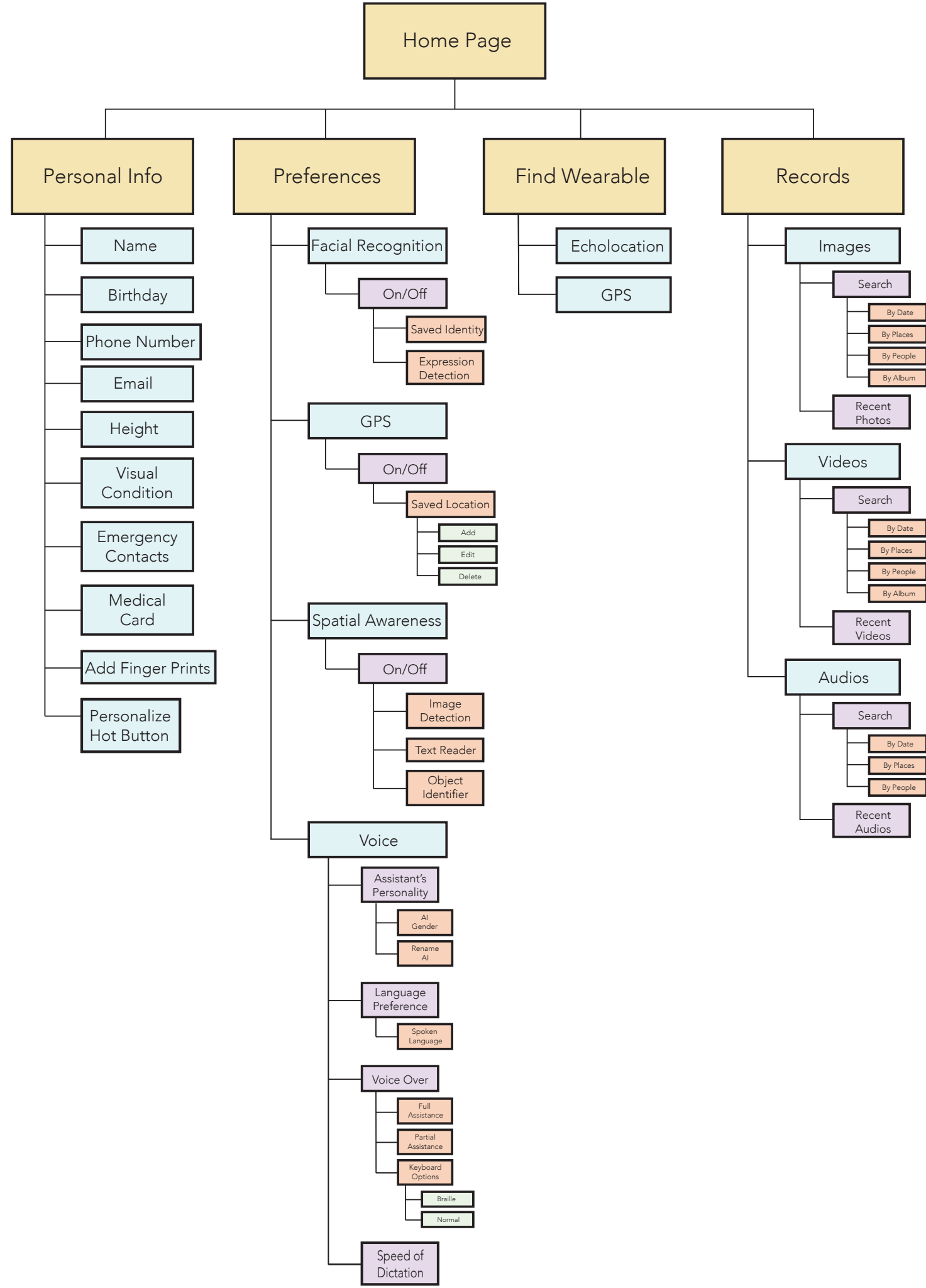
Sitemap

Our team did 4 versions of the site map throughout the project. This was constantly changing the more we were panning out our app and its features. Here are the 4.



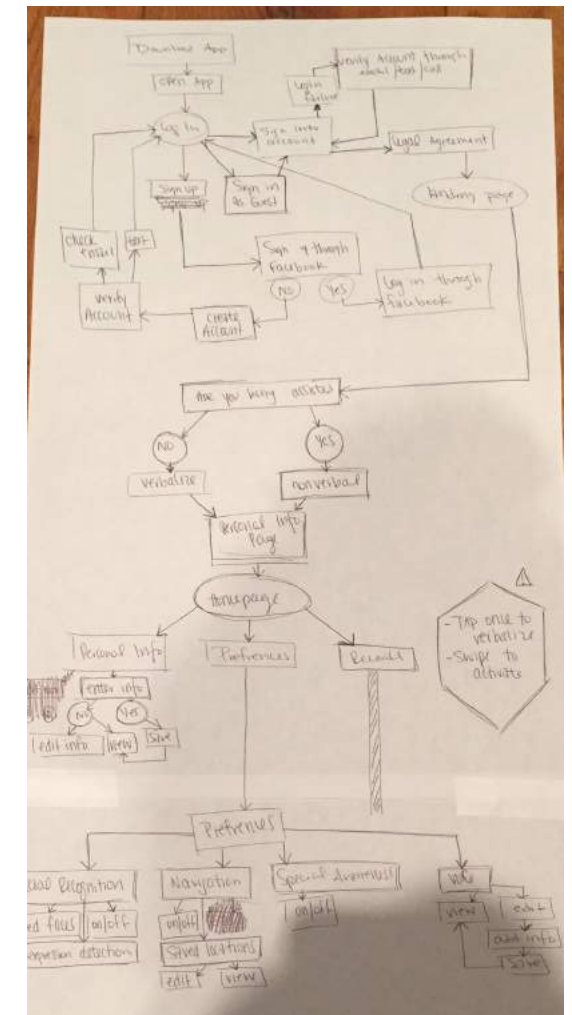
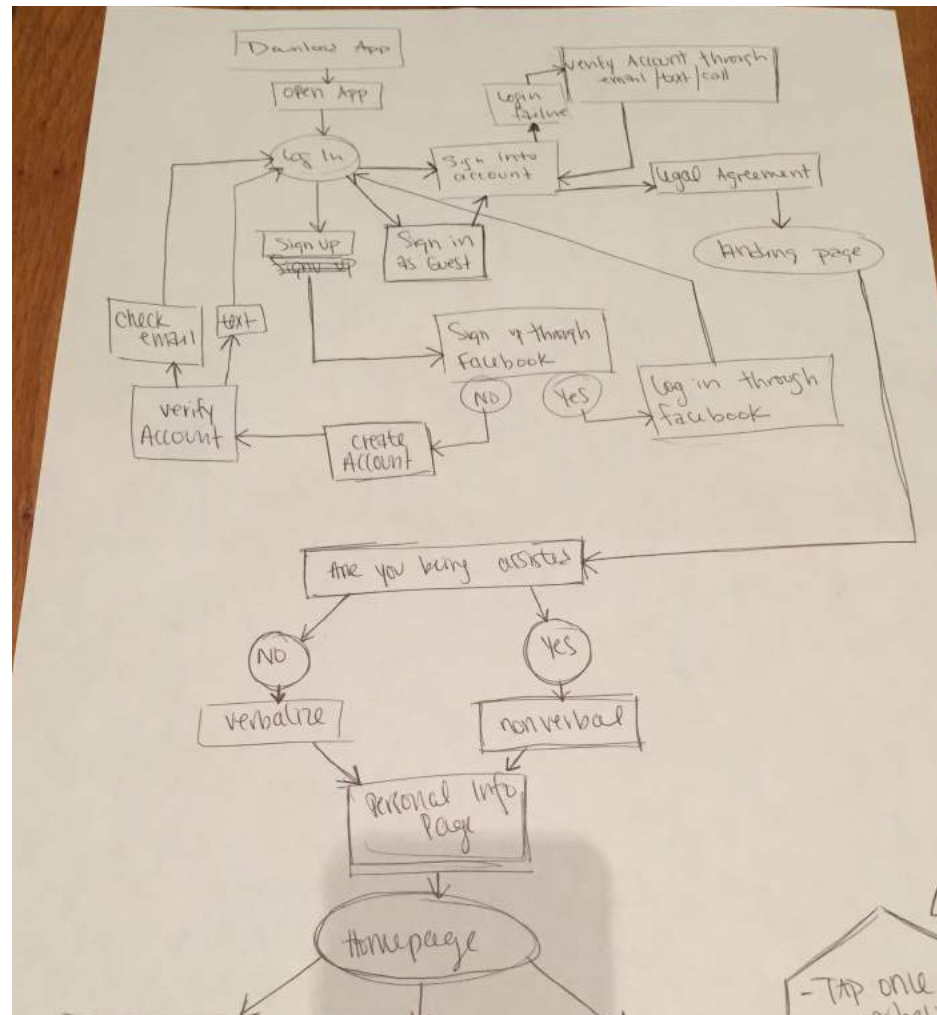
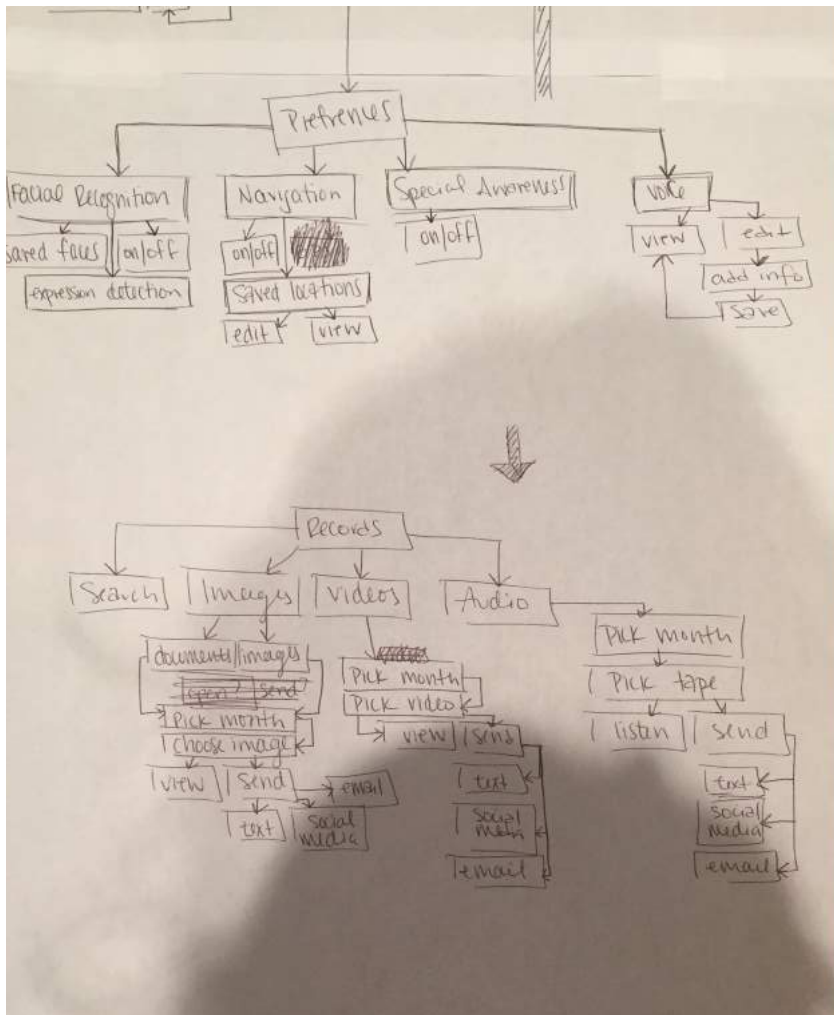


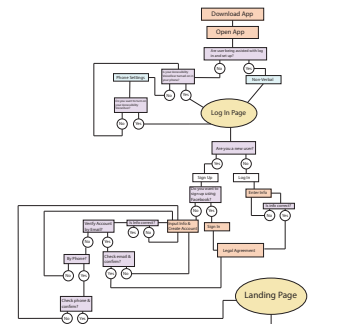
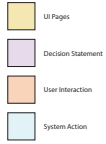




Flowchart for App

Our team had seven 7 versions of the flowchart for the app. This was constantly evolving throughout the entire process. We were changing the visual layout and the way we wanted our users to interact with the app. Here are 3/7.





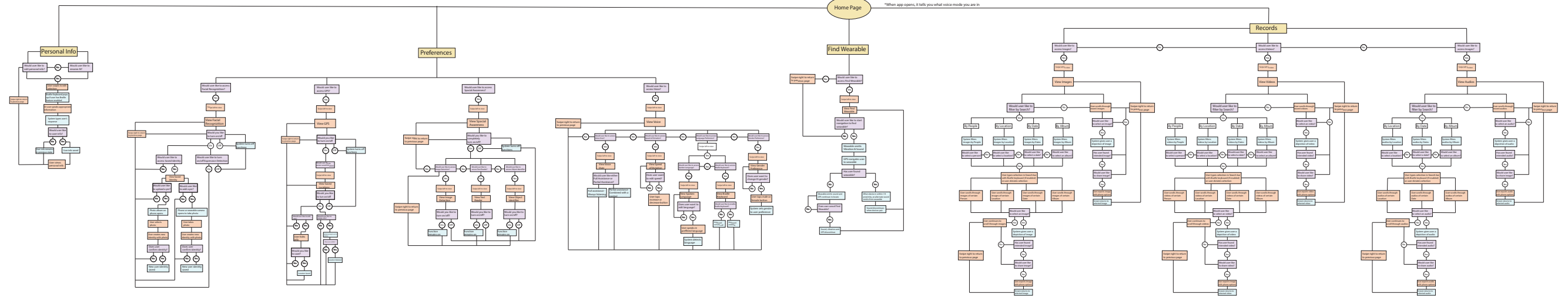
Landing Page

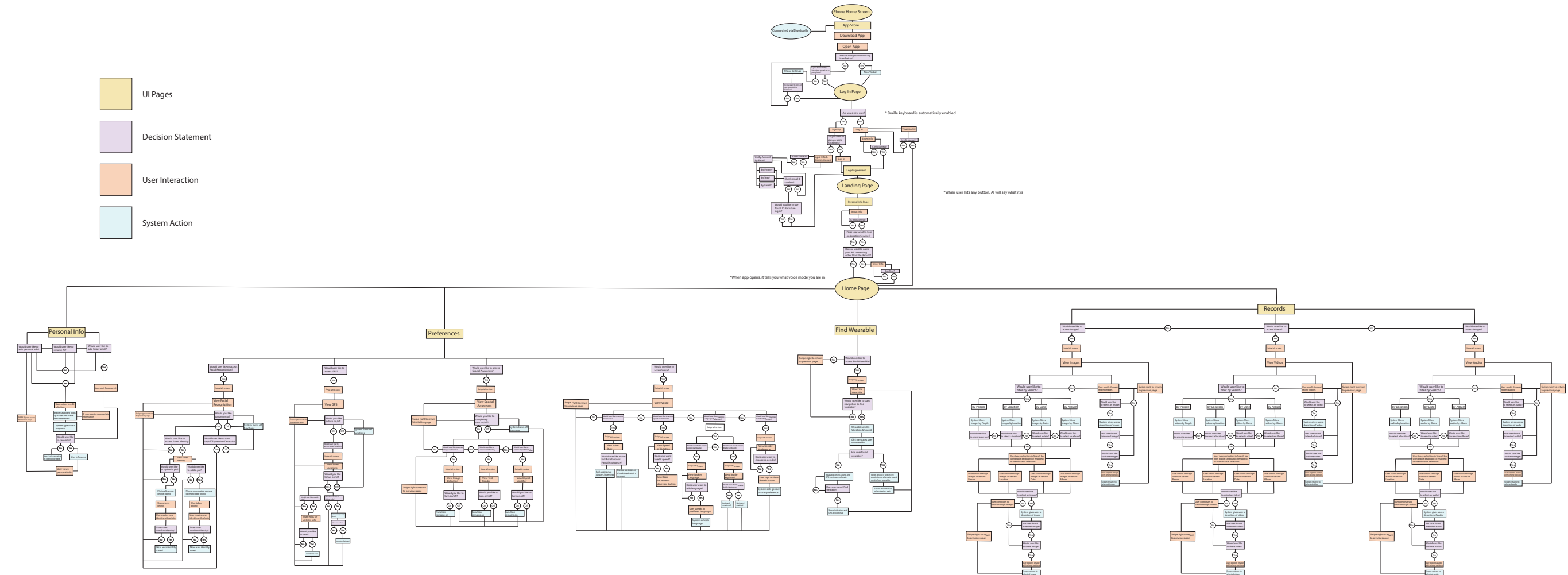
Personal Info Page

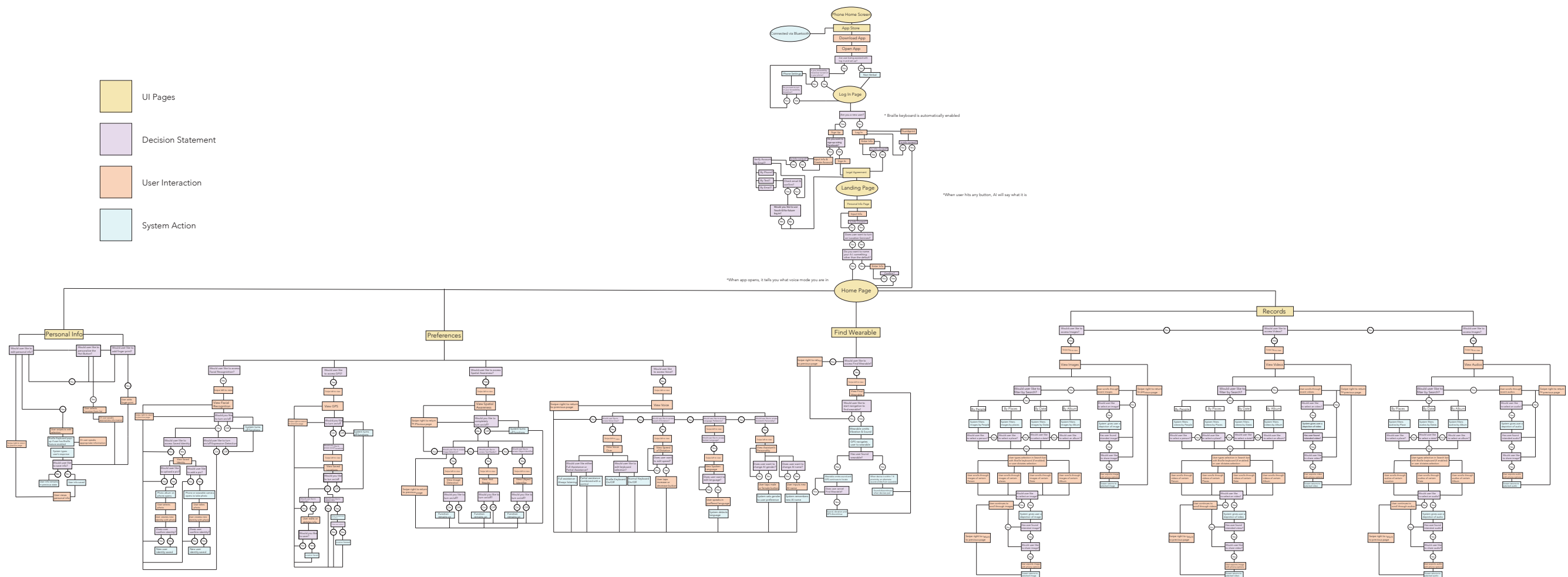
Find Wearable

Home Page

*When app opens, it tells you what voice mode you are in



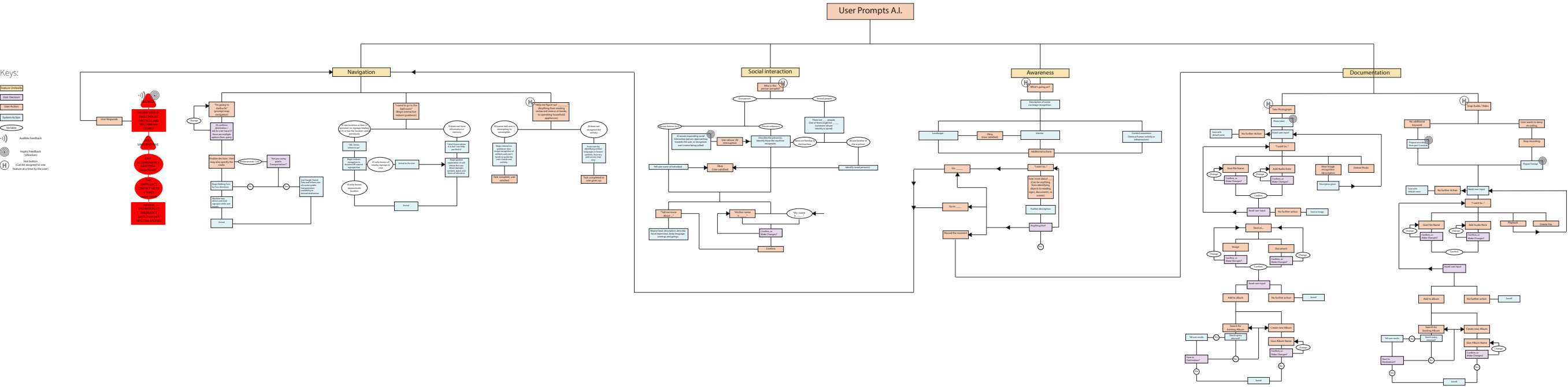




Flowchart for Wearable

Creating the flowchart for the wearable seemed impossible to us! Because the wearable doesn't have a beginning or an end, figuring out how to chart / map it out was the hardest part. We decided to break it down by features and come up with some basic ways of triggering them.

Wearable AI:
Conversational User Interface (CUI) Flowchart



Persona 1

Our team had seven 6 versions for each persona. We were able to figure out the information within each persona fairly quickly, but we visually changed the layout multiple times. Here are 2/6 for each persona.



Maria Susana Jimenez

"I know my physical surroundings as well as my career were vital to my beautiful life, but I didn't realize how much I depended on my visual sense."



Created by Chiara Ciani from Noun Project

Personality & Interest

- Outgoing
- Playing and surfing at the beach with her dogs
- Physical collecting memoirs and taking photos
- Reading, writing and language



Created by Yu Lu from Noun Project

Values

- Family
- Husband's work ethic
- Nature
- Literature & History



Created by Brian Dettlau from Noun Project

Goals & Motivation








- Getting back to her active lifestyle
- Dogs and kids and husband
- Being able to read or write again
- Wanting to write an autobiography
- Learn braille



Directed by Edward Boehman from Noun Project

Frustration

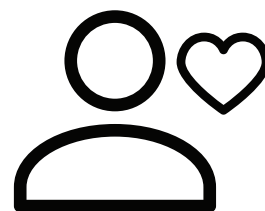
- Not being able to enjoy the California views or lifestyle
- Her interests are harder to achieve
- Her retirement plans and savings have to take a pause
- She was in the midst of writing a bilingual book

Age		62 years old
Visibility Level		Recent accidental (3 m) Able to see form and space
Location		Santa Barbra, California
Ethnicity		Hispanic
Occupation		Was a magazine editor Now holds a book club
Income		High Class Husband, government & savings
Marital Status		Married
Assistance		Guidance stick



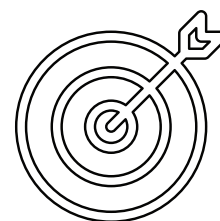
Maria Susana Jimenez

“ I know my physical surroundings as well as my career were vital to my beautiful life, but I didn’t realize how much I depended on my visual sense. ”



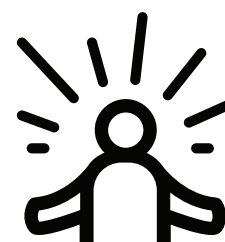
Values

Family
Husband’s work ethic
Nature
Literature & History



Goals & Motivation

Getting back to her active lifestyle
Dogs and kids and husband
Being able to read or write again
Wanting to write an autobiography
Learn braille



Personality & Interest

Outgoing
Playing and surfing at the beach with her dogs
Physical collecting memoirs and taking photos
Reading, writing and language



Frustration

Not being able to enjoy the California views or lifestyle
Her interests are harder to achieve
Her retirement plans and savings have to take a pause
She was in the midst of writing a bilingual book

Age



62 years old

Visibility
Level



Recent accidental
Able to see form
and space

Location



Santa Barbra,
California

Ethnicity



Hispanic

Occupation



Was a magazine
editor
Now holds a
book club

Income



High Class,
Husband,
government
& savings

Marital
Status



Married

Assistance



Guidance stick

Persona 2



Marquis B.

"My favorite quote is: 'Living well is the best revenge' by George Herbert "



Personality & Interest

Introverted
Family oriented
Hot tempered
Sports
Music
Self expression art



Values

Family
Honesty and genuity
Acceptance



Goals & Motivation

Finish high school and go to college
Move away from home and start fresh
Being Independent in all aspects
Start his own record label



Frustration

Bullied by peers for being blind
Always depending on others for transportation
Lack of social life

Age



15 years old

Visibility Level



Born blind
No form or shape
Light & some color

Location



Fairfax, Virginia

Ethnicity



African American

Occupation



Student (ADA) implemented in public school

Income



Low-middle class Allowance

Marital Status



Single

Assistance

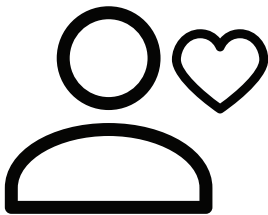


Guidance stick
Assistant dog

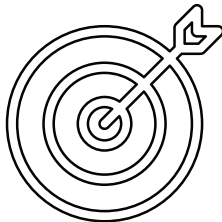


Marquis B.

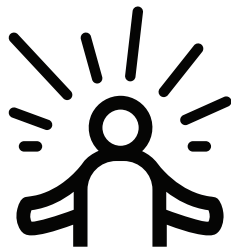
“My favorite quote is: ‘Living well is the best revenge’ by George Herbert”



Values
Family
Honesty and genuity
Acceptance



Goals & Motivation
Finish high school and go to college
Move away from home and start fresh
Being Independent in all aspects
Start his own record label



Personality & Interest
Introverted
Family oriented
Hot tempered
Sports
Music
Self expression art



Frustration
Bullied by peers for being blind
Always depending on others for transportation
Lack of social life

Age	Visibility Level	Location	Ethnicity	Occupation	Income	Marital Status	Assistance
15 years old	Born blind No form or shape Light & some color	Fairfax, Virginia	African American	Student (ADA) implemented in public school	Low-middle class Allowance	Single	Guidance stick & Assistant dog

Experience Maps

Our team had 5 iterations of the experience maps for each persona. The main thing that was changing was the visual layout.

We started off by doing research on experience maps and customer journey maps, we then created our layout and then we all put sticky notes on a wall and moved things around, changed our minds a lot and came up with our two experience maps! Displayed are 2/5 & 3/5

Research

Basic Steps:

- Uncover the truth
- Breakdown research into building blocks
- Create stakeholders
- Chart the course
- Make template
- Start adding info
- Rough
- Sticky notes
- White board
- Include quotes or extra things of importance
- Tell the Story
- Add sketches
- Add details
- Flush out
- Make it pretty
- Use your map
- Pick out pain points or opportunities
- Storyboard
- Keep mapping

Touchpoint = point of interaction between a persona and any agent or artifact of an organization

Channel = a medium of interaction with customers or users

Web, mobile, print, voice calls

This is a huge, hard, fun and insightful project

Should be with entire team

Once mapping is done... it's not done

Gain insights

Insights to action

Answer "now what"

Purpose:

To see your work through the eyes of the people receiving it

Lays out the different routes and points at which these people become:

Aware of what you do

Feel about what you do

Connect with what you do

A way to condense complex information into a format more easily understood through highlighting the key points of your offering

Once you have collected a series of experience maps based on various people, you can make comparisons across this set of concluded issues or positives with your service

When done well it illuminates the holistic customer experience

Demonstrates highs and lows people feel while interacting with product or service

How to use it:

Document experiences from people who have been in contact with your work

One per person

Capture

Activities

Motivations

Satisfaction

Be sensitive to:

Why

What

How

Service Design book chapter 7:

Customer experience is the sum of the task experiences involved in using a service

Customer experience is more than a happy or unhappy dynamic

Emotion of bad service is the frustration and reflection of quality

The sum of a customer's interaction with a service

4 experiences :

User experience = interactions with technology

Customer experience = experiences with retail brands

Service provider experience = what it's like to be on the other side

Human experience= the emotional affect of services that impact quality of life

Develop one or more customer journeys that describe the situations you would like to act out with customers

This provides you with feedback of parts of the whole life cycle of the new service

The user journey acts as the manuscript for the prototype and should describe the different actors and which tangibles are needed

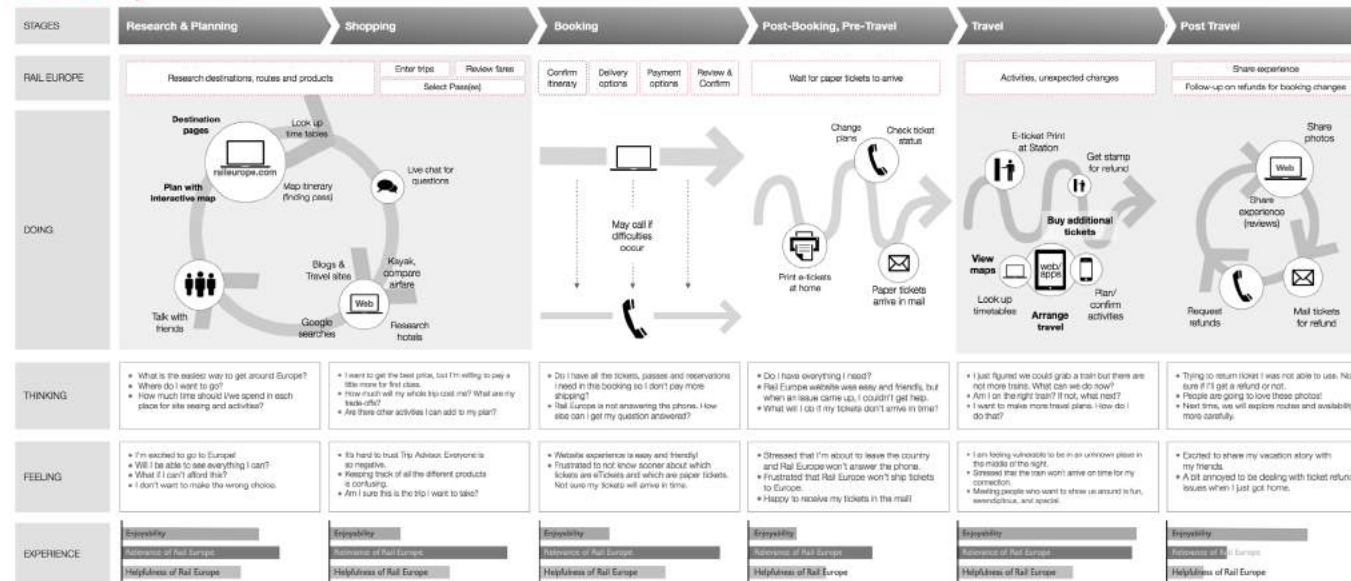
You can then decide to take a particular kind of user through a journey using specific touch points you have created for the experience prototype

Rail Europe Experience Map

Guiding Principles

People choose rail travel because it is convenient, easy, and flexible.	Rail booking is only one part of people's larger travel process.	People build their travel plans over time.	People value service that is respectful, effective and personable.
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Customer Journey



Opportunities

GLOBAL	PLANNING, SHOPPING, BOOKING	POST BOOK, TRAVEL, POST-TRAVEL
<p>Communicate a clear value proposition.</p> <p>STAGES: Initial</p>	<p>Enable people to plan over time.</p> <p>STAGES: Planning, Shopping</p>	<p>Improve the paper ticket experience.</p> <p>STAGES: Post-Booking, Travel, Post-Travel</p>
<p>Help people get the help they need.</p> <p>STAGES: Booking</p>	<p>Visualize the trip for planning and booking.</p> <p>STAGES: Planning, Shopping</p>	<p>Accommodate planning and booking in Europe too.</p> <p>STAGES: Traveling</p>
<p>Support people in creating their own solutions.</p> <p>STAGES: Global</p>	<p>Arm customers with information for making decisions.</p> <p>STAGES: Shopping, Booking</p>	<p>Proactively help people deal with changes.</p> <p>STAGES: Post-Booking, Traveling</p>
<p>Engage in social media with explicit purposes.</p> <p>STAGES: Global</p>	<p>Connect planning, shopping and booking on the web.</p> <p>STAGES: Planning, Shopping, Booking</p>	<p>Communicate status clearly at all times.</p> <p>STAGES: Post-Booking, Post-Travel</p>

Information sources: Stakeholder interviews, Cognitive walkthrough, Customer Experience Survey, Existing Rail Europe Documentation

Design, confirm, User process, Non-linear, but time-based

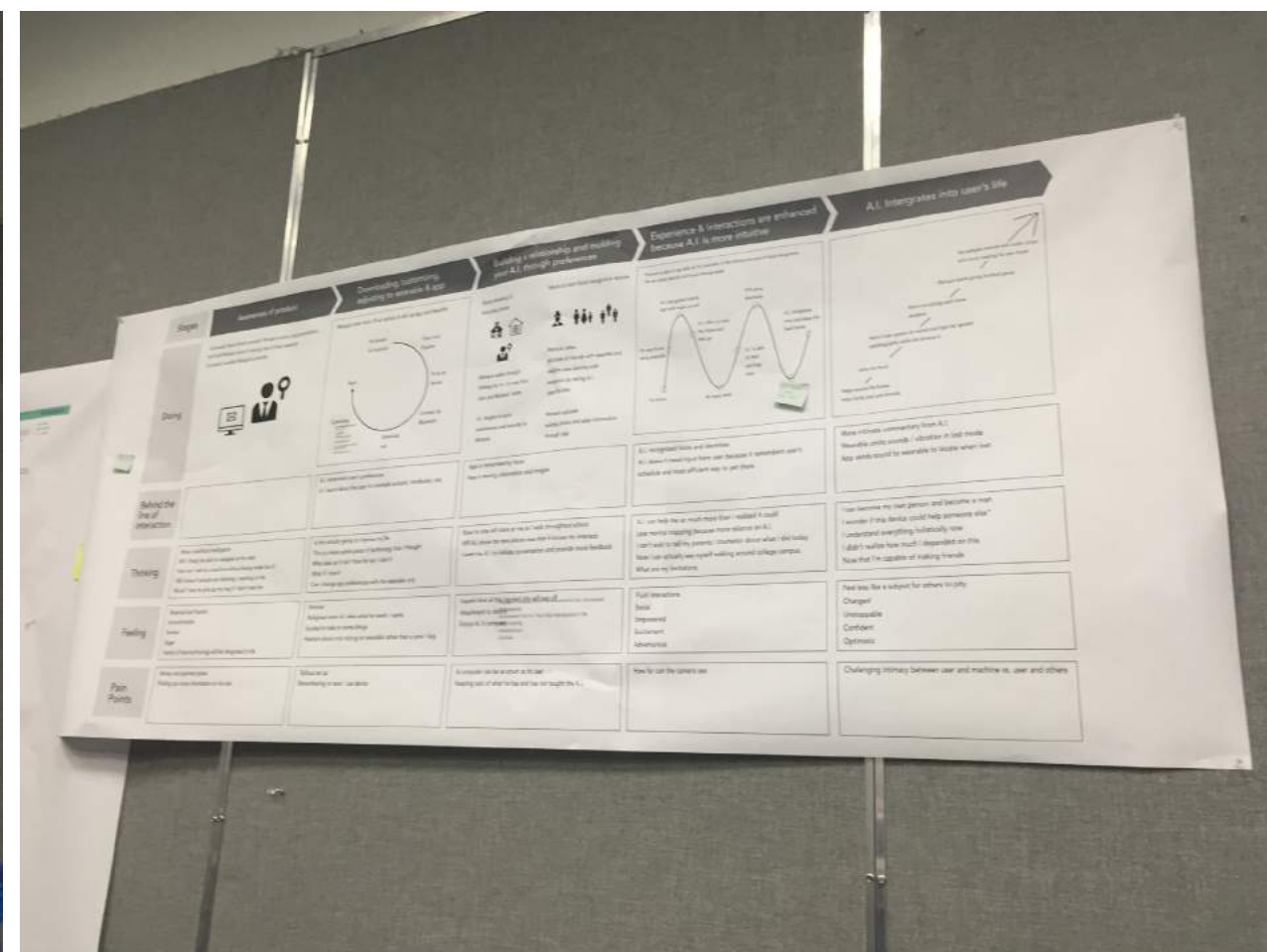
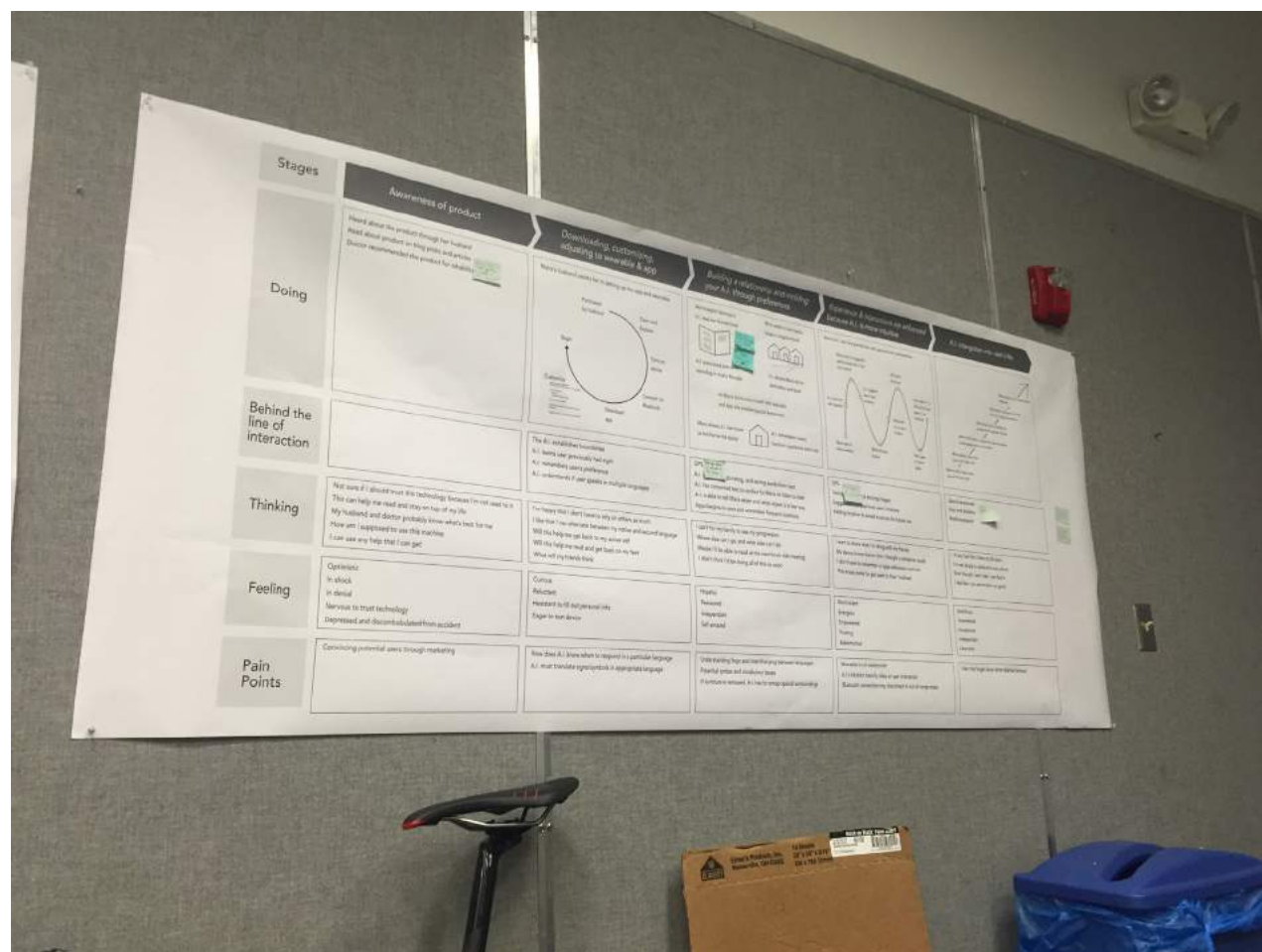
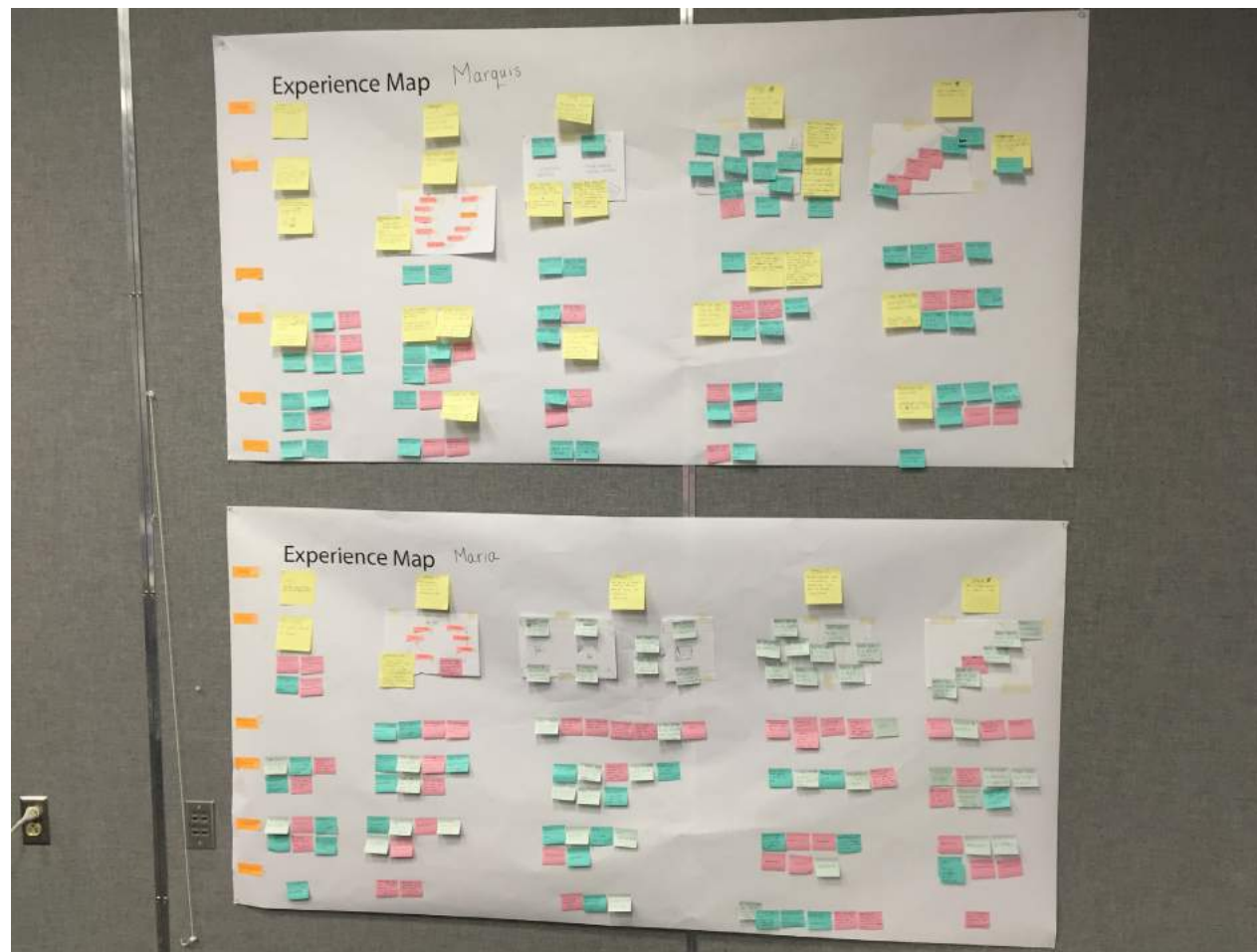
Experience Map for Rail Europe | August 2011

adaptive path

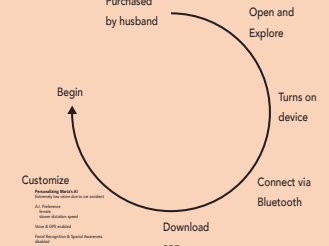


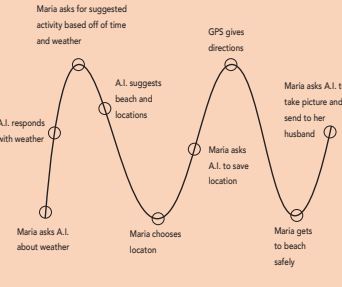
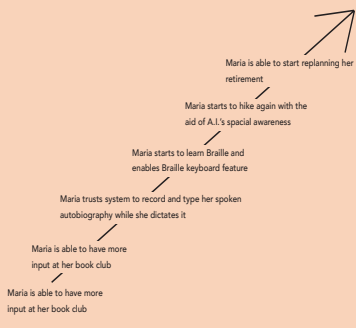
CUSTOMER JOURNEY MAPPING

designthinkersacademy

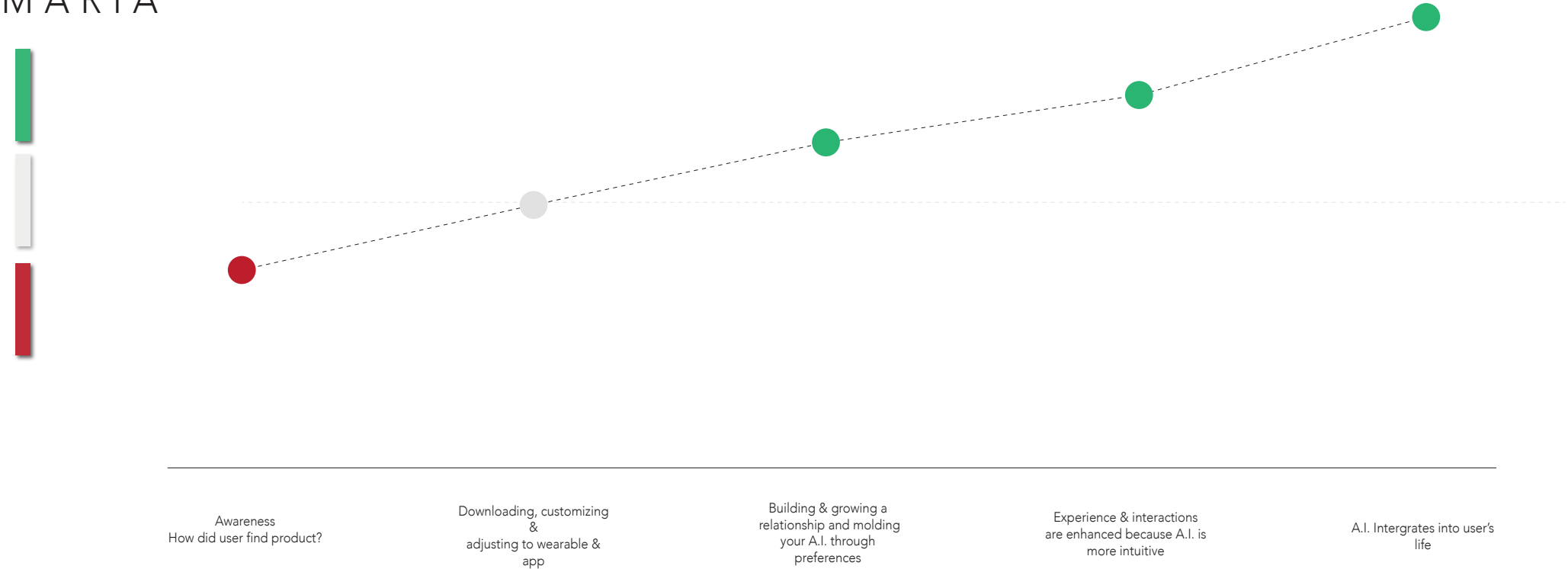
EMOTIONAL STATUS OF PERSONA				
 Name Profile Behaviour				
CONTEXT				
WHAT IS THE PERSONA TRYING TO DO?				
JOURNEY STAGES				
TOUCHPOINTS				
OPPORTUNITIES AREAS				



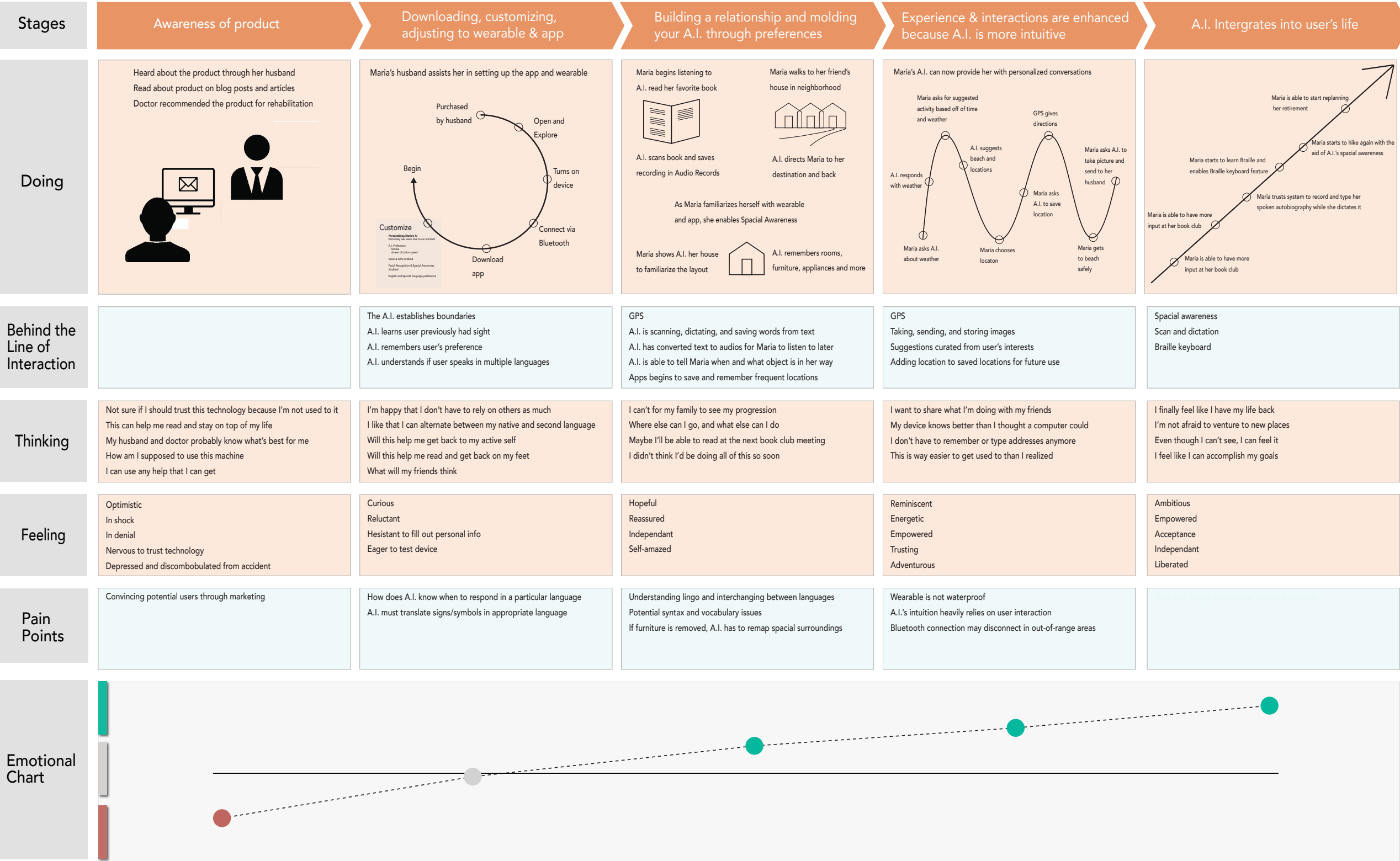
Maria

Stages	Awareness of product	Downloading, customizing, adjusting to wearable & app	Building a relationship and molding your A.I. through preferences	Experience & interactions are enhanced because A.I. is more intuitive	A.I. Intergrates into user's life
Doing	Heard about the product through her husband Read about product on blog posts and articles Doctor recommended the product for rehabilitation	Maria's husband assists her in setting up the app and wearable 	Maria begins listening to A.I. read her favorite book  A.I. scans book and saves recording in Audio Records As Maria familiarizes herself with wearable and app, she enables Spatial Awareness Maria shows A.I. her house to familiarize the layout  A.I. remembers rooms, furniture, appliances and more	Maria's A.I. can now provide her with personalized conversations 	
Behind the line of interaction		The A.I. establishes boundaries A.I. learns user previously had sight A.I. remembers user's preference A.I. understands if user speaks in multiple languages	GPS A.I. is scanning, dictating, and saving words from text A.I. has converted text to audios for Maria to listen to later A.I. is able to tell Maria when and what object is in her way Apps begins to save and remember frequent locations	GPS Taking, sending, and storing images Suggestions curated from user's interests Adding location to saved locations for future use	Spacial awareness Scan and dictation Braille keyboard
Thinking	Not sure if I should trust this technology because I'm not used to it This can help me read and stay on top of my life My husband and doctor probably know what's best for me How am I supposed to use this machine I can use any help that I can get	I'm happy that I don't have to rely on others as much I like that I can alternate between my native and second language Will this help me get back to my active self Will this help me read and get back on my feet What will my friends think	I can't for my family to see my progression Where else can I go, and what else can I do Maybe I'll be able to read at the next book club meeting I didn't think I'd be doing all of this so soon	I want to share what I'm doing with my friends My device knows better than I thought a computer could I don't have to remember or type addresses anymore This is way easier to get used to than I realized	I finally feel like I have my life back I'm not afraid to venture to new places Even though I can't see, I can feel it I feel like I can accomplish my goals
Feeling	Optimistic In shock In denial Nervous to trust technology Depressed and discombobulated from accident	Curious Reluctant Hesitant to fill out personal info Eager to test device	Hopeful Reassured Independant Self-amazed	Reminiscent Energetic Empowered Trusting Adventurous	Ambitious Empowered Acceptance Independant Liberated
Pain Points	Convincing potential users through marketing	How does A.I. know when to respond in a particular language A.I. must translate signs/symbols in appropriate language	Understanding lingo and interchanging between languages Potential syntax and vocabulary issues If furniture is removed, A.I. has to remap spacial surroundings	Wearable is not waterproof A.I.'s intuition heavily relies on user interaction Bluetooth connection may disconnect in out-of-range areas	User may forget about other disabled features

Emotion Chart MARIA



Experience Map
MARIA



Marquis

Stages

Stage 1 Awareness
How did user find product?

Stage 2 Downloading, customizing & adjusting to wearable & app

Stage 3 Building & growing a relationship and molding your A.I. through preferences

Stage 4 Experience & interactions are enhanced because A.I. is more intuitive

Stage 5 A.I. Intergrates into user's life

Doing

Counselor's Recommendation:
Counselor heard about product through articles and conventions, and told Marquis about it during one of their sessions

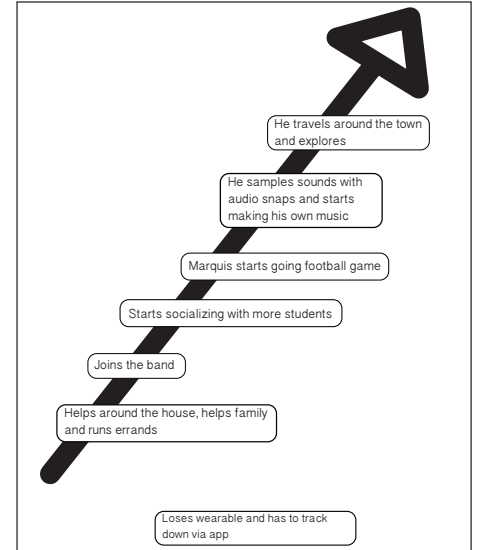
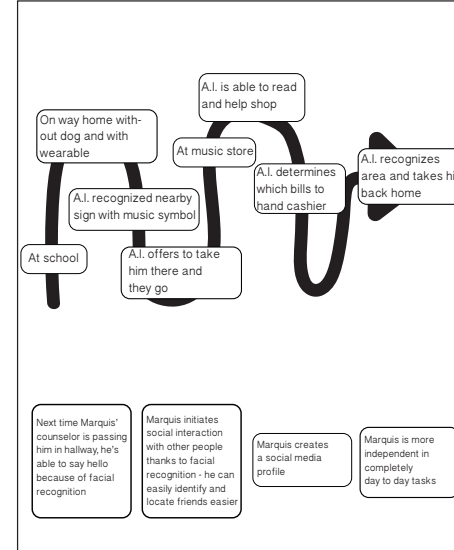
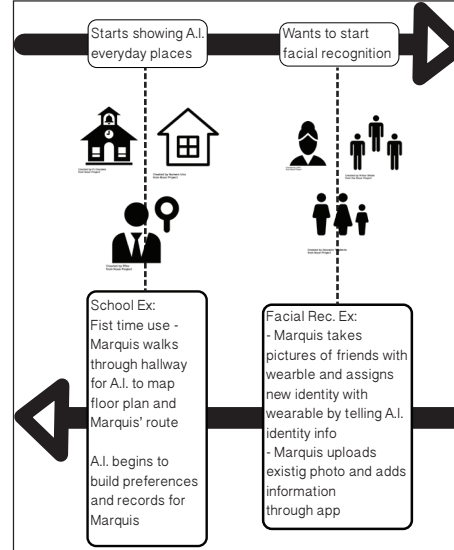
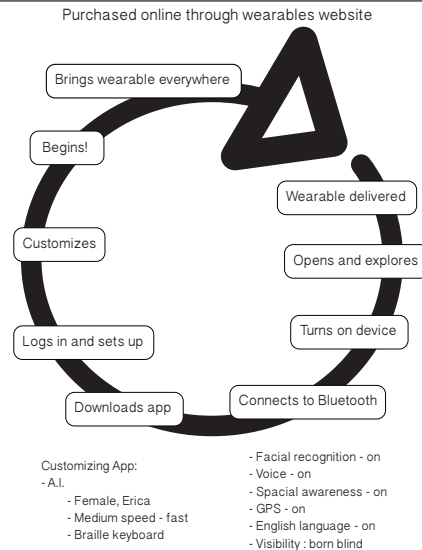
Counselor emailed parents about product



Created by Icons 8081 from Noun Project



Created by Piller from Noun Project



Behind the line of interaction

- A.I. remembers user's preferences
- A.I. learns about the user, for example account, vocabulary, etc

- App is remembering faces
- App is storing information and images

- A.I. recognized faces and identities
- School Ex: A.I. doesn't need input from user but is able to remember user's schedule and best / fastest way to get there
- A.I.: "It's Monday morning and your first period is in Room 145, would you like me to navigate you there?"
V.S.
Marquis: "I know first period is in Room 145, how do I get there?"

- More intimate commentary from A.I.
- A.I. "are you going to ask _ to prom?"
- Wearable omits sounds / vibration in lost mode
- App sends sound to wearable to locate when lost

Thinking

- "This is just another device designed by people who aren't blind"
- "What is Artificial Intelligence?"
- "Will I finally be able to navigate on my own?"
- "How can I talk to a machine without being made fun of?"
- "Will I know if people are listening / reacting to me?"
- "Would I have to give up my dog if I don't nee him?"
- "Can I go on a regular date or find a relationship?"
- "I don't want to be robo-man!"

- "Is this actually going to improve my life?"
- "I might as well try it out because I have nothing to loose."
- "What is the machine going to do with all of my info?"
- "This is a more subtle piece of technology than I thought."
- "What else can it do? How far can I take it?"
- "What if I loose it?"
- "What if the device dies? How do I charge it?"
- "Will I have to take it off during tests?"
- "Can I change app preferences with the wearable only?"

- "Not everyone will stare at me as I walk throughout school."
- "Will the A.I. show me new places now that it knows my interests?"
- "Can I trust this app and A.I. with all this information?"
- "I want the A.I. to have more authority in ininitiating feedback and conversation."

- "This A.I. can help me with so many things I didn't realize I needed help with."
- "Less mental mapping because more reliance on A.I."
- "I can use social media."
- "I can't wait to tell my parents / counselor about what I did today!"
- "Now I can actually see myself walking around college campus."
- "What are my limitations?"

- "I can become my own persona dn finally become a man"
- "I wonder if this device couldhelp someone else"
- "I understand everything holistically now"
- "I didn't realize how much I depended on this"
- "Now that I'm capable of making friends...girlfirend?"
- "Will I need this forever?"
- "I can start makng a bucket list!"

Feeling

- Skeptical but hopeful
- Uncomfortable
- Excited
- Eager
- Fearful of how technology will be integrated in life

- Anxious
- Each time expectations are met, user's trust, excitment and delight increases
- Excited to take on some things
- Confused on the system
- Hesitant on getting rid of other tools and just using the wearable

- Hopeful that all this inputed info will pay off
- Attachment to device
- Enjoys A.I.'s company

- Fluidity of interactions / conversations has increased
- Empowered
- Excitement that A.I. has fully intergrated in life
- He's trusting
- Adventurous
- Curious

- Incomplete and lost without wearable
- Reassured when found and all information is still in tact
- Feel less like a subject for others to pity
- Changed
- Unstoppable
- Confident
- Optimistic
- Becomes neutral - Initial delight is now gone, user takes the system as a natural part of life and feels grounded

Pain Points


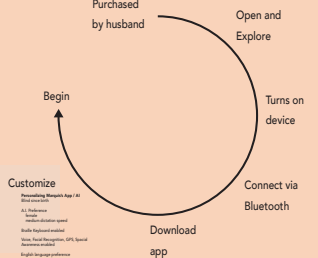


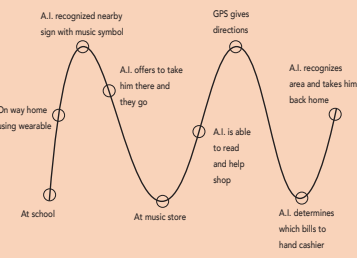
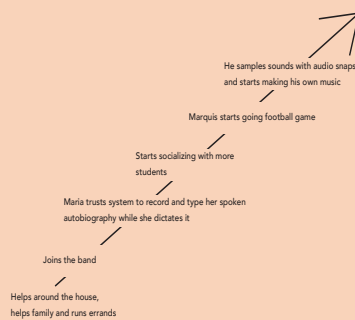
- Money and payment plans
- Finding out more information on his own

- A.I. may conflict with Siri
- Tedious set up
- Remembering to wear / use device

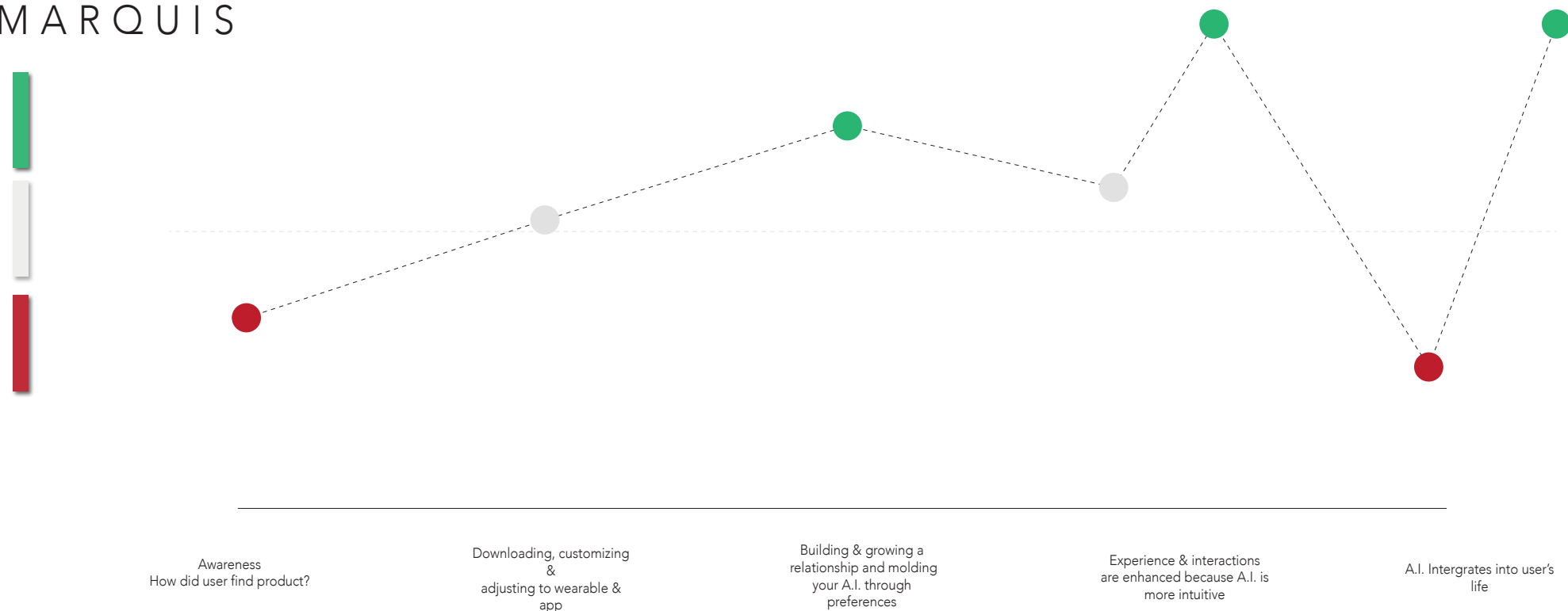
- A computer can be as smart as its user
- Keeping tack of what he has and has not taught the A.I.

- How far can the camera see?
- Face limitations is full extent of the app's features are explored

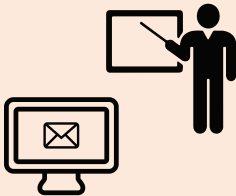
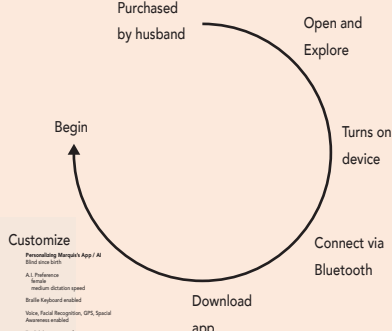


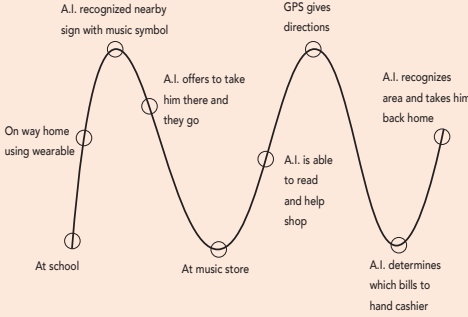
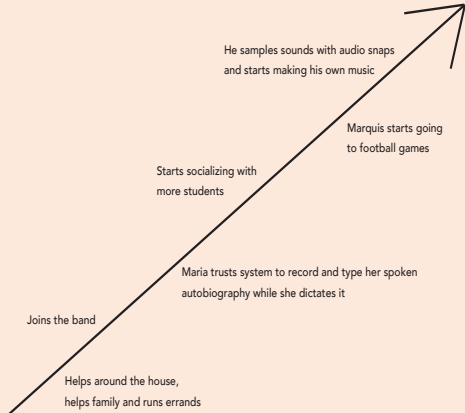
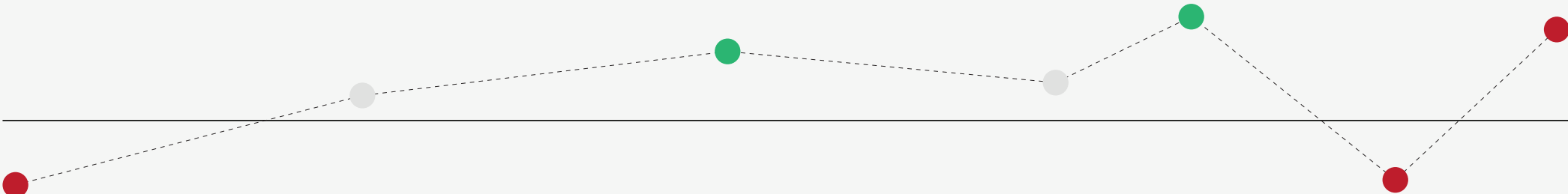
- Challenging intimacy between user and machine vs. user and other humans

Stages	Awareness of product	Downloading, customizing, adjusting to wearable & app	Building a relationship and molding your A.I. through preferences	Experience & interactions are enhanced because A.I. is more intuitive	A.I. Intergrates into user's life
Doing	<p>Counselor heard about product through articles and conventions, and told Marquis about it during one of their sessions Counselor emailed Marquis's parents</p> 	<p>Marquis uses Voice Over option to set up app and wearable</p> 	<div> <p>Starts showing A.I. everyday places</p>  <p>Marquis walks through hallway for A.I. to map floor plan and Marquis' route</p> <p>A.I. begins to build preferences and records for Marquis</p> </div> <div> <p>Wants to start facial recognition feature</p>  <p>Marquis takes pictures of friends with wearable and assigns new identity with wearable by telling A.I. identity info</p> <p>Marquis uploads existig photo and adds information through app</p> </div>	<p>Marquis is able to say hello to his counselor in the hallway because of facial recognition He can easily identify and locate friends easier</p> 	
Behind the line of interaction		A.I. remembers user's preferences A.I. learns about the user, for example account, vocabulary, etc.	App is remembering faces App is storing information and images	A.I. recognized faces and identities A.I. doesn't need input from user because it remembers user's schedule and most efficient way to get there	More intimate commentary from A.I. Wearable omits sounds / vibration in lost mode App sends sound to wearable to locate when lost
Thinking	What is Artificial Intelligence Will I finally be able to navigate on my own How can I talk to a machine without being made fun of Will I know if people are listening / reacting to me Would I have to give up my dog if I don't nee him	Is this actually going to improve my life This is a more subtle piece of technology than I thought What else can it do? How far can I take it What if I lose it Can I change app preferences with the wearable only	Now no one will stare at me as I walk throughout school Will A.I. show me new places now that it knows my interests I want the A.I. to initiate conversation and provide more feedback	A.I. can help me so much more than I realized it could Less mental mapping because more reliance on A.I. I can't wait to tell my parents / counselor about what I did today Now I can actually see myself walking around college campus. What are my limitations	I can become my own person and become a man I wonder if this device could help someone else" I understand everything holistically now I didn't realize how much I depended on this Now that I'm capable of making friends
Feeling	Skeptical but hopeful Uncomfortable Excited Eager Fearful of how technology will be integrated in life	Anxious Delighted when A.I. does what he needs / wants Excited to take on some things Hesitant about only relying on wearable rather than a cane / dog	Hopeful that all this inputed info will pay off Attachment to device Enjoys A.I.'s company	Fluid interactions Social Empowered Excitement Adventurous	Feel less like a subject for others to pity Changed Unstoppable Confident Optimistic
Pain Points	Money and payment plans Finding out more information on his own	Tedious set up Remembering to wear / use device	A computer can be as smart as its user Keeping tack of what he has and has not taught the A.I.	How far can the camera see	Challenging intimacy between user and machine vs. user and others

Emotion Chart MARQUIS

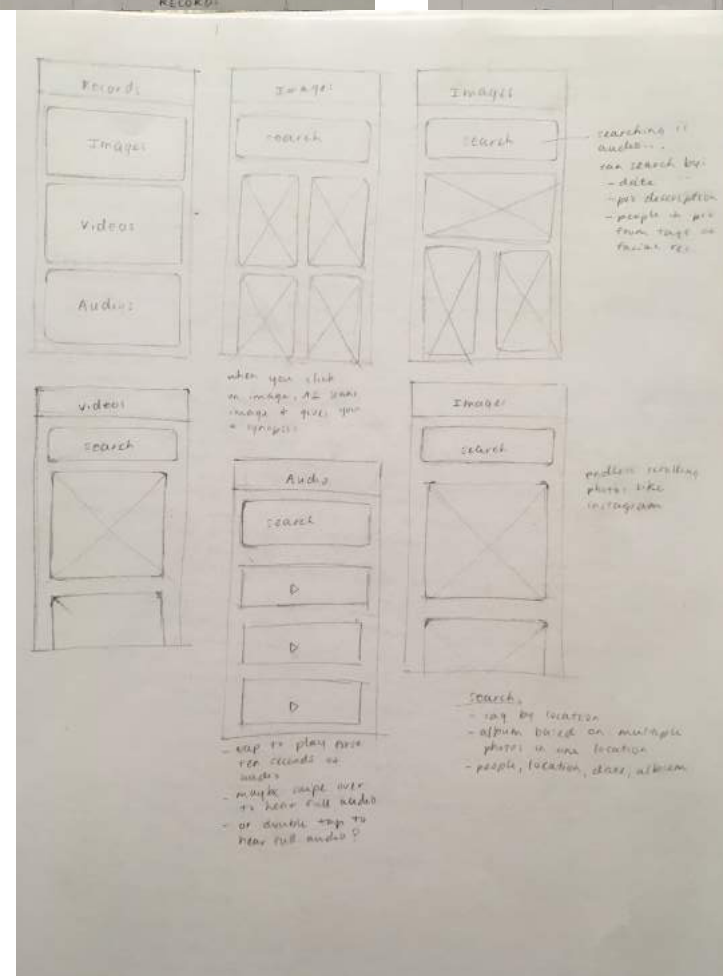
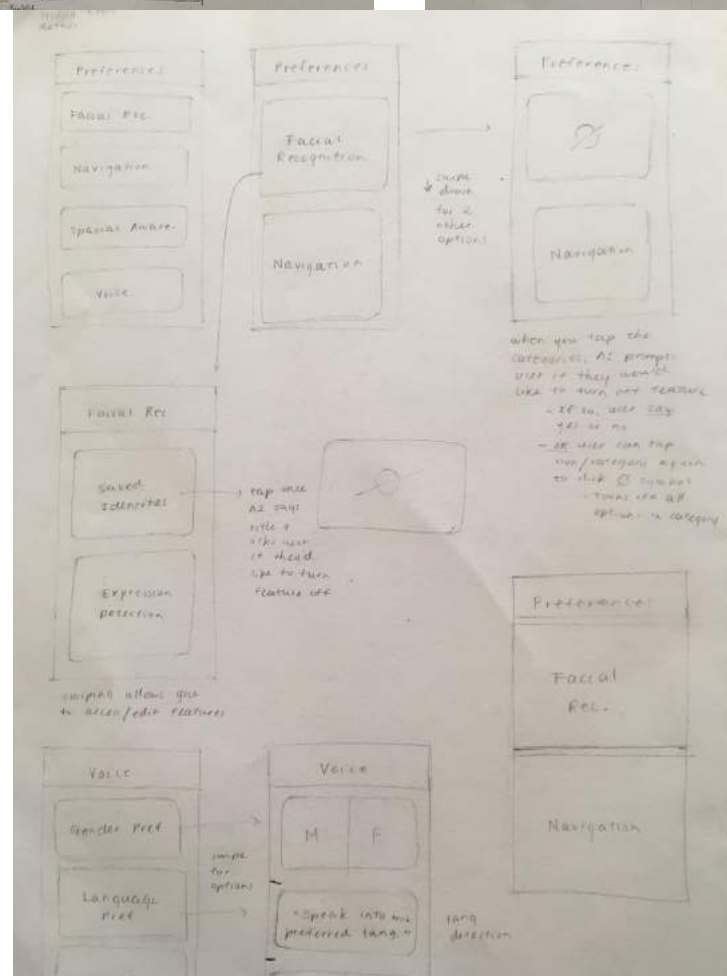
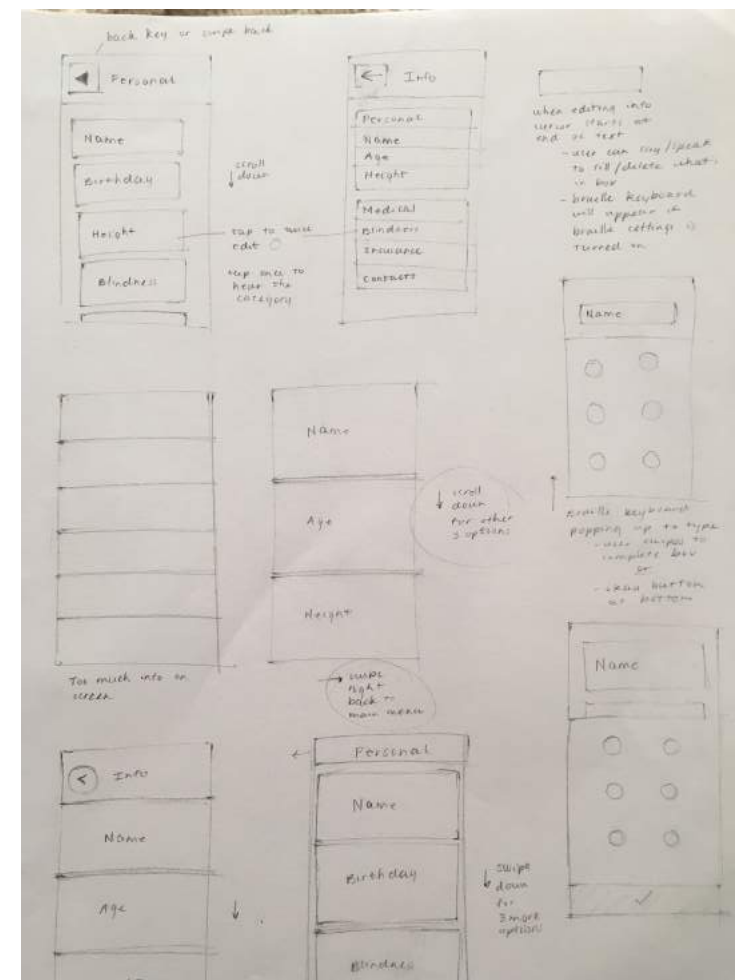
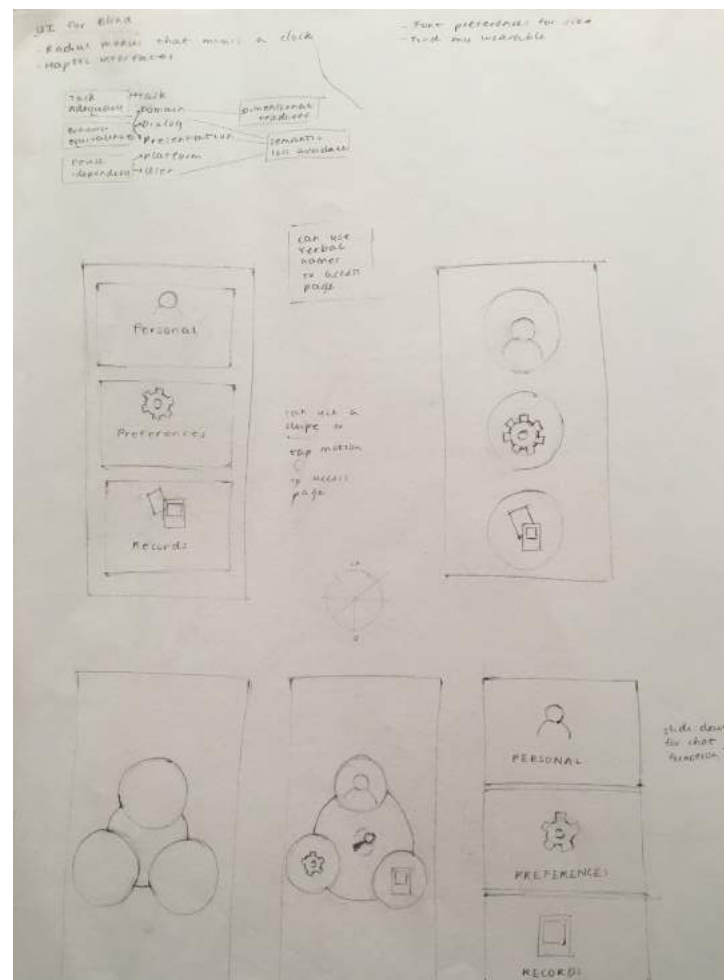
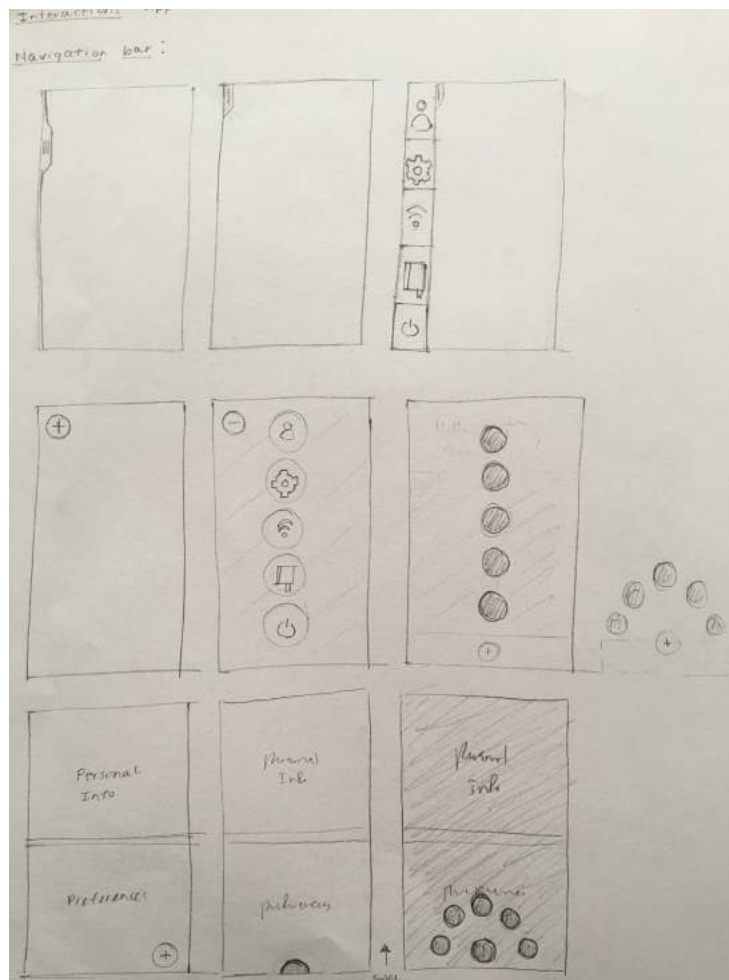


Experience Map
MARQUIS

Stages	Awareness of product	Downloading, customizing, adjusting to wearable & app	Building a relationship and molding your A.I. through preferences	Experience & interactions are enhanced because A.I. is more intuitive	A.I. Intergrates into user's life
Doing	<p>Counselor heard about product through articles and conventions, and told Marquis about it during one of their sessions</p> <p>Counselor emailed Marquis's parents</p> 	<p>Marquis uses Voice Over option to set up app and wearable</p> 	<p>Starts showing A.I. everyday places</p>  <p>Marquis walks through hallway for A.I. to map floor plan and Marquis' route</p> <p>A.I. begins to build preferences and records for Marquis</p> <p>Wants to start facial recognition feature</p>  <p>Marquis takes pictures of friends with wearable and assigns new identity with wearable by telling A.I. identity info</p> <p>Marquis uploads existig photo and adds information through app</p>	<p>Marquis is able to say hello to his counselor in the hallway because of facial recognition</p> <p>He can easily identify and locate friends easier</p> 	
Behind the line of interaction		<p>A.I. remembers user's preferences</p> <p>A.I. learns about the user, for example account, vocabulary, etc.</p>	<p>App is remembering faces</p> <p>App is storing information and images</p>	<p>A.I. recognized faces and identities</p> <p>A.I. doesn't need input from user because it remembers user's schedule and most efficient way to get there</p>	<p>More intimate commentary from A.I.</p> <p>Wearable omits sounds / vibration in lost mode</p> <p>App sends sound to wearable to locate when lost</p>
Thinking	<p>What is Artificial Intelligence</p> <p>Will I finally be able to navigate on my own</p> <p>How can I talk to a machine without being made fun of</p> <p>Will I know if people are listening / reacting to me</p> <p>Would I have to give up my dog if I don't nee him</p>	<p>Is this actually going to improve my life</p> <p>This is a more subtle piece of technology than I thought</p> <p>What else can it do? How far can I take it</p> <p>What if I lose it</p> <p>Can I change app preferences with the wearable only</p>	<p>Now no one will stare at me as I walk throughout school</p> <p>Will A.I. show me new places now that it knows my interests</p> <p>I want the A.I. to initiate conversation and provide more feedback</p>	<p>A.I. can help me so much more than I realized it could</p> <p>Less mental mapping because more reliance on A.I.</p> <p>I can't wait to tell my parents / counselor about what I did today</p> <p>Now I can actually see myself walking around college campus.</p> <p>What are my limitations</p>	<p>I can become my own person and become a man</p> <p>I wonder if this device could help someone else"</p> <p>I understand everything holistically now</p> <p>I didn't realize how much I depended on this</p> <p>Now that I'm capable of making friends</p>
Feeling	<p>Skeptical but hopeful</p> <p>Uncomfortable</p> <p>Excited</p> <p>Eager</p> <p>Fearful of how technology will be integrated in life</p>	<p>Anxious</p> <p>Delighted when A.I. does what he needs / wants</p> <p>Excited to take on some things</p> <p>Hesitant about only relying on wearable rather than a cane / dog</p>	<p>Hopeful that all this inputed info will pay off</p> <p>Attachment to device</p> <p>Enjoys A.I.'s company</p>	<p>Fluid interactions</p> <p>Social</p> <p>Empowered</p> <p>Excitement</p> <p>Adventurous</p>	<p>Feel less like a subject for others to pity</p> <p>Changed</p> <p>Unstoppable</p> <p>Confident</p> <p>Optimistic</p>
Pain Points	<p>Money and payment plans</p> <p>Finding out more information on his own</p>	<p>Tedious set up</p> <p>Remembering to wear / use device</p>	<p>A computer can be as smart as its user</p> <p>Keeping tack of what he has and has not taught the A.I.</p>	<p>How far can the camera see</p>	<p>Challenging intimacy between user and machine vs. user and others</p>
Emotional Chart					

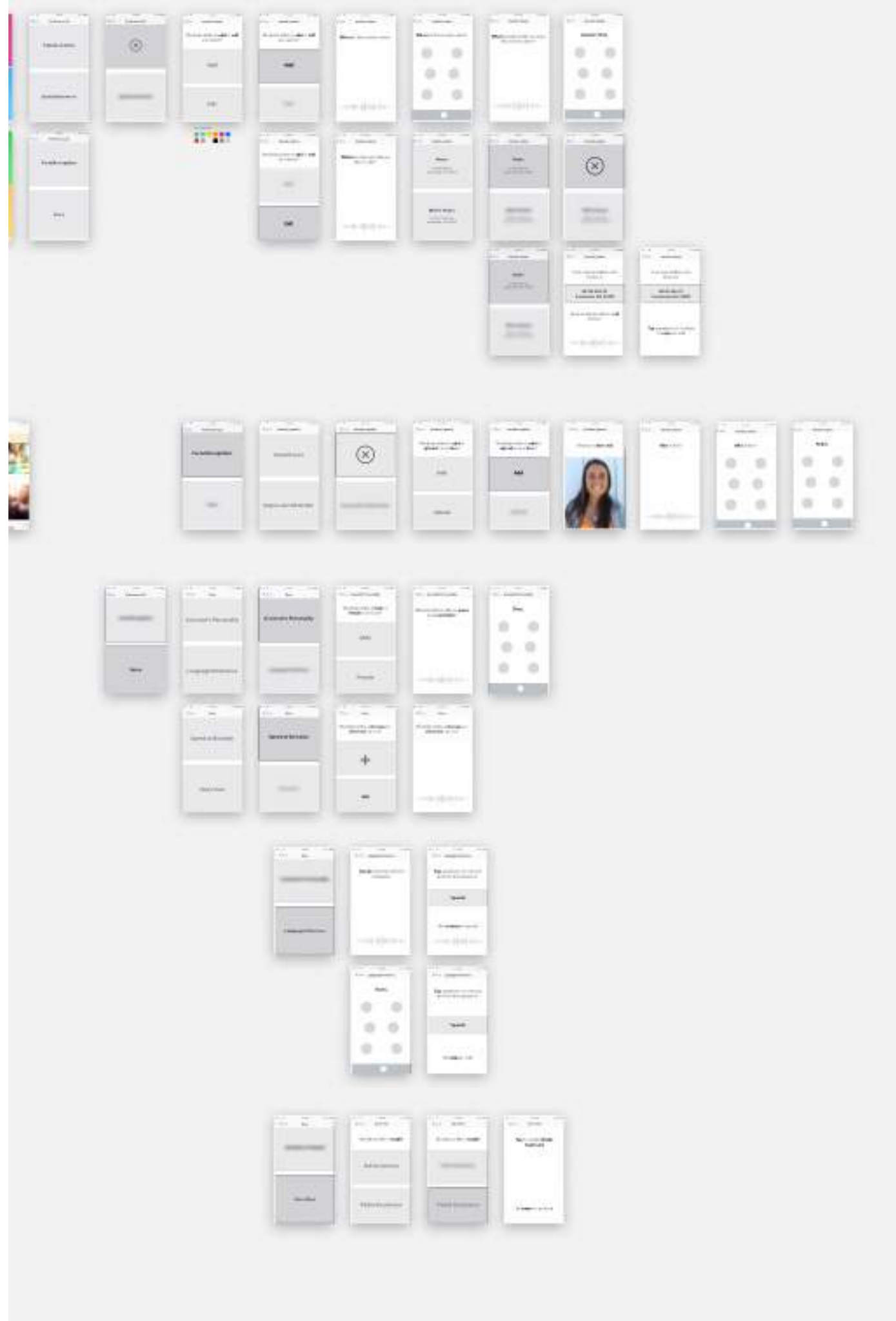
Wireframes

Designing with the specific needs of our users' in mind, we aimed to create a bold and bright conversational user interface that uses key interactions to navigate. Some challenges included simplifying the appearance of complex information, and choosing intuitive and meaningful interactions that were easy for the user to learn.

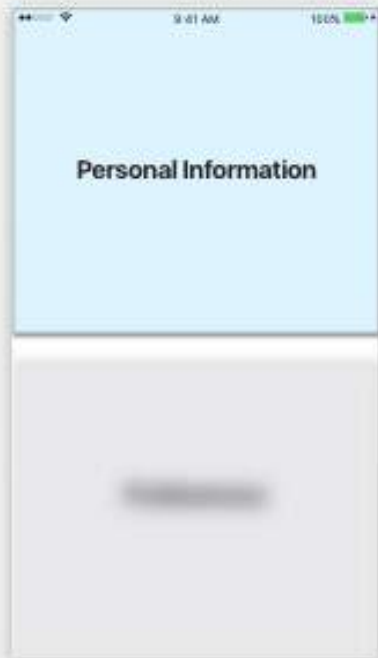


Lo-Fi





iPhone...opy 19



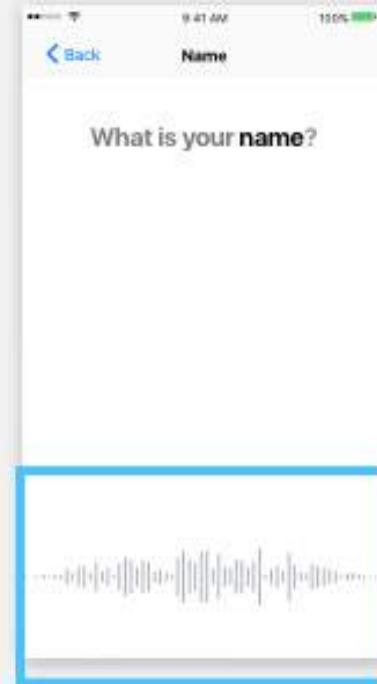
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iPhone...opy 14



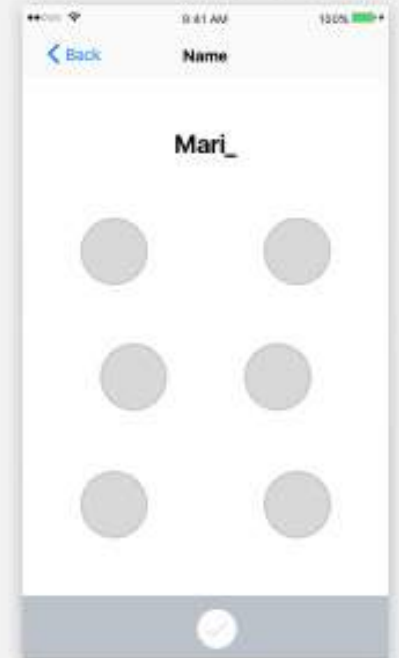
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iPhone...opy 15

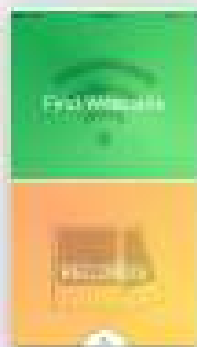
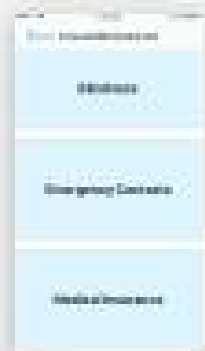


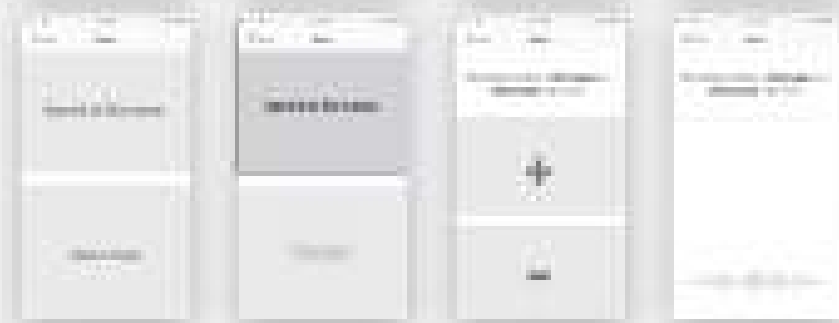
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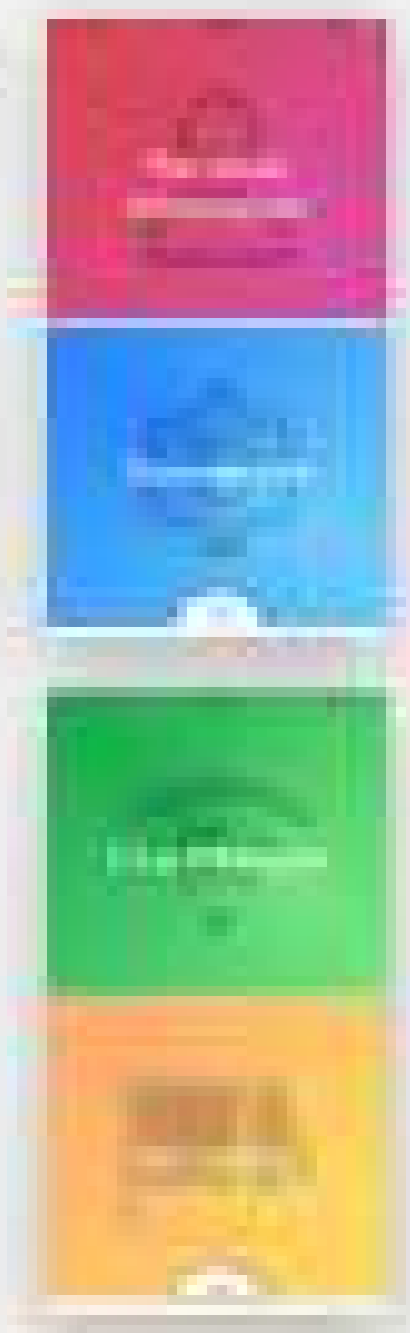
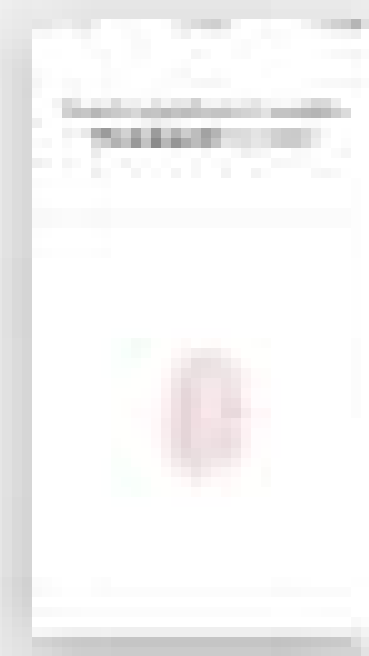
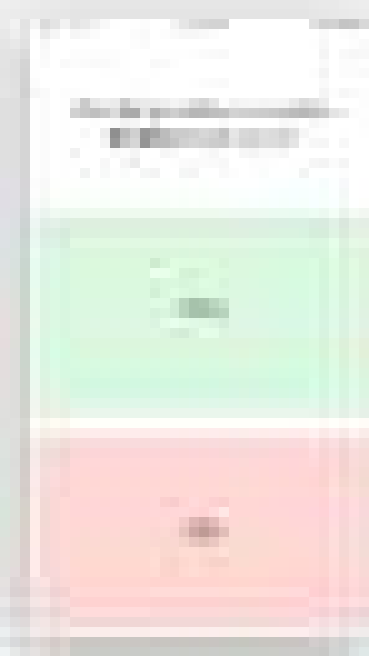
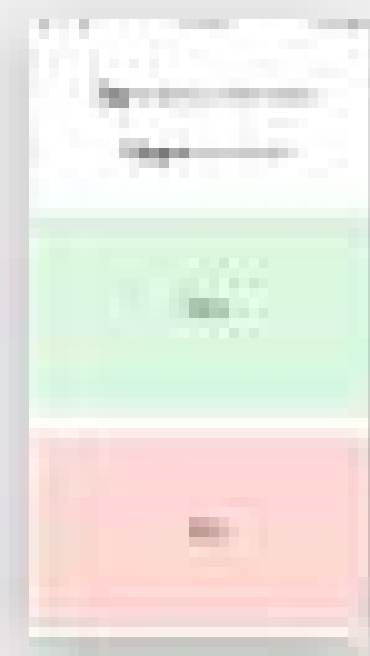
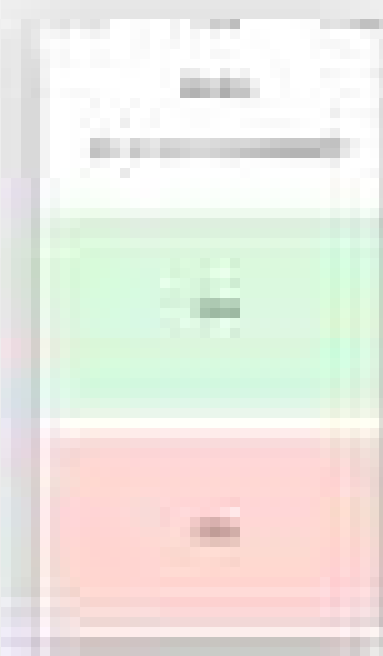
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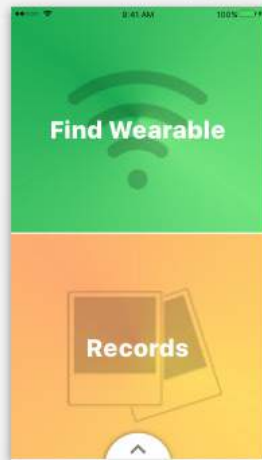




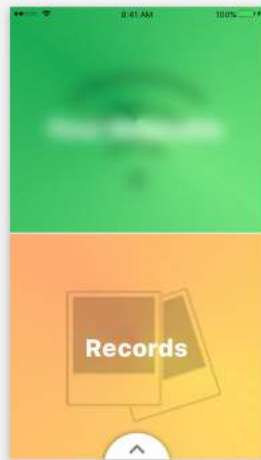


Hi-Fi

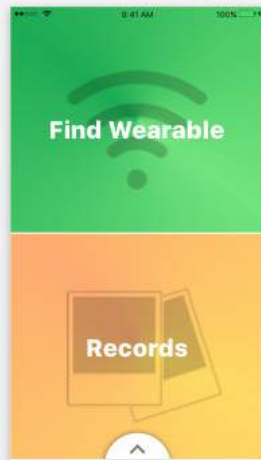
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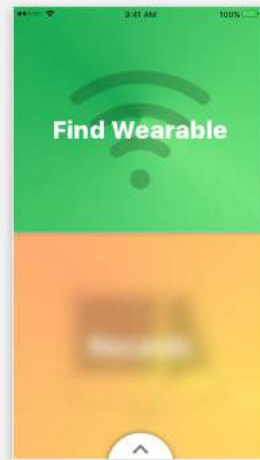
Main Pa...Records



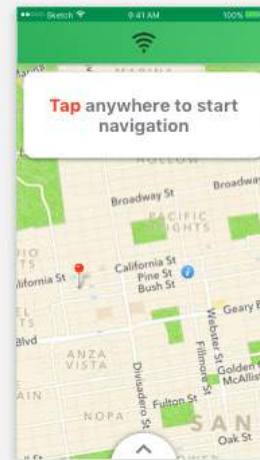
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Main Pa...earable



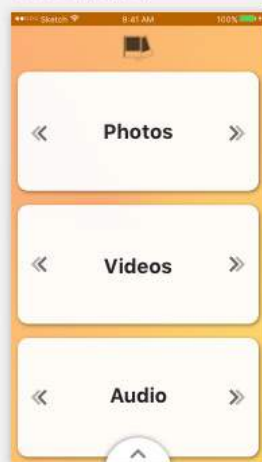
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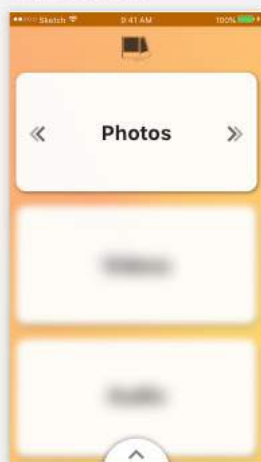
Find wearable 2



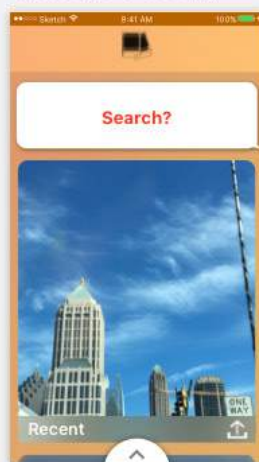
Records1



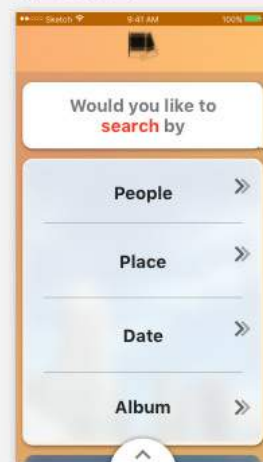
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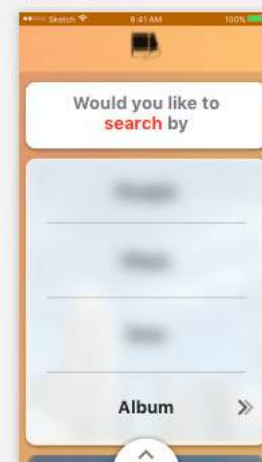
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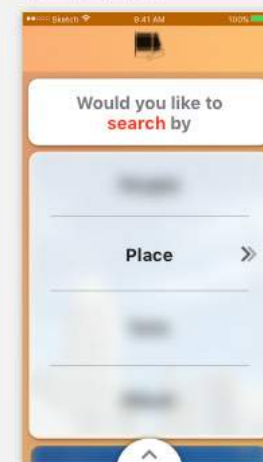
iPhone 7



iPhone 7



Records5



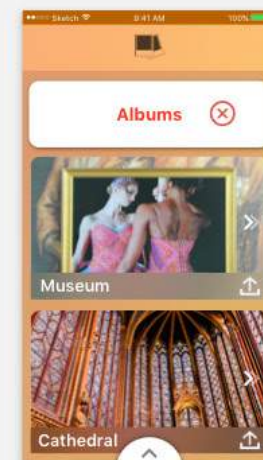
Records6



Records Export



iPhone 7



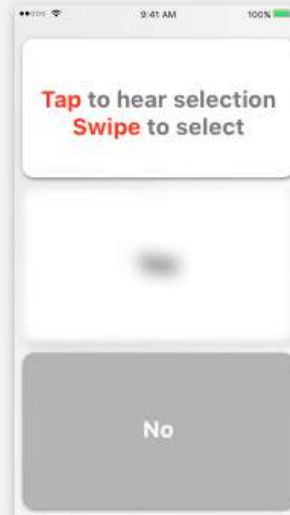
iPhone 7



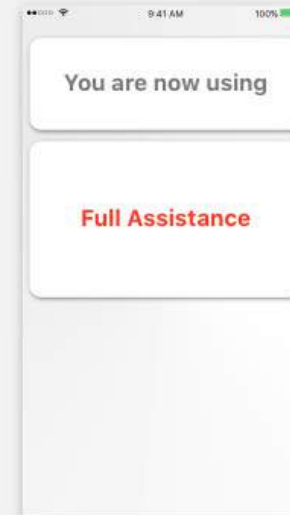
Quick C...l Screen



INTRO 5 NO



INTRO 6 NO



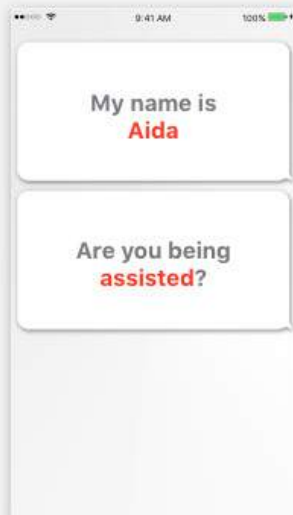
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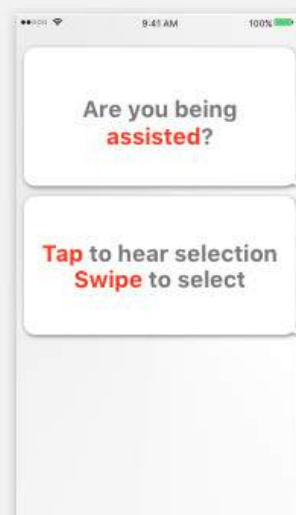
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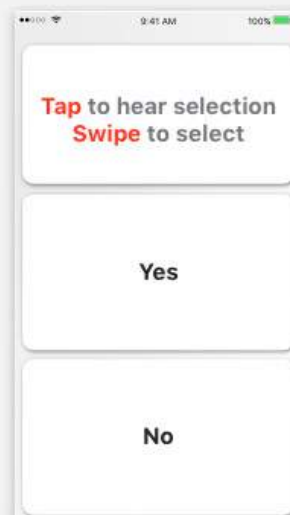
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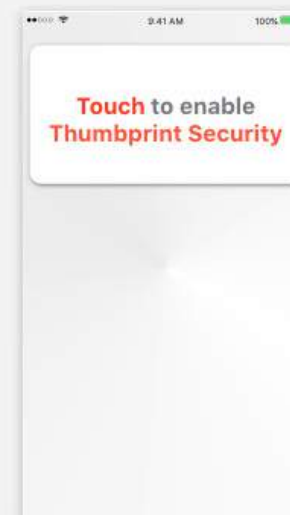
INTRO 4



INTRO 8



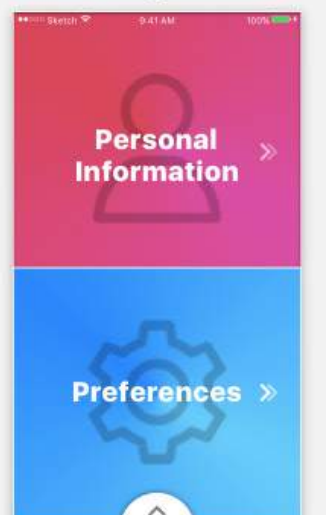
INTRO 9



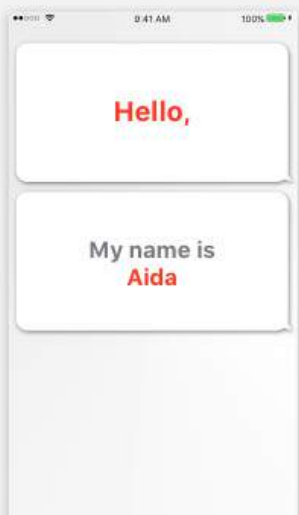
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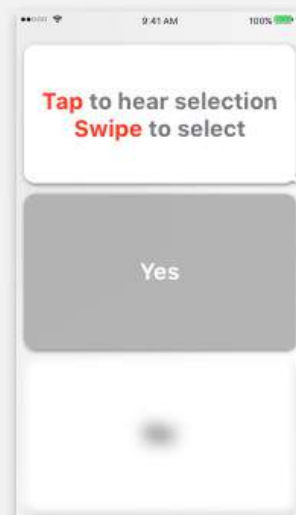
Main Page 1



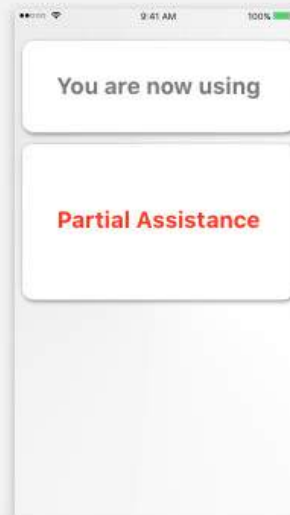
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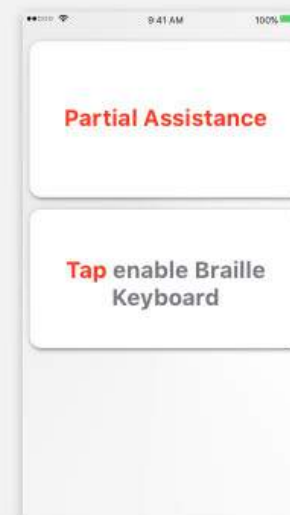
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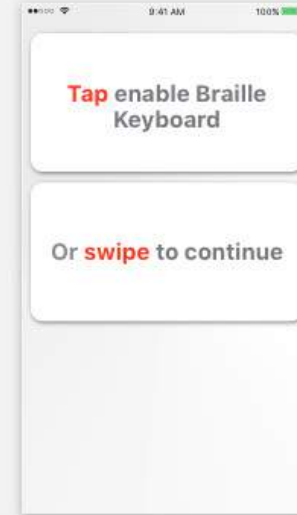
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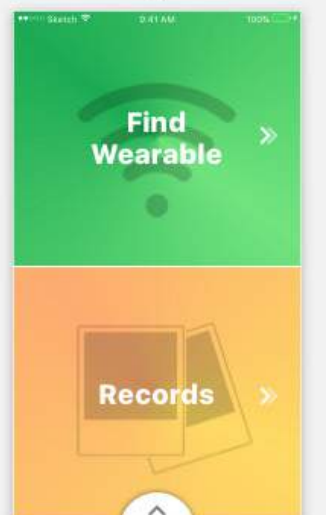
INTRO 7 YES



INTRO 7 YES

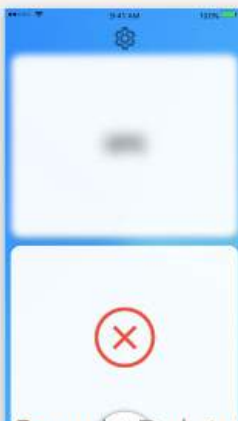


Main Page 2





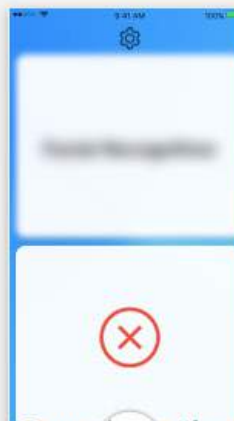
Spatial Delete



Facial...delete



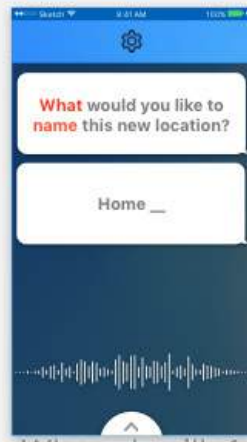
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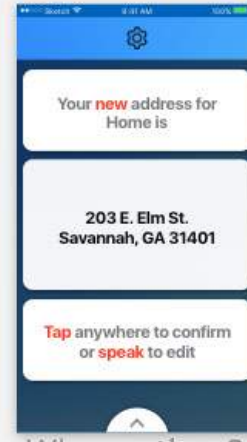
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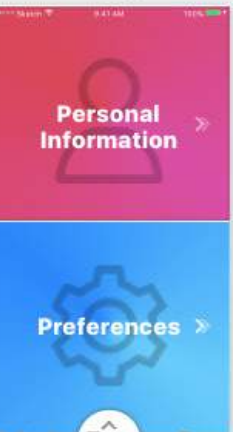
Where...oken4



Where...oken5



Main Page 1



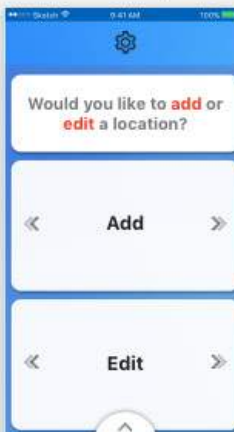
Prefer...es 1/2



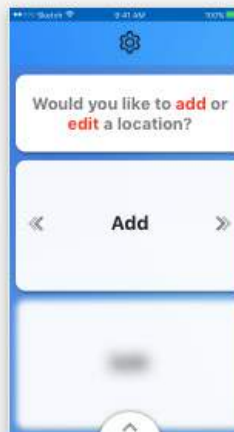
Saved...Delete



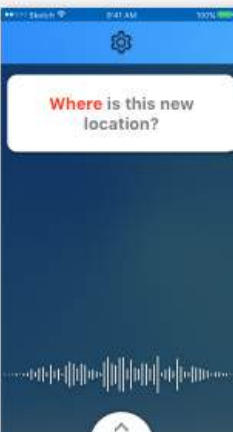
Saved...d/edit)



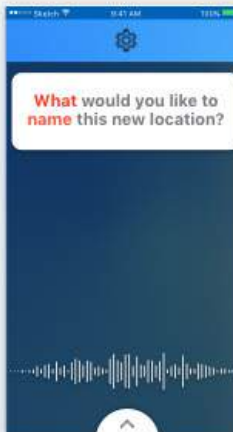
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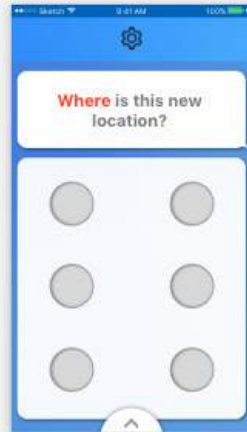
Where...oken1



Name...oken2



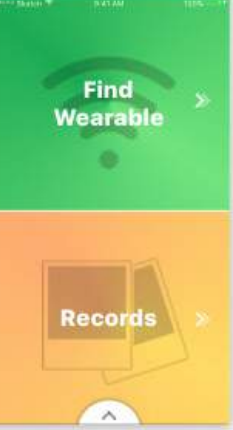
Wher...braille1



Where...tion 2



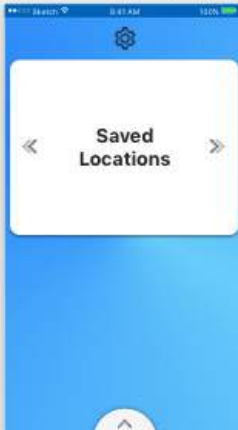
Main Page 2



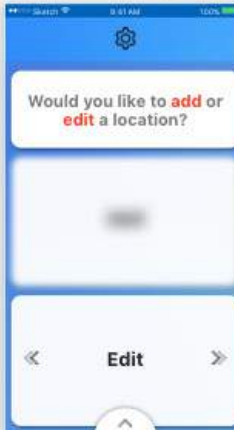
Prefer...es 2/2



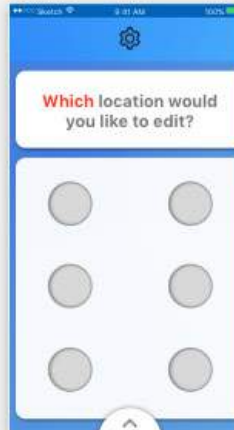
iPhon...Copy 3



Saved...option



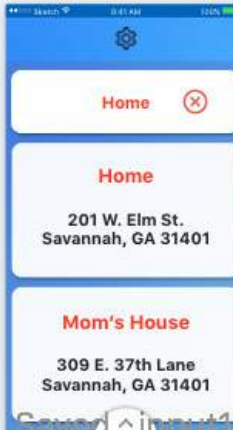
Edit Lo...braille



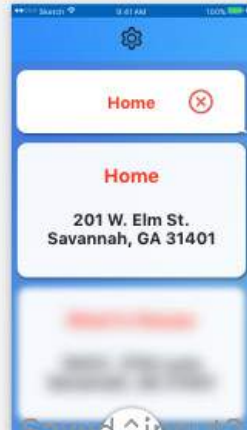
Edit L...raille2



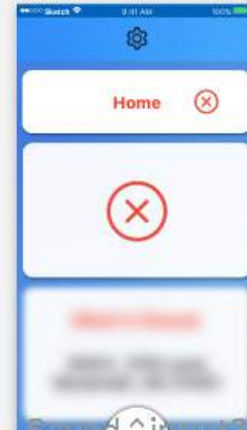
Edit L...Home"



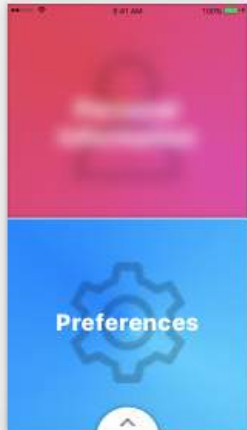
Edit L...lected



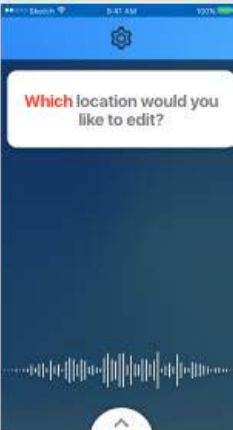
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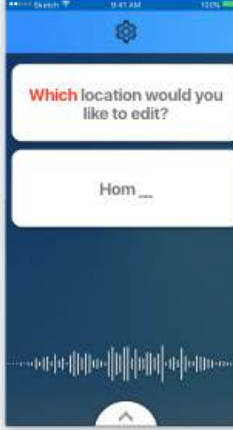
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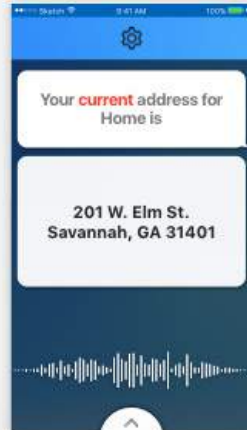
Saved...oken



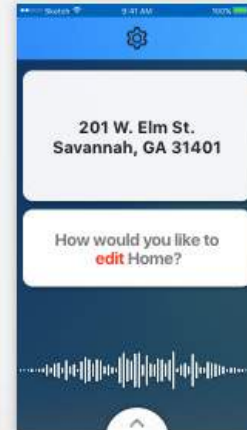
Saved...input1



Saved...input2



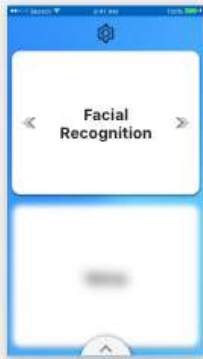
Saved...input3



ole 2



Faci...ition1



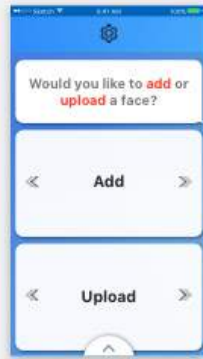
Facia...tion2



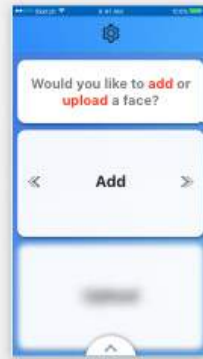
Faci...elete



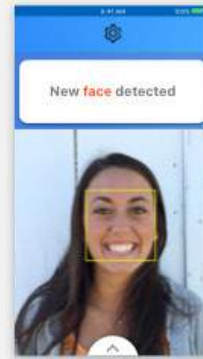
Facia...tion3



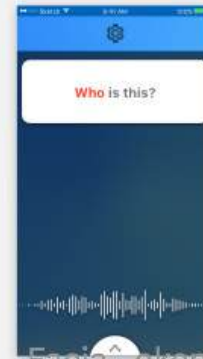
Facia...tion4



Facia...tion5



Facia...oken



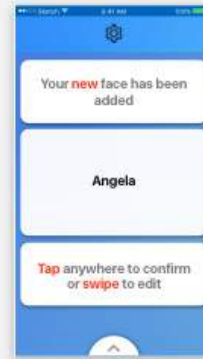
Facia...raile



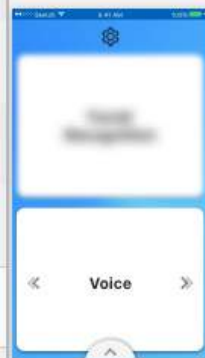
Facia...raile



Facia...raile



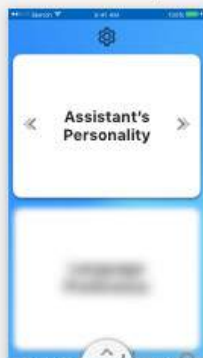
Voice1



AI Pe...ality1



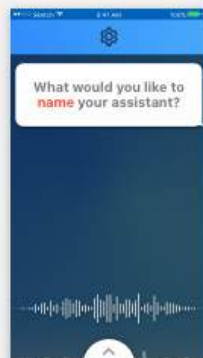
AI Pe...ility2



AI Pe...ility3



AI Pe...oken



AI Pe...raile



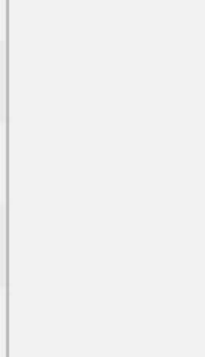
Facia...oken



Facia...oken



spee...tion1



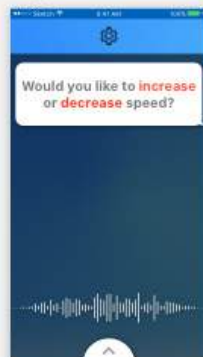
spee...tion2



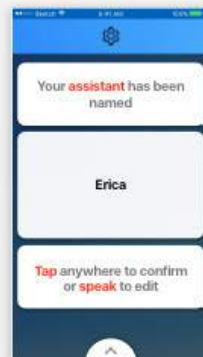
spee...anual



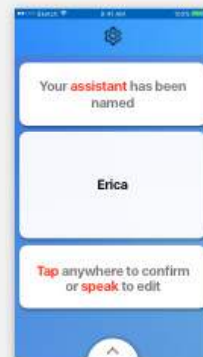
spee...oken



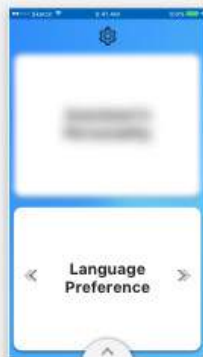
AI Pe...oken



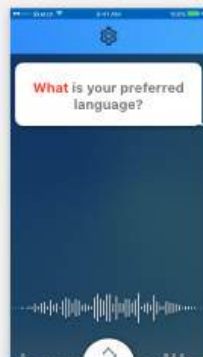
AI Pe...raile



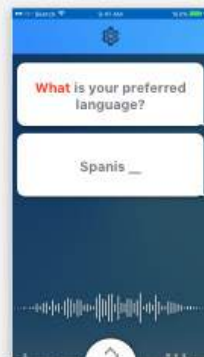
lang...pref1



lang...oken



lang...oken



lang...oken



lang...oken

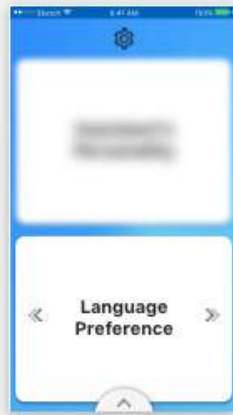


land...braille

land...braille

land...braille

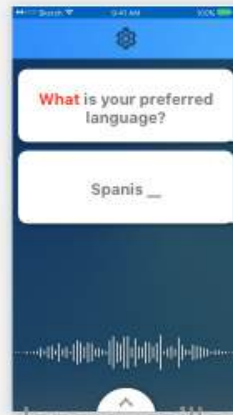
langu...pref1



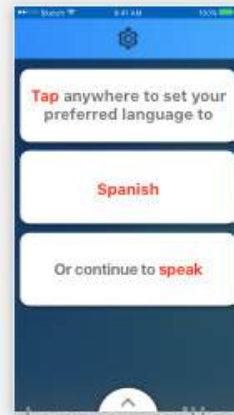
langu...oken



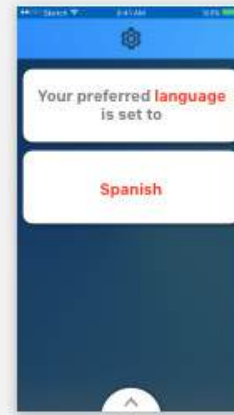
langu...oken



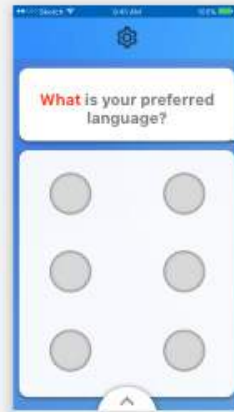
langu...oken



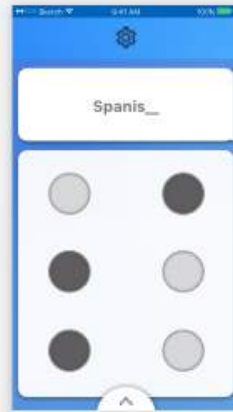
langu...oken



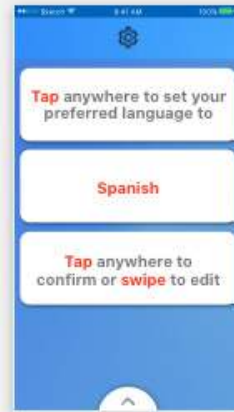
langu...raile



langu...raile



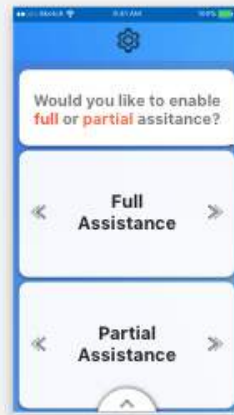
langu...raile



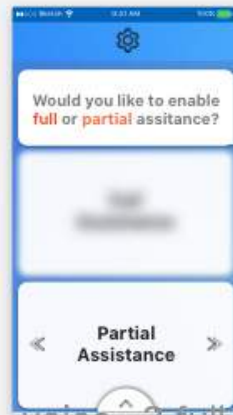
voice over1



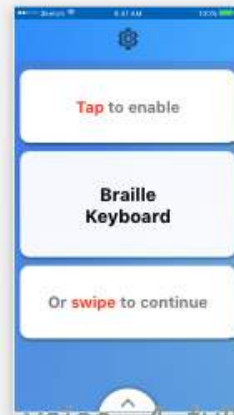
voice over2



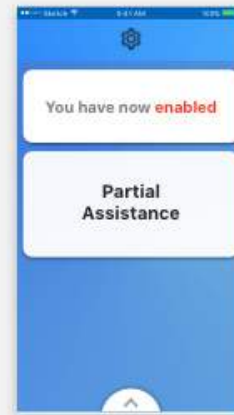
voice...artial



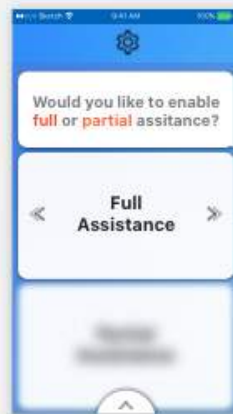
voice...artial



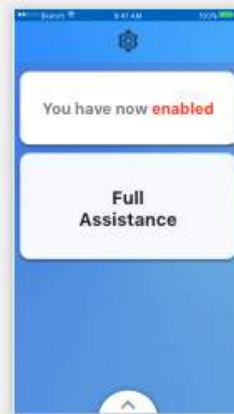
voice...artial



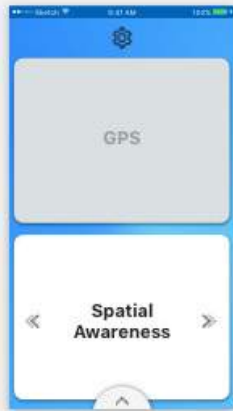
voice...3 full



voice...4 full



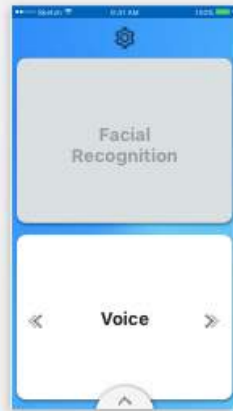
Idle Saved



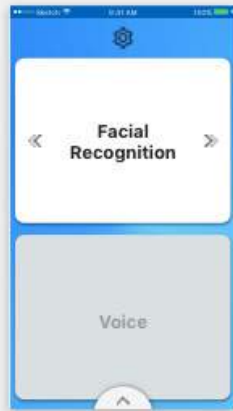
Idle spatial



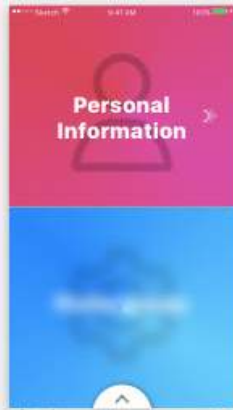
Idle Facial



Idle Voice



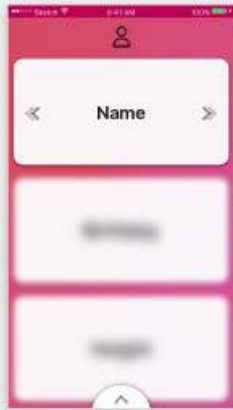
Main...al Info



Perso...nce 1



Perso...nce 3



Perso...nce 4



Perso...nce 5



Perso...nce 6



Perso...oken



iPhon...opy 2



Perso...nce 2



Spati...elete



Facial...elete



Voice Delete



Main Page 1

Prefe...es 1/2

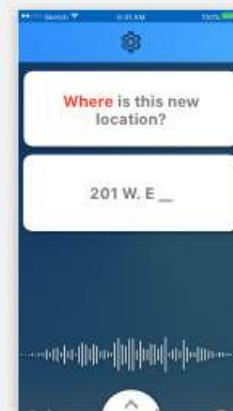
Save...Delete

Save...d(edit)

Save...cation

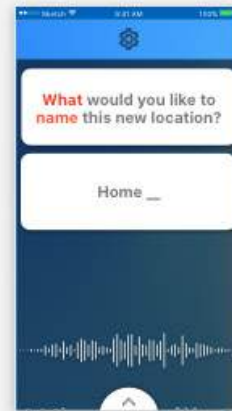
Wher...oken1

Wher...ken3



Nam...oken2

Wher...ken4



Wher...raile1

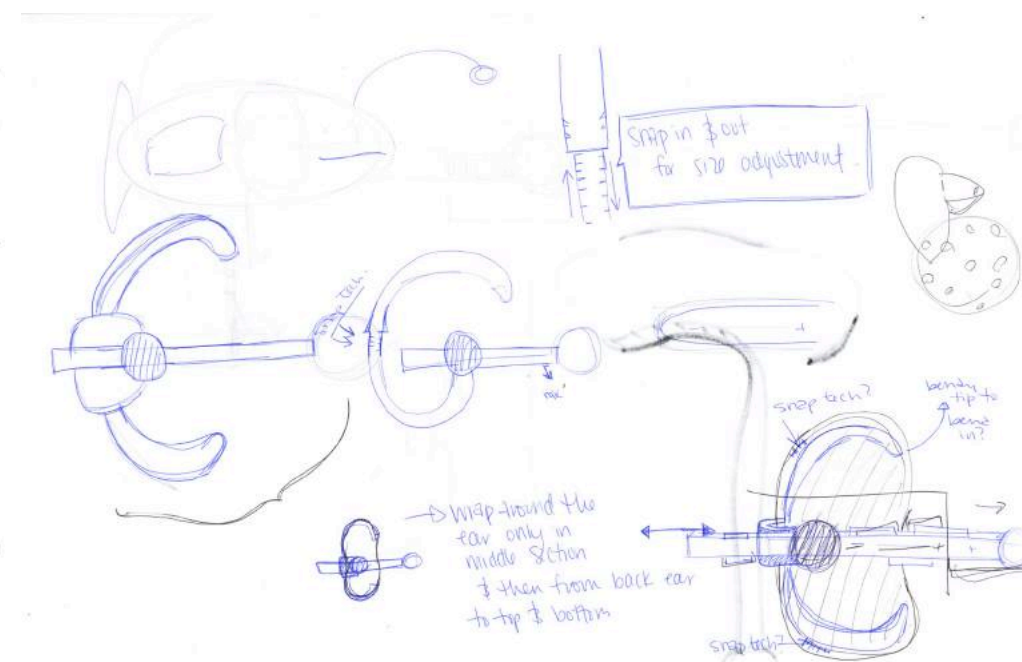
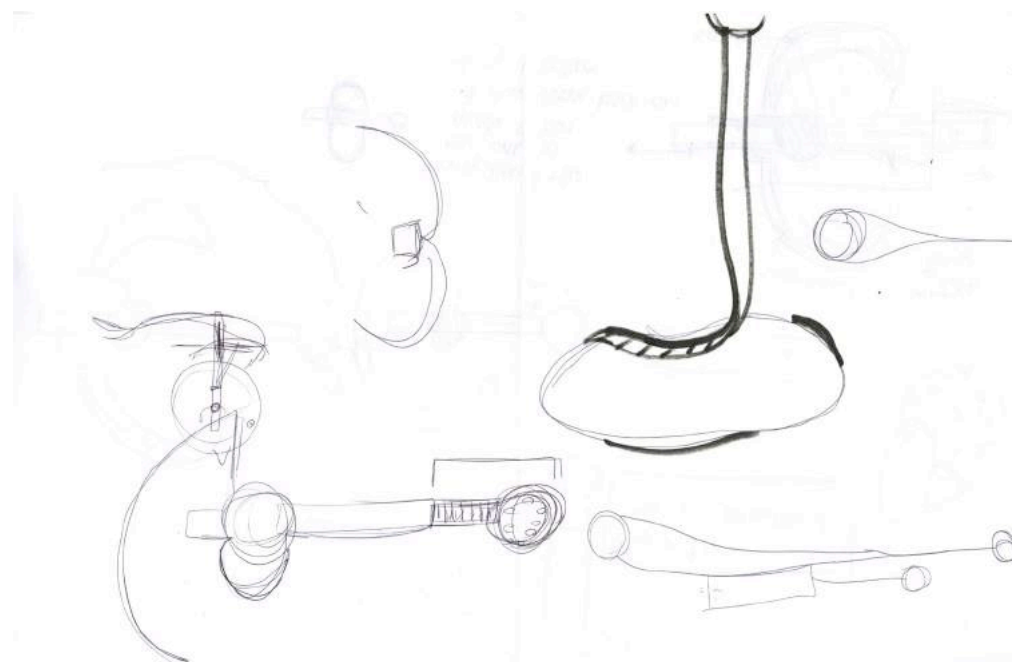
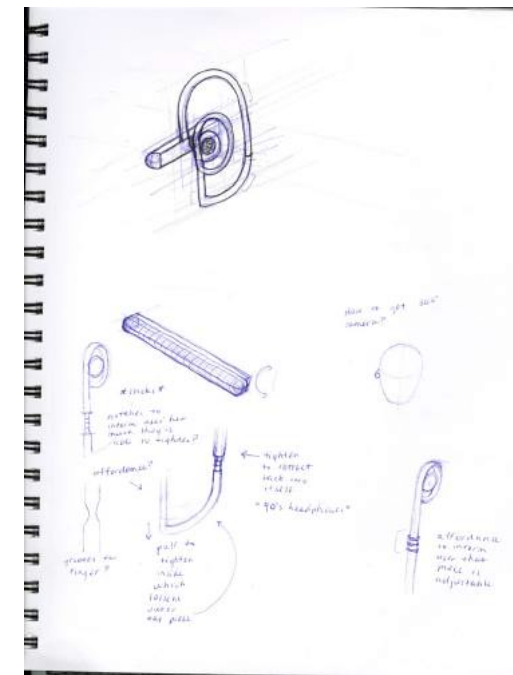
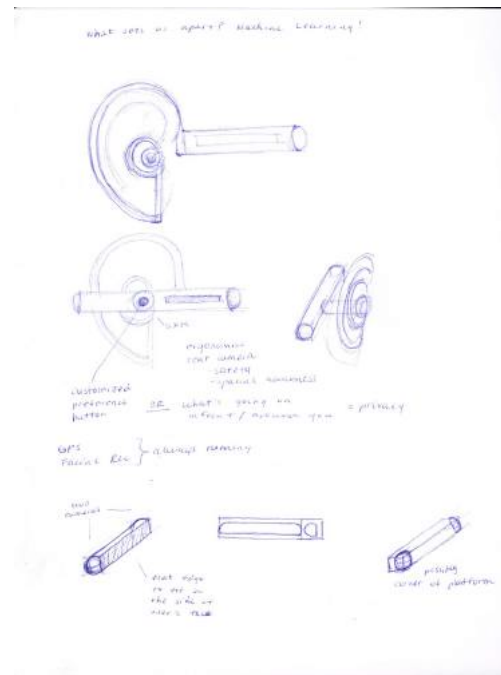
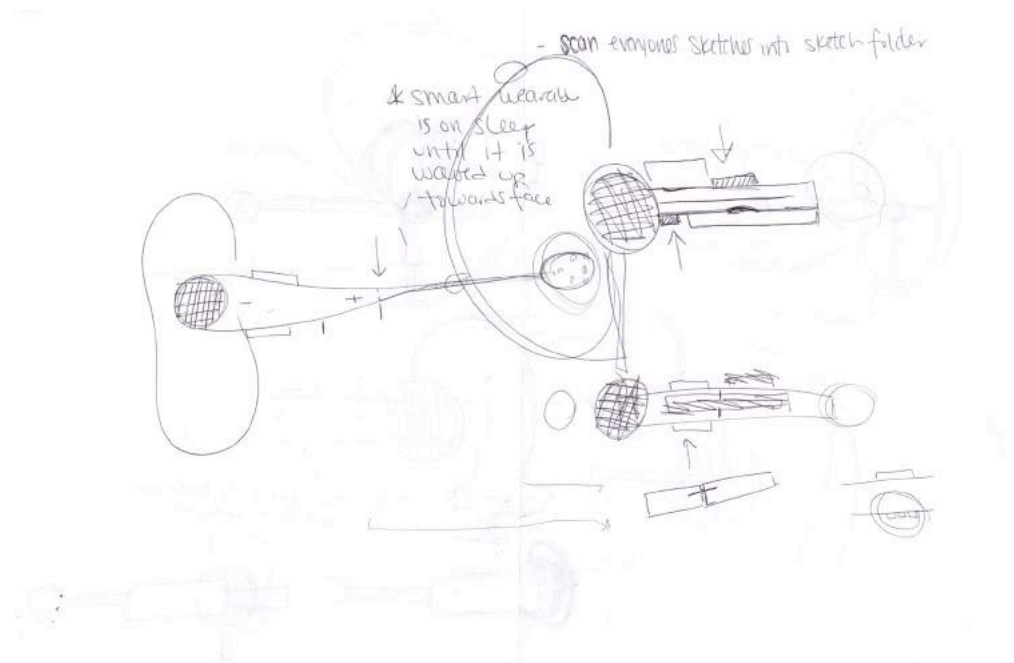
Wher...ken5

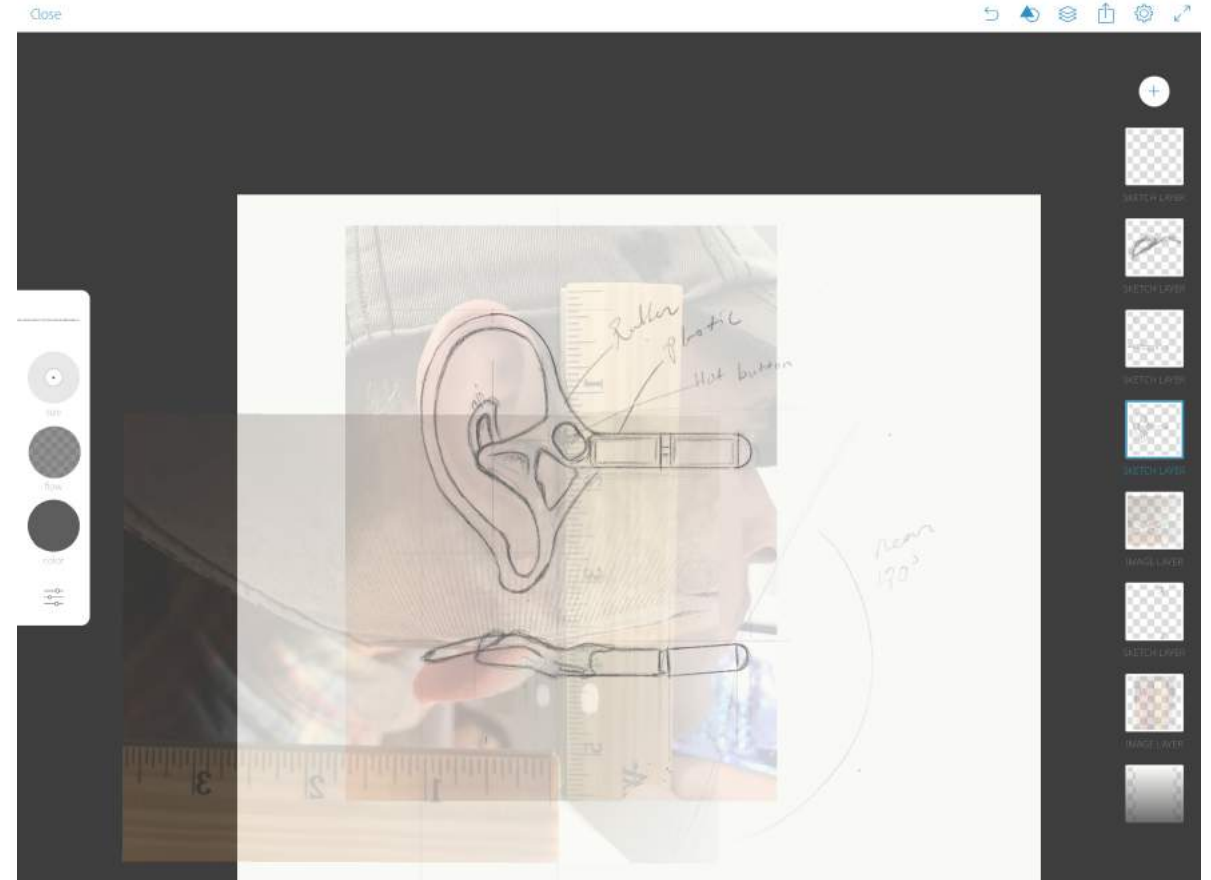
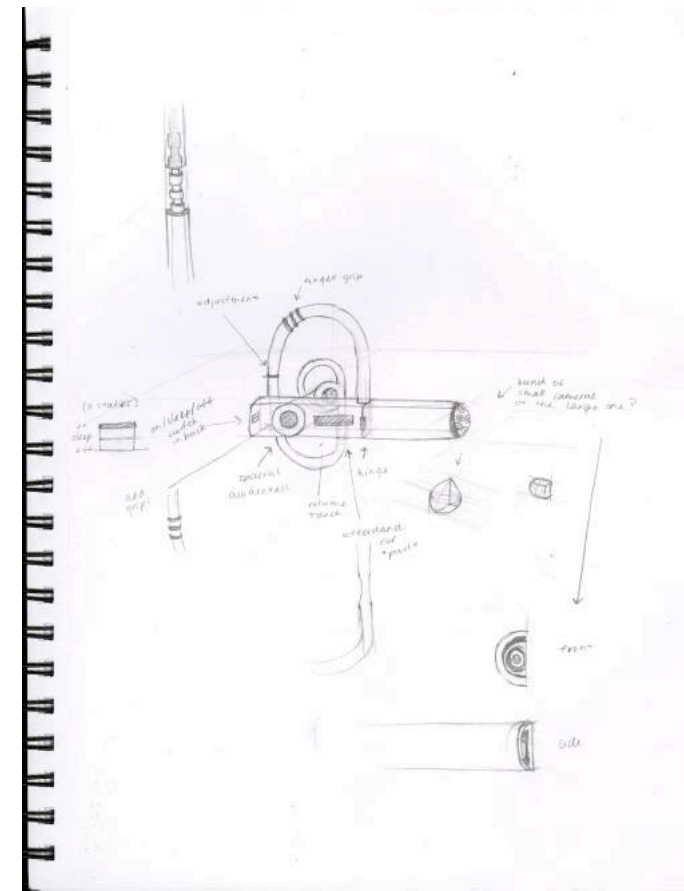
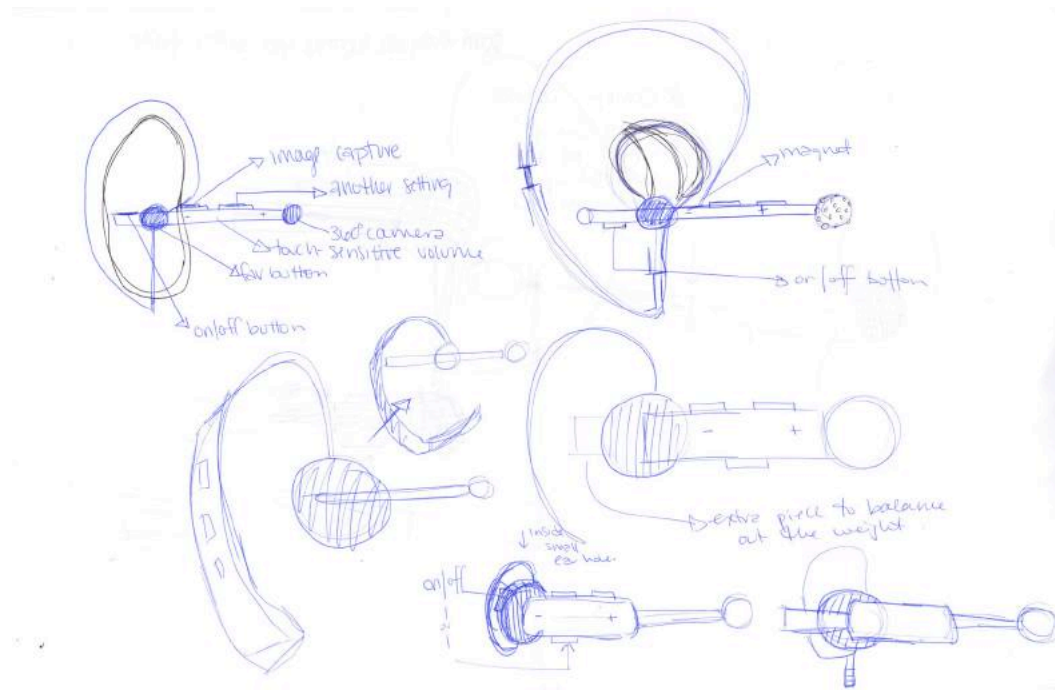
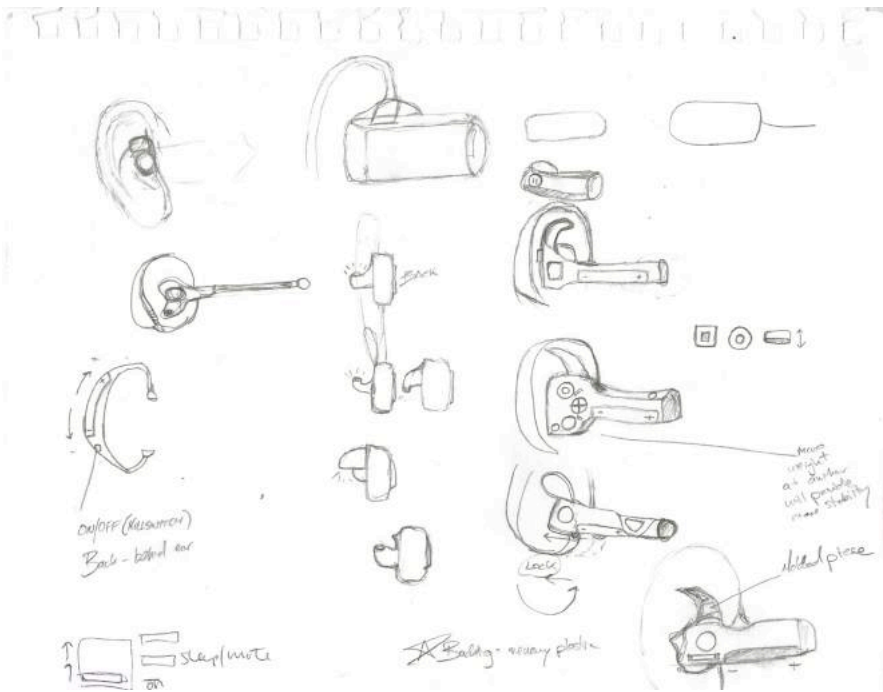


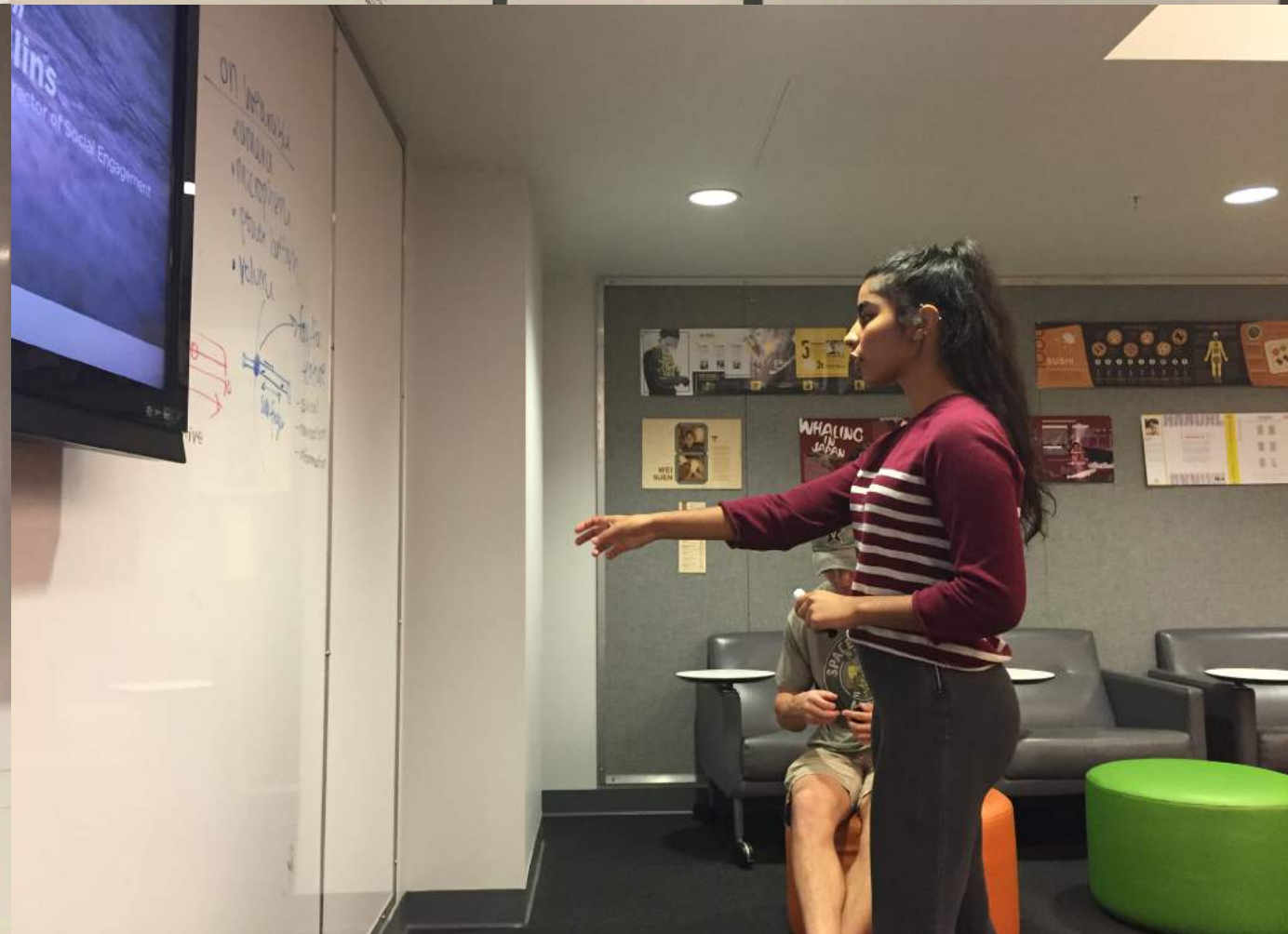
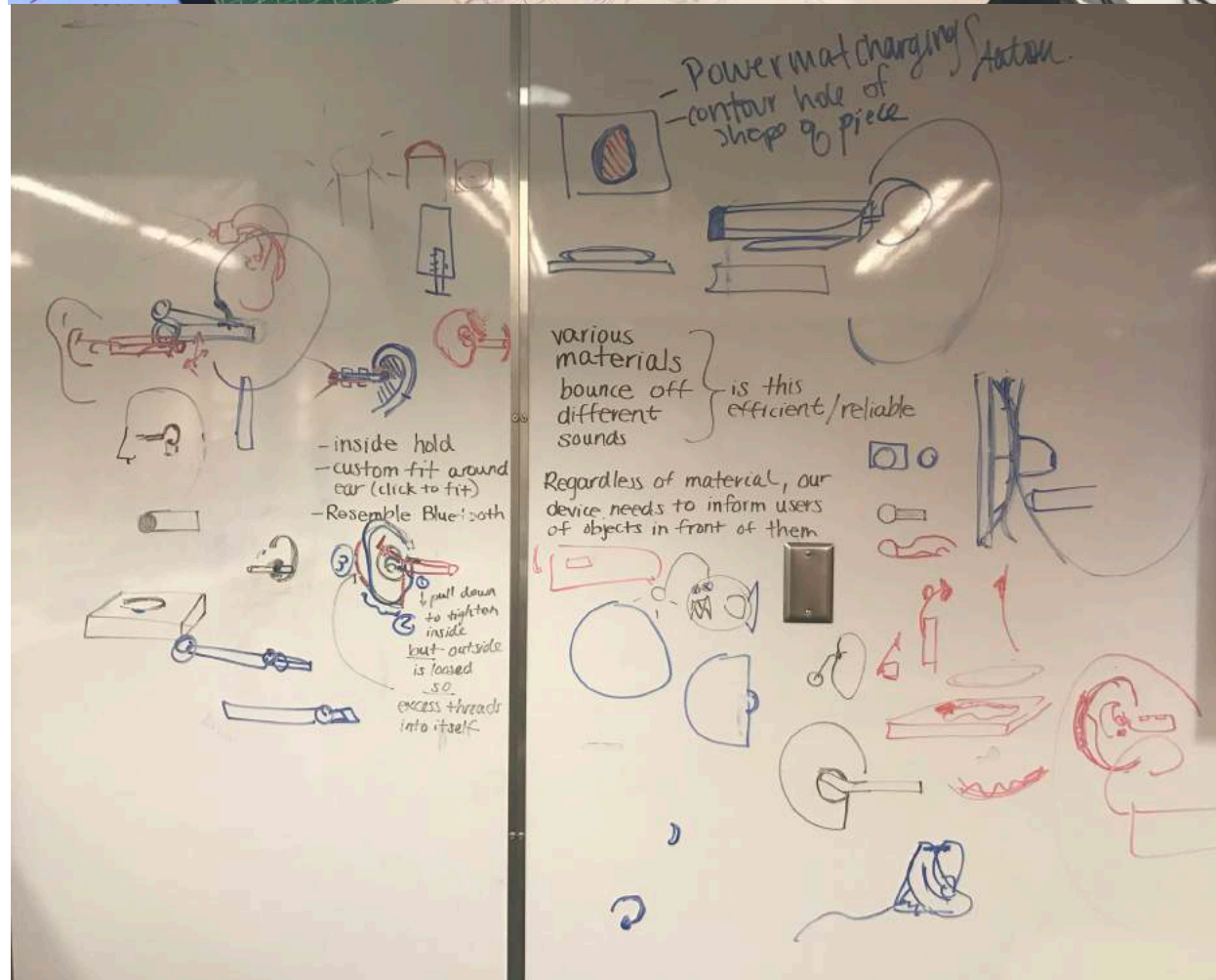
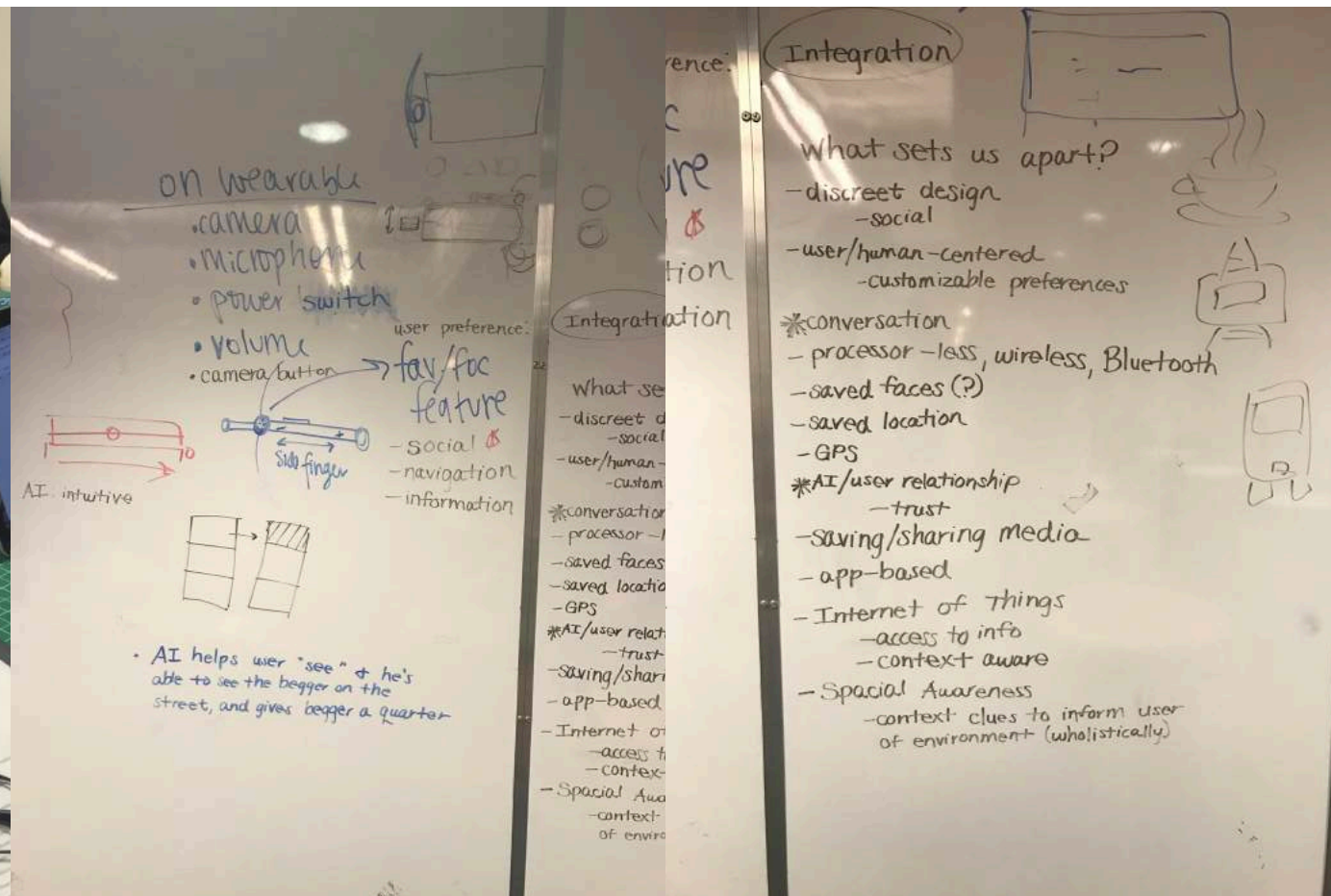
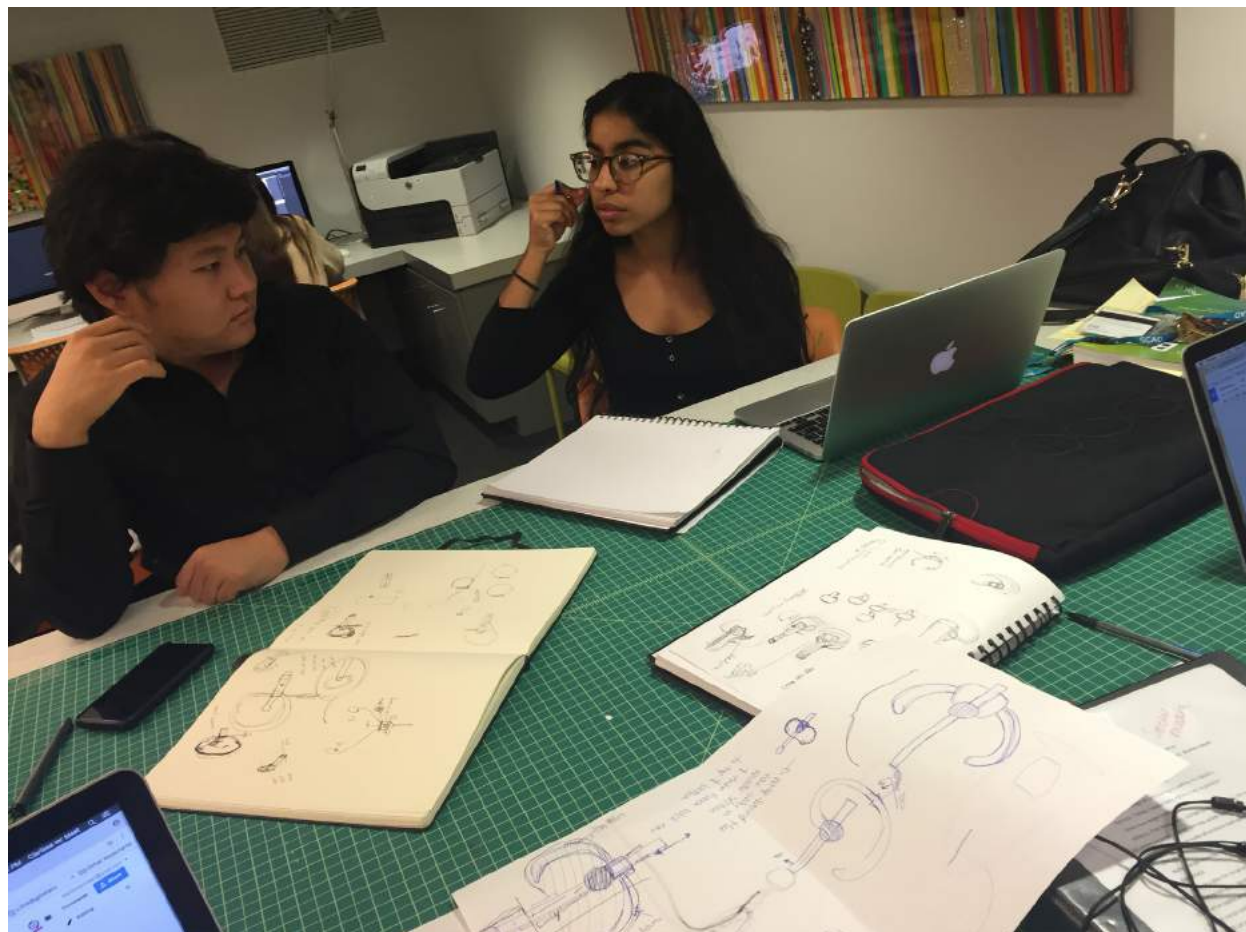
Wher...tion 2

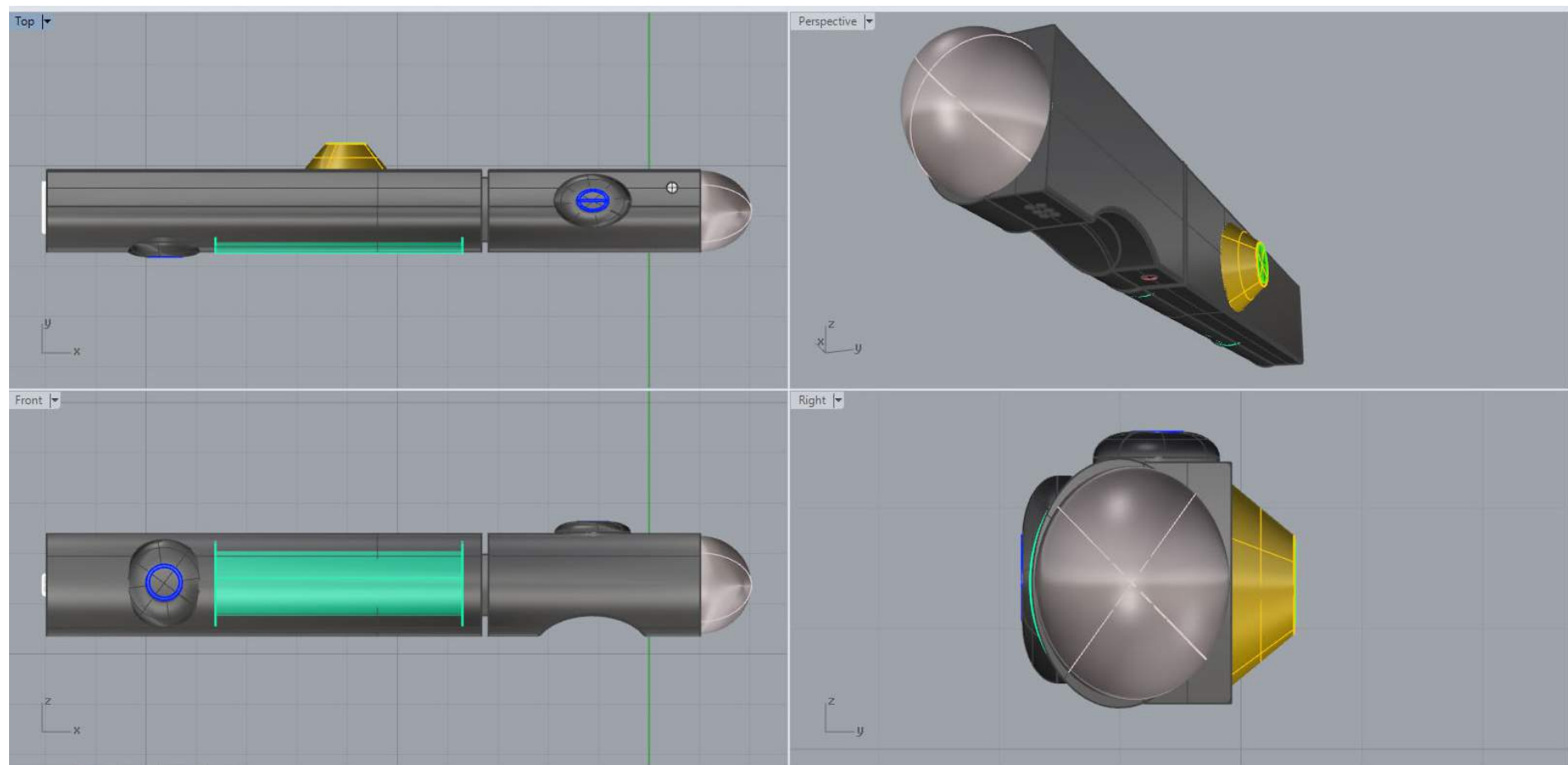
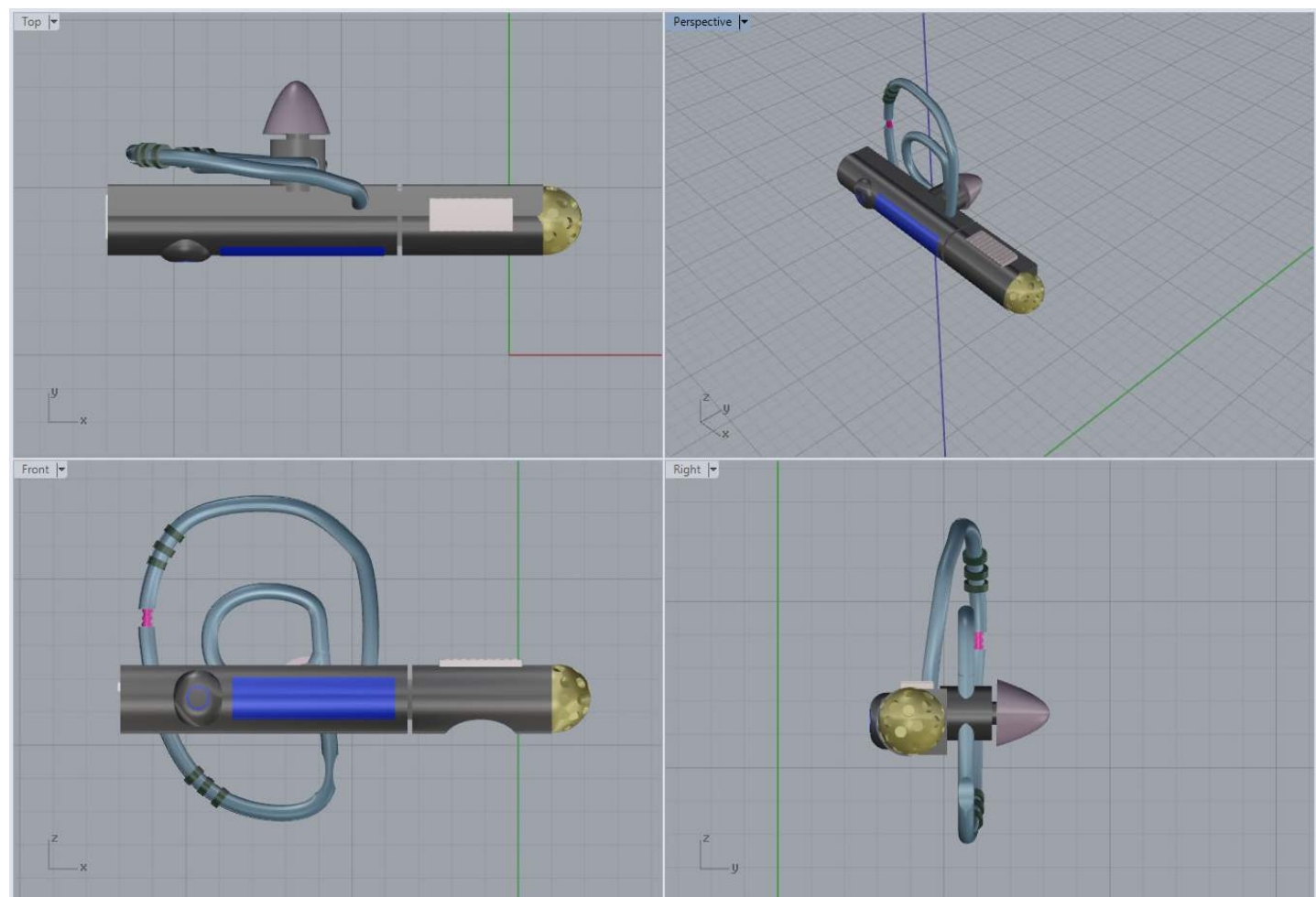
Wearable

We waited to come up with the design of the wearable device because we wanted to finalize all of our features and functionalities first. We did some research, sketched ideas, brainstormed and then put it into Rhino and Keyshot to finalize and make it all whole and pretty!



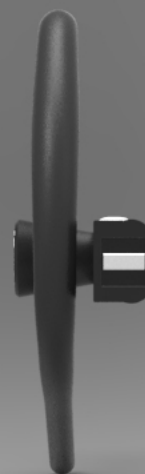












Mockups





Movie





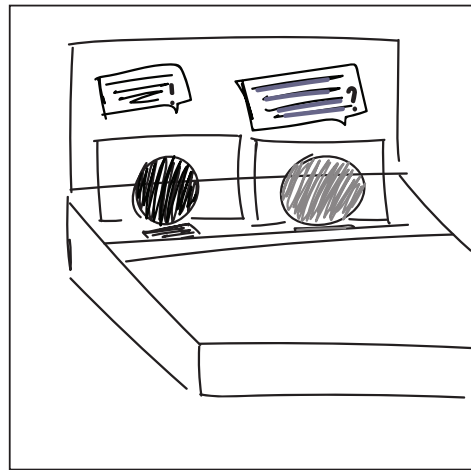
Our team created a model and 3D printed a mockup version of the headphone to use during the movie sketch



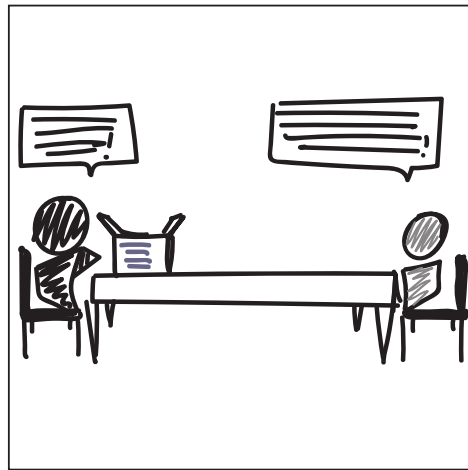


Storyboard

The storyboard for the movie went through multiple phases, from doing a separate storyboard for each persona to a general situation to show its features used by an average user to trying to grab the audience attention and emotion.



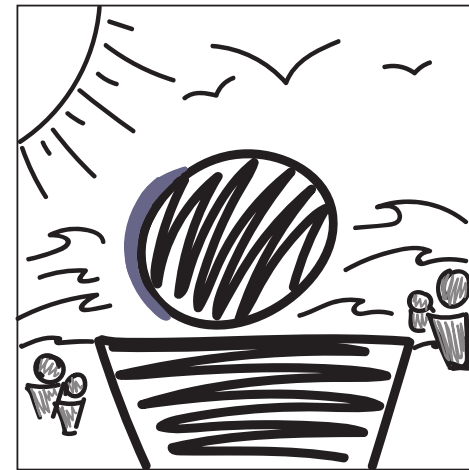
Maria's husband tells her about the new wearable technology.



Maria and her husband open, customize and start using the wearable!



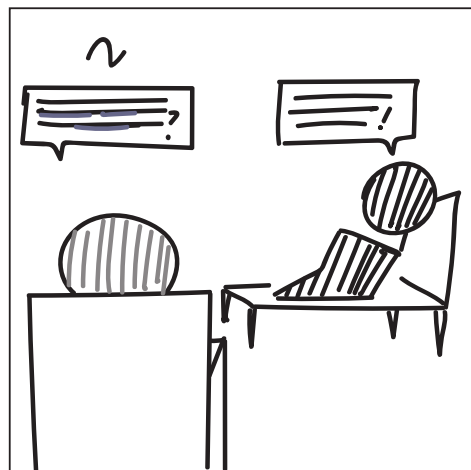
Maria shows the A.I. the inside and outside of her house so that it can start remembering things such as rooms and furniture, using the spacial awareness feature.



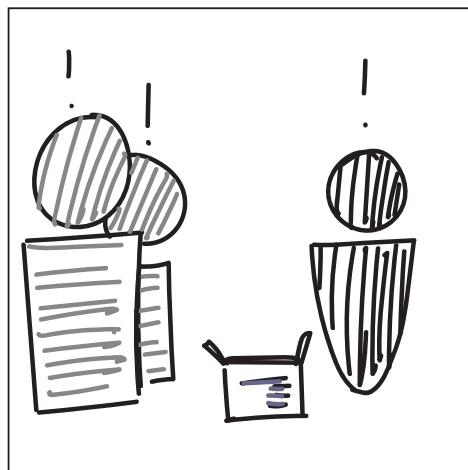
Maria goes to the beach because the A.I. suggested it after Maria asked about the wearable.
It's so beautiful that Maria asked the A.I. to send her husband a picture.



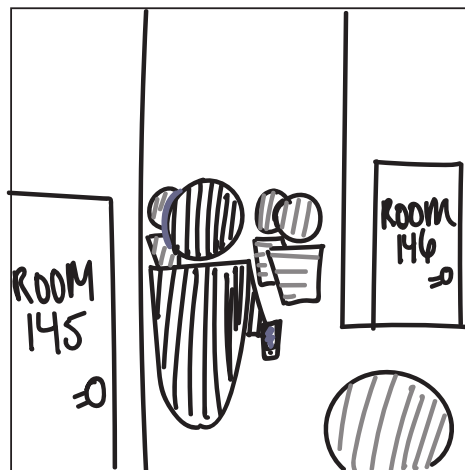
Maria is back to her old self with the intergration of the A.I. in her life.
Maria starts reading everyday and the A.I. is helping her write a book!



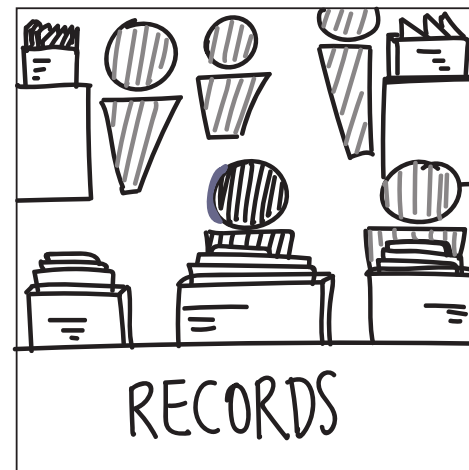
Marquis learns about wearable technology from his counselor.



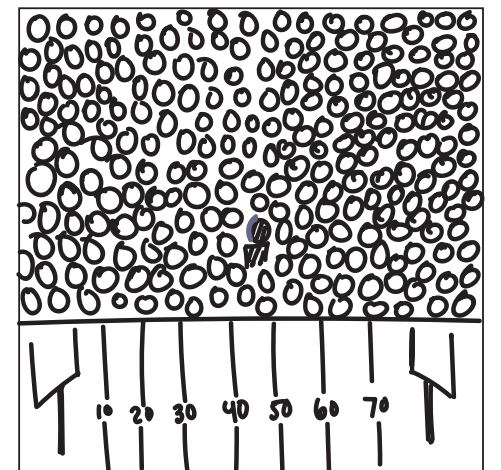
Marquis' family helps him purchase the wearable technology and they all start customizing the new technology!



Marquis starts showing the A.I. everyday places so it can start remembering.

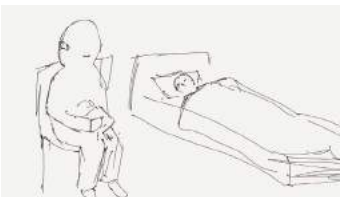
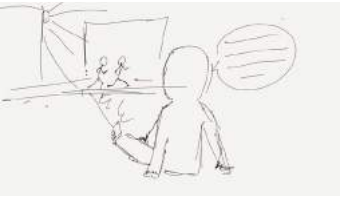
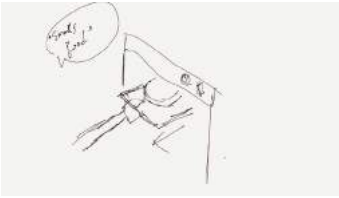
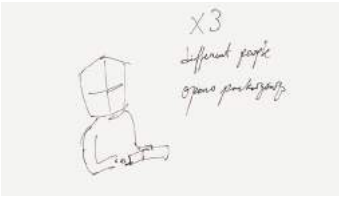
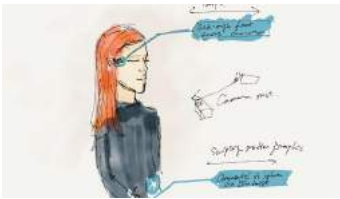


A.I. shows Marquis a cool record store to visit on their way home from school. The A.I. also helps his shop and pay.

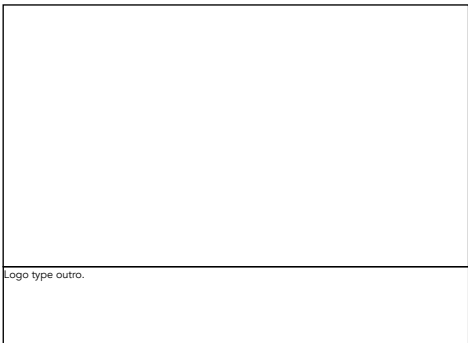
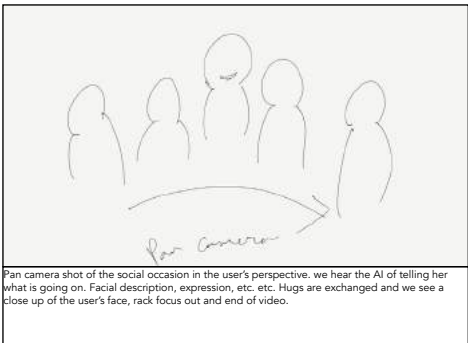
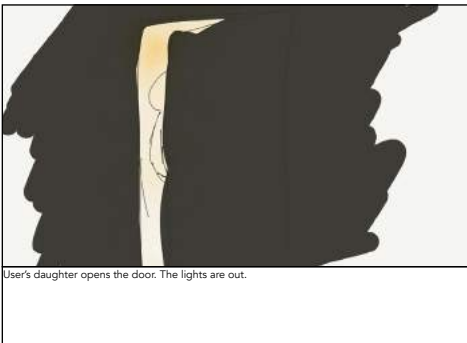
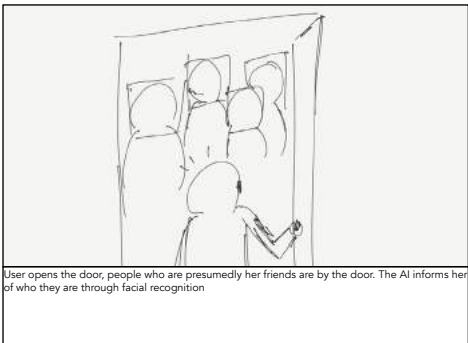
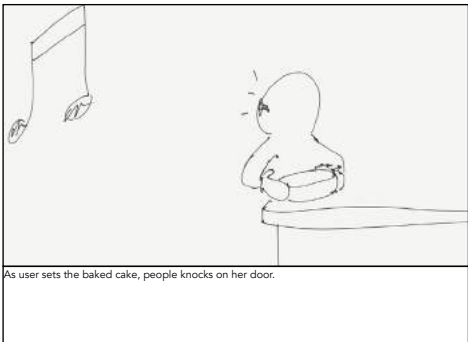
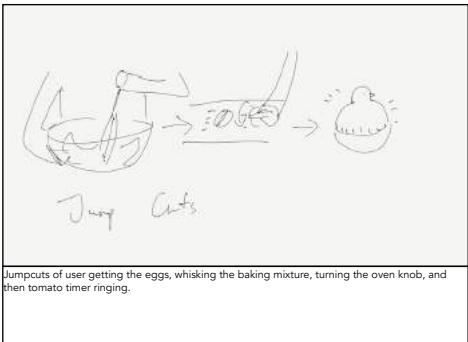
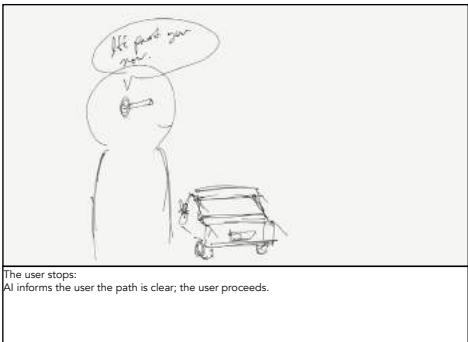
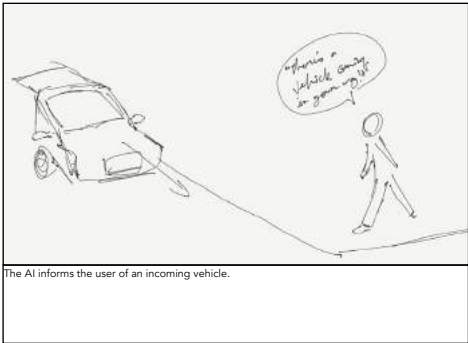
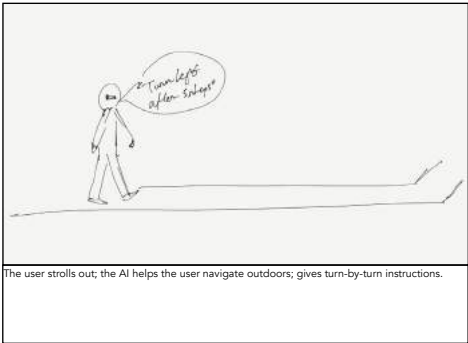
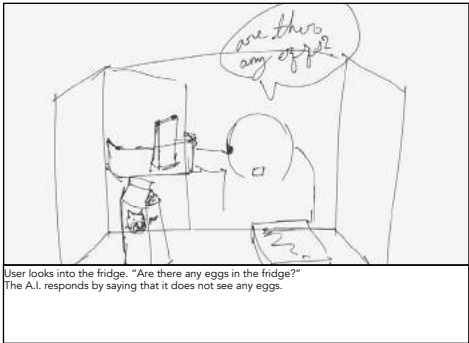
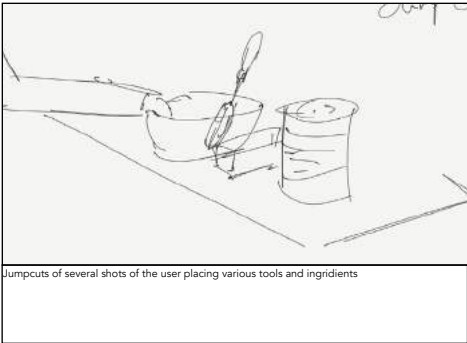
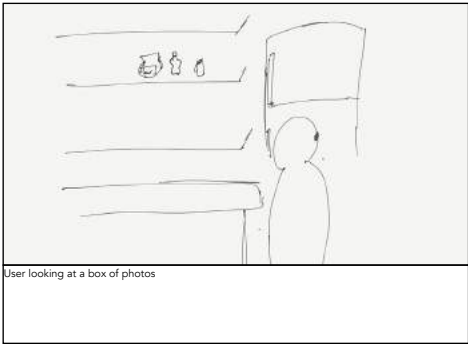
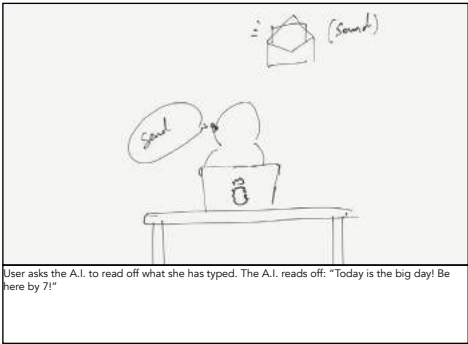
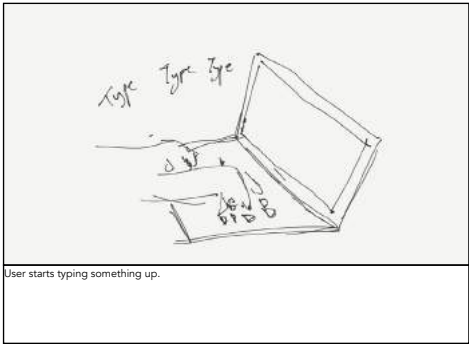
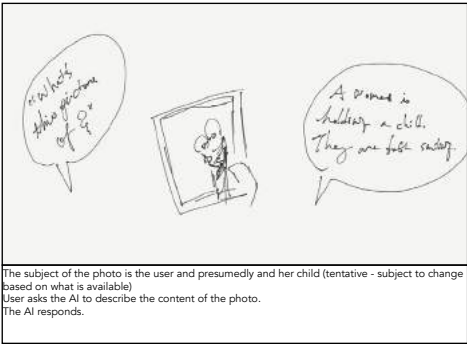
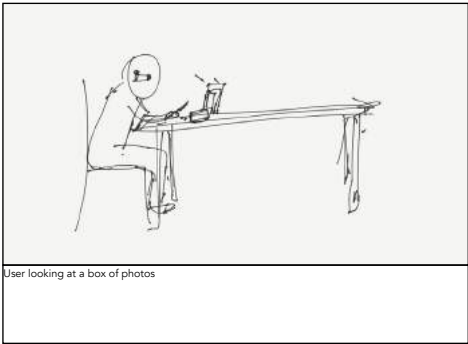


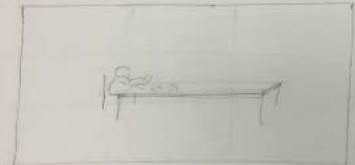
Marquis feels more comfortable doing normal teenage activities and social events since the A.I. is now intergrated in his life.

VIDEOSKETCH NARRATIVE

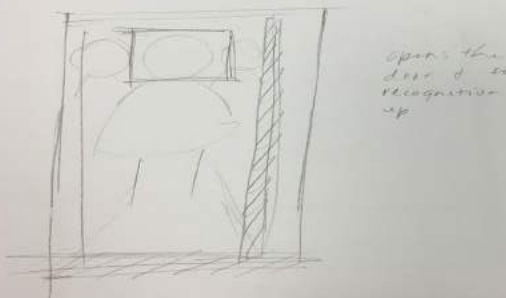
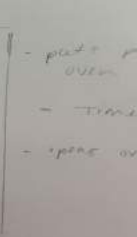
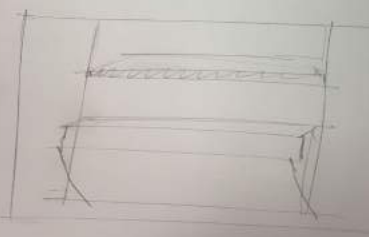
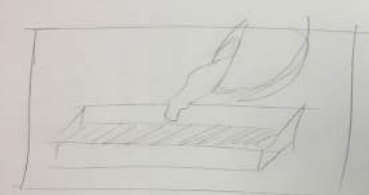
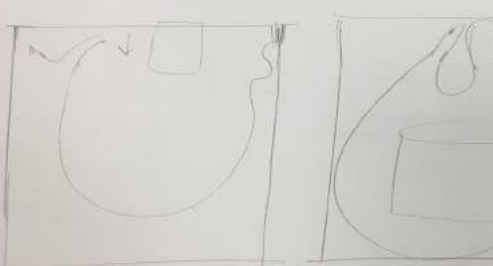
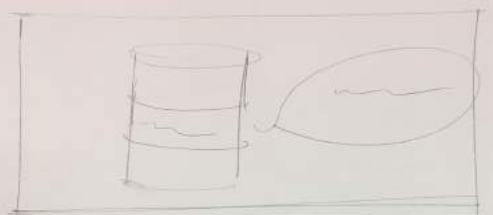
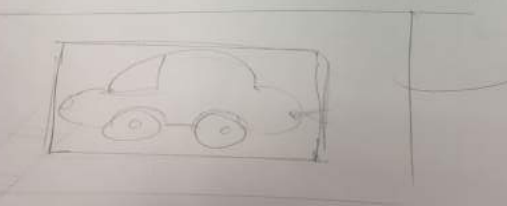
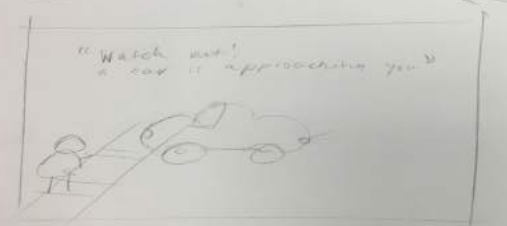
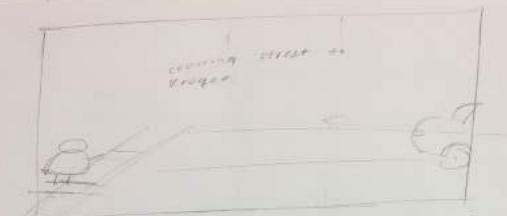
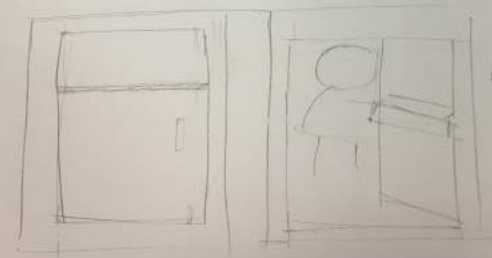
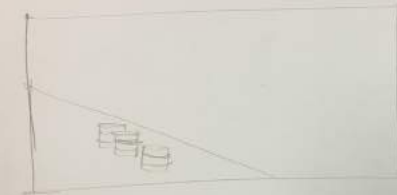
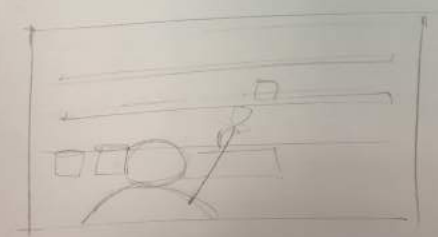
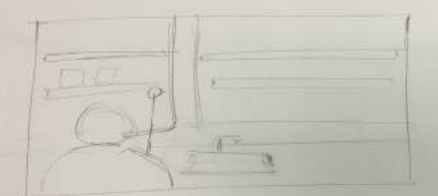
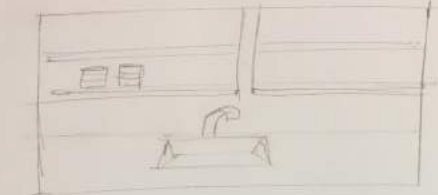
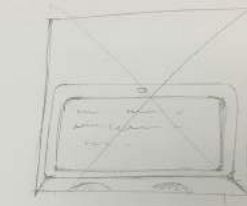
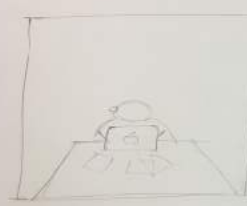


STORYBOARD

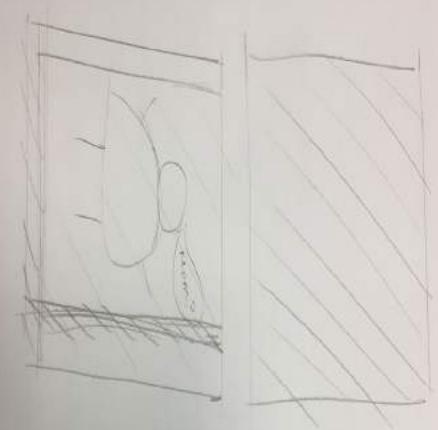




make the
bed and
place
the screen
on the
bed.



opens the
door & so
recognition
up



big screen is

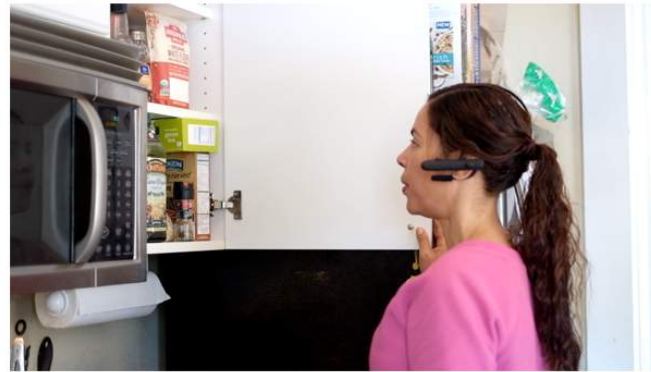
door opens open

cut 1



when I wake up
- probably a morning when I wake up
- probably a morning when I wake up

more of the same
- more of the same
- more of the same



Movie Takes

Synopsis

This narrative shows a user's journey throughout the day. The user puts on the wearable (it is implied that the user already has experience with the machine), steps outside, reaches her destination where she has brunch with her friend. Navigation and social interaction features are explored at this stage. The user then walks up North towards river st. As the user crosses a street, a car tries to speed through a red. The wearable informs the user of this so the user can stop in time. Once the user reaches river street, the user uses the documentation feature to record sounds of bustling crowd/gulls about. The user also takes a photo of the view and sends it to their friend. The user continues to venture about, accentuating the freedom the wearable grants the user to go and do things with significantly less constraints.

Shot list

User picks up wearable

User puts on the wearable.

Wearable: "Good Morning ____"

User: "Good Morning"

Pan of medium shot of the user, wearable visible and smartphone in one hand.

Motion graphic showing "Voice controlled A.I. Guide" and "Connected to iPhone via Bluetooth"

User Opens door of their home

Wearable: "The door is just a couple of steps in front of you"

User spreads hands to feel the door, reaches handle, and opens it.

User is walking out in the street

User: "I'm meeting ____ at Collin's Quarter today"

Wearable: "Okay. Would you like my help walking there"

User: "Yes, please"

AI informs the user when passing notable landmarks (Street signs, stop lights etc)

User arrives at Collins quarter, and the AI informs the user of their friend. The user calls for their name and waves first.

Sitting down, having a good time, the User subtly presses the awareness button, and the A.I. informs of her friend's body language and facial expression

The A.I. helps user read off the menu. The user makes their decision.

The user starts making their way to river st. When the user tries to cross, a car tries to run red light. The user is informed by the A.I., steps backwards, and confirms that the user is alright.

The user asks the AI what's going on, and AI gives the scene description.

User takes a photo of it and shares it with one of her friends via text

At river street, the user walks about for a little bit, listening in, feeling the breeze etc. Takes an audio snap of sounds of gulls, ships, or people.

User goes on to more adventure!

