DESIGN BOOK

SIRI DRIVE MODE

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DESIGN FOCUS & PROBLEM SPACE

When users are in the car, drivers are constantly listening to music, podcasts, radio and checking their emails. Performing these activities can be distracting and hard to accomplish for drivers. We feel that the use of gestures to control your email, media, etc. can not only create a less dangerous situation for a driver while also increasing the ease at which they perform their daily activities while driving. Our idea is to integrate gestures into the iOS platform (similar to Siri), so that users when driving can use a multitude of apps and control them using simply hand gestures. These gestures would replace the potentially distracting actions of having the change the radio channel, open up Spotify to play a certain song, fast forward through a playlist/album, etc. The gestures could also be used for messaging purposes to move through text message conversations without ever having to reach for your phone, and would have the ability for the driver to accept and decline calls with a quick swipe of the hand.

User Background

For this project, we decided to focus on the accessibility/user empowerment aspect of the instructions. Our users do not necessarily have a specific handicap or disability, but rather are driving a car which presents its own unique set of limitations and challenges that must be worked around. Since the majority of the population spend significant amounts of time in a car commuting, running errands, etc., our user base can potentially be a large percentage of the population. To help us generate ideas and refine and test our prototype, we consulted an actual user to understand the challenges they face every day while driving. Our user, who we will refer to as Justin, is a commuting Hopkins student. He often spends up to an hour driving between school and home on the weekends, and during the week uses his car to hang out with friends around Baltimore and go grocery shopping. During this time in the car, Justin interacts with his phone in various ways, from playing music and listening to podcasts to using Google Maps to help navigate during long trips. Though he rarely does so now, Justin mentioned an interest in being able to safely read through

and potentially filter emails and messages he may receive while in the car. After speaking with Justin, we developed a user persona to get a better understanding of his background and his interactions with his phone in the car.

Justin Lee

"I would love a piece of technology that I could use in the car to allow me to easily control a variety of apps while driving without requiring me to look away from the road or take my hands off the wheel for an extended period of time."

Age: 22
Work: College undergrad, soon will be working for Facebook as a Machine Learning Engineer
Family: Single
Income: $137,445
Location: Currently Baltimore, soon Mountain View, California
Education: Johns Hopkins (undergrad)

Personality

Introvert	Extrovert
Thinking	Feeling
Sensing	Intuition
Judging	Perceiving

Driven | Social | Intelligent

Goals

- Be able to change the radio stations, increase volume, move to next song while driving without have to look at phone or reach across dashboard
- Would like to be able to manage emails on commute to work and school without having to read the emails
- Would like to be able to answer and decline calls quickly and swiftly while driving
- Want to be able to fast forward and rewind on his podcasts while driving easily if he ever misses something that was said

Frustrations

- Currently has to take time to unlock his phone and then manually use one hand to change songs on Spotify
- Changing the radio to find a station he likes can be difficult and time consuming to do, especially in areas with high traffic that require his complete attention on the road
- If an email or a message needs to be responded to quickly, Justin will either wait until a red light to read and respond, or will just have to wait until he gets home to respond

Bio

Justin is a senior undergrad at Johns Hopkins University, and has accepted a position as a Machine Learning Engineer at Facebook for next spring. He currently commutes to school for an hour on weekdays, and is planning on also commuting for about the same time when he moves out to California in March. On the weekend, he uses his car to go grocery shopping, drive with friends to various places (hiking excursions, out to dinner, to the beach, etc.). Since he spends so much time in the car, he likes to use his phone in various ways while driving, including using Spotify to play music and podcasts, using Google Maps to navigate, and reading emails and messages (when it is safe). Though he would never text and drive, using his phone in all these ways does require extensive time with only one hand on the wheel and often has to take his eyes off the road periodically to look at his phone screen.

Car Facts

Make: Toyota

Model: Camry 2016

GPS: Uses Google Maps on iPhone

Commuting Time: 2 hrs/day

Applications Used: Spotify, Flipboard, GoogleMaps, Facebook Messenger

Brands & Technology

Breakdown of Applications Used While Driving

Music/Media

Email/Messaging

News

Navigation

PROBLEM UNDERSTANDING

Methods

By using contextual inquiry, we started our process observing and interviewing our subject as they drove. We chose to interview them as they drove because it would allow us to see how they actually behaved rather than how they believed they behaved. It would also allow us to observe breakdowns in the current process. Through the interviewing our objectives were to learn what activities the subject does while driving, and how they go about doing those activities. Once we answered our "what" questions, we needed to find out "why." This was achieved through collaborative brainstorming with the subject to see how they would react to changes in subject's workflow. Additionally, we wanted to see what activities the subject may want to do while driving that current implementations limit. Once we decided on the scope of the solution we were building, and which problems we would focus on, we built our wireframe and presented it to the subject. With their approval, we filmed our video prototype and showed it to the subject for one final round of feedback.

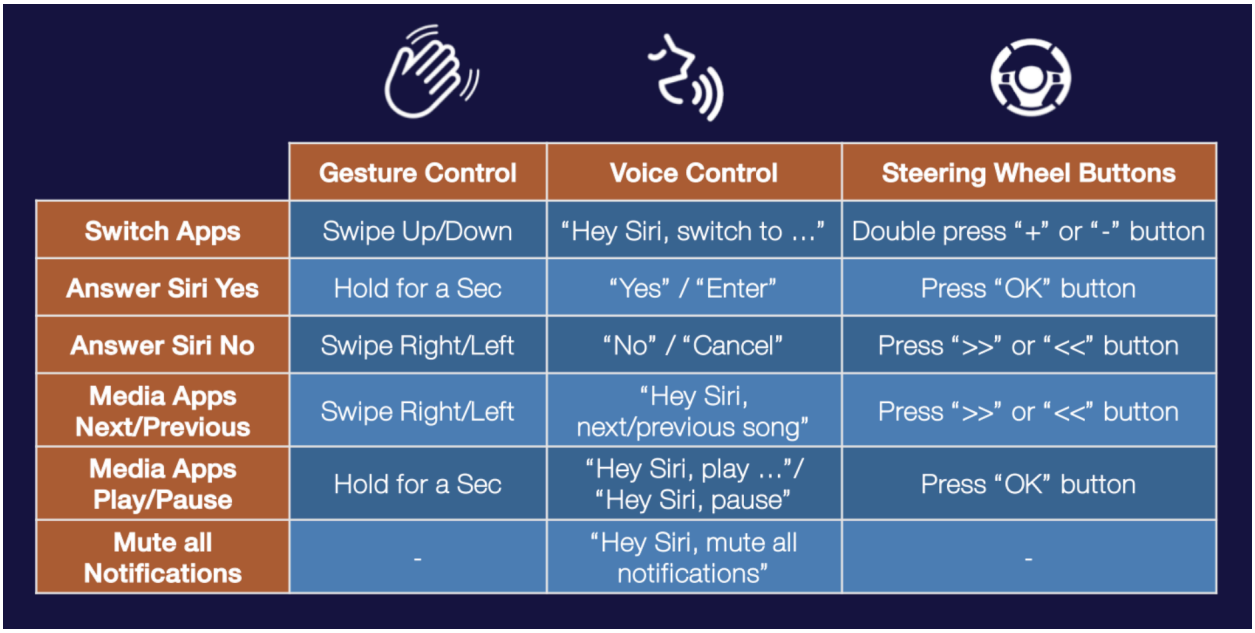
Findings

Our discussions with Justin were incredibly informative. By maintaining an open dialogue and taking the time to listen and understand his needs while driving, we were able to formulate a strong problem space surrounding the use of a phone while driving. We were able to pinpoint a few specific application areas of focus that Justin felt he utilized consistently. The first was media and music, which includes using the radio, listening to music on Spotify, and listening to podcasts using either Spotify or the Apple Podcast app. Not only would Justin use these apps, but would often like to use a consistent set of controls: altering the volume, fast-forwarding or rewinding a song or portion of a podcast, or changing the current song or playlist. Justin also mentioned a desire to be able to check incoming messages, stating, "…I would also get some email/Messenger/WeChat notifications when I am driving, but I will only check on them when I get to my destination or when I am waiting for a red light… Sometimes I've got some important messages or emails when I am driving, but I have to wait until I drive to my destination, then I can check them and reply". This quote highlighted an important finding for us: users consistently are trying to check their phone for messages and emails. If we could design a system that would allow this to take place while driving and also limiting any distractions, this would be incredibly beneficial to users such as Justin. Justin also did not like how currently any incoming phone calls would have to

be accepted or ignored by touching the screen, which takes his hands and eyes of the wheel and road, respectively. This finding reminded us of the importance of a gesture to ignore or accept phone calls. Justin also pointed out some frustrations with the current Siri system, which he occasionally will use. He noted that, “You can ask Siri to play music and do navigation for you, but Siri will open the Apple Music and the Apple Map by default. However, I don't use them, I use Spotify as my music player and Google Map as my navigation app." Furthermore, Justin said that a downside to using Siri while driving is often it still requires actually looking at and touching the screen to operate the applications once-opened.

IDEATION & PROTOTYPING

Operations Overview



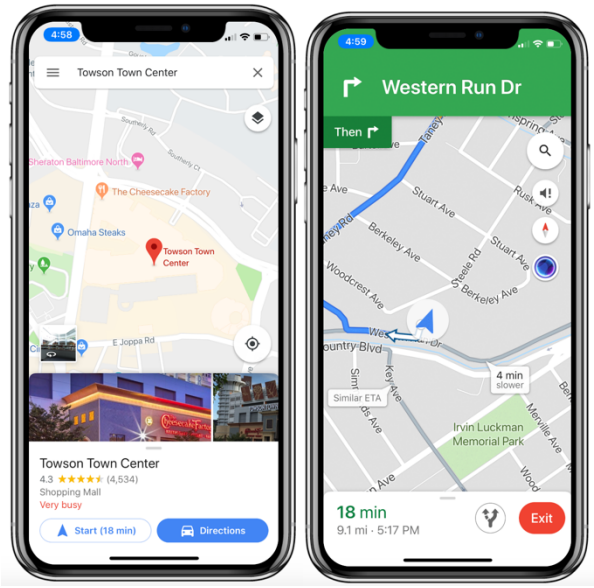
	Gesture Control	Voice Control	Steering Wheel Buttons
Switch Apps	Swipe Up/Down	"Hey Siri, switch to …"	Double press "+" or "-" button
Answer Siri Yes	Hold for a Sec	"Yes" / "Enter"	Press "OK" button
Answer Siri No	Swipe Right/Left	"No" / "Cancel"	Press ">>" or "<<" button
Media Apps Next/Previous	Swipe Right/Left	"Hey Siri, next/previous song"	Press ">>" or "<<" button
Media Apps Play/Pause	Hold for a Sec	"Hey Siri, play …"/ "Hey Siri, pause"	Press "OK" button
Mute all Notifications	-	"Hey Siri, mute all notifications"	-

Above is a concise overview of the operations of our Siri Drive system, which can be broken down into three main modes of operation: gesture control, voice control, steering wheel buttons. All three have the capability to perform the same actions, which is important to give the driver as much versatility and freedom as possible. As shown above, universal commands exist to perform actions such as playing/pausing and switching apps, regardless of the current application in use.

Interface

Though our design is minimalistic in the sense that it does not have the standardized interfaces the way a normal app would, the screens below help to provide an idea of what interacting with Siri Drive would look like for a user.

The first three screens demonstrate the process to enter Siri Drive mode. The first is the standardized home screen, the second is the current Siri interface that can be reached by holding the home button or simply by stating "Hey Siri". To enter drive mode, the user should state the simple command 'Hey Siri, enter drive mode". The fourth screen shows the orb that indicates that the phone is in Drive Mode. Once the command to enter Drive Mode is given, this is the screen that will appear. A black background with gentle blues and purples were selected to ensure that the driver could know that the phone was still in drive mode without feeling distracted or drawn to the screen while driving.



These two screens above show what a user may see on their phone when using Google Maps to navigate. Note the small orb on the second screen to indicate that Siri Drive is still being used. Though this is the only noticeable difference on the interface, it signifies to the driver that the phone is ready to capture any hand gestures made if the user needs to hear directions again, exit the navigation, etc.

The first screen here shows where in settings the user can alter the current state of Siri Drive. It is found with other settings for the phone. After clicking Siri Drive on the Settings screen, you will be brought to the Siri Drive interface, which is sectioned into three types of applications: media,

messaging, and navigation. Clicking on the '+' icon will bring the user to a new screen where they can add applications into Siri Drive.

If the user clicks on the plus icon for media apps, they will be brought to the screen on the left. Here the user can toggle which apps they want to be added, which are again sectioned off for simplicity under Music, Podcasts, and News. After the user has toggled the desired applications, clicking the back icon in the upper left-hand corner will return the user to the Siri Drive interface. It is clear that the toggled apps have now been added to be used during Siri Drive mode.

If the user clicks on the plus icon for messaging apps, they will be brought to the screen on the left. Here the user can toggle which apps they want to be added, which are again sectioned off for simplicity under Messaging or Email. After the user has toggled the desired applications, clicking the back icon in the upper left-hand corner will return the user to the Siri Drive interface. It is clear that the toggled apps have now been added to be used during Siri Drive mode.

Lastly, if the user clicks on the plus icon for navigation apps, they will be brought to the screen on the left. Here the user can toggle which apps they want to be added. This guarantees that if the user wants to use Google Maps or some other application for navigation other than Apple Maps, they have the option to. This was a built-in factor after consulting with our user and the frustration with the inability to choose which navigation app to use with the current Siri platform. After the user has toggled the desired applications, clicking the back icon in the upper left-hand corner will return the user to the Siri Drive interface. It is clear that the toggled apps have now been added to be used during Siri Drive mode.

TESTING & EVALUATION

To test our interface/prototype, we brought it to our participatory design user and also showed him our video prototype (https://youtu.be/qUU5xABT7Aw). Overall, Justin really enjoyed the design and thought the interface over all was pretty easy to use. Justin again reiterated his interest in the idea, and thought that that Siri Drive mode provides an easy and safe way for users to switch between and interact with apps while driving. Justin pointed out though that there might need to be a command to mute notifications, which can be frustrating and distracting (therefore dangerous) to drivers. Currently, we have Siri Drive as a setting in the phone, and its access to apps is restricted to those selected by the user. Justin suggested potentially changes this, giving Siri Drive global access permission, and then within each respective app settings decide whether it should be accessed by Siri Drive. This is definitely something to consider, however; either way it will not impact the main design and functionality of the system.

REFLECTION

How is participatory design different from common HCD? Are you able to gain insights that are otherwise not possible with participatory design?

Throughout this project, we were able to gain some very unique insight into working with a user designer and the participatory design process as a whole. Participatory design differs in a few ways from common human-centered design (HCD). The first, most notably, is that the user is actively engaged to help build the product, offering input and suggestions throughout the project lifecycle rather than just testing an idea/prototype. Since the user is intertwined in every aspect of the design, the need for a fixed number of milestones and iterations. Normally, with HCD there are structured design and developing iterations, after each a prototype is tested with a user. However, with the user being an active member of the design team, changes and suggestions can be implemented fluidly into the current design. This structure lends itself to the Agile Software Development Lifecycle[1], where designers and developers make frequent, incremental changes to their design, allowing for more flexibility in development and the ability to pivot quickly based on the users changing needs. Each feature we designed will be modified several times before it being integrated into the system.

[1] For more on the Agile Software Development Lifecycle, see https://en.wikipedia.org/wiki/Agile_software_development

Secondly, we noticed that participatory design forced us to become more detail-oriented. By generating ideas directly with a user, we had to focus not only vague concepts but also on small details that would allow them to be successfully implemented. Every time we proposed an idea, we were met with "Why?", "What if?", and "How?" questions from the user, who was looking to get a thorough understanding of our idea. In doing so, we had to really flesh out our idea from top to bottom, and be able to explain it clearly and efficiently to the user to ensure its purpose. In doing so, it allowed us to consider all aspects of the problem space and think of ways to create a design that we not only thought was beneficial, but a real user did as well. Finally, a major difference we noticed between participatory design and HCD is the satisfaction rate of the user. Since we included the user in all steps of the design process, when we presented him with the final prototype, he was very satisfied since he had been giving suggestions about our implementation the entire project lifecycle. This is markedly different from common HCD since you run the risk of misunderstanding the participants initial desires and creating an interface that is not intuitive or beneficial to the user. This can be extremely time-consuming, especially if users have a negative opinion of a high-fidelity prototype that took a while to make. With participatory design however, we were able to present a hi-fi, complex interface wireframe to our user and receive high praise with minimal criticism since the user helped contribute to the design. Often, the criticism is only related to desirable elements rather than flaws with required elements. One thing to note is that participatory design in this case may have led to a design that only suites one user rather than the larger population since they were the only person we consulted with. This could be combated by receiving feedback from multiple users after the prototype is complete.

APPENDIX

Interview notes

Q: What apps do you use when you are driving?

A: "When I am driving, I usually use the Navigation app, the Music app and the Podcast. I would also get some email/Messenger/WeChat notifications when I am driving, but I will only check on them when I get to my destination or when I am waiting for a red light."

Q: Would you reply those incoming messages?

"Sometimes I've got some important messages or emails when I am driving, but I have to wait until I drive to my destination, then I can check them and reply"

Q: What's your feeling when you are using those apps when driving?

A: "Different apps use different buttons to achieve the same effect. And it is hard to switch different apps when I am driving. It would be nice if we could have a unified interaction style for operating different apps"

Q: Do you know Siri can do a lot of things for you when you are driving?

A: "I know I could use Siri to help me when I am driving, but I still would go to the dashboard to operate apps"

Q: What do you know about Siri for driving?

A: "I can ask Siri to play music and do navigation for me, but Siri will open the Apple Music and the Apple Map by default. However, I don't use them, I use Spotify as my music player and Google Map as my navigation app."

Q: Do you know Siri can also read emails & messages for you?

A: "I know Siri can read emails and messages, but the things is you need to ask Siri to do it. So I would rather just check by myself."

Q: Are there any other things you want to tell us? Like something you feel frustrated when driving with using apps?

A: "Sometimes it's very distracted when I'm using navigation and suddenly comes a phone call. Also, I need to manually switch to the navigation app if I accept to answer that phone call."

Video Scenario Scripts

Video Link:
https://drive.google.com/file/d/17gp8sBbvDjGjeqUyAAzHotHLoZdKdlrE/view?usp=sharing

Scenario 1: Siri Drive runs different media apps for you when you are driving

User: Hey, Siri, Enter Drive Mode

Siri: Drive Mode Entered

User: Hey, Siri, Play Summer 2018 Playlist

Siri: Now playing Happier from Ed Sheeran.

[...Playing music from Apple Music...]

[...User's hand swipe right...]

Siri: Playing next song: Little Things from One Direction.

User: Hey, Siri, play previous song.

Siri: Playing previous song: Happier from Ed Sheeran.

[...User's hand swipe up...]

Siri: Switching to Flipboard. News title: What Tesla did for luxury cars, Rivian wants to do for pickups. Would you like to listen the details?

User: No.

Siri: Next news title: GameStop's Cyber Monday 2018 deals on PS4 and Xbox One consoles and games. Would you like to listen the details?

[...User doesn't response...]

Siri: Next news title: The 40 best Cyber Monday deals you need to know about. Would you like to listen the details?

Users: Yes

[...Siri starts to read the news content...]

User: Hey, Siri, Switching to Podcast

Siri: Now running Podcast. Playing "Are you ready to make friends" from Conan O'Brien.

[...Siri starts to play Podcast from Conan O'Brien...]

Scenario 2: Siri Drive reads notifications & messages for you

[...User open Google Maps to start driving navigation...]

[...Siri runs in the background, shows a beautiful motion animation in a circle...]

Siri: Head west to the Western Run Drive toward Baywood Ave, Drive Mode Entered

User: Play Summer 2018 Playlist

Siri: Now playing Happier from Ed Sheeran.

[...Siri play music...]

[...You've got an email...]

Siri: You've got an email from Johns Hopkins University Career Center with title "Medimmune on campus, Credit intersession career courses, internships and more." Would you like to listen the details?

User: No thanks

[...Playing music from Apple Music...]

[…You've got a Messenger message...]

Siri: You've got a Messenger message from Minjian saying "Hi, Eyan, How's the project presentation slides going?". Would you want to reply?

[...User hold his hand for a second...]

Siri: Please say your replying message.

User: Hi, MJ, I just complete the presentation slides, I'm driving now. I will upload the slides to our google drive soon.

Siri: Message sent.

[...Playing music from Apple Music...]

Siri: You've got a phone call from Eyan Goldman. Would you like to answer it?

User: Yes

[...Start the phone conversation...]

[...Conversation ends, then continue to play music from Apple Music...]