FINDING

Exploratory Research

20 ft

to your **right**

Introduction

Introduced in 2019, Apple's U1 chip revolutionalizes the way we interact with our devices, and how our devices interact with each other. The unique ability of the U1 chip uses positioning technology called Ultra-Wideband (UWB) radio that allows devices to be aware of their exact proximity to one another.

Though this sounds similar to connecting through Bluetooth or WiFi, UWB requires no service or pre-existing connection. Spatial awareness is the main component of the design. This rids of levels of abstraction and helps devices to determine the precise location of another U1 equipped device.

While working to design a Capstone project utilizing this technology, our main focus is developing an application that would not be able to exist without the U1 chip, or provides progressive enhancement.

When designing something compatible with this chip, it is important to be mindful of distance, compatibility, embracing the physical action, and keeping the task themselves simple.

We dug into Apple resources geared toward designing compatible software with the U1 chip, as well as looking into other existing applications.

Apple: U1 In Action

AirTag is a prominent example using the U1 chip. When looking for an object attached to an AirTag, the user's phone screen displays a large arrow with either a red or green background depending on the direction and distance. The arrow shifts as the user moves, specifically pinpointing the AirTagged device. As you get closer, the phone begins to vibrate.

The HomePod also has a specific action tied to the U1 chip. As an iPhone plays music, moving it towards the HomePod through different boundaries indicates a certain response. Once the iPhone approaches a certain distance, the HomePod lights up, and a banner appears to pair the iPhone. When you get even closer, the song transfers from the iPhone to the HomePod.

Last year, Apple released to developers the "Nearby Interaction" feature to use with iOS 14. Applications are able to stream the exact distance and location of other U1 compatible devices. The implementations ranged from creating virtual water balloon fights, to rideshare apps sharing the location of the driver in real-time, to playing virtual paddle ball.

These examples highlight some of the most important features of designing for spatial awareness using the U1 chip: visual, haptic, and audio cues partnered with a simplistic design and physical action. Continuous feedback from the device to the user provides a streamlined and continually adapting experience.

Brainstorming

Our team had several ideas ranging from U1 assistance in the customer service industry, to creating a game similar to Geocaching at local community events, to envisioning an interactive music festival experience tracked by U1. We ran into similar issues for each of them, typically dealing with the scale of the idea, the availability to solve the problem using another technology, or compatibility and implementation issues between devices.

Find My offers a similar service to those made available by the U1 chip, enabling users to find their friends, family members, and other devices through their location and connection. Apple Pay allows users to track their purchases and involvement with local businesses without the need for U1 technology. The future holds a lot of promise for the adoption of UWB technology as it becomes more widely available and consumers upgrade their personal tech.

Our Idea

After looking into software like Google's MapIndoors and troubleshooting event navigation ideas, we settled on working to develop a software that allows you to navigate large indoor event spaces.

This idea is founded in the idea of progressive enhancement, which seeks to improve a pre-existing technology for those with access to newer features, like the U1 chip. Our idea of having a convention navigating app works to better the experience of convention or conference culture.

By improving upon existing apps held by these gatherings, we implement the technology of U1 chips by helping with navigation and connectivity. We use the greater, more precision navigation by having each tagged panel room or vendor stall within the conference hall. This way, people can see both the exact direction and distance to their desired location.

Additionally, we engage the more social aspect of ultra-wide band technology by encouraging those with the software to meet up with one another. We know that this kind of connection can be fostered based on the use of AirDrop and locating people in the same proximity. When by another person with the same software, a badge or marking on the app will appear. This will hopefully foster greater meetups and encourage more social interactions. Though we are still working out the kinks,