

## **Positional Tracking Standard for Augmented Reality Proposal**

### **Background on the current landscape:**

The advent of Augmented Reality (AR) is here. We see Microsoft already shipping development versions of HoloLens, Apple announcing its efforts in researching AR, and Magic Leap is pulling in hundreds of millions of dollars of outside investment without even hinting at their eventual product. Augmented Reality has a very simple goal, allow software to act like physical objects. A CAD user can see their creation sitting on a table while they're working on it. A football fan can watch a game from a TV projected onto a wall and make it as large as they'd like. A gamer can shoot aliens that appear to be coming out of the walls. This new paradigm allows for experiences with software never before possible. We are looking to use HoloLens to push this new paradigm forward.

### **The problem we would like to fix:**

These AR experiences create "physical" objects out of pure software, and so far they've proven to do that well. However, it struggles when you want to use this paradigm to interact with other hardware like a wireless speaker. We can easily talk to that speaker on the network layer using IP standards, but telling an AR device where that speaker is in physical space does not have a defined solution. We call this problem 'positional blindness'

The ability to connect to that speaker and determine where it is in physical space allows for new types of interactions, and shortens the ones we already use every day. Traditionally to determine what is playing on that speaker you would need to get your phone, unlock it, and find the app that's playing music. If you want to interact with the speaker itself to see how much battery it has left you need to go to a different app, or handle the speaker yourself. If we know where that device is in the physical world, we can just look at it and all of the information we're looking for is floating above or around it, along with controls to play and pause.

A wireless speaker is only one example where knowledge of an internet connected device's location would add value. If a smoke detector is low on battery it can present itself to you rather than beeping incessantly. A robotic vacuum can show you how much longer it will be cleaning. A door lock can show you who has been entering and leaving your home and at what times. An internet router can show you if the network is healthy, and what devices are connected. Allowing devices to present information to you in such an intuitive way is invaluable, especially as more devices, many without displays, are connected in the home.

Creating a standard for this type of positional tracking would allow us to intuitively interact with the ever growing number of devices around us. Other solutions to this include using a phone and a list of apps and options to control specific devices which quickly gets overwhelming. Another option is voice control which requires you to remember the name and commands for every device in your home. Creating a positional tracking standard for hardware devices allows us to present only the information you want rather than requiring you to memorize every device in your home.

**How we plan on fixing it:**

We plan on creating a three part solution to the problem of positional blindness.

First, we need to design a standard that will allow an augmented reality device like HoloLens to track physical objects. This standard will be one part software and one part hardware.

Second, we need to create a piece of hardware that we can track in 3D space using HoloLens. This device will need to be able to display a unique identifier that both tells the HoloLens which object it is associated with and where that object is in 3D space. For example, a wireless speaker is sitting on the table and on top of it will sit this device that can tell the HoloLens all of this information.

The last piece of this solution is an application on HoloLens that can see this unique identifier and communicate with the device we want to control. Again, for the wireless speaker, we can talk to the speaker directly using IP, then the hardware identifier that we build will show the HoloLens where that speaker is in physical space.