Smart Reality

Project

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Introduction

In the project, we demonstrate proof of concept for replacing daily physical actions with actions that are done via gestures in augmented reality.

The demo was done on LIFX - smart lamp and Spotify - music player.

With the help of these capabilities, children, people with disabilities, and adults can easily perform activities that in the past required physical effort.

The next step will be to connect the furthermore smart devices in our physical world so that we can control them through the virtual world.

Application Overview

We developed an application that runs on Microsoft Hololens.

For demonstrating the idea of control real devices from the app we connected two smart devices to it (using their APIs):

LIFX smart lamp and Spotify music player.

The system consists of 3 main modules:

1. **Object Recognition**

   Each supported smart device is represented by a unique QR Code.
   We used Vuforia SDK to detect and decode the QR codes.

2. **Object Representation**

   Each supported smart device has a virtual representation that enables controlling it. For example - a smart lamp can be represented by a virtual switch shown in the augmented reality once the it's detected.
   The representation is done using Unity UI objects.

3. **Object Controlling**

   After the smart device is detected, a representation is being shown that allows performing operations. For example: for a lamp, virtual switch will pop up in the augmented reality, pressing it will turn the light on .
   The operation are being detected with Hololens gesture mechanism.
   The operation itself happens once the gesture is being detected and performed using HTTP request to the smart device API.

System

The application developed using Unity 2018.3.0f2 (64-bit) game engine, scripted with C# in Visual Studio 2017.

Unity is a cross-platform game engine developed by Unity Technologies. Unity gives users the ability to create games and experiences in both 2D and 3D, and the engine offers a primary scripting API in C#, for both the Unity editor in the form of plugins, and games themselves, as well as drag and drop functionality.

Microsoft Visual Studio is an integrated development environment (IDE) from Microsoft. It is used to develop computer programs, as well as websites, web apps, web services and mobile apps. it can produce both native code and managed code.

Equipment Required

Microsoft Hololens

Lifx light

Device that runs Spotify

Link to the web API -

https://api.developer.lifx.com/

Link to the web API -

https://developer.spotify.com/documentation/web-api/

Demonstration