**VR controlled robot arm**

**Overview:**

The app needs to allow you to use the VR headset (currently having the Oculus Rift headset to work on) and you should be able to control a robotic arm from a distance by seeing through a camera what’s going on where the camera is and to be able to move the arm / arms using your controllers. The main thing is the arm being controlled as seamless as possible using all the sensor information from the controllers and projecting them to the real life robotic arm.

This app should be useful in case you need to go somewhere that could be fatal for a human and not a problem for a robot. This app can be extended a lot afterwards as to add movement to a whole robot, full camera view and making it as easy to use as possible for everyone.

**The application:**

There were a number of ways to start and develop the app. As i had the Oculus Rift VR Headset I opted to find ways to develop only for it and found Unreal Engine, Unity or plain old C++ . I opted towards Unity more because programming everything for VR on C++ seemed to be a pretty big deal and would have taken too much time and effort for a single person project. Unreal Engine doesn’t let you publish the app if you don’t buy the license and is only for hobby purpose. In any case Unreal Engine has beautiful graphics and realistic predefined shapes and geometry but as we only need to do some virtual UI and look through a camera, then we didn’t really have any need for Unreal Engine`s complex assets. Unity is pretty free if you don’t earn a large sum of money and I was already accustomed with it a bit so I started using that.

In Unity I found a library dedicated and compatible with a lot of VR headsets and looked easy enough to use and modify it on my own. The library I mentioned is called VRTK (Virtual Reality ToolKit) and has a lot of functionality for the VR headset. We won’t need to use most of them but it will surely help with creating the UI elements for the application.

We needed the Oculus SDK as well to be able to use the Oculus Rift. We will need a different SDK for every different VR headsets (HTC Vive or the upcoming Steam VR headset).

The minimum milestone i need to reach is to make the robotic hand just move as accurate as possible based on the controller movements. The robotic arm needs to be wirelessly connected to the app so that it could be used from anywhere.

**The robotic arm:**

I had some ideas on how to make a simple and easily programmable robotic arm for the application. I thought of using Raspberry Pi, an Arduino or an already constructed robot or robotic arm specifically designed for this. The simpler solution would be the already constructed robot arm as I won’t need to think up a robot arm design and then recreate it in real life. Having an Aruino or a Raspberry PI could actually be the better solution as they will let me create a custom robotic arm that is specifically designed for my app. Raspberry can use more advanced programming languages for programming the robotic arm and is more powerful than the arduino making processes faster.

For the moment there are a lot of tutorials around how to make a robotic arm in Arduino and it’s cheaper than its counterpart Raspberry Pi so I’ll stick with the Arduino for the moment if we find one lying around and try to do the robotic arm using it. In case of hitting a wall or something the project can be changed to Raspberry Pi pretty easily.

