Stefano

Detailed description of design

A description of the design should be given, and design decisions should be explained in report format. The function of all parts should be explained in detail, and the manner in which the individual parts work together should be discussed.

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The VR/AR project has many different parts that makes the project’s purpose a reality. To start off, we have the unity build. The Unity build is a unity project which is built by the team which consists of the Hololens interfacing, C# scripts, assets, and game objects. Game objects will be created, like a Text Mesh Pro game object which will be used to help perform the user interface for the AR/VR Blackjack tool assist. The C# script helps deal with logic, and can help perform the probability algorithms needed as well. Other functionality needed which is built directly with the unity editor is a start button which will indicate the app to start the AR/VR Blackjack assist program. This button will know when it is clicked with hand gestures with the Microsoft Hololens. To have this button we will have to import the MRTK (Mixed Reality Toolkit) package. This toolkit has many objects, and tools which help build AR/VR games. After the start button is clicked, the program automatically starts detecting the player’s and dealers cards, and will perform calculations and update the UI with probabilities in percentages, depending on whether to hit or stay in the game of blackjack. In addition, the AR/VR blackjack assist will have sound effects when win/or losing a hand to make the game more interactive.

Moreover, the Unity Build is also able to install packages. These packages are 3rd party software that can be added to further add functionality to the Unity app. Examples of packages that will be used are “Barracuda”. Barracuda is used to help interface with the Machine learning algorithm YOLO. Barracuda is used to allow Unity to load a UNNX file so that it can launch YOLO itself, and the python machine learning training script. The Python script will be used to train the algorithm so that it detects playing cards, most importantly, the number specified. The card symbol doesn’t matter when playing Blackjack. Another 3rd party package that most likely will be used is “Vuforia”, Vuforia is used to allow access to AR functionality in unity, like the AR camera game object which replaces the camera in the unity game to be the AR camera for the Hololens. In addition it allows the creation and interfacing of AR images.

Finally, some other implementations that has been done with the AR/VR Project is its ability to perform a TCP connection to communicate data between Python and C#. The reason we might need this is in case we need to program with Python to then transmit data between Python and the Unity app. This data could include data needed for the probability calculation algorithm, or data needed for Barracuda and YOLO for object detection.