Project Proposal

Richard Ballaux, Viktor Deturck, Leon Santen

Augmented Reality game

For this mini-project, we seek to analyze the video of a live webcam image. We want to use Python to recognize an arbitrary object in a defined space (the frame of the cam) and map this to a parameter to use it as an input for different applications. Our initial thought was to teach the computer to recognize body parts and joints to recreate a simple skeletal structure. However, this appeared to be somewhat ambitious, so we decided that one or more objects with a defined color would be easier to track. Our minimum viable product will be an interactive version of pong with 2 players, each with a physical object (recognizable for the webcam) as a controller. We can extend this to a virtual game of air hockey, which will involve some more physics and parameters like velocity, acceleration, and collision factors.

Learning Goals:

Richard: I would like to learn how to develop a full program architecture without any starting code. Next, I am very interested in applications in AR, such as games or other, maybe even useful applications. At last, I want to learn how to work together with more than two people on the same project.
Viktor: I have always been wanting to learn how to make and design games. The augmented reality part is a very nice addition and fun way to interact with the game. I also really want to learn how to implement real-world physics in a virtual space, so I hope we will make it to the air hockey version.
Leon: One of my major learning goals is how to use a more complex library and implement it. Further, I want to get used to classes and be able to use them throughout the entire program. I wish we learned/ I knew more about conventions in programming regarding formatting, variable naming, code structures etc.

Libraries:

We are planning on using OpenCV since this is a very powerful and famous library for all computer vision applications. To create the game another library we would use, will probably be the pygame library. Richard already used this library in the AI and Algorithm toolbox.

Mid-project Check-in:

On the computer vision-part, we think that getting OpenCV installed will already be a big challenge. On the game part, we could probably get to the stage where we have the playground lined out and maybe some part of the collision detection.

Biggest risks:

We are working in a team of 3 people, so communication, task separation, and efficiency will be very important and will be some of the biggest risks for this project. We also foresee calibration and the object recognition as possible obstacles in achieving our MVP. Merging the two different software components (OpenCV recognition and the actual game) might take more time than initially expected. Considering the short time period for this project, we might have to decide how much time and energy we want to sacrifice for this project. For the air hockey implementation, we would need to program a small but accurate physics engine. This might not be feasible in the given time frame.