

BI-Weekly Report- HoloLens project

Client: Microsoft HoloLens Gaming (Group 11)

Team: Miron Zelina (Leader), Mehul Modha, Tilman Schmidt

Internal Supervisor: Dr Dean Mohamedally **TA:** Aron Monzpart

Report Number: 4

Introduction:

Team 11 is working on the Microsoft HoloLens with the objective of delivering a Game or API highlighting the capabilities of what the HoloLens can do. The idea being that the API can be used as a building block for other applications that will be designed in the future of this product.

Discussed tasks and challenges:

These past two weeks, we have finally managed to complete a few prototypes. OpenCV was abandoned, due to recommendations from Microsoft and the difficulty of integrating it with the HoloLens, and instead, a Microsoft provided solution for marker tracking was used and integrated by Tilman, which is now working. The asteroid game served as a useful learning experience, but was discarded as a game design idea, due to asteroids hitting the user being an uncomfortable mechanic. Work has begun on a demo displaying HoloLens' abilities to rotate and translate objects with gestures. And finally, Mehul began work on a chess game, which would synchronise the playing field between two HoloLens devices, however this development is stalled by the fact that we do not have access to multiple devices. We are currently searching for ways to alleviate this (by using an emulator and a real device).

Meeting with Aron Monzpart on 29th November 2016

During our weekly meeting, where we present our progress so far, we have received valuable feedback on what we have done, and Miron, who is working on gesture recognition, was pointed to a research paper concerning modern gesture recognition made in collaboration with Microsoft. This meeting was inspiring for the team, as we found a more concrete direction we could take the project, with an API for gesture recognition in gaming, for example.

Plan of action:

Next week, and the week after that will be dedicated to unifying our research and uploading it to our website. We need to create an experiment log - where our various prototypes will be described, a research section - where we can point visitors to research we have found useful along the way, and other useful content and links.

Individual Bi-Weekly feedback

Mehul Modha: For these two weeks, I am focusing on building a chess game within unity. The game will then allow multiplayer capabilities and shared holograph when two player are wearing the hololens. The idea is to combine work on Tilmans marker tracking and trigger the generation of the board and the game in order to play. This has involved learning how to design a chess game and gathering assets to use for this project.

Tilman Schmidt: Since I was not able to find a solution to the compilation issues related to OpenCV, I further investigated other solutions to marker tracking. While Vuforia seemed promising at first, it requires a HoloLens device to test the program, thus making it impractical for my purposes. Instead, I found a modified version of the AprilTag marker tracking library within the Microsoft HoloToolkit repository, and was able to get tracking to work within the editor using that code. I created a simple test application that uses tracked marker positions on the video to place 3D objects such that their position matches what is shown on the video. I intend to use this program to measure the performance of the tracking library and make any appropriate optimizations so that I can reach real-time performance and stable tracking. While I am currently still using the full HoloToolkit library, I have also created a standalone native plugin of just the AprilTag library, so that I have more control over the tracking configuration in the case that I need it.

Miron Zelina: I have worked on asteroids, before switching to gesture recognition. I learned how to use the gestures provided by HoloLens and the HoloToolkit for Unity. Although HoloLens provides a few gestures, it is too limited to support a gaming application currently, so either we will have to define new gestures or provide menus in the game for various actions. Although creating custom gestures is discouraged by Microsoft currently, gaming applications will probably need such new gestures. This could be a topic of research we could pursue more, but we will have to ask a representative of Microsoft, whether they would use it – otherwise it would be overwritten by their gestures in the future and therefore a wasted effort for us to develop.