

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: 5

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:

In the past two weeks, we have focused on populating our website with content and gathering material for our video. For this purpose, we researched libraries, papers and articles either concerning HoloLens directly, augmented reality or virtual reality. We also wrote down our processes, tools, and plans of action for the next term on the website for all to see. Also included in the website is our experiment log, with descriptions of our prototypes and the challenges we faced in creating each one. As for the video, we each recorded our own demos of the functionality so far, so we can cut the raw footage during the holidays.

We have also worked on more prototypes for our chess game, and marker tracking, while also developing a demo for rotating and translating holograms using gestures. The chess game is still in early development stages, while the rotation of holograms has hit a difficult roadblock, but we think we will be able to overcome these challenges.

Plan of action:

Christmas holidays are coming up and our plan is to improve our prototypes to a presentable state, so that we can work on the video. It will probably be the case that we will not be able to record the improved prototypes, but we will nevertheless try to display everything we can in our video. We also plan to setup a meeting with Dr Dean Mohamedally or establish an email exchange with Microsoft, to focus our efforts into something of value to our clients.

Meetings:

Unfortunately, our teaching assistant was abroad for our lab session in the first week, and the second week was scenario week. We did, however, send the link to the website by email and gathered feedback, which we then used to improve our website. We also borrowed the HoloLens during scenario week to capture some more footage.

Individual Bi-Weekly feedback

Mehul Modha: For the past two weeks I've continued working on the HoloLens Chess Game, this involved creating assets and applying rules to the chess pieces, this is facilitated through the unity asset store. The plan during Christmas is to complete the chess game, begin applying a multiplayer mode to allow two HoloLens to interact with the same game. Will need to do further research into marker tracking to generate the application.

Tilman Schmidt: I have started work on measuring the performance of the image tracking, and improving it to meet the real time requirements. I have reached near-real time performance already by reducing the image size taken from the webcam, however I will have to test whether the loss in tracking accuracy is acceptable. For these experiments I have expanded the functionality of my standalone AprilTag plugin, and I plan to use this for the rest of this project, both because it allows me to adjust tracking parameters, and because the HoloToolkit code provides very limited access to the pose matrix generated by the library, which is important to determine the rotation of the tag in 3D space. Over the Christmas break, I plan to further optimise the tracking, and implement functionality to convert the detected tag pose to a rotation for unity to use.

Miron Zelina: I have been working on a rotation and translation demo. It is a piece of functionality we will likely often reuse, whether it is for the chess game or for further projects. I am using various shapes built from cubes, which the users can move by tapping and then dragging the object in the world space – it follows the hand rather than the gaze. The rotation should work by double-tapping a hologram and then moving the hand to facilitate rotation around different axes – however, this does not currently work very well. I have also been able to record a video of my initial experiments with this demo, which we can hopefully incorporate into our final version of the video after the holidays.