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 Monszpart*
Report Number: *2*

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

Discussed tasks and challenges:
Within these two weeks, we set the foundation of our team and began work on the project. We were given the opportunity to try the HoloLens out and interacted with the features it has. We tried to run a demo program but we had trouble with getting it to initialise on the HoloLens. As a team there is still a lot more learn about how the HoloLens works. In addition, work has begun on Unity to make more demo projects.
On Tuesday 18th October 2016, we unfortunately could not get our hands on the actual device, because it was unavailable. Instead, we focused on research and web development. We looked at OpenCV integration with HoloLens - object or marker tracking. We also watched more demos by Microsoft and various reviews of HoloLens, mainly its use in gaming application.

Strengths and Weakness Assessment
As a team we discussed what our strengths and weakness were to find possible bottleneck and what areas we could work on in order to keep a streamlined timeline for this project.
Tilman Schmidt
Strengths: Experience with unity, game development, fluent with C sharp
Weakness: Time management, Management of workload
Mehul Modha
Strengths: HTML, research, time management, experience with java
Weakness: No prior experience to C sharp, no experience with unity or game development
Miron Zelina
Strengths: Java, JavaScript, PHP, My SQL, Prior experience in Team Leadership
Weakness: No prior experience to C sharp, VR

We hope that throughout this project we will be able to improve on our weakness and use each other strengths to meet deadlines and client requirements.

Problems/ Challenges:
One thing that has been achieved during the week is that demo project for marker tracking has been rebuilt in order to be used with unity. It has successfully run on the emulator; however, it was not "seeing" the object through the camera on the HoloLens. Nevertheless, we have now managed to get it working with some latency issues with tracking and what is being displayed, which we will need to diagnose.

Plan of action

So far with all the systems set in place and working, we can now continue work with unity, designing model and exploring what can be done, and the limitation involved with ideas we would like to explore, whether this be a time or physical constraint. We have also begun work on our webpage which will host information on our project, the aim is to have a static page built by this week which we can make live.

As a team, we have discussed what we would like to get working before building a framework for a game, the following are to be considered:

- Gazing (Information popping up)
- A beacon/ checkpoint system
- Face and Voice recognition
- Object recognition

However, while developing these methods, we also need to think what we can use these feature in how to provide a unique user experience with these systems

Individual Bi-Weekly feedback

Mehul Modha: These two week I focused on research on possible project to pursue on the HoloLens. I also worked on the website which will be deployed and used to display our project and what has been achieved so far. In addition, I have also been looking at the Unity tutorials in order to learn how to work on the HoloLens. Hopefully we can get some more time with the device to test the model projects.

Tilman Schmid: This week, I concentrated on the problem of object marker tracking through the HoloLens camera feed. Initially, this meant researching existing projects that used the OpenCV library or libraries built on top of that. There were not many good resources on building OpenCV for the HoloLens, however I found an example Unity project that used the Aruco library for marker tracking (https://github.com/qian256/HoloLensArucoUnity). While this project was also outdated, I managed to re-build the Unity project and successfully test the code with the pre-built OpenCV and Aruco dll files, both in the Unity editor and on the HoloLens. Following from this, I started work on building the dll files myself, fixing some problems in the corresponding repositories along the way. Currently, I have managed to build all the dlls, however they do not work in the Unity editor yet - this will be a task for the coming weeks. After that problem is resolved, I will then work on translating marker tracking information into the Hologram coordinate space through the HoloLens "Locatable Camera" API.

Miron Zelina: I went through Unity tutorials and part of the HoloLens Academy – the official tutorial for HoloLens by Microsoft. After that I started on a small project, featuring a simple asteroid-dodging game in virtual space to test out how dodging thing will feel like with HoloLens and whether it is viable (whether it causes dizziness or near-clipping issues). It also tests out various Unity elements, like UI text. Unfortunately, the test with the device couldn't occur, so I hope to improve this version or create a new demo for next week.