HoloLens Sprint 1 Report

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Intended Progress

Team HoloLens's first sprint was intended to get a start on figuring out how the pre-existing project functions, as well as brainstorming various ideas as to how we can improve the concept and design. The group also discussed the possibility of connecting multiple Hololenses together for both educational and medical purposes.

Liam's plan for the first sprint was to identify how the collaborative "web application" was going to be tackled. Along with helping to do research to identify the best plan of action for updating the current 3D models and continue to progress in C# and Unity.

Chase found anatomically accurate Unity models and imported models into the existing Unity project. Project files were initialized and set up on the Hololens and streaming PC. Gus, the project sponsor, was met with and goals were set for the educational anatomy app and collaborative web space.

Lucas dedicated the first two weeks of this project to researching the various requirements needed for the project to run in Unity as well as the possibility of establishing a remote connection between two devices.

Mohammad spent the time throughout Sprint One understanding the project and what really is an AR environment and how it will apply to this application. Now the idea and understanding of the project has shifted as the talks with the customer progressed. Now I am looking at pairing multiple AR headsets to communicate with each other.

Progress Reflection

Liam feels that the team's first sprint was a slight disappointment as it took much longer than expected to receive the current code for application hindering the team's ability to start understanding the current state of the project. On the other hand he saw the rest of the team take the initiative to step up and put a great deal of work towards other areas of the project. This allowed them to feel more confident about the

project and where they will be focusing their work the rest of the semester. The work he accomplished researching various applications along with speaking with the team's partner to ensure both sides were on the same page helped to ensure the rest of the team was informed and able to progress in the right direction.

Chase spent his time the past two weeks doing extensive research on other groups with similar ideas. The most notable company that is doing similar stuff to our group's is Apoqular. Apoqular is a Fifteen thousand dollar per semester VR simulator for an educational app and for 3d CT imaging. One thing Apoqular did in their VR environment was set up a collaborative aspect feature where a floating doctor head can see the 3d scans being manipulated. Some other ideas gained from other companies were creating a 3d anatomy atlas and insight into what a mobile anatomy app looks like.
Another accomplishment was finding professional 3d models of the male and female human anatomy on the website TurboSquid. The male models alone cost $800, but it has all the different systems like digestive, lymphatic, and cardiovascular systems like the doctor wants. The models were tested and will work in our version of Unity.

Lucas spent the last two weeks beginning his research on how to connect multiple Hololenses to each other, viewing the same model and being able to interact with it. Spending some time searching various ways to accomplish this as well as reaching out to a source familiar with developing applications for the Hololens, he came across a software development kit that allows a second hololens to connect to the first through a direct IP address and connection to the internet. During this time, the group received the pre-existing source code for the project, so Lucas worked on getting the project uploaded into the group's directory and downloading the correct version of Unity to run it on. After the Unity project was set up towards the end of the sprint, Lucas began brainstorming ideas of how the existing user interface can be changed to improve the user experience. He asked this question to the project's sponsor, who will provide ideas of changes he would like to see in the near future.

Mohammad now understands that ideas can change and while he was excited setting up a front end for a web application it turned out that it is not what the customer wanted. So after communicating with the team and the customer, he wants multiple AR glasses communicating, now we understand this can be done using IP configuration and a strong internet connection. So I will be working with the mirroring.

Problems Encountered

Liam struggled with helping the team access the source code for the project as it was difficult to contact the team's partner on the issue. Email communication seemed to elongate the problem or cause one side to lose information in the interpretation of the emails. To fix this issue Liam found communicating in

real time over the phone or on a video call to ensure that his group mates and the partner were all in agreement.

Chase ran into the problem of demo-ing the app on the Hololens. Until we get the Hololens Unity app from the doctor, we can't test our 3d models. One thing we can do in the meantime is work on the different overlay systems in Unity for the muscular, skeleton, and cardiovascular systems and the user interface.
Another problem was we just got the Unity project files last Thursday, 3 weeks into the project, and found out that the previous group had already spent $600 on professional models too. So we are going to ask the doctor if he wants development on the models already purchased, or if he wants more expensive models with more features i.e. digestive system and reproductive organs.
Lastly, we ran into the problem of the project's scope being too big. In our last meeting with the doctor, he left the project's development direction open ended and wanted our input and feedback on what is possible to do. This unspecific goal led to group members going in different directions on what to work on. Some of the development time was spent on unproductive goals like researching VR Surgeon Simulators and educational VR childbirth walk throughs. Ultimately our group decided not to go in the simulator route, but the 3d anatomy educational app and collaborative features.

Lucas ran into the issue of not finding many resources on how to connect two Hololenses together remotely. Although articles online say that it is theoretically possible, there is not much information on how to accomplish this goal. In addition, the project runs on an older version of Unity, which could cause issues in the future when the group is trying to add new models or make changes to the existing Unity files.
After the group received the source code for the project created by previous groups that have worked on it, there is little to no documentation on how the project files are structured, as well as how to run the application through the headset. Since we have not been able to contact the previous group, it has slowed the groups' progress with our initially planned goals.

Mohammad didn't know what a HoloLens was and the programming capabilities regarding the technology so I spent some time playing with the Hololens and doing research on it. I thought we were developing a web application to see the AR on a monitor for users to see and draw on, so I started setting up react components, but that is not what the customer wanted. So I scrapped that and did research on how to connect multiple hololenses together.

Projected Progress

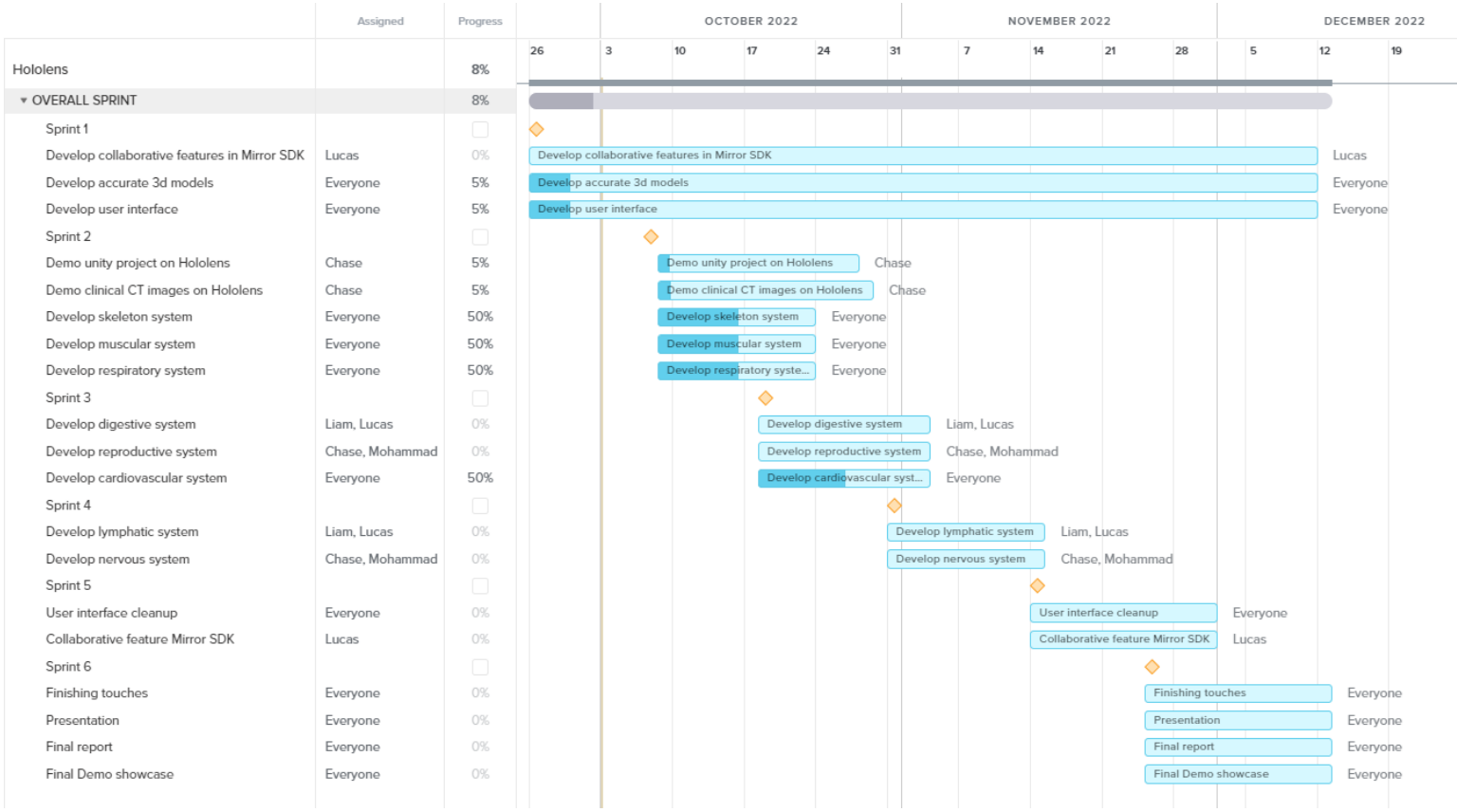
Liam understands that the challenges faced by the team throughout the first sprint made it more difficult to get started on the project. Although he is confident that in the coming weeks the team can make the progress they had intended for the first sprint along with much more. The setbacks faced allowed the

team to develop a better understanding of the project's deliverables as well as how each individual on the team worked and communicated.

Chase has made progress in Unity on the user interface and the models. The files we're still waiting for are the Hololens app that runs the Unity project and the patient's CT image files. Also, the doctor who's sponsoring the project is sending us his Hololens, so that we can start work on the collaborative features.

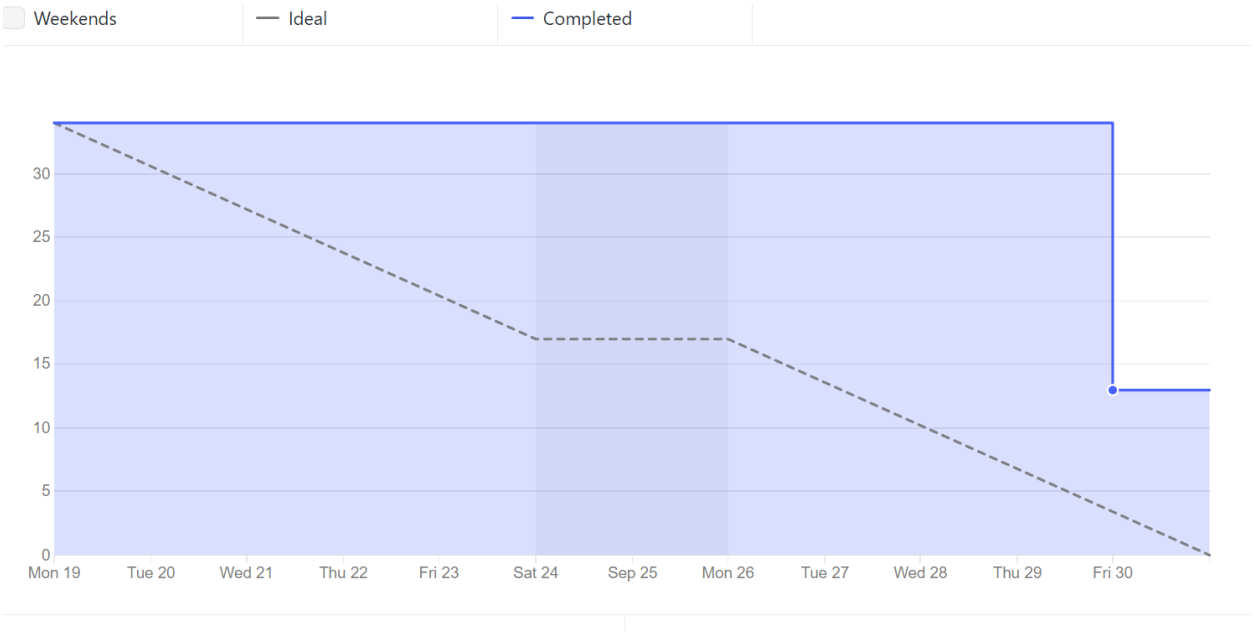
Lucas feels confident in the future progress of the project. Although it took the group over a week to receive the source code, they are now able to start on some of the features established by the team beforehand. At this point in time, it is difficult to predict how long some of these features will take to implement. However, these predictions will become more accurate over time allowing us to prioritize issues as they arise. For the next sprint, Lucas and the group will be presented with the tasks of increasing their understanding of the source code as well as implementing new models and UI elements per the sponsor's request.

Mohammad is excited about connecting multiple AR headsets. Now that we have the source code I will start playing around with the connection and broadcasting to other headsets. While also working on understanding the source code and working with the team to accomplish the deliverables.



https://app.teamgantt.com/projects/gantt?ids=3231203

Update of Burndown Chart



The first sprint as a whole did not go as planned for the group. Due to the late start in receiving the source code, we had to push back the majority of the issues we planned to cover in the first two weeks. However, now that the ball is rolling we plan to complete issues at a much faster pace throughout the next sprint. Something the team plans to do during the next two weeks is stay in constant communication on what each member is working on and what issues are completed in order to avoid redundancy issues. In the next sprint, the group has over double the amount of story points to complete.

Issues moved into Sprint 2:

-Continuing to research motion tracking

-Continuing to research the Mirror SDK and connecting multiple Hololenses

Issues created for Sprint 2:

-Changes to the user interface

-Adding motion tracking to the models

-Implementing full-body models

Teamwork Reflections

Liam's experience thus far has been a major indication that the team is willing and able to accomplish what they set out to at the beginning of the semester. They have navigated the issues encountered well as a team and are all excited to make continued progress in the up and coming sprints.

Chase feels like this project is a perfect learning experience for developing applications for the Hololens with a universal application like Unity. Through this project many hours will have to be spent in the Library where the Hololens is located and on development in Unity on a beefy PC.

Lucas feels confident that the team will be able to accomplish the larger picture goals that the team has agreed upon throughout the semester. The communication between the team has been solid, and the group members have all been able to find times to meet throughout the week. Once things start getting into a rhythm, Lucas believes the team will be able to work together flawlessly to complete tasks at a steady rate.

Mohammad is looking forward to this project, it is complicated to understand while also having a lot of moving parts. Now the team has a wide variety of skill sets and communication skills have been great. We try our best to answer any questions that we have.

Conclusion

As a whole, the team feels optimistic about beginning the project. Although the first week started out rocky without being able to access the source code, the team worked together in researching how to accomplish various set goals and are excited to get the ball rolling. In the next sprint, the team hopes to make changes to the pre-existing user interface as well as updating the models and adding new layers. Since receiving the source code, the group has not come across any major issues and will continue researching and developing at a steady rate.