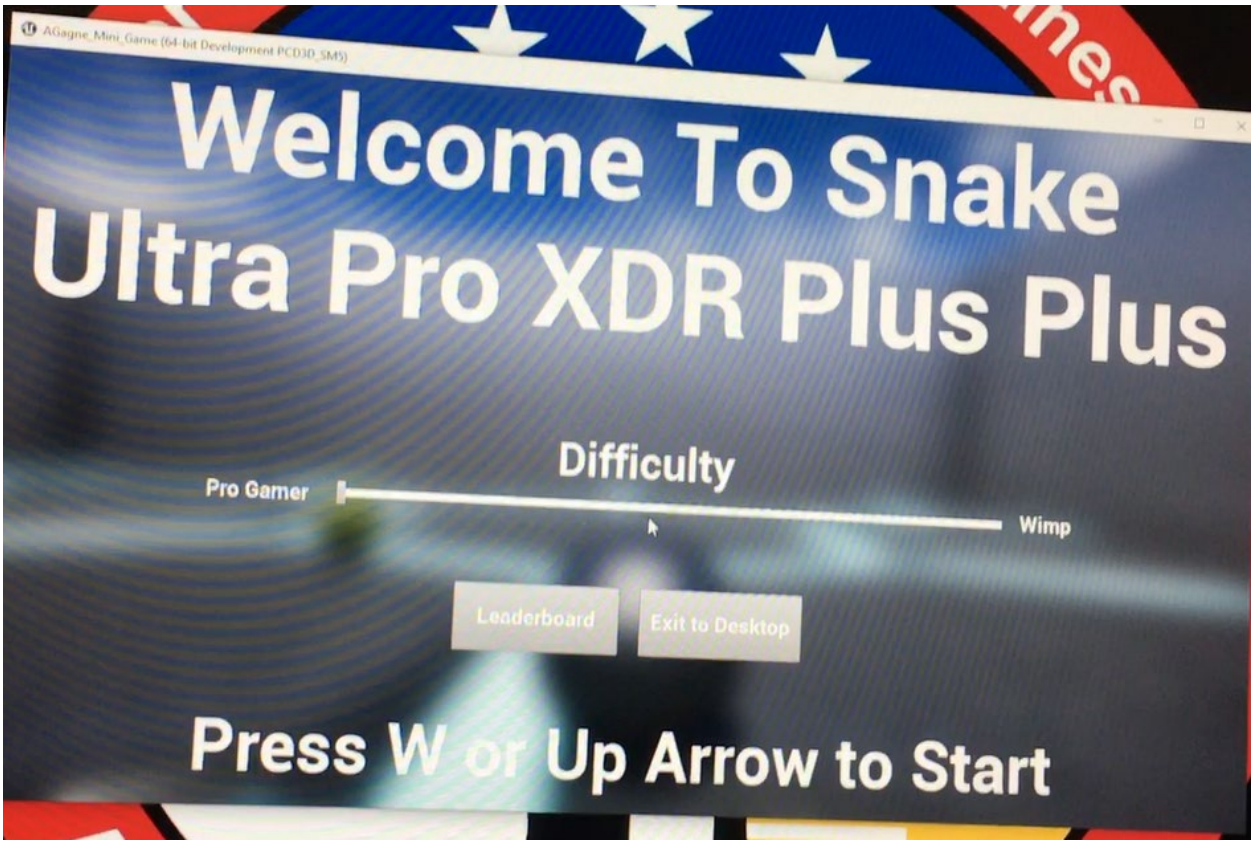
Internship Reflection Essay

Over the course of my internship experience at the Air Force Research Laboratory Gaming Research Integration for Learning Lab, I learned a lot about collaborating with others on a project to reach a final product and deadline and improved my professional presentation skills. During my internship, I worked with 2 other Wright Scholar interns. The project we worked on was a Microsoft HoloLens application that would provide visual instructions to the user. We worked on this project in conjunction with O'Neil and Associates. At the beginning of the project, we outlined the different parts that would need to be developed so that we could have a good product. We needed to have good HoloLens integration, an intuitive user interface, and reliable object recognition. I was assigned with developing the object recognition software, and I learned a lot not only about Vuforia, but also about collaborating with others. I worked with my other team members to make sure that Vuforia was able to communicate with the HoloLens and the user interface. At the end of the project, we had to present out project to O'Neil. We spent several days preparing our presentation along with practicing what we were going to say. At first, I struggled with consistency in the information I was giving, but as I practiced more, I got better at presenting the parts that I worked on. Overall, this internship experience gained me a lot of relevant experience and showed me a lot about working in a professional environment.

Entry 1: 6/11/2021, 9 hours, 38 hours total

Earlier this week, we started an introduction to the GRILL and working in Unreal Engine by creating mini games. My mini game was a 3D recreation of the popular game snake. Today I put the finishing touches on the game, getting the tail of the snake to spawn properly, and a working leaderboard that saves. The game controls pretty well, and I even added a difficulty slider to make it more accessible to different players.

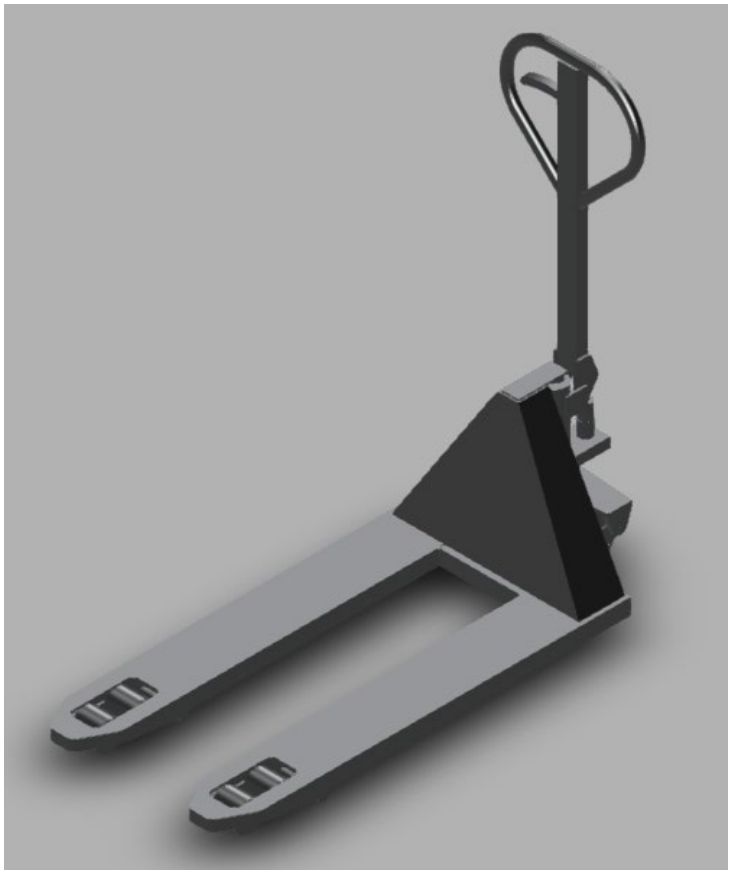


Entry 2: 6/15/2021, 9 hours, 58 hours total

Today, I worked on figuring out what object recognition software we want to use. The first option I looked at was Vuforia. Vuforia features direct integration with both unity and the HoloLens, making it very easy to integrate. The second option I looked at was Wikitude. Wikitude featured some HoloLens integration, however it was not at the level of Vuforia, and it also costs several thousands of dollars. Finally, I looked at OpenCV, which is very powerful, however it does not have very good integration with the HoloLens. In the end, we chose Vuforia because it is free and easy to use.

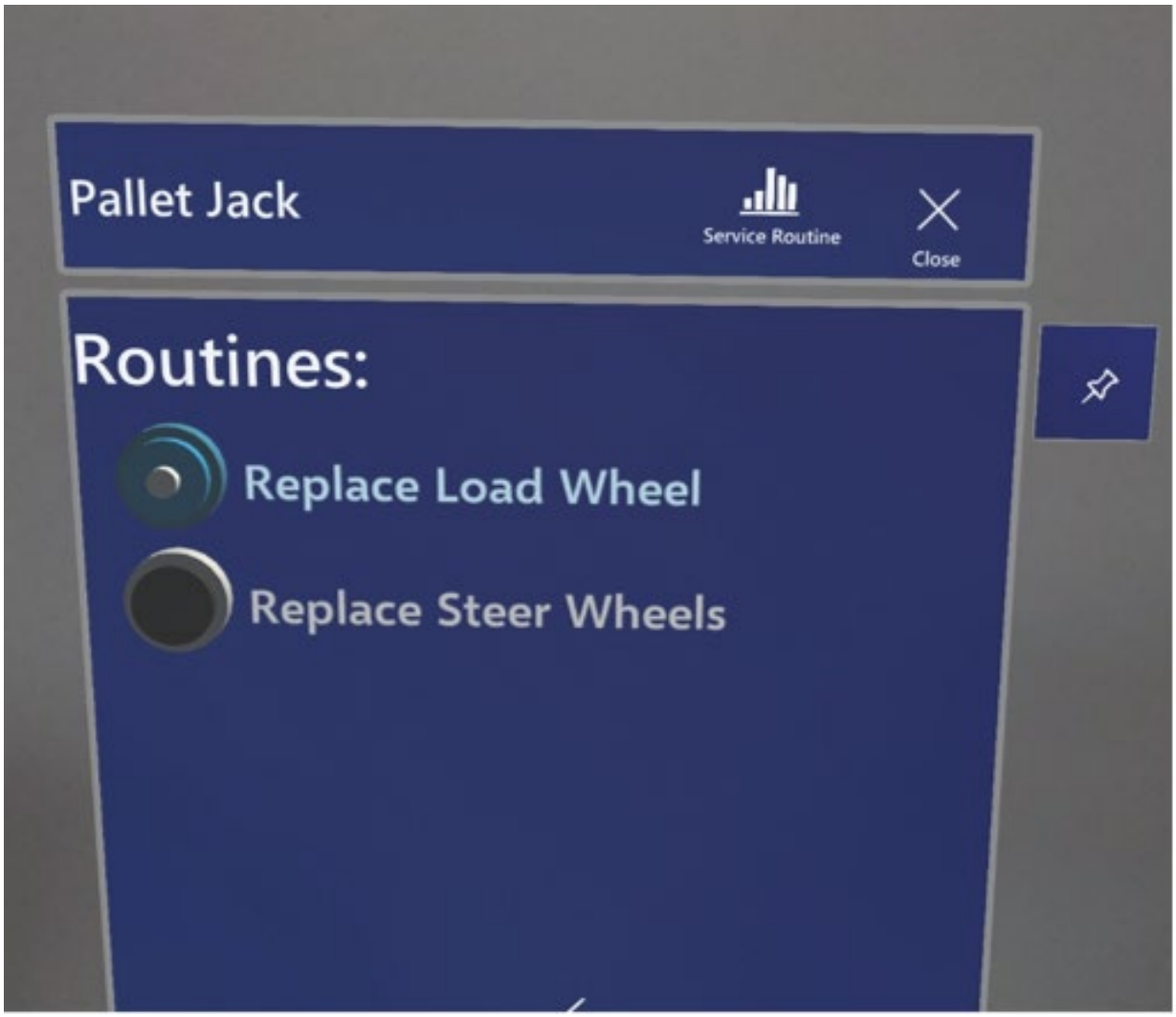
Entry 3: 6/16/2021, 9 hours, 67 hours total

Today, I used Fusion 360 to create a reconstruction of the pallet jack based of the STL file we found online. The STL file was all one body, but for the purpose of our project, we want to be able to move individual parts by themselves. To do this, I recreated the pallet jack in Fusion 360 and made each part of the pallet jack an individual component. I then exported the file as an OBJ file since it can contain multiple individual bodies. This will make it a lot easier to animate the model.



Entry 4: 6/23/2021, 9 hours, 94 hours total

Today, I worked on integrating the Vuforia program with the User Interface. This was actually a quite simple process, as calling one method would pull up the UI. This is a big step in terms of the program.



Entry 5: 6/25/2021, 8 hours, 112 hours total

The internet has been out since yesterday. We don't know what's happening, but we can't work on anything because it's all online. I had a two-hour lunch and I went all the way to Fairborn. We tried to see how far we could get in the dinosaur game on google, and I got second place. We also played monopoly, and I won, but only because we didn't fully understand the rules. The internet came back in the last hour, but we had a lecture about magnets to go to, so we didn't get to work on our projects.

Entry 6: 6/28/2021, 9 hours, 121 hours total

Today, I worked on trying to get the model to line up in real life. I tried a variety of different methods of lining up, but I couldn't get the model to show up. However, the menus pop up when it recognizes the pallet jack, meaning that for the user, they just have to walk up to the pallet jack and the menus will appear.

Entry 7: 6/29/2021, 9 hours, 121 hours total

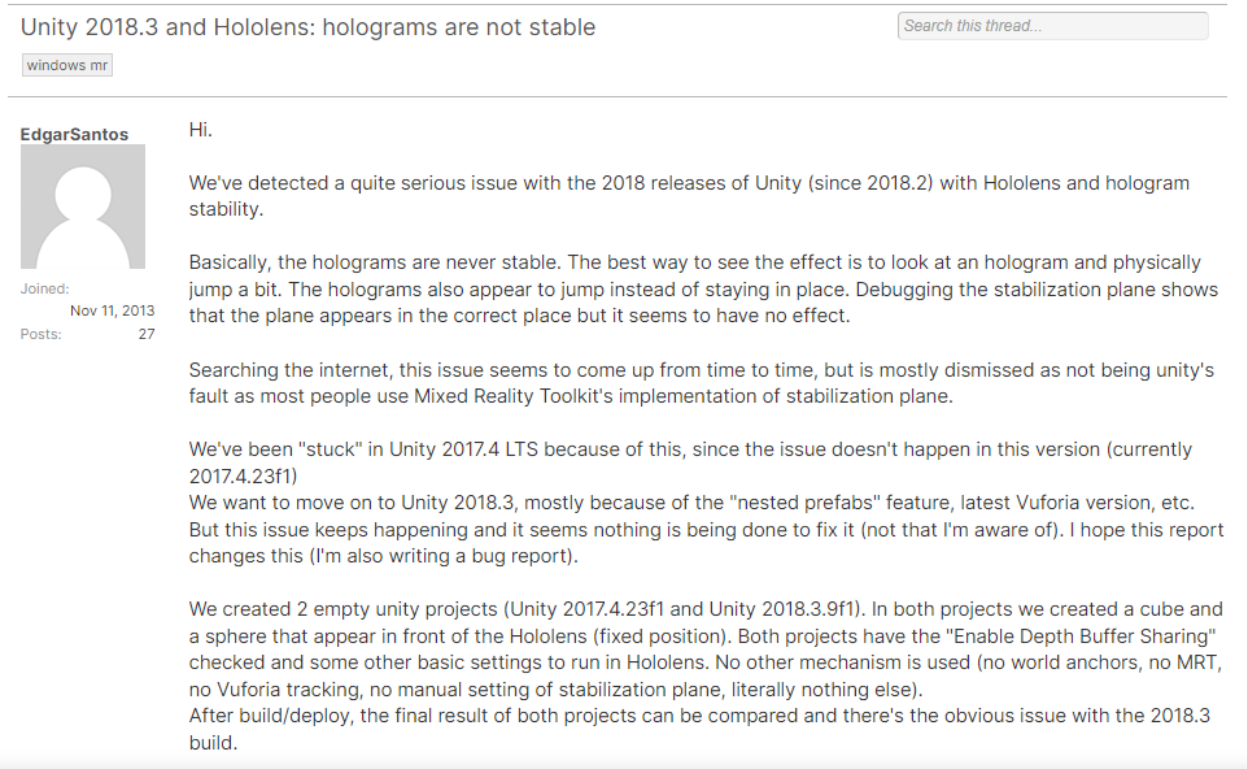
Today, I worked on getting more alignment with vuforia. I tried even more methods of adding and subtracting transforms, but still couldn't get it to work ideally. Made a demo for our customer and tested it.

Entry 8: 7/2/2021, 8 hours, 147 hours total

Started testing the capabilities of Vuforia Model Targets in Unity. I used the Vuforia Model Target Creation Tool to create a model target of a Honda CRX. Unfortunately, Mike's car was not there to test the model on. Fortunately for me, Vuforia has a lot of trouble identifying different car models, so the model target was able to recognize any car as a Honda CRX. I used a laptop with unity running on it, and a webcam to test it.

Entry 9: 7/6/2021, 9 hours, 156 hours total

Tested the object alignment again, but it was not consistent. Sometimes it was on top, sometimes it was halfway across the room. I looked online for a solution, but the only thread with a similar problem is from 2018 and has no useful solution.



Unity 2018.3 and Hololens: holograms are not stable

Search this thread...

windows mr

EdgarSantos

Joined: Nov 11, 2013
Posts: 27

Hi.

We've detected a quite serious issue with the 2018 releases of Unity (since 2018.2) with Hololens and hologram stability.

Basically, the holograms are never stable. The best way to see the effect is to look at an hologram and physically jump a bit. The holograms also appear to jump instead of staying in place. Debugging the stabilization plane shows that the plane appears in the correct place but it seems to have no effect.

Searching the internet, this issue seems to come up from time to time, but is mostly dismissed as not being unity's fault as most people use Mixed Reality Toolkit's implementation of stabilization plane.

We've been "stuck" in Unity 2017.4 LTS because of this, since the issue doesn't happen in this version (currently 2017.4.23f1)
We want to move on to Unity 2018.3, mostly because of the "nested prefabs" feature, latest Vuforia version, etc. But this issue keeps happening and it seems nothing is being done to fix it (not that I'm aware of). I hope this report changes this (I'm also writing a bug report).

We created 2 empty unity projects (Unity 2017.4.23f1 and Unity 2018.3.9f1). In both projects we created a cube and a sphere that appear in front of the Hololens (fixed position). Both projects have the "Enable Depth Buffer Sharing" checked and some other basic settings to run in Hololens. No other mechanism is used (no world anchors, no MRT, no Vuforia tracking, no manual setting of stabilization plane, literally nothing else).
After build/deploy, the final result of both projects can be compared and there's the obvious issue with the 2018.3 build.

Entry 10: 7/21/2021, 9 hours, 238 hours total

I finally finished getting the model alignment to work. After about 10 revisions of the object alignment program, I finally found a good way to position the model. It uses a couple of transforms so you can tune in the position and get the alignment spot on. It's not perfect, but it is by far the best version of the object alignment program. The project is in a close to finalized state, we just gotta clean up some stuff.