The goal of my individual capstone project was to stimulate the discussion of the inherent security risks in Kernel 0 anti-cheat systems by exploring how such systems may be bypassed in the future. Kernel 0 anti-cheat systems are becoming increasingly prevalent in competitive video games. These systems have unfettered access to users' computers and provide an entry point to negative actors. These systems say that allowing such permissions is necessary to provide the best anti-cheat possible. My project aimed to point out weaknesses in these systems by testing a way to circumvent them. Thereby showing that they are not the absolute security system these companies purport them to be and that the inherent risks of systems like these are not outweighed by the benefits.

The strategy I devised and implemented during my internship was the development of a working prototype that streams visual content from a gaming machine over to a computation machine via a software application called OBS NDI. The computation machine then runs a python script using the OpenCV library which makes use of computer vision to analyze the video stream, select targets, and return commands back to the gaming pc on target locations and when to fire. While my design implementation did not bypass the Kernel 0 anti-cheat due to the commands I ended up using to move the cursor on the gaming PC. I discovered that the theory behind my software bypassed kernel 0 anti-cheat systems.

Through this project, I have been able to conclude that kernel 0 anti-cheat systems will eventually be bypassed either by a solution similar to mine or via other technologies that are already emerging. When these systems are compromised they will no longer provide the level of security that validates the inherent permissions granted. The danger is that any vulnerability in the anti-cheat can function as an access point for bad actors.

My key learnings and skills developed from this challenging project are learning and understanding python. From this project I know feel I am able to program in python with competence and effectiveness. I have built on my learning from CSS 382 Intro to AI by learning more about Machine learning and its applications of computer visions through the OpenCV python package.