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CS Senior Design II

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Self-Assessment

Part A

As a whole, this project was one that allowed me to learn more about technologies that I had never before used and to get exposure to machine learning as a discipline. From an individual contribution standpoint, my role was to leverage my game development knowledge to create an environment that our neural network could navigate and learn from. I ended up using C# and Unity, as well as a host of art creation software's to build out the game itself. The game that I created is reminiscent of the childhood game tag. Then I hooked my game up with the neural network, finding a way to provide the needed information to the learning algorithm to train. I did build upon the skills that I identified in my initial assessment, as I will detail below.

Even from the onset, I knew that I needed to learn a lot when it came to Unity, given that it is a very popular video game environment that I will need to use in industry. I had to learn how to use Unity's Scenes and had to learn how C# scripts could be used to control and handle the logic of the game. I figured this out by looking into online tutorials and guides about best practices when it comes to writing in C# and how it interfaces with Unity itself. I also had to find out how to handle physics collisions between the environment and the players. I did this by leveraging the existing physics system that Unity provides and adding in my own checks to it to

allow for things such as running and jumping. Lastly, I had to learn how to use packet exchange and sockets to allow for the communication between the neural network and the game so that the network could train/play the game.

I now can say that I am at least partially competent in 2d game development using Unity and C#. I also have an understanding of how to use network communication to control player movement and behavior. When it comes to success, it mainly came in the form of having a functioning game, fit with menu screens, UI, and smooth gameplay. I was happy with the result of the game and how it interfaced with the neural network. In terms of obstacles, I had a hard time really fleshing out the artwork and the level design of the game because the majority of our time was spent worrying and tinkering with the training aspect of the AI. So the real limiter is that the most technically difficult part of the project limited our ability to focus on some of the quality of life improvements that the game could have had. Additionally, my team had difficulty getting the neural network to learn fast enough to be a well-rounded AI that could compete against humans. Our limited knowledge and experience with training meant that we did not optimally fine tune the factors involved in training which impeded the neural networks progress.

Part B

Our group accomplished the creation of a good rudimentary environment in which a neural network AI can be trained in real time using visual data. We also grew in our ability to collaborate and assign each other tasks. This took the form of bouncing ideas off of each other during planning meetings and then implementing those ideas. Group work, as a duo, works quite well, especially since there is a mutual respect between my teammate and myself. We have complimentary skills that allowed this project to come together as it did. I am very big concept

oriented and more of an organizer while he is very technically savvy and has the drive to really

dive into topics to get the most out of them.