Training a Convolutional Neural Network to Play Pong Using OpenAi Gym

As the title suggests, my goal for this project is to create a convolutional neural network that can win a game of pong against the A.I. in OpenAi's Pong-v0 environment. This is related to the scope of the CS5600 because I will be training a convolutional network which is closer related to what I have learned in this class so far.

This will be a new project that is not related to any of my other projects for my different classes.

For this project I will be using OpenAI gym which will need to be installed in order for the project to run. This could potentially require install cmake also, but otherwise you should be able to run pip install gym to get OpenAI gym to work. This will also require running pip install Atari because the game environment will be from the Atari class of games.

I will not be using any large datasets for this project, but I will include the URL for OpenAI gym's Pong Environment. This will be main resource I will be using for this project. https://gym.openai.com/envs/Pong-v0/

In terms of deliverables, I will be training a ConvNet to win a game of pong in the OpenAi gym's environment. I will submit my source code, the trained ConvNet, a README, and a performance report where I will discuss any performance improvements I noticed and what that means for the project as a whole.

I will be doing a programming project so I will have to create a README file with all the instructions on how to run the project. I will include all the information from the above replicability paragraph, and I will add any pertinent information as the project continues. As of

right now I plan on clearly stating the steps I took to get my project to run and any other important information like how to change training episodes.

Planned Schedule:

- Setup all necessary installations to get the environment up and running – 11/26
- Turn the game image from OpenAi into something my CN can use to train – 12/1
- Create my CN 12/5
- Create action (Move up or down) and then add rewards based on success or failure 12/11
- Backprop and Training 12/15

One of the potential risks I see for this project is course load from my other classes. I currently am working on a project for my robotics class which will also require a lot of time because data gathering with Spot can be difficult. Another risk is my job schedule changing as I am currently working, but also looking for a new job. I will be traveling next week for Thanksgiving which will also take up a couple of days. I will have a lot of time demands over the next couple of weeks which is why I chose to only do one CN instead of an ensemble. This should hopefully be a large enough project, but not run the risk of me having to change my plans close to the due date.