

Senior Design (492) Biweekly Report

Team Name: sdmay21-proj033

Team Members: Karter Krueger, Joshua Kalyanapu, Matthew Phipps, Rithvik Menon, Ryan Howe, Thamir Al Harthy, and Zachary Mass

Report Period: 3/1/2021 - 3/15/2021

Summary of Progress in this Period

During this period the team managed to make a lot of progress. Matthew managed to bug fix the issues we were having with the GNN code. On top of this Karter managed to get the simple_baselines3 CNN policy code integrated with the openAI gym code completed during the previous reporting period. The GNN team as a collective also studied implementations of GNN's to try and understand their uses, as well as how to implement one for our project. Matthew also managed to clean up the gitlab a lot during the period, though it still has work that needs to be done.

Zach, Ryan, and Rithvic worked on setting up Docker images with Unreal Engine and AirSim. We were ultimately able to successfully create an Ubuntu-based image using the ue4-docker open-source tool. Next we will need to move our code repo onto the image and work on getting it to run successfully in the container. Docker image is currently stored in [Docker Hub](#) so that team members can all pull from it.

The Simulation team is still having difficulties running the simulation on the servers and is still trying to get this working. On top of this they are trying to determine heuristics to keep track of to try and test new ways, and challenge old, to improve our current heuristics.

Pending Issues

- There is an error produced with running Unreal Engine with Docker, invalid attempt to read memory at 0x0 leads to a SegFault
- Need to discuss long term portability of docker images rather than just tied to a specific student's account in docker hub
- GNN we are having issues running it still outside of the environment that Deepak has set up

Individual Contributions

Name	Individual Contributions	Hours This Week	Hours Cumulative (Didn't start tracking until this report)
Zach Mass	Worked on developing Docker Images, significant amount of hurry/wait as docker images built and lots of troubleshooting of linux/bash and windows/powershell crossover	15	15
Rithvik Menon	Worked on developing Docker Image for Unreal Environments	9	9
Thamir Al-Harthy	Attempted to obtain Simulation Results	6	6
Matthew Phipps	Learned more about GNNs and RL, debugged GNN and clean up Gitlab	11	11
Karter Krueger	Learned more about GNNs and got CNN policy integrated properly.	13	13
Joshua Kalyanapu	Attempted to obtain Simulation Results	3	3
Ryan Howe	Worked on developing Docker Image for Unreal Environments	10	10

Summary of Weekly Adviser Meeting

We went over individual contributions, including specific updates on the status of getting a Docker image running and work from the GNN and CNN. We also did a review of proper Git etiquette and talked about cleaning up the repo. For next week, Deepak gave us the goals to:

- 1) Run the code on Alienware
 - 2) Integrate GNN with StableBaselines
 - 3) Check the CNN Code + Debug it
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Plans for Upcoming Reporting Period

In the upcoming reporting period we are planning to start the integration of the GNN with the stable_baselines3 repo. Specifically the custom policy network for the D3QN interface provided by stable_baselines3. On top of this we hope to have the docker instance up and running so that we can start running our code, training the neural nets. After this is achieved we can really

start to look into improving the heuristics we are using in our implementation of the GNN/CNN policies.

For Docker, we need to pull our repo into the Docker container and get it to run successfully.

This will likely entail a lot of troubleshooting errors. We also need to begin having discussions about pipelines or other implementations to automatically deploy the code to Docker containers as updated.
