

EE/CprE/SE 491 WEEKLY REPORT 9

Apr 3 - Apr 9

Group number: 20

Project title: GridGPT

Client &/Advisor: Gelli Ravikumar

Team Members/Role:

- **Tin Ngo -> AI Integration Specialist**
- **Jackson Phillips -> AI Integration Specialist**
- **Emma Heithoff -> Power Systems Specialist**
- **Eddy Andrade -> Frontend Lead**
- **Nick Doty -> Power Systems Assistant**

○ **Weekly Summary**

- We as a team continued to work on our assigned roles. After careful consideration and seeking advice from us, Nick has decided to switch his role from a Backend Lead to a Power Systems Assistant. He will work closely with Emma with the Power Systems to help us all overall to understand DSS files much better. We will outsource Backend with the previous team who worked on the project. We also began setting up our virtual machine so we all can start working on the project with our own VMs. In doing so, we came across a couple issues, and we're hoping for it to be resolved soon.

○ **Past week accomplishments**

- Tin Ngo: Our project uses Docker heavily so I did research on Docker. I plan on developing a design that containerizes the AI module. This container will include all the necessary dependencies to operate and utilize complex AI models. Docker already has a repository of AI/ML images that will allow us to build the containers we need. When thinking about this project, I also think about how we can monitor and evaluate our AI module. I looked into different database options and came to the conclusion that MongoDB would be the best. I will use MongoDB to store responses generated from the beginning of this project journey until the end. This will allow us to monitor and evaluate our AI Model. I also created a block diagram of the Hugging Face architecture because it is different from OpenAIs architecture. I got really deep into learning about the low level for how AI models work.

Here is the block diagram:



- Jackson Phillips: This week I spent time getting familiar with OpenAI's api tools and found a page where you can send a message to 2 different gpt models to compare the results which will be very useful once I can get some example questions with expected responses.
- Emma Heithoff: ChatGPT generated example data for our dataset categories (3). I reviewed my role in the AI training to prepare to input data I am generating into Jackson's Hugging Face potential models. I focused on how datasets are organized so a model can train effectively. We observed changes from dss_python to the newest implementation by reviewing the schema code.
- Eddy Andrade: This past week, I got to show my idea of implementing the grid model UI to the client. They liked it so I will work off of that design. I began to set up the teams' master virtual machine, and I worked with the previous Frontend lead Peeyush who worked on the project. However, when attempting to set it up and have the VM ready to go to run the project we came across some issues. We tried to resolve them but we were spending a significant amount of time on it. Peeyush told me that he would try to figure out what was going on and he would let me know. For the time being, I will be waiting on that.
- Nick Doty: This week I have focused on finishing a tutorial that allowed me to get more familiar with the OpenDSS software for when we get it loaded on to our VMs. Additionally, I have looked more into

DSS files found on GitHub, specifically DSS-Python and AltDSS-Schema to get familiar with file formatting for when we have our own datasets to work with.

○ **Pending issues**

- Tin Ngo: No pending issues
- Jackson Phillips: No pending issues.
- Emma Heithoff: No pending issues.
- Eddy Andrade: Virtual Machine is having some issues with running the overall project. Will wait on Peeyush to update me on any updates that come up.
- Nick Doty: N/A

○ **Individual contributions**

| <u>NAME</u> | <u>Individual Contributions</u> <i>(Quick list of contributions. This should be short.)</i> | <u>Hours this week</u> | <u>HOURS cumulative</u> |
|--------------------|---|-------------------------------|--------------------------------|
| Tin Ngo | Docker, MongoDB, block diagrams, AI research | 12 | 64 |
| Jackson Phillips | OpenAI testing | 6 | 54 |
| Emma Heithoff | Detailed Gantt, Dataset experimentation | 6 | 46 |
| Eddy Andrade | Virtual Machine setup and Project setup | 6 | 54 |
| Nick Doty | Basic DSS understanding | 6 | 54 |

○ **Comments and extended discussion**

○ **Plans for the upcoming week**

- Tin Ngo: I want to start experimenting and creating proof of concepts. Last week, I was supposed to, but based on feedback from our advisor, I prioritized other things. We also got access to our OpenAI API key. I also want to try and get our VMs
- Jackson Phillips: I would like to get our VMs cloned and get closer to getting HPC access. I also want to get some example questions and responses for DSS scripts from the DSS experts to test different models for accuracy before we dive too deep into training them.
- Emma Heithoff: I want to see how the datasets generated by ChatGPT match some of the Hugging Face models Jackson has found, and then adjust my dataset generation accordingly. I want to become familiar with storing our datasets in the backend by talking to Nick about his research to this point and the graduate students, also.
- Eddy Andrade: The main thing I wanted to do was set up the Virtual Machine so I can begin running the project, but while I am waiting for the VM to work with it I can continue on learning about Next.js and maybe even about the use of Streaming.
- Nick Doty: Once the VMs are working properly, I will get the OpenDSS software running on it.

Additionally, I will talk to Emma regarding the databases that GridGPT is going to use to store the data.

- **Summary of weekly advisor meeting**