

EE/CprE/SE 491 WEEKLY REPORT 2

Feb 7 - Feb 13

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 -> Backend Lead**

○ **Weekly Summary**

After acquiring more details about our project, we invested time into learning more about AI models, dss files, and dug a little into Hugging Face. We talked about three different use cases of our application and how to leverage them. Since we are in the designing phase, we found value in exploring how to use AI models from Hugging Face into applications. We also worked on acquiring knowledge on REACT for our front-end and Python Flask for our back-end.

○ **Past week's accomplishments**

- **Tin Ngo:** After meeting with our advisor, I spent some time thinking about what knowledge I should obtain and so I spent some time learning about how to use transformers and pipelines that are provided by Hugging Face. This will allow us to work with AI models in hugging faces. I also spent some time trying to set up docker dev containers so that we won't have to worry about dependencies later on. One of the use cases it explains how we would want a copilot application to help generate code. I looked a little bit into code llamas that might help with this.
- **Jackson Phillips:** I spent most of my time this week getting familiar with running a Gpt locally so I can learn more about how to write code for the model we will design. I was able to get gpt2 using the transformers library on hugging face running locally and printing very basic generated text.
- **Emma Heithoff:** After our client detailed the use case possibilities for the design I began the process of exploring the dss files that are relevant for the dss_python project; This project is an engine viewable on GitHub and was written on a different API than we will use, I currently believe. I viewed test cases of DSS files on GitHub and do need additional time to absorb the information fully. I aimed to familiarize myself with the terms I did not understand on the programming side of our project so far in our conversations and progressed on connecting their future design into my knowledge of power analysis.
- **Eddy Andrade:** this past week, me and my team spoke with our client to catch up on the project. In the meeting, I spoke with the client to decide which language I should use to program the User

Interface for GridGPT. The client recommended me to use React and to implement the latest version of Node.JS to work with React. For this past week, I began to learn and familiarize myself with React and get my IDE environment (WebStorm by JetBrains) set up. I also learned about Bootstrap to give me more options to design websites with React.

- Nick Doty: The team met with our client and got more specifics regarding GridGPT. For the backend, we were instructed to use Flask architecture. To begin my research, I found a Flask tutorial I plan to review. This tutorial will allow me to get good hands-on experience with Flask that can be utilized in our project.

○ **Pending issues**

- Tin Ngo: I had some issues with Docker dev containers. I didn't understand how to import dependencies that would work with Hugging face imports.
- Jackson Phillips: I had some issues getting any AI models running but I was able to get GPT2 doing something small but I am still having issues with other models and I'm not quite sure how to fix that.
- Emma Heithoff: I do not have issues at the moment, however, I do need more time exploring the dss files and python projects working with them previously. I anticipate questions after more time has been spent over the next report period.
- Eddy Andrade: currently, I am still familiarizing myself with React and learning about the basics of the code. Until we have a good foundation with our AI, I will continue to work on bettering my understanding with React and Bootstrap.
- Nick Doty: I have no issues at the moment. Currently researching Flask architecture and how it can be implemented as the backend.

○ **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	Transformers tutorial, docker, code llama	7	13
Jackson Phillips	Got gpt2 running a basic function.	8	14
Emma Heithoff	Research of .dss files & Python extension	6	12
Eddy Andrade	React/Bootstrap Research & Development	6	12
Nick Doty	Flask Research & Development	6	12

○ **Comments and extended discussion**

- Tin Ngo: N/A
- Jackson Phillips: N/A
- Emma Heithoff: N/A
- Eddy Andrade: as of this week, no comments or questions.
- Nick Doty: N/A at this time

○ **Plans for the upcoming week**

- Tin Ngo: Continue to work on a mini-application that uses an AI model from Hugging Face. I want to set up an environment that uses docker dev containers so that when we all develop our code, we won't have any dependency issues that are very common in the industry.
- Jackson Phillips: I will be continuing to work on gpt2 functions to try and pass in user input to allow us to talk to the model.
- Emma Heithoff: Continue to tailor my research to the need for GridGPT based on the foundation of other projects I've been analyzing in GitHub.
- Eddy Andrade: continue to research more about React and Bootstrap. Learn more about the different features I am able to work with and how to implement them for our AI.
- Nick Doty: Learn more about the flask architecture and how it can be utilized as the backend in GridGPT

○ **Summary of weekly advisor meeting**

In our meeting with our advisor this week, he outlined some use cases for us to think of for the project. The four use cases are the following...

Use Case #1: GridPilot of GridGpts

- Utilize the DSS-Extensions repository on GitHub, which contains power grid models stored in folders.
- Each model is represented by a master file that can include references (redirects) to other files, allowing for a modular approach to grid modeling.
- The AI model (possibly based on GPT or similar) is expected to dynamically modify or add script lines to these DSS files based on the context or requirements.

Use Case #2: GridRealTime of GridGpts

- The project will interact with various databases like InfluxDB, GraphDB, and MongoDB, which store real-time and historical data relevant to the power grids.
- The purpose here might be to integrate or utilize this data within the grid simulations or for analytics.

Use Case #3: GridGPT-G of GridGpts

- Incorporate data from OpenDSS (Open Distribution System Simulator), leveraging example JSON files found in the dss-extensions GitHub repository for modeling or simulation purposes.

Use Case #4: Data Sources

- OpenDSS - Open Distribution System Simulator

- Utilize an AI model to understand DSS files and provide dss_python scripts for power flow analysis and apps.

He also advised us to focus more on understanding how to make basic functions for AI models rather than implementing our final functions for the project.