

EE/CprE/SE 491 WEEKLY REPORT 8

10/9/2024 – 10/16/2024

Group number: 42

Project title: GridGPT 2.0

Client &/Advisor: Gelli Ravikumar

Team Members/Role:

Luke Eitzmann -OpenDSS-Lead

Ian Louis - Power Co-lead

Scott Rininger - Power Co-lead

Aditi Nachnani - Full Stack AI Co-Lead

Ian Bussan - Full Stack AI Co-Lead

- **Weekly Summary**

This week, we met with our advisor Dr. Gelli to present our research from the previous week. The grid team worked on coding optimization functions in Gurobi. The Grid team has also been practicing using OpenDSS and has been documenting their findings with the software. The Grid team also researched more into distribution system operators. The AI team got the AI key for OpenAI and implemented a related topic that we have been researching. Including implementation of ChatGPT with DSS files and integration of LLM querying from Databases.

- **Past week's accomplishments**

- **Luke Eitzmann:** I continued my practice for OpenDSS. I am watching YouTube videos and implementing their practices into my own script in an attempt to learn how to use OpenDSS. I've created some slides to record all new discoveries in OpenDSS
- **Ian Louis:** I worked on implementing a Python script to optimize VPPs. To do, this I used a python library called Gurobi. I finished implementing the objective and constraint functions, and I am just waiting on data to test the script.
- **Ian Bussan:** This week I implemented ChatGPT to query data from databases Neo4j and FluxDB. I learned how to structure the prompt for each type of Database, Neo4j makes

ChatGPT make a cipher, for FluxDB makes ChatGPT make flux. Then have ChatGPT translate the query back into the natural language.

- **Aditi Nachnani:** This week, I got hands-on experience on how to take DSS files and feed them to the AI model as the context. To achieve this, I read the file, extracted the important information, and sent it as the content with the prompt. Additionally, I looked into tokens and what token limits we have for our OpenAI subscription.

- **Scott Rininger:** I researched more about DSOs. This time I focused on the interaction between the different actors in a DSO. I also came up with different schemes the United States could use to implement DSOs

- **Pending issues**

- No issues

- **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>
Luke Eitzmann	Learned and practiced using OpenDSS. Created slides to record all new Discoveries for OpenDSS	6	30
Ian Louis	I wrote a Python script for optimizing the creation of Virtual Power Plants from DERs	6	30
Scott Rininger	Created a presentation about the findings from my research and presented to the group and the client. Specifically over the interaction between DSO actors and the different schemes	6	30
Aditi Nachnani	Implemented a simple AI model and injected DSS files as context	6	30
Ian Bussan	Implementation of ChatGPT with Neo4j and FluxDB, create flux and ciphers	6	30

- **Plans for the upcoming week**

- **Scott Rininger:** My plan for the upcoming week is to dig deeping into DSOs to provide the team with more information to use during the project. I am going to discover how they operate in more detail.

- **Ian Louis:** I am going to continue work on my optimization script. I will use test data

provided, to debug and verify my script.

- **Luke Eitzmann:** Next week, I plan to continue what I've been doing and try to learn more about OpenDSS. I will continue to watch YouTube training videos, and Professor Gelli has provided me with a workshop to learn about OpenDSS. I also plan to assemble my own script.

- **Ian Bussan:** I will learn how to fine-tune the model for creating Neo4j ciphers. In addition, I will also plan to implement my LLM query code to GridAI Neo4j grid models, in addition to learning more about ChatGPT.

- **Aditi Nachnani:** The plan for next week is to look into how to fine-tune models using OpenAI and look at how to improve performance when given large files. Specifically, I will look into context state management.

- **Summary of weekly advisor meeting**

This week we discussed our individual progress with Dr. Gelli. The Grid team presented the research we did this week about our special topics. Scott researched more about distribution system operators and how they operate, Luke researched and practiced the use of OpenDSS software, recording everything he found, and Ian worked on creating a Python script to find the optimal grouping of DERs to form VPPs. The AI team presented their implementation of ChatGPT with DSS files and integration of LLM querying from the Database. Aditi worked on ore processing DSS files and using that as the context for the model. Ian implemented ChatGPT to query data from databases Neo4j and FluxDB.