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Graduate Data Engineering Capstone

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Midterm Check-In

**Overview of Status:**

The project is well on track. I am close to finishing the research phase which focuses on intelligent traffic routing, real-time anomaly detection, threat mitigation, and adaptive load balancing. I’ve been able to identify relevant technologies that align with these goals such a netmiko, Juptyer Lab suite, ChatGPT, Gemini, and Grok LLMs, Wazuh, Logstash, PyTorch and Python.

Next, I am going to focus on building a test network using emulation software, EVE-NG and leveraging the technologies identified to test LLMs to see if they can be used to automate and deepen log analysis and provide accurate feedback of configuration files. With the research phase nearing completion, the next steps will involve prototyping and testing on the emulation software to build out the AI models and network. I plan to use Grok, ChatGPT, and Google Gemini models available online if I am unable to install them locally and train them. Following this, I will focus on running performance evaluations to test the efficiency of the models with log and configuration analysis. Lastly, I plan to compile comprehensive documentation and prepare for the final presentation of the project's outcomes and next steps.

**Milestones Completed:**

* Initial scholarly research
* Notes taken for research paper
* Framework created for paper
* Procured development/test environment for deployment of tests (EVE-NG)

**Milestones to Complete:**

* Formal writing of paper and PowerPoint
* Final source selection
* Write automation code to grab logs from network devices
* Deploy in test environment and begin testing
* Integrate results into final paper and presentation