Capstone assessment: Michael Mercer

Our senior design project is meant to be an assistant to professors and students alike. This tool will help create unique example problems based off of problems done in class. This will help professors differentiate their homework assignments to prevent cheating and also allow students to get more practice relevant to class instead of going on the internet and finding a question that may or may not be relevant to the class. It will also actively deter cheating, why pay for a Chegg account and look up guided solutions to homework when you can work through a practice problem with a guided solution? Evergreen classrooms will create a healthy learning environment by giving students relevant practice problems.

Classes that helped me prepare for this class are software engineering, ai, machine learning, and scientific writing. Software engineering helped me learn how to keep track of my software related work and gave me the tools I needed to effectively work on a team. AI taught me about the importance of using algorithms over some generative model. Machine learning taught me how I can analyze data and use it to create a more self-sustaining app. Scientific writing will help me draft up our pitches as well as be able to articulate our desires to the software itself when generating these problems.

Coop played the biggest role in my ideas for the project. At GE I worked a lot on requirements engineering and how to keep a programming environment as simple as possible to prevent us from making a confusing repository full of packages that the model does not even need. On my other rotations I actually had a direct focus on AI and machine learning. I collected data, validated data, and even got to work on RAG models which is likely the structure evergreen classrooms will follow. At Belcan I got a lot of experience with managing servers that run backend processes, specifically keeping them secure and making sure all necessary services are up and running.

I am excited to work on this project for many reasons. The most influential reasons being that throughout college, I wished that I could have some more example problems from the professor. Time and time again I would find myself redoing problems from class or homework problems, just to find out that the exam is a lot more difficult or that the stuff I studied was not even relevant. This tool will help students get more exposure to different types of questions instead of just studying the same questions over and over again. I have worked with the people on my team before and I know that they are driven to deliver good results which always makes me feel better about a project. I am also excited to actively develop a RAG model outside of work or class.

Our plan of action should follow that of other RAG model projects. First, we will analyze our requirements to get our repository setup. Second, we will work with our advisor to make and label some data to use for the model, there are a lot of professors willing to help with this tool. Third, we will implement a basic front end to help us test our model later. Fourth will be our actual implementation of our rag model probably leveraging a tool like AWS. Then finally we need to validate our model and make sure it preforms as expected. How I will measure my work is based on how the model preforms and it is simple as that. We have done a good job if our model preforms well, whether it be as a prototype or even a fully finished product. Realistically this project will take a couple years to reach its full potential, but seeing as how the university was already going to research this beforehand, I think a solid prototype and proof of concept for further research will suffice.