

Our senior design project is focused on designing organic, transparent photovoltaic panels for use in agrivoltaics. The computer science side of this project will be focused on utilizing Graph Neural Networks and Generative AI models to study relationships between different materials for this use case. Utilizing these models, we can test different combinations in order to develop a panel which absorbs specific wavelengths and in turn generate electricity while allowing plant growth.

This project builds on some foundational topics covered in my academic journey, namely CS4033 AI Principles and Applications. I am also currently taking EECE 5146 Evolutionary Computing, which while not being directly related is sort of a parallel approach to AI models. Contrasting my experience with that course and this project will ultimately give me perspective on which method is ideal for a particular application in my career.

In my previous experience, I have had very little experience with AI models in any form. A brief portion of my work at FIS involved training a machine learning model for Optical Character Recognition, but that is the extent of my previous experience. My time at both FIS and Crown Equipment Corp have taught me to learn new technologies quite quickly, as well as the evergreen subjects such as project management, development practices, etc. FIS specifically involved working with a team of peers with a technical mentor, which is very similar to this project's development process.

I was motivated to work on this project because of the involvement with OMID-USA and their mission. Along with the mission, this is an opportunity to dive into the current software development zeitgeist of generative AI and in a way which I would consider worthwhile. As this is quite different from most of the work that I have done in the past I'm currently researching GNNs as well as the engineering behind photovoltaics in order to design the final product. During this time the project has also been continuously recruiting engineers from other disciplines to round out the final team.

The final deliverables for this project will ideally include a working prototype of the photovoltaic panels. Unfortunately, I don't think we will be able to see the product out in the field and adjust as it will need to be tested over the course of a growing season. Because of this, I think some aspects of the project will continue to be developed beyond the scope of my senior year but I'm hoping to leave the project with a working model which can process the data in addition to the panel itself. It can be difficult to accurately judge the pace of development, especially when working with a new (to me) technology, so I'm trusting my advisor to give me honest feedback during the development process.