

Fall 2024 Project List

MGMT 690 ELI Corporate Consulting

Project 1

International **graduate** students in **STEM** have limited options if they want, for example, to establish their own business in the U.S. after graduation or work for a tech company that is unable to sponsor an H-1b Visa. Our International Scholars Services (ISS) office has been working with the Department of State to enable Purdue to sponsor graduated researchers under an enhanced **J-1 program**. The implementation of this program is complicated and requires careful planning as there are quite a few entities at Purdue that need to play a role (e.g., Industry partnerships, Legal, Research, Sponsored programs, etc.) as well as external parties such as chambers of commerce. The ultimate goal is to provide similar opportunities for international students as domestic students and to keep the Purdue-trained talent in the United States.

Project 2

AI company in **Ed-Tech** is looking for analytical assistance in **knowledge graph development** and understanding student progress to map. The founder would guide students and have access to corpora data and student response information. While knowledge graphs from reduced dimensional data is pretty common, proper labeling of this is not as well developed. Further, new developments such as GraphRAG from Microsoft may alter the process of knowledge graph development. Perhaps more important than knowing what is in a corpus is the ability to understand how students map on this corpus. The goal is to understand what students know and do not know based on limited response information versus a topical inventory of student responses to be more predictive. In other words, can you use limited student responses along with the graph relationship to quickly assess gaps in knowledge between concepts.

Project 3

Retrieval Augmented GenerativeAI (RAG) has been a standard process in feeding large language models pointed information for some time. The process is based on a vector match between the embeddings of the query and the embeddings of the retrieved information. There have been some recent articles on RAG and the accuracy of this process particularly when you have a complex query or a complex text chunk. Transformers which tokenize text have multiple layers (heads) which process text on the way to become a vector embedding. These heads allow for different and simultaneous processing of attention mechanisms into tensor vectors. The last hidden head in the transformer has tokenized information which is thought to be beneficial for retrieval. While all of this may sound very complex, the project is a comparison of embedding/retrieval models for improved RAG. Students will gain a more complete understanding of how LLM/AI works and will set students up for interviewing and careers in AI.