

Project 1: Vectorized Embedding Optimizer for Large Language Models (VEO-LLM)

Company Overview:

Analytical Data Systems empowers businesses by providing state-of-the-art software products, data processing systems, and AI-driven analytics solutions. Our experts are passionate about enabling companies to make informed decisions, optimize operations, and drive growth using data-driven insights. As a computer science student at a top engineering school, you have a unique opportunity to participate in our summer project, which aims to equip you with the skills and experience necessary to excel in the highly competitive world of data analytics, AI, and software development. Join us in our quest to revolutionize the way businesses harness the power of data and technology to unlock new opportunities, maximize value, and shape the future.

Description:

In this project, participants will work collaboratively to develop the Vectorized Embedding Optimizer for Large Language Models (VEO-LLM), a cutting-edge tool designed to optimize the selection of vectorized embeddings for LLMs like GPT-4. By leveraging advanced summarization and keyword extraction techniques, the VEO-LLM aims to improve context understanding and selection for advanced LLM prompt chaining. The focus will be on creating efficient algorithms, and back-end utilities to facilitate vector optimization for various tasks. Additionally, a reporting interface that provides information-optimized embeddings for various applications, including summarization and analysis of multiple documents via chat, is desired.

Technology: GPT-4, Langchain, Milivus, Node, React, Python

Open Source Starting Point: <https://github.com/mayoosar/gpt4-pdf-chatbot-langchain>

Objectives:

1. Develop algorithms to optimize vectorized embeddings for context understanding: Students will work together to research and develop algorithms for selecting the most appropriate vectorized embeddings, enhancing the LLM's ability to understand context and produce more accurate results. Think about having 1000s of documents, or emails, or other unstructured data and the vector organization and retrieval to facilitate effective multi-prompt chains driven by a back end agent.
2. Implement advanced summarization and keyword extraction techniques: In order to improve the VEO-LLM's overall performance, participants will explore and implement advanced techniques for text summarization and keyword extraction. These approaches will allow the tool to comprehend the context better and provide more accurate prompt chaining.
3. Create back-end utilities and tools to support the optimizer: The team will design and build back-end utilities that support the VEO-LLM, including ingestion, data preprocessing, and evaluation tools. This will ensure that the optimizer is adaptable to various applications and can handle the demands of different LLMs.
4. Test the tool with various applications and contexts: To evaluate the effectiveness of the VEO-LLM, participants will test the tool across a range of applications and contexts, such as

sentiment analysis, language translation, and content generation. This will provide valuable insights into the tool's performance, strengths, and potential areas for improvement.

Why this project:

The VEO-LLM project offers a unique opportunity for students to delve into the world of large language models and make a significant contribution to this rapidly-evolving field. Students will gain hands-on experience with cutting-edge technologies and techniques, applying their skills to real-world challenges in natural language processing and artificial intelligence. The project is specifically designed to be completed within a 5-week timeframe, making it an ideal choice for an intensive, fast-paced learning experience.

By participating in this project, students will not only develop valuable technical skills but also foster critical thinking, problem-solving, and collaboration abilities. The VEO-LLM project is a fantastic opportunity for ambitious computer science students to showcase their talents, make a meaningful impact in the field of AI, and lay the foundation for a successful career in the technology industry.

IP: I encourage students to leverage any learning or know-how gained on these projects for their own use. However, any code or data used in the development of the project will remain the property of Analytical Data Systems.