**CPS AI Assistant**

**Enhancing Course Discovery and Student Support with RAG AI and Vector Database**

**Project Overview**

The CPS AI Assistant is an AI-powered chatbot designed to help students at the College of Professional Studies (CPS) at Northeastern University efficiently access information about available programs, courses, and general academic queries. Navigating university websites can be time-consuming, and relying on academic advisors for every question may burden faculty. To address these challenges, this AI assistant provides 24/7 support, enabling students to retrieve accurate information quickly and conveniently.

**Why RAG?**

The project leverages Retrieval-Augmented Generation (RAG) workflow, vector databases and LLM to enhance the accuracy and relevance of search results. Traditional keyword-based search mechanisms often fail to capture contextual meaning, whereas vector similarity search improves response quality by understanding semantic relationships between queries and stored information.

**Key Benefits**

* **Efficiency**: Students can instantly access structured course-related data without sifting through multiple webpages.
* **Accuracy:** Using vector similarity search ensures more relevant responses tailored to specific queries.
* **Accessibility:** Available 24/7, reducing dependency on academic advisors.
* **Customizability:** Offers two distinct search modes for precise information retrieval.

**Challenges & Drawbacks**

* **Overlapping Course Information:** Initially, a single search mode resulted in inaccuracies due to similar course structures across programs.
* **Vector Search Limitations:** The model may retrieve unintended results when course names are too similar.
* **Scalability Concerns:** As new programs and courses are introduced, maintaining an updated and optimized database is crucial.

**How It Works – Demonstration**

The CPS AI Assistant operates in two search modes:

* **Program-Specific Search**: Users select a program from a dropdown menu and ask detailed questions like "What is the course structure for this program?" or "What is the annual tuition fee?"
* **General Search:** Students can compare multiple programs, evaluate different campus offerings (Boston, Seattle, or online), and analyze career prospects.

By implementing the RAG workflow and vector similarity search, the chatbot retrieves precise information and, with the help of an LLM, generates accurate responses based on the context received in relation to the user’s query. Youtube Video Link for the project: <https://www.youtube.com/watch?v=vh3L0OKt4v4>