

EZ AP Companion

Make studying for your AP exams EZier

CS Project:

A personalized learning chatbot that helps students self-study for the AP Calculus Exam

Project Requirements/Specification Report

- Problem: Students need help with studying for the AP exam on their own.
- Target audience: Students independently studying AP Calculus
- Formal requirements:
 - Tasks:
 1. Provide explanations of Calculus topics and concepts
 2. Provide sample AP-style questions and FRQs (both from previous tests and textbook as well as original, newly-generated problems)
 3. Provide explanations with properly formatted steps
 - System inputs: Text prompt with the problem and any necessary math symbols
 - System outputs: Formatted text with the requested material for the user
 - User interface: Elaborated on later in the document (ChatGPT-esque)
- See existing technologies, PC, GPU with $\geq 8\text{GB}$ VRAM
- Armaan Priyadarshan: Finding API, editing,
- Ethan Zhou: Testing data, GUI,

Goals:

Create a Chatbot to help students study by providing concepts, formulas, and AP-style practice problems (both new and old) relevant to a topic when students ask for help

Features:

- Unit-by-unit resources and guided explanations of concepts
- Walks through sample problems step-by-step and provides comprehensive solutions
- Provides homework and practice test problems
- Formats math symbols

Technical and Data Feasibility

- Obtain data from existing AP questions
- Get video transcripts and problems from AP Classroom and AP YouTube channel
- Past AP Calculus AB and BC FRQs from CollegeBoard website
- Previous questions and tests from our classes
- Online questions and explanations from other classes
- Online textbooks
- Online courses

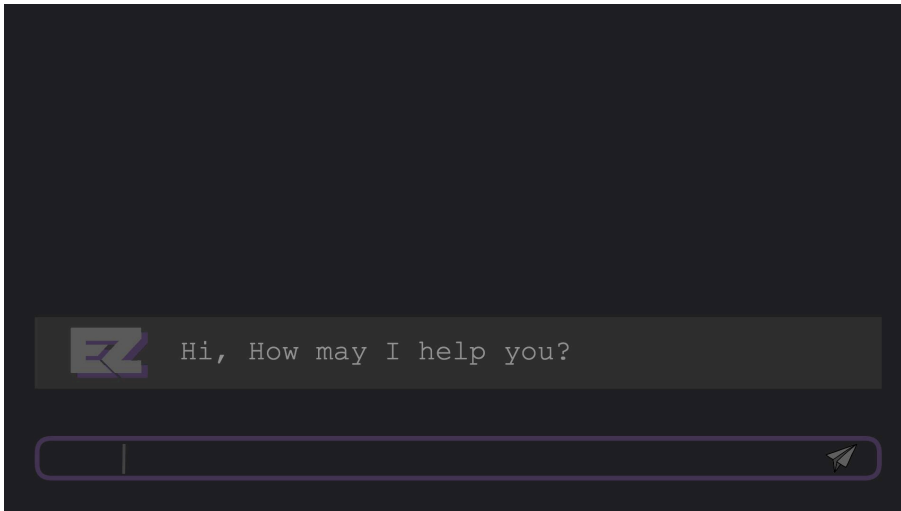
Existing technologies

- PyTorch
- HuggingFace Transformers
- Some existing open-source LLM (maybe LLaMA, GPT-J, Chinchilla?)
 - Smaller parameter model

- Training hardware (either Google Colab or a GPU with 8GB VRAM or more)

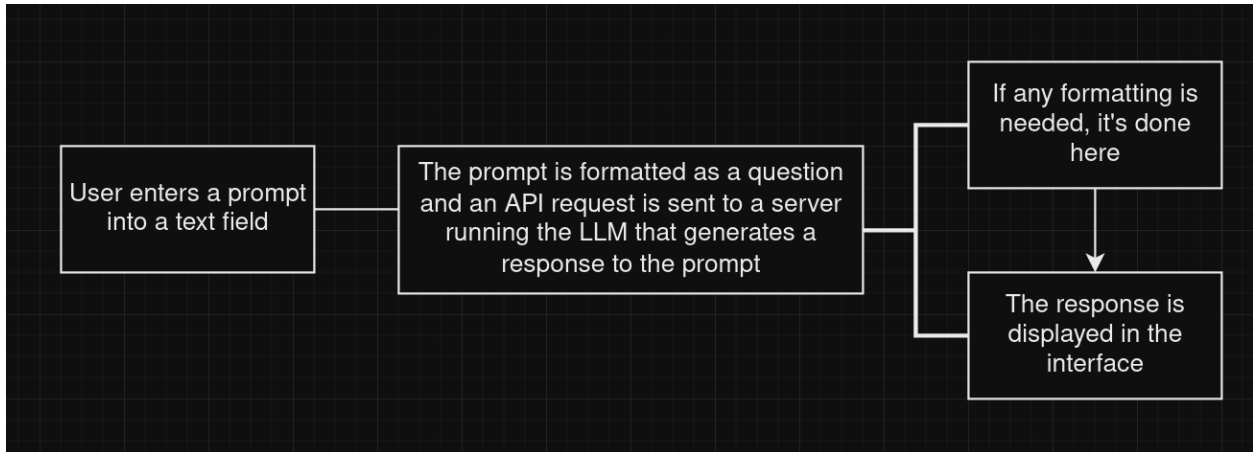
User Interface

- Similar to ChatGPT
- Chat window with text bar to signal input
- Light and dark modes
- Dark mode example:



- Calculator keyboard underneath input bar for those who do not want to use text prompts or mobile users

Flow Chart



Persistent Storage

- We aren't yet sure if we can implement persistent storage of the questions and answers on the LLM
- The LLM will probably be running on the cloud, so we'd need cloud storage if we do decide to use persistent storage