DS400 Capstone AI Tutor

Angelo Botticelli

Intro

- Cloud Mentor is an innovative, AI driven tutoring platform designed to give students a greater means to study outside of office hours and tutoring hours
- Proctors are able to log onto the website and drop files of their course notes into the page which they can then train on a course. Proctors may have any number of courses each with their own files
- Students are able to log on to the website and select any number of courses they've been assigned by their proctors and query those respective models

Frameworks-OpenAI API +

- To accomplish this, I have leveraged OpenAI's API to query a 4o version of ChatGPT
- The model is passed the text content from docs entered using either PyMuPDF or Python's Presentation package as well as a template prompt telling the model how to best behave as a tutor
    - PyMuPDF is a library designed for text & graphic extraction from PDFs though currently it is only leveraged for text
- When the training is complete, the course gains that as its stored context and all current student conversations inherit that
- Handwritten documents are supported locally but not on the cloud site due to memory constraints

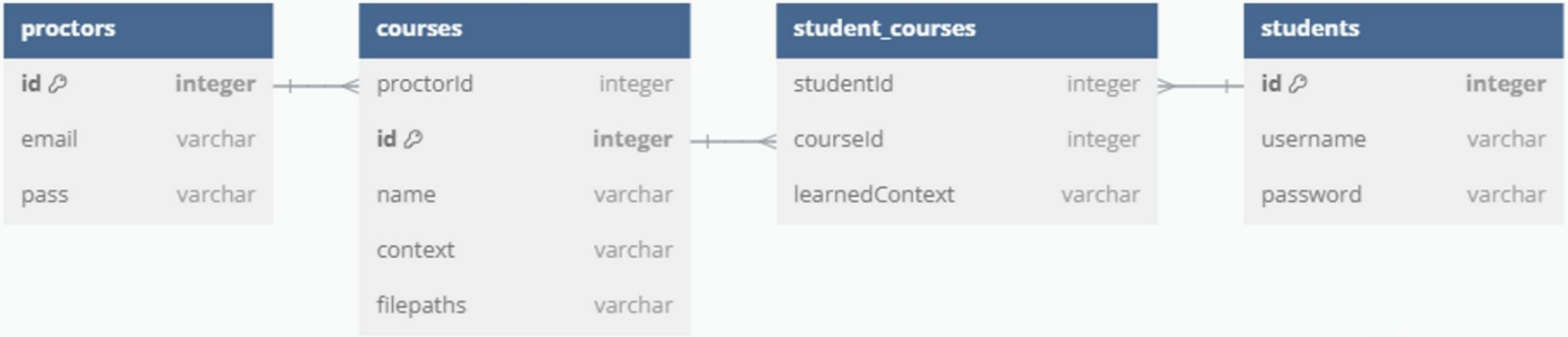
Frameworks-Flask

- This project utilizes a python package called Flask
  - Flask is a python framework designed for web apps to help link pages with python code
- Before the webpage was made, this was a terminal-based application with executables to read files and to query for answers
- Now with Flask, these executables are connected to the JS files for each page, linking those functions to interactable elements

Frameworks-Google Cloud

- The project is hosted on google cloud with nearly all functionality present
- Also new is the integration of data storage in 2 forms
- Buckets:
  - A bucket is basically a folder created on the cloud which I need as a proctor will be able to store the notes they upload to the tutor
  - Currently this is all on one “admin” directory but now that databases are working, I will transition this into a new folder for each proctor
- PostgreSQL
  - I have a relational database model hosted on google cloud SQL using PostgreSQL
- I also plan to soon integrate cookies to save the user’s name

DS400 Integration-DBMS Diagram



Note: the actual implementation is very similar; however, I renamed proctor's email to be username

Recorded Demo

Current Progress

1	Tutor Can understand PDF #1		Done
2	Tutor can tutor #2		Done
3	Tutor can handle pptx #5		Done
4	Tutor scope #3		Done
5	Multiple Questions #6		Done
6	Tutor can handle written documents #4		Done
7	Math Support #11		Todo
8	Ensure RESTfullness #22		Done
9	Data Scraping #16		Todo
10	Test Further Models #14		Todo
11	Basic UI-Proctor Side #8		Done
12	Basic UI-Student Side #9		Done
13	Advanced UI- Database #10		Done
14	Advanced UI-Log in #12		Done
15	Advanced UI-Proctor #13		Done
16	Advanced UI-Student #15		Done
17	Extra UI- TTS #17		Todo

Future Works & Improvements

- Graphics from notes supported as an input
- Loading line by line for prompts
- Text-To-Speech responses
- Specialized support for mathematical operations and LaTex input
- Re-integrating handwritten doc support for the cloud version
- Deletion for students from a course
- Testing of further models such as Gemini

Useful Links

Github Repo

Cloud Page