Educational Help tool

Overview of Educational help tool

An educational help tool is a technology-driven solution designed to assist students, educators, and learners of all ages in their academic endeavors. Its primary goal is to provide support, guidance, and resources to enhance the learning experience. Here's a brief summary of key features and functions commonly found in educational help tools:

1. **Subject-Based Assistance:** Offers help and information on a wide range of subjects, including science, math, history, literature, and more.
2. **Prompt-Driven Responses:** Utilizes prompts to interact with AI models, such as GPT-3, to generate responses, explanations, and educational content.
3. **Customizable Prompt Types:** Provides various prompt types, including overviews, importance, key points, examples, study tips, and quiz questions.
4. **Quiz Generation**: Generates quiz questions and answers to test knowledge and reinforce learning.
5. **Educational Resources:** Suggests and provides access to educational materials, articles, videos, and websites related to the chosen subject.
6. **Sentiment Analysis:** Analyzes the sentiment of generated responses to assess emotional tone and context.
7. **Learning Profiles:** Tracks and maintains profiles for individual students, recording their progress and subjects studied.
8. **Recommendations:** Offers personalized recommendations for related subjects or topics based on user interactions and learning profiles.
9. **User Authentication:** Supports user registration and authentication for personalized experiences.
10. **Feedback Mechanism:** Allows users to provide feedback on responses, helping improve the system's accuracy and relevance.
11. **Logging and Analytics:** Logs user interactions and performance data for analysis and system improvement.
12. **Accessibility and Compliance:** Ensures the tool is accessible to users with disabilities and complies with data privacy regulations.
13. **Continuous Improvement:** Incorporates user feedback to enhance the system's functionality and content quality.
14. **User Support:** Provides channels for users to seek assistance and support beyond automated responses.
15. **Documentation:** Offers user and administrator documentation to guide effective usage of the tool.

An educational help tool aims to empower learners by making educational content and support readily available, fostering a more engaging and effective learning experience. In this project I will implement some key functions to show case the use of AI in developing an educational tool.

Brief summary of AI techniques used in the project.

Generative AI

Generative AI is a type of artificial intelligence that can generate new content like the examples it has been trained on. Unlike other types of AI that rely on preexisting data to make decisions, generative AI can create new content, such as text, images, or even music, by learning patterns and relationships in the input data.

Large language models

Large language models, or **LLMs**, are a type of machine learning model that can generate natural language text with impressive quality and fluency. They are trained on massive text datasets using deep neural network architectures, such as transformers, and can learn to predict the probability distribution of words in a text sequence.

LLMs are designed to be highly flexible and can be fine-tuned to perform tasks, such as language translation, text summarization, question-answering, analyzing, or inferring by adjusting the model's parameters and training it on task-specific data. This flexibility makes LLMs a versatile tool for various natural language processing applications.

Several AI models have emerged recently and are becoming increasingly popular. Let's look at a few examples:

GPT-3

GPT-3 (Generative Pre-trained Transformer 3) is a language processing AI model developed by OpenAI, which can generate very complex text. It can take small amounts of inputs to produce relevant and useful responses. GPT-3 has 175 billion parameters, making it one of the largest and most powerful language models ever created. It has a wide range of applications, including text completion, summarization, translation, question-answering, and more.

ChatGPT

ChatGPT is an LLM created by OpenAI. It is based on the GPT architecture and can generate complex responses to a wide range of prompts, including text-based prompts, questions, and commands. ChatGPT is designed to be a conversational AI that can engage in dialogue with users on a variety of topics and is commonly used in chatbots, virtual assistants, and other natural language processing applications.

What is a prompt?

A **prompt** is a stimulus or cue to elicit a particular response or action. Prompts can take many forms, such as verbal or written instructions, visual cues, or physical gestures. For example, a teacher might give students a prompt to guide their writing on a specific topic.

In natural language processing and LLMs, a prompt is an input provided to the model in order to generate a response or prediction. The prompt can be a sentence, a question, a paragraph, or an instruction.

For example, when using a large language model to generate text, a prompt can be a few words or a sentence that provides a starting point for the model to generate a longer piece of text. Based on the prompt, the model then uses its language modeling capabilities to predict and generate the most likely continuation of the text. Similarly, in question-answering tasks, a prompt can be a question. The model uses it to generate a response based on its understanding of the context and knowledge in its training data.

The following are a few examples of prompts used for LLMs:

- "What is the capital city of the United States of America?"
- "List down the top five most played sports."
- "Explain the difference between 'affect' and 'effect.'"

Description of the program

1. **generate_quiz_questions(topic):**
    - This function generates quiz questions based on the specified topic.
    - It sends a prompt to the "text-davinci-002" OpenAI engine to generate quiz questions.
    - The generated questions are returned as text.
2. **analyze_sentiment(text):**
    - This function performs sentiment analysis on the provided text.
    - It uses the VADER SentimentIntensityAnalyzer to analyze the sentiment of the text.
    - The function returns a sentiment analysis score, including positive, neutral, negative, and compound sentiment scores.
3. **update_student_profile(student_name, subject):**
    - This function updates the student's learning profile with the subject they have interacted with.
    - It maintains a dictionary where each student's name is associated with a list of subjects they've studied.
4. **get_subject_info(subject, prompt_type="overview"):**
    - This function retrieves educational information about a subject based on the specified prompt type.
    - It sends a prompt to the "gpt-3.5-turbo" OpenAI model, asking for information about the subject.
    - The response is analyzed for sentiment, and both the response text and sentiment scores are returned.
5. **generate_resources(subject):**
    - This function generates educational resources related to a specified subject.
    - It sends a prompt to the "gpt-3.5-turbo" OpenAI model to suggest educational resources.

- The function returns the suggested educational resources.

The main part of the program is within the **if __name__ == "__main__":** block. It interacts with users through the command-line interface, allowing them to input their name, select a subject, choose a prompt type, and either generate quiz questions, educational resources, or retrieve information about the subject.

Throughout the program, OpenAI's GPT-3.5 Turbo model and VADER SentimentIntensityAnalyzer are utilized to provide educational assistance and analyze the sentiment of generated content. Additionally, the program maintains learning profiles for students, allowing them to track the subjects they've studied.