Generative AI Agent for Tutoring

Harnessing the capabilities of Large Language Models (LLMs) fused with proprietary data, this AI system utilizes Retrieval-Augmented Generation (RAG) techniques to create an agent that diligently assumes the role of a tutor, guiding and assisting students throughout their educational pursuits.

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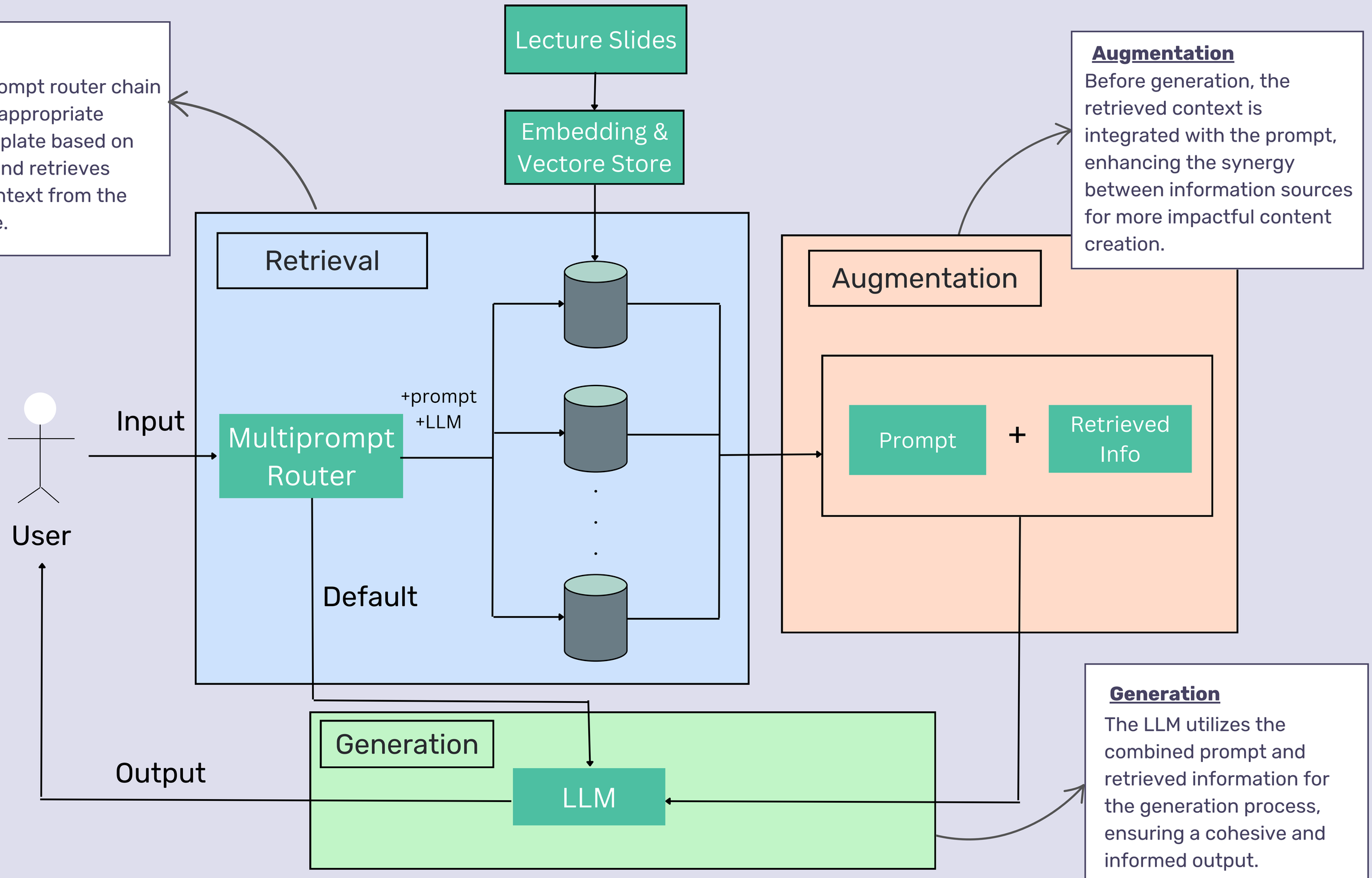
Introduction

Traditional educational methods often struggle to cater to the diverse learning styles and paces of individual students and as a result, there is a growing need for personalized and adaptive learning solutions. However, standard Q&A bots on the market provide limited engagement and adaptability. Harnessing the rapid advancement of AI, particularly the development of OpenAI's GPT-3.5 Turbo and LangChain, new possibilities for creating these intelligent educational tools have been made possible.

LangChain

Retrieval
The multiprompt router chain selects the appropriate prompt template based on user input and retrieves relevant context from the vector store.



Augmentation
Before generation, the retrieved context is integrated with the prompt, enhancing the synergy between information sources for more impactful content creation.

Generation
The LLM utilizes the combined prompt and retrieved information for the generation process, ensuring a cohesive and informed output.

Agent as Tutor

To be an effective tutor, an agent should have the following characteristics:

- Understand and adapt to the learning styles of students
- Assess the learning progress of students
- Identify weak areas and misconceptions according to course materials

Results and Performance

Q: How to start implementing my own neural network?

ChatGPT

AI: Here are some python codes to train, evaluate and tune your model to make predictions.

RAG Agent

AI: Here are some basic concepts to understand before implementing your model
(Evaluate understanding of concepts)

Tutor Question Prompting

- Describe the flow of information from the input layer to the output layer in a feedforward neural network. ✓
- What purpose do activation functions serve in the feedforward process? ✓
- Explain how the error is calculated in the context of backpropagation. ✗

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- How are the weights updated during the backpropagation process to minimize the error?
- What is the role of the chain rule in backpropagation?
- Explain how the error is calculated in the context of backpropagation.

Conclusion

In conclusion, the AI agent adeptly fulfills its tutoring responsibilities through the application of RAG techniques. This bears significant implications, including the potential to alleviate the workload of educators. By deploying such agents to assist in teaching, professors and tutors can enhance efficiency, ensuring students receive ample guidance in their coursework.

References/Related Literature

AutoGen: Enabling Next-Gen LLM Applications via Multi-Agent Conversation, [https://arxiv.org/abs/2308.08155]

Violation of Expectation via Metacognitive Prompting Reduces Theory of Mind Prediction Error in Large Language Models, [https://arxiv.org/pdf/2310.06983.pdf]