Senior Full Stack Developer Assignment: LLM-powered Chat for Document Exploration

This assignment evaluates your ability to design and implement a chat application that leverages Large Language Models (LLMs) to facilitate discussions around uploaded documents.

Objective:

Develop a chat application where users can upload a PDF document and then engage in a focused conversation about the content with an LLM. The LLM should stay within the context of the uploaded PDF and avoid introducing irrelevant information.

Challenges:

- **Contextual Understanding:** Move beyond simple keyword matching. Integrate Named Entity Recognition (NER) to allow the LLM to identify key entities (people, places, organizations) within the PDF. This enables deeper context understanding during the user's chat.
- **Multi-Document Summarization:** Extend functionality to handle multiple PDFs related to a similar topic. The LLM should summarize the key points from these documents and utilize that summary as the foundation for the chat.
- **Highlighting & Annotations:** Allow users to highlight specific sections of the PDF during the chat. The LLM should focus its responses on the highlighted areas, demonstrating the ability to integrate user interaction with LLM responses.
- **Disagreement Handling:** Introduce scenarios where the LLM might present conflicting information from the PDF or its knowledge base. Design the system to acknowledge these discrepancies and provide users with options to explore further (e.g., highlighting relevant sections in the PDF or offering additional sources).

Evaluation Criteria:

- **Accuracy & Relevance:** The LLM's responses will be assessed for factual accuracy based on the uploaded PDF content. We'll evaluate how well the responses stay relevant to the topic and avoid going off on tangents.
- **User Interface (UI) & User Experience (UX):** Consider the design of the chat interface. How effectively does it integrate the LLM responses, PDF highlighting functionalities, and any additional features you implement?
- **Scalability & Efficiency:** We'll assess your approach to handling large PDFs and managing multiple chat sessions concurrently. This evaluates your ability to consider real-world application scenarios.

Bonus Points:

- **Sentiment Analysis:** Incorporate sentiment analysis of the chat conversation. The LLM can then adjust its responses based on the user's emotional tone (e.g., providing clarifications if the user seems confused).
- **Personalization:** Allow users to set preferences for the LLM's response style (e.g., concise summaries, detailed explanations).

Deliverables:

- A working chat application prototype demonstrating the core functionalities mentioned above.
- A technical document outlining your design decisions, implementation approach, and any future considerations.

Timeline: 1 week

This assignment provides an opportunity to showcase your skills in:

- Software development using a modern programming language and framework.
- Integration of Large Language Models (LLMs) with your application.
- Understanding of Natural Language Processing (NLP) concepts like Named Entity Recognition (NER) and Sentiment Analysis.
- Designing a user-friendly and efficient chat interface.

We look forward to seeing your creative solutions!

Please submit this assignment at talent@worxwide.com