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Progress Report Number: 4

Note:

This week I and Nushkan did peer programming sessions utilizing LangChain in our chat system and streaming the data. Commits are pushed by Nushkan only.

Work Date/Hours Logs

Date	Number of Hours	Description of Work Done
March 24	2.5	Researched LangChain Expression Language (LCEL) for structured pipeline execution.
March 25	3	Integrated LCEL into chatbot logic for improved modularity and readability.
March 26	2.5	Implemented streaming with agents to enable real-time responses.
March 27	3	Refactored agent execution to efficiently handle multiple tool calls within a query.
March 28	2.5	Optimized memory handling in LangChain to improve response continuity and efficiency.
March 29	3	Conducted extensive testing and debugging to ensure smooth agent interactions.
March 30	2	Finalized enhancements, documented changes, and prepared the report.

Work Completed This Week

This week, I enhanced the Asklytics AI chatbot by incorporating LangChain Expression Language (LCEL) to create a more structured and maintainable processing pipeline. This improved the modularity and execution flow of AI tools for sentiment analysis, stock/housing predictions, and summarization.

I also implemented streaming with agents, allowing real-time responses and dynamic interaction handling. Previously, chatbot responses were sequential and delayed, but now they are asynchronous and more interactive. Additionally, I optimized LangChain's memory module to efficiently manage conversation history and prevent redundant queries.

Key Improvements:

- **LCEL integration** for structured pipeline execution.
- **Streaming response with agents** for better interactivity.

- **Enhanced memory management** to improve chatbot continuity.
- **Optimized multi-tool execution** to handle complex queries efficiently.

Challenges included handling concurrent tool execution within an agent, which I resolved by prioritizing tool calls and optimizing execution order. Additionally, ensuring memory consistency while handling streaming outputs required fine-tuning LangChain's built-in memory persistence methods.

GitHub Repository Check-In

The following files have been updated in the GitHub repository under **Implementation**:

- asklytics_chatbot2.py – Updated chatbot logic with LCEL, streaming agents, and improved memory management.

This progress ensures that Asklytics can now provide **real-time insights, structured responses, and efficient data processing**, enhancing the overall user experience.