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Progress Report Number: 5

Note: Like last week, this week I and Nushkan again did peer programming sessions utilizing LangChain in our chat system and streaming the data. Commits are pushed by both of us but mainly by me.

Work Logs

Date	Hours	Description of Work Done
March 31	2.5	Designed and configured LangChain AgentExecutor with streaming callback support.
April 1	3	Integrated custom tools (search, arithmetic, forecasting) into the AI assistant pipeline.
April 2	2.5	Implemented custom QueueCallbackHandler for real-time streaming responses.
April 3	3	Developed structured prompt templates for agent reasoning and multi-step tool use.
April 4	3	Enabled async tool handling and tested agent responses across multiple use cases.
April 5	2.5	Finalized architecture, improved output clarity, and reviewed feedback handling logic.
April 6	2	Documented the agent framework and updated files for GitHub commit and reporting.

Work Completed This Week

This week, I focused on advancing the **Asklytics AI Agent** by building a robust LangChain-based assistant that handles real-time data analytics and query resolution.

Using **LangChain's AgentExecutor** and **OpenAI's GPT-4o-mini**, I implemented streaming agent responses powered by a custom QueueCallbackHandler, allowing the chatbot to deliver partial, dynamic outputs in real-time.

Additionally, I developed and registered multiple custom tools including search (via SerpAPI), arithmetic operations, and time series forecasting, all designed to be triggered contextually during a conversation. I also created a structured **ChatPromptTemplate** to guide the agent's reasoning, allowing it to think step-by-step when using multiple tools in a single query.

Key achievements:

- Integrated **LangChain streaming agents** for real-time, asynchronous responses.
- Built custom tools with async support for arithmetic, forecasting, and web search.
- Developed a structured prompting system for agent-driven reasoning.
- Enhanced user interaction flow and tool execution sequencing.

One challenge was ensuring smooth concurrent execution of multiple tools without blocking, which I addressed using asynchronous routines and refined prompt formatting. Another key focus was making the chatbot scalable and maintainable for future extensions

GitHub Repository Check-In

The following file was updated in the repository under asklytics/agent_logic:

- **asklytics** – Includes LangChain streaming agent, custom tool integration, and prompt refactor.

This progress significantly improves Asklytics' user interaction quality and responsiveness, paving the way for intelligent and personalized analytics support.