Project Development Assignment

Overview

In this task, you will develop a fully autonomous agent using LangChain and openAI API. The agent should interact with users, retrieve relevant information from vector DBs and provide useful insightful responses based on user prompts. This assignment encourages practical application of generative AI concepts, emphasizing prompt engineering, clean code, and effective use of APIs and databases.

Assignment Requirements

1. **Agent Input**: The autonomous agent should begin by explaining its functionality to users. It will then wait for a user prompt to trigger its flow.
2. **Environment Variables**: The agent should use an `.env` file with a single environment variable, `API_KEY`, which will be provided. All other configurations, including the vector database URL and deployment name, must be hardcoded in the code.
3. **Vector Database**: The RAG system should use an online vector database to store and retrieve documents. Several free options are available, such as Qdrant. Groups must preload the database with the required documents before submitting the agent. The database link should be hardcoded into the agent's code.
4. **Framework**: Use `LangChain` to build the autonomous agent. The agent should follow a structured flow that ensures seamless interaction inline microagents.
5. **Code Quality**: The code should be clean, well-documented, and follow best practices. Provide comments where necessary to explain key parts of the code.
6. **Project structure:** The repository must include a directory named `agent`, which contains individual files for each microagent. The file organization should reflect the logical architecture of the project, enabling maintainability and clarity.
7. **Budget:** Your total budget for the project is **$20** for both the gpt-4o (text completion) and embedding deployment. Your team should count tokens

(input/output) when training the agent. Teams that will overstep their budget will not meet the project criteria which can result in severe grade reduction.

Submission Guidelines

1. **Repository Submission**: Each group must submit a GitHub repository link by **21st August 2025**. The repository should contain the entire project and be ready to run out of the box.
2. **Python Version**: The project should be compatible with **Python 3.11**. Ensure that all dependencies are listed in a `requirements.txt` file. Users should be able to install the required packages using the following command: pip install -r requirements.txt
3. Include a directory named `tokens_count` in the root of your repository. This directory should contain a summary file (e.g., `total_tokens.txt`) that reports the total number of tokens consumed by your project during development and testing.
4. **Example Prompts**: The repository should include a folder named `examples`, containing at least three sample input prompts and the corresponding output produced by the agent.

Final Note

These autonomous agents represent state-of-the-art technology with **advanced reasoning** capabilities. As you develop your agent, think about the broader implications and potential applications across various areas of life. Consider what new possibilities can be unlocked by harnessing these cutting-edge tools to solve real-world problems and enhance our daily experiences. Never it was possible to develop a fully autonomous agent so fast and with such quality - It's pretty cool 😊

Good luck!

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