Assignment: Text-to-SQL Agent

Overview

This assignment requires you to develop a natural language interface that translates user input (in plain text) into SQL queries for the Pagila database.

Dataset Details

The Pagila database consists of 21 related tables.

Setup

Clone the repo and run the following command to setup locally.

1. Run: `docker-compose up`
2. Done! Just use: `docker exec -it pagila psql -U postgres`

Requirements

1. **Input Format:** Plain text questions from the user.
2. **Output Format:** SQL query and execution results displayed as a table.
3. **Accuracy and Performance:**
    - The system should generate accurate SQL queries that align with the schema constraints (e.g., proper table and column names).

    - Gracefully handles ambiguous, incomplete, or incorrect user inputs, providing feedback to help the user refine their query.

4. **Model Considerations:**
    - You may use the free tier of Gemini or any other OSS LLM.

Evaluation

- The agent should be be evaluated against a set of 40 natural language queries (provided below).
- The scoring breakdown could be as follows:
    - 100% for fully correct queries.
    - 50% for queries that are logically correct but have minor errors.
    - 0% for queries that are incorrect or produce the wrong results.

Test Queries

Here is the set of 40 natural language queries that will be used for evaluation, available as an excel sheet.

Deliverables

1. Codebase with a README explaining setup and usage.
2. An interface (CLI/Web/notebook) to test things out.
3. A brief demo showing the system in action with multiple test cases.
4. Evaluation results, including accuracy scores for the 40 queries.
5. Analysis of the the errors and approaches followed for incremental improvements to the accuracy.