**🔍 SQL Query Assistant**

An AI-powered web application that allows users to interact with a MySQL database using natural language. This tool translates user questions into executable SQL queries, runs them, and provides clear, conversational answers, making database interaction accessible to non-technical users.

**✨ Features**

* **Natural Language to SQL Translation:** Converts plain English questions into syntactically correct MySQL queries using Google Gemini's powerful LLM.
* **Query Execution:** Seamlessly executes the generated SQL queries against a connected MySQL database.
* **Natural Language Response Generation:** Provides easy-to-understand, conversational answers based on the query results.
* **Interactive User Interface:** Built with Streamlit for a user-friendly and intuitive experience.
* **Database Connection Status:** Displays real-time database connection details and lists available tables.
* **Example Questions & Quick Actions:** Offers pre-defined queries and quick buttons to help users explore the database efficiently.
* **Error Handling:** Includes robust error handling for API and database connection issues.

**🚀 Technologies Used**

* **Python**
* **Streamlit:** For building the interactive web interface.
* **Google Generative AI (Gemini 2.5 Flash):** The Large Language Model (LLM) for natural language understanding and SQL generation.
* **Langchain:** Framework for orchestrating LLM interactions with the database.
* **MySQL:** The relational database system.
* **python-dotenv:** For managing environment variables (e.g., API keys, database credentials).
* **pymysql:** MySQL database connector for Python.
* **tenacity:** For adding retry logic to API calls.

**📸 Screenshots**

**Main Interface & AI Response**

*A user querying "show me the total revenue" and receiving a natural language response.*

**Additional Insights & Quick Actions**

*The application providing additional insights and quick action buttons after a query.*

**⚙️ How to Run Locally**

Follow these steps to set up and run the SQL Query Assistant on your local machine.

**1. Prerequisites**

* **Python 3.8+:** Ensure you have Python installed.
* **MySQL Database:** Have a MySQL database instance running (e.g., via Docker, XAMPP, or a local installation).
* Make sure you have a database named mystore (or adjust the DB\_NAME in your .env file).
* Ensure your MySQL user (root by default in the code) has the necessary permissions.
* **Google Gemini API Key:** Obtain an API key from [Google AI Studio](https://makersuite.google.com/app/apikey).

**2. Clone the Repository**

git clone https://github.com/your-username/sql-query-assistant.git  
cd sql-query-assistant

**3. Set Up Environment Variables**

Create a file named .env in the root directory of your project (the same directory as sql\_query.py). Add the following content, replacing the placeholder values with your actual credentials and API key:

GOOGLE\_API\_KEY="YOUR\_GOOGLE\_GEMINI\_API\_KEY"  
DB\_USER="root"  
DB\_PASSWORD="your\_mysql\_password"  
DB\_HOST="localhost"  
DB\_PORT="3306"  
DB\_NAME="mystore"

**Important:** Never share your GOOGLE\_API\_KEY or database credentials publicly. The .env file is included in the .gitignore to prevent accidental uploads.

**4. Install Dependencies**

It's recommended to use a virtual environment to manage dependencies.

# Create a virtual environment  
python -m venv venv  
  
# Activate the virtual environment  
# On Windows:  
.\venv\Scripts\activate  
# On macOS/Linux:  
source venv/bin/activate  
  
# Install required Python packages  
pip install -r requirements.txt

If you don't have a requirements.txt file, you can generate one by running pip freeze > requirements.txt after installing the necessary libraries (streamlit, langchain-google-genai, langchain-community, SQLAlchemy, pymysql, python-dotenv, tenacity).

**5. Run the Application**

Once all dependencies are installed and your .env file is configured, run the Streamlit application from your terminal:

streamlit run sql\_query.py

This command will open the application in your web browser, usually at http://localhost:8501.

**📧 Contact**

Feel free to reach out if you have any questions or feedback!

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