Intelligent SQL Querying using LLM (Google Gemini)

1 Introduction

Structured Query Language (SQL) is used to manage and retrieve data from relational databases. However, writing SQL queries requires technical knowledge.

This project simplifies database interaction by converting natural language questions into SQL queries using a Large Language Model (LLM) such as Google Gemini.

2 Objective

To convert natural language into SQL queries.

To integrate Google Gemini API for intelligent query generation.

To execute generated queries on SQLite database.

To display results using a Streamlit interface.

3 Problem Statement

Many users find it difficult to write SQL queries. This project provides a solution by allowing users to ask questions in simple English and automatically generating correct SQL queries.

4 Technologies Used

Python

SQLite

Streamlit

Google Gemini API

5 System Architecture

User → Streamlit Interface → Gemini API → SQL Query Generation → SQLite Database → Result Display

6 Working Methodology

User enters a question in English.

The question is sent to Google Gemini API.

Gemini converts the question into an SQL query.

The query executes on the SQLite database.

The result is displayed on the screen.

Advantages

Easy database interaction

No need for advanced SQL knowledge

Time-saving

User-friendly interface

9️⃣ Limitations

Requires internet connection (for Gemini API)

API key required

Query accuracy depends on prompt quality

🔟 Conclusion

The Intelligent SQL Querying system reduces the complexity of writing SQL queries by using AI technology. This project demonstrates how LLMs can simplify database management and improve accessibility for non-technical users.