IntelliSQL

Intelligent SQL Querying with LLMs Using Gemini Pro

Course: Cloud Application Development

Academic Year: 2025–2026

Abstract

IntelliSQL is an AI-powered cloud application that converts natural language queries into SQL statements using Google's Gemini Pro Large Language Model (LLM). The system simplifies database interaction by allowing users to ask questions in plain English. It integrates Streamlit for the user interface, SQLite for database management, and Gemini Pro for intelligent query generation.

1. Introduction

Structured Query Language (SQL) requires technical expertise for database interaction. IntelliSQL bridges this gap by leveraging Large Language Models to translate natural language into executable SQL queries.

2. Problem Statement

Manual SQL query writing can be complex and error-prone. This project develops an AI-driven solution to convert natural language queries into structured SQL statements.

3. Objectives

• Convert Natural Language to SQL • Integrate Gemini Pro LLM • Secure API Key Management • Provide User-Friendly Interface • Enable Efficient Data Exploration

4. System Architecture

User → Streamlit UI → Gemini API → SQL Generation → SQLite Database → Results Display

5. Technologies Used

Technology	Purpose
Python	Backend programming
Streamlit	Web user interface
Google Gemini Pro	Natural language processing
SQLite3	Lightweight database management
Pandas	Data handling and processing

python-dotenv	Secure API key management
Git & GitHub	Version control

6. Conclusion

IntelliSQL demonstrates the practical integration of Large Language Models into cloud-based database systems. By converting natural language into SQL queries, it enhances accessibility, improves productivity, and simplifies database interaction.