Enhancing Business Analytics through LLM-SQL Integration

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July 19, 2025

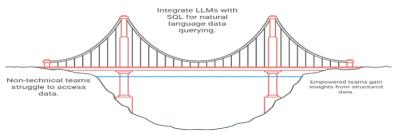
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Introduction

- Most business data is structured (e.g., P&L)
- Non-technical teams struggle with SQL access
- LLMs excel at language, not table logic
- Analysts are often needed for simple queries
- Delays in insight lead to slower decisions
- ullet We aim to build a bridge: ${f chat}
 ightarrow {f SQL}$

Bridging the Gap: LLMs and Structured Data Access



Objective

- Build a natural language—driven finance Q&A tool
- Convert user questions into structured SQL
- Ingest P&L, balance sheets as inputs
- Return human-readable answers with insights
- No SQL/BI knowledge required from users
- Unlock real-time access to performance metrics

Scope and Limitations

- Focused on financial statements and KPIs
- Inputs are structured (P&L, balance sheets)
- Supports performance-based natural questions
- Extendable to HR, sales, ops domains
- Limitation: Relies on defined schema structure

Problem Statement

To develop an LLM-powered interface that answers natural language questions about financial data using SQL reasoning.

- LLMs struggle with structured data reasoning
- Schema mapping and SQL generation are difficult
- Answers must be accurate and explainable
- Assumes clean, labeled relational database schema

Input, Technique, and Output

• Input:

- P&L, balance sheets (relational DB)
- User provides natural language question

• Technique:

• Few-shot prompting (GPT-4)

• Output:

• Executed SQL + human-readable summary

Documents Users upload files like P&L or balance sheets Return Readable Store as Structured Insights The system responds with Data is parsed and stored natural language output in relational format Run SOL on Ask in Natural Finance Database Language The guery is executed on Users ask questions in stored tables plain English LLM Generates SOL Ouerv An LLM converts the question into SOL

Upload Financial

Financial Data Analysis Cycle

Future Scope

- Extend support to unstructured financial documents
- Integrate visual dashboards with auto-generated charts
- Add multilingual support
- Expand to sales, HR, and operations domains