Text-to-SQL Assistant
Team AInnovate

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Dify workflow, SQL safety layer

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Python app version, charts, backend logic

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Presentation, workflow design, screenshots

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Dataset design, documentation, SQL validation

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UI flows, testing, role-based demos

The Problem

Dependency on Tech Teams

Many people in companies cannot write SQL. Because of that, they depend on technical teams for even small questions.

Simple Questions Blocked

Finding simple answers like "Show sales for each month," "Find top customers," or "Check revenue by product" requires a ticket.

This Slows Teams Down

Non-technical users should be able to ask questions in plain English and get answers without writing SQL. Our app solves this.

Our Solution

- **Type in normal English:** We built a simple tool where anyone can type a question.
- **AI Writes the SQL:** The app automatically writes the correct SQL query.
- **Safety Check:** It checks the SQL for safety before running.
- **Runs on Database:** The safe SQL is run on the database.
- **Get Clear Answers:** It shows the answer in clear, easy-to-read text.

No SQL knowledge needed. Just ask → get answer.

Who Can Use It? (User Roles)

Admin

Full access. Can see everything.

Analyst

Can see analytics data. Cannot see Finance tables.

Finance User

Can see revenue and payment data. Cannot see Analyst data.

Example: An Analyst trying to access a Finance table gets "Access Denied".

How It Works (The Workflow)

- **User logs in:** App checks if ID/password is Admin, Analyst, or Finance.
- **App loads the database structure:** So it knows the correct tables and columns.
- **AI writes the SQL:** User's English question → SQL query.
- **Safety Check:** If SQL tries to UPDATE, DELETE, ALTER → system blocks it.
- **Role Check:** App checks if user is allowed to run that SQL.
- **Database Execution:** Safe SQL is run on Snowflake.
- **Final Answer:** AI explains the result in simple English.

Dify Version Demo

- **Question Input:** The user types their question in a simple text box.
- **SQL Generated:** The system shows the SQL it created for transparency.
- **Safety Block:** A harmful query (e.g., DELETE) is caught and blocked.
- **Final Answer:** The user receives a safe, plain-English answer.

Our Dify version uses a full workflow of login, knowledge loading, SQL generation, safety checks, and role checks.

Python Version Demo

Charts & Clean Data

The Python version follows the same steps but adds charts, faster execution, and a clean data view.

- Displays results as interactive charts.
- Offers faster execution for complex queries.
- Presents data in a clean, filterable table.

Advanced Architecture

- Uses a multi-agent AI system (Planner, Validator, Optimizer).
- Employs Chain of Thought (CoT) reasoning for complex queries.
- Features a 4-tier permission system (Guest, Viewer, Analyst, Admin).

Security & Safety

- **SQL Safety Layer:** Blocks harmful commands like UPDATE, DELETE, ALTER.
- **Role-Based Access:** Admin, Analyst, Finance → each sees only what they need.
- **No direct database access:** Users never touch real SQL.
- **Sanitization + Validation:** Protects from wrong queries or mistakes.

Why This Matters (Business Impact)

Accelerate Insights

This tool helps companies make data accessible to everyone, not just technical users. Finance, marketing, operations, education — all can benefit.

This tool helps companies:

- Answer questions faster.
- Reduce dependency on analysts.
- Save time on writing queries.
- Avoid data mistakes and risky queries.

Future Improvements

Voice-based questions • Dashboard auto-generation • Support more databases • Connect with BI tools

Thank you!