

AI Business Intelligence Analyst

Project Overview

Non-technical business owners and managers often can't access the data they need to make decisions. BI tools require SQL knowledge or analyst support, creating a bottleneck that slows decisions and keeps operational insights locked away from the people who need them most.

Designed and developed an AI Business Intelligence Analyst that lets SMB owners and managers ask plain-English questions about their business data and get instant answers — with charts and narrative summaries — without writing a single line of SQL or waiting for a report.

Questions like "Which customers haven't reordered in 90 days?", "What were my top 5 products last quarter?", and "Where are we losing margin?" are answered in seconds, connected to the client's live database, spreadsheet, or BI tool — no data export, no analyst required.

Architecture & Solution

A text-to-SQL engine translates natural language queries into accurate, context-aware database queries using the client's schema. The LLM is provided with schema metadata, business-specific terminology, and example queries to ensure generated SQL reflects the client's actual data model rather than generic assumptions.

Query results are passed to a charting and narrative layer that selects the most appropriate visualisation and generates a plain-English summary alongside the raw data. Role-based access controls ensure staff only see data relevant to their function, and a query audit log provides governance visibility for administrators.

Business Impact

Business owners and managers gained direct access to operational insights without relying on analyst support or BI tool training. Decision-making cycles shortened as key metrics became immediately accessible. The platform surfaced trends and anomalies that had previously gone unnoticed due to the effort required to query them, enabling more proactive management of customers, products, and margins.

Key Capabilities

- Natural language to SQL translation
- Context-aware query generation from schema metadata
- Automated chart selection and generation
- Plain-English narrative summaries alongside raw results
- Live database and spreadsheet connectivity
- Role-based data access control
- Query audit log and governance visibility
- Support for PostgreSQL, BigQuery, and common BI tools

Technologies

Python, OpenAI APIs, Text-to-SQL Engine, React, Charting Libraries (Recharts/Chart.js),

PostgreSQL, BigQuery, REST APIs, Docker.