Project Design Phase
Proposed Solution Template

Date	February 18, 2026
Team ID	LTVIP2026TMIDS80425
Project Name	Smart Bridge – Intelligent SQL Querying
Maximum Marks	2 Marks

Proposed Solution Template

Project team shall fill the following information in the proposed solution template.

S.No.	Parameter	Description
1	Problem Statement (Problem to be solved)	Non-technical users such as business analysts, small business owners, and project managers struggle to interact with relational databases because SQL requires specialized programming knowledge. This creates a bottleneck where users must depend on IT teams for data retrieval, leading to delays in decision-making and reduced productivity. There is a need for an intelligent tool that can bridge the gap between natural language and structured query language.
2	Idea / Solution Description	**Smart Bridge – Intelligent SQL Querying** is a full-stack web application that allows users to query databases using plain English. The system uses Google Gemini AI to convert natural language questions into valid SQL queries, executes them on a connected SQLite database, and presents results in a clean, formatted table. The application includes: • Natural language query input panel • AI-powered SQL generation using Google Gemini 1.5 Flash • Interactive database schema viewer • Generated SQL display with explanation • Premium dark-themed responsive UI built with React

3	Novelty / Uniqueness	Unlike generic AI chatbots that generate SQL without database context, our solution is **schema-aware** – it reads the actual database structure and uses it to generate accurate, executable SQL. The tight integration between the AI layer, database engine, and frontend provides an end-to-end experience where users can go from a natural language question to data results in a single interface. The architectural modularity allows swapping database engines and AI providers.
4	Social Impact / Customer Satisfaction	• **Democratizes data access** – empowers non-technical users to independently query databases • **Reduces IT bottleneck** – frees developer teams from ad-hoc data request burden • **Accelerates decision-making** – instant data retrieval instead of waiting for manual queries • **Educational value** – helps students learn SQL by seeing the generated query alongside results • **Cost-effective** – eliminates need for expensive BI tools for basic querying needs
5	Business Model (Revenue Model)	• **Freemium SaaS Model**: Free tier with limited queries/day; premium tier with unlimited queries, multi-database support, and advanced AI features • **Enterprise Licensing**: On-premise deployment for organizations with data security requirements • **API-as-a-Service**: Offer the NL-to-SQL conversion as an API for third-party applications • **Educational Licenses**: Discounted pricing for universities and coding bootcamps

6	Scalability of the Solution	• **Database Scalability**: Modular database layer supports SQLite, PostgreSQL, MySQL via configuration change • **AI Provider Scalability**: Abstracted AI service allows swapping Gemini for GPT-4, Claude, or open-source LLMs • **Horizontal Scaling**: FastAPI backend can be deployed behind load balancers with multiple workers • **Cloud-Native**: Architecture supports containerization (Docker) and cloud deployment (AWS, GCP, Azure)