

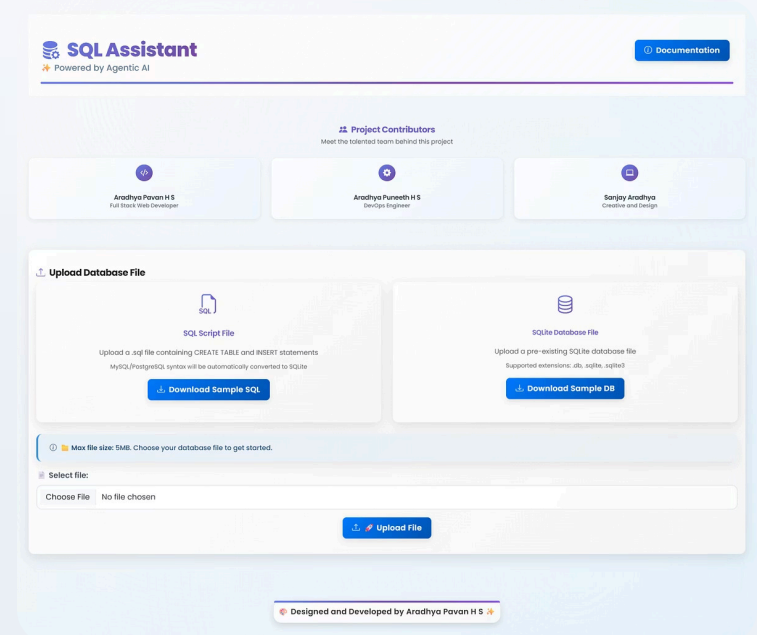
# Agentic LLM SQL Assistant

## Inspiration

People struggle with complex SQL queries involving multiple tables and relations. Students and business people want answers from data, but can't write the complex queries needed to get deeper insights.

Even experienced developers can get confused with the different database languages and dialects. RDBMS remains the most widely used database management system for storing and retrieving data.

We thought: "What if you could just ask questions in normal English and get the data you need?"



# Challenges in Traditional SQL Query Writing

- Complex syntax demands deep SQL and database knowledge
- Multiple SQL dialects cause confusion and errors
- Manual schema exploration is time-consuming
- Query optimization requires expert skills
- Non-technical users struggle to translate questions into SQL
- Manual writing is error-prone and inefficient

# How SQL Assistant Solves These Problems

- Converts plain English questions into accurate SQL queries
- Supports multiple SQL dialects like MySQL, PostgreSQL, SQLite
- Automatically analyzes database schemas for seamless query generation
- Executes queries in real-time and displays user-friendly results
- Includes a library of example queries for exploration
- Offers an intuitive web interface for easy interaction

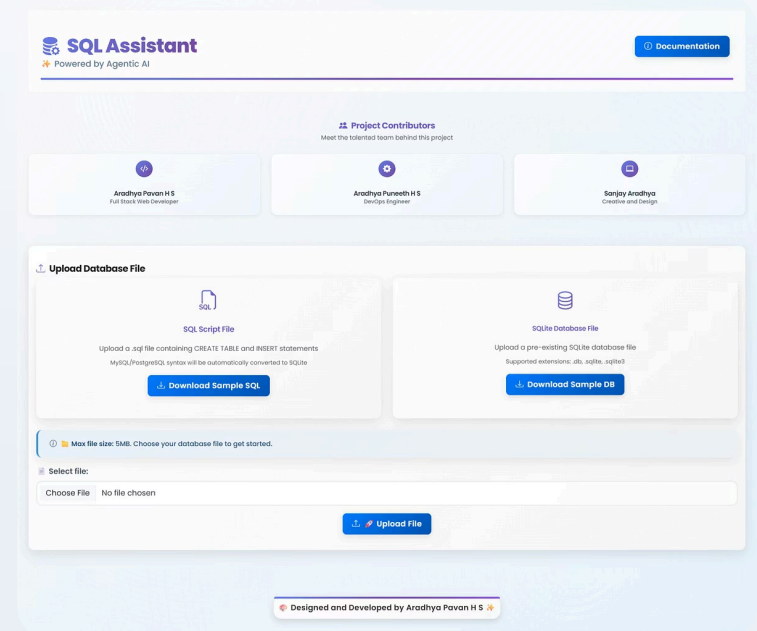
# Backend & AI Technologies Powering SQL Assistant

- Python Flask for server-side application framework
- SQLAlchemy for multi-database abstraction
- SQLite as the primary query execution engine
- Mistral AI large language model for natural language to SQL conversion
- PhiData agentic AI framework for intelligent query generation



# Frontend & User Experience Technologies

- HTML5, CSS3, and Bootstrap 5 for responsive, modern UI
- JavaScript for interactive frontend features
- DataTables for advanced table display and manipulation



# Benefits for Different Users

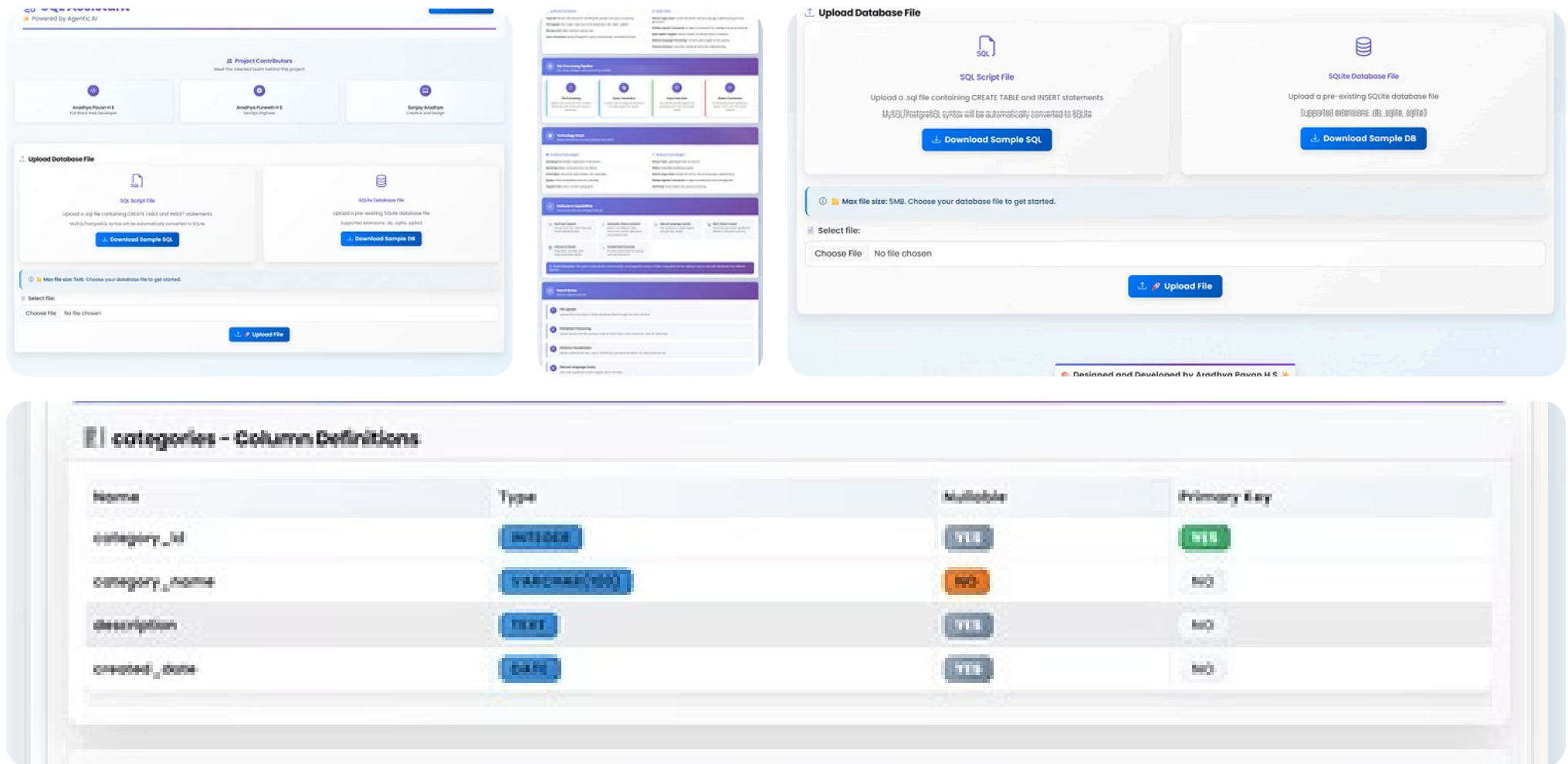
## Data Analysts & Developers

- Rapid query development and error reduction
- Seamless multi-dialect support
- Optimized, efficient queries

## Students & Business Users

- Instant help with complex SQL concepts
- Natural language interface for self-service analytics
- Reduced dependency on technical teams

# Project Snapshots: Visual Overview



Snapshots showcase the intuitive interface, documentation, file handling, and schema visualization features.

# Future Enhancements & AI Advancements

- Query explanation with detailed SQL breakdowns
- AI-powered performance optimization suggestions
- Intelligent auto-completion for natural language queries
- Query history to improve suggestions over time
- Integration with MCP server and transition to OpenAI SDK
- Support for small local language models for broader AI compatibility