

ConversAI: The Intelligent SQL Agent

-Meera Reji

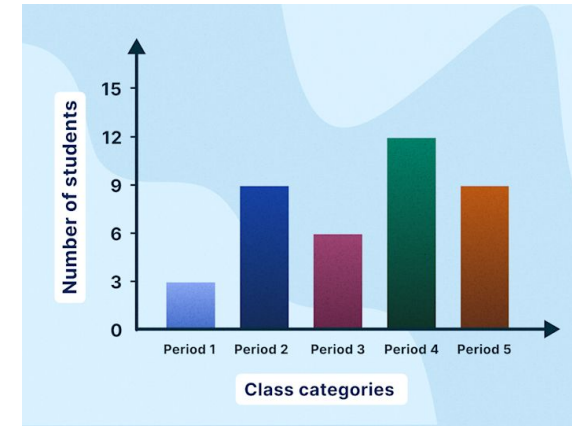
Introduction

ConversAI: The SQL Intelligence Agent

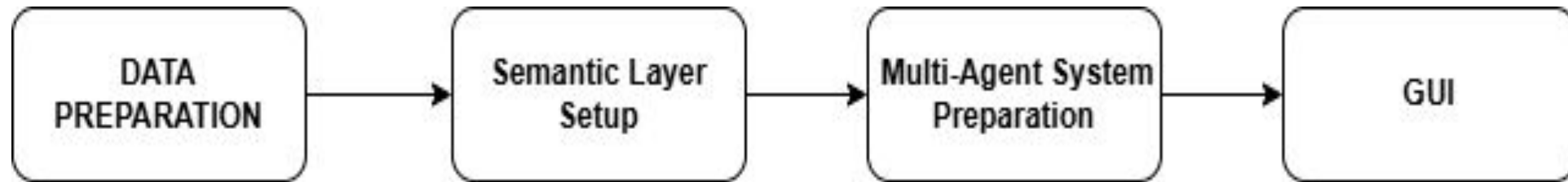
Interact with e-commerce data using natural language

Multi-Agent System:

- **SQL Agent:** Converts user questions into SQL queries
- **RAG Retriever:** Performs semantic search using ChromaDB
- **Visualization Generator:** Displays results as tables and charts
- **Web Browser Agent:** Browses the web to fetch external product/industry information and definitions
- **Voice Query Support:** Supports voice-based queries for accessibility.



Architecture

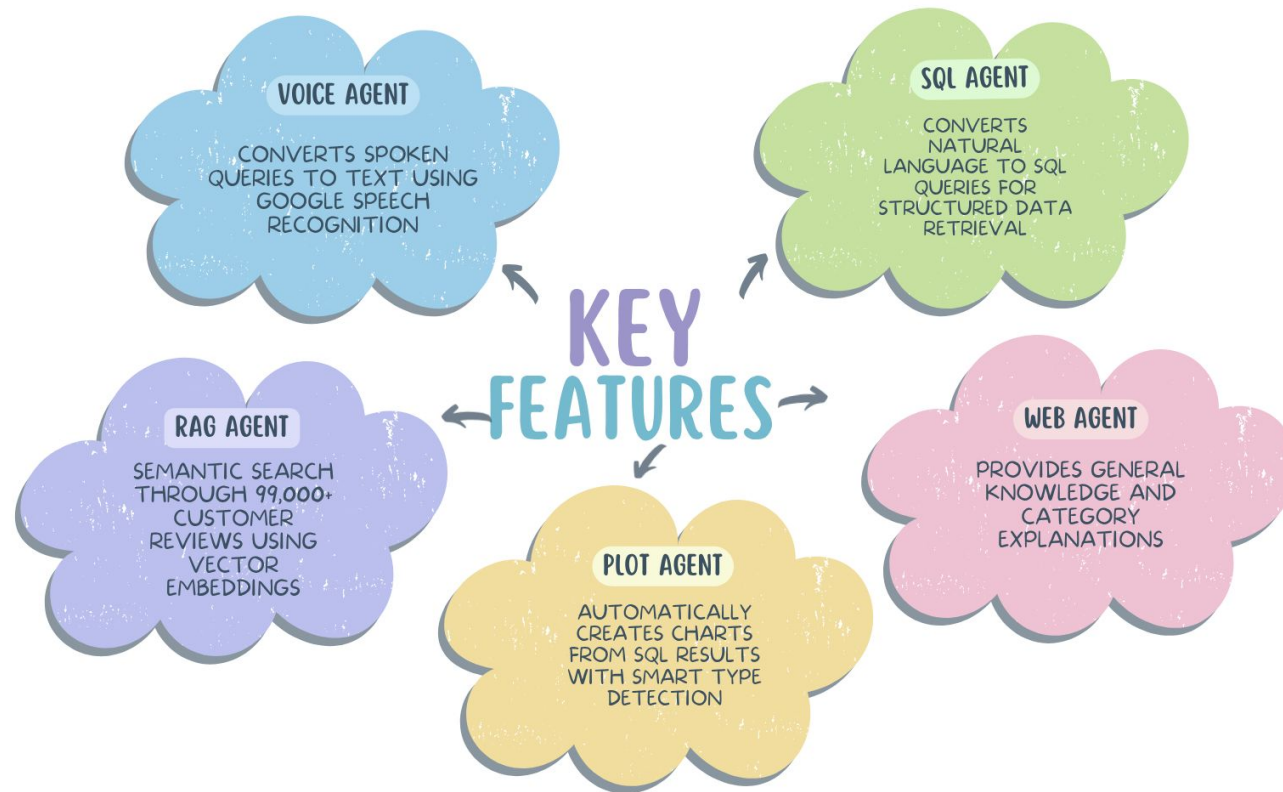


Stage 1: Data Storage & Vectorization Pipeline

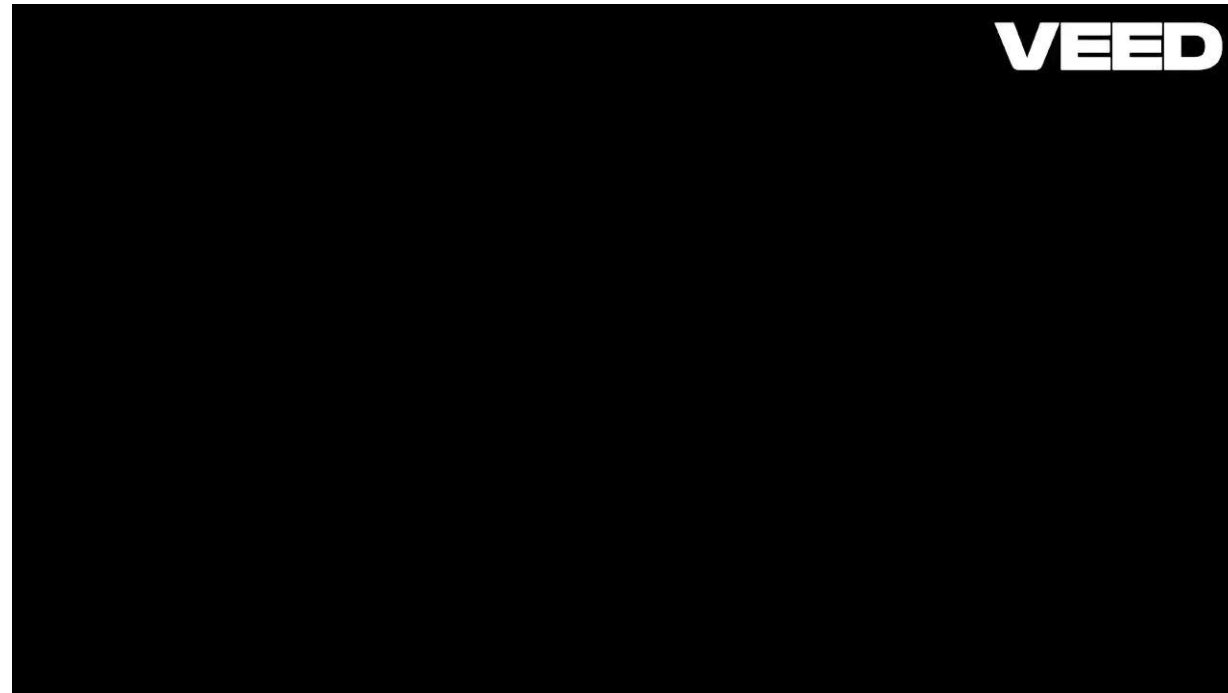
Steps Implemented

- **Google Drive Integration:** Mounted Drive to store databases and vector data persistently.
- **Data Ingestion & Storage:** Loaded CSV files and stored them as tables in **SQLite** (`olist_sqlite.db`).
- **Vector Store Setup:** Created a **persistent ChromaDB** for long-term text embedding retrieval.
- **Embedding Model:** Used **BAAI/bge-m3** (Transformer-based) for multilingual text embeddings.
- **Vectorization:** Converted text fields into dense vectors and stored them with metadata in ChromaDB.

Stage 2: Agents



Demo



DriveLink: <https://drive.google.com/file/d/1GFHXOU07knUGFXMOksIJG40CEA4jg6uk/view?usp=sharing>

YouTube Link: <https://youtu.be/ffmUvqMdlZc>

Tech Stack

AI & NLP

Gemini 2.0 Flash

LangChain

HuggingFace Embeddings

SpeechRecognition

Data & Storage

SQLite

ChromaDB

Pandas

BAAI/bge-m3

Visualization & UI

Matplotlib

Seaborn

Gradio

PyDub

Future Enhancements

- **Multi-language support** - Transcribe and query in Portuguese, Spanish, and other languages.
- **Query suggestions** - Autocomplete based on recent queries for faster interaction.
- **Predictive analytics** - Forecast sales trends and identify trending products.
- **Real-time data streaming** - Stream live orders instead of relying on historical data.
- **Fine-tuned models** - Domain-specific SQL generation using LoRA fine-tuning for higher accuracy.
- **Improved context handling** - Smarter follow-up query interpretation and caching.

Github

Link to the github repo:

<https://github.com/MeeraReji/ConversAI-SQL-Agent>

Thank
You