

## Introduction

**Background:** Clinical trials generate massive volumes of standardized data, including Adverse Events, Concomitant Medications, and Patient Medical History.

- While industry standards ensure high-quality collection, extracting actionable insights from raw, static formats is highly inefficient.

- **The Problem:** Clinicians spend too much time navigating raw data rather than analyzing medical outcomes.

- **Overall Vision:** To bridge the gap between complex clinical data and medical professionals by building an intuitive, interactive platform that accelerates data exploration, improves patient safety monitoring, and streamlines clinical decision-making.

## Research & Methodologies

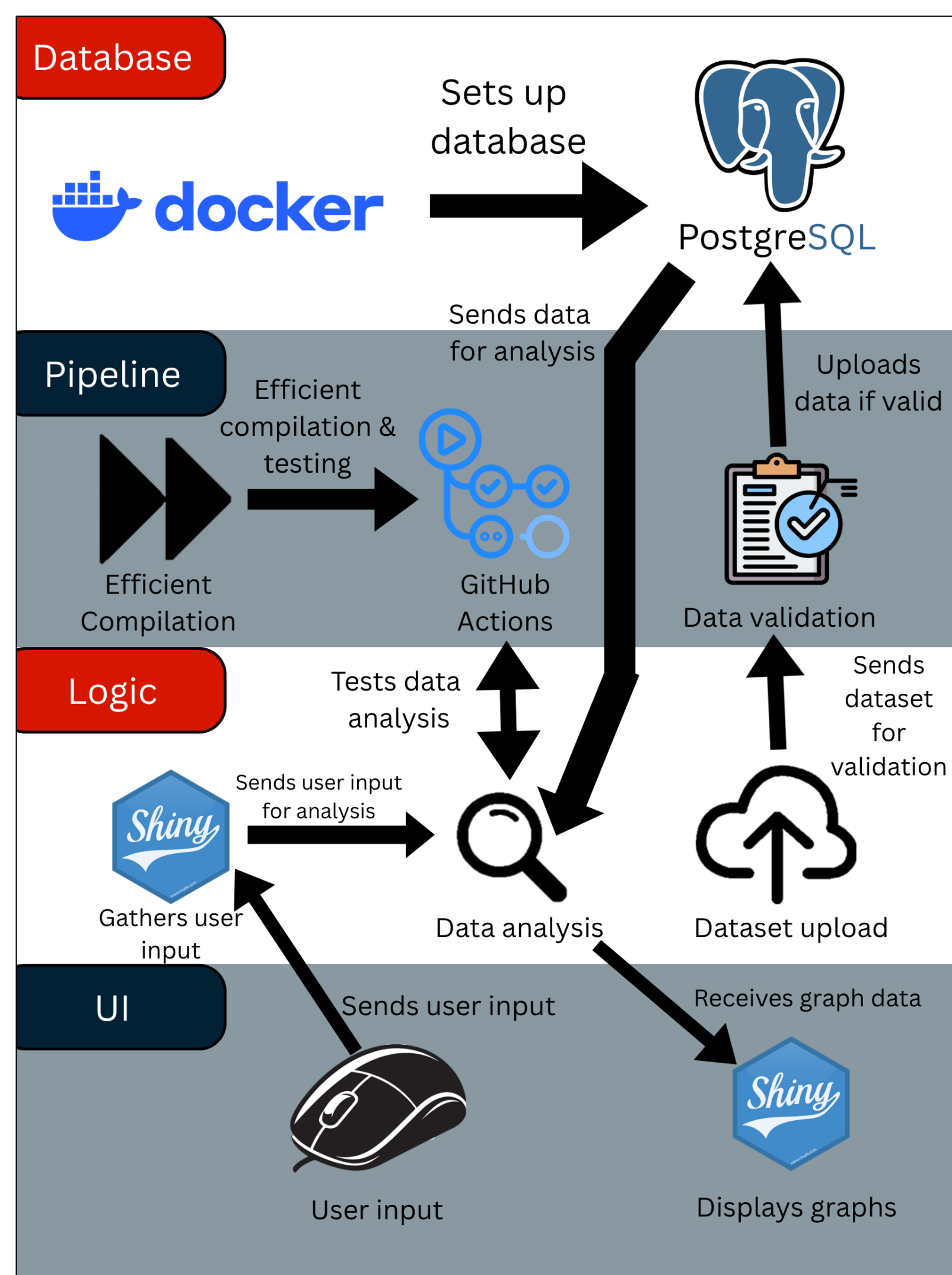


Figure 1: Diagram of Research & Methodologies

## Dashboard

- **R Shiny** framework, transforming static clinical datasets into web-based application for dynamic data exploration and visualization.
- Visualizes clinical trial data encompassing **AEs, CMs, MHs, and DMs**
- Interactively filter clinical data by body systems, durations, and demographics to uncover targeted insights.

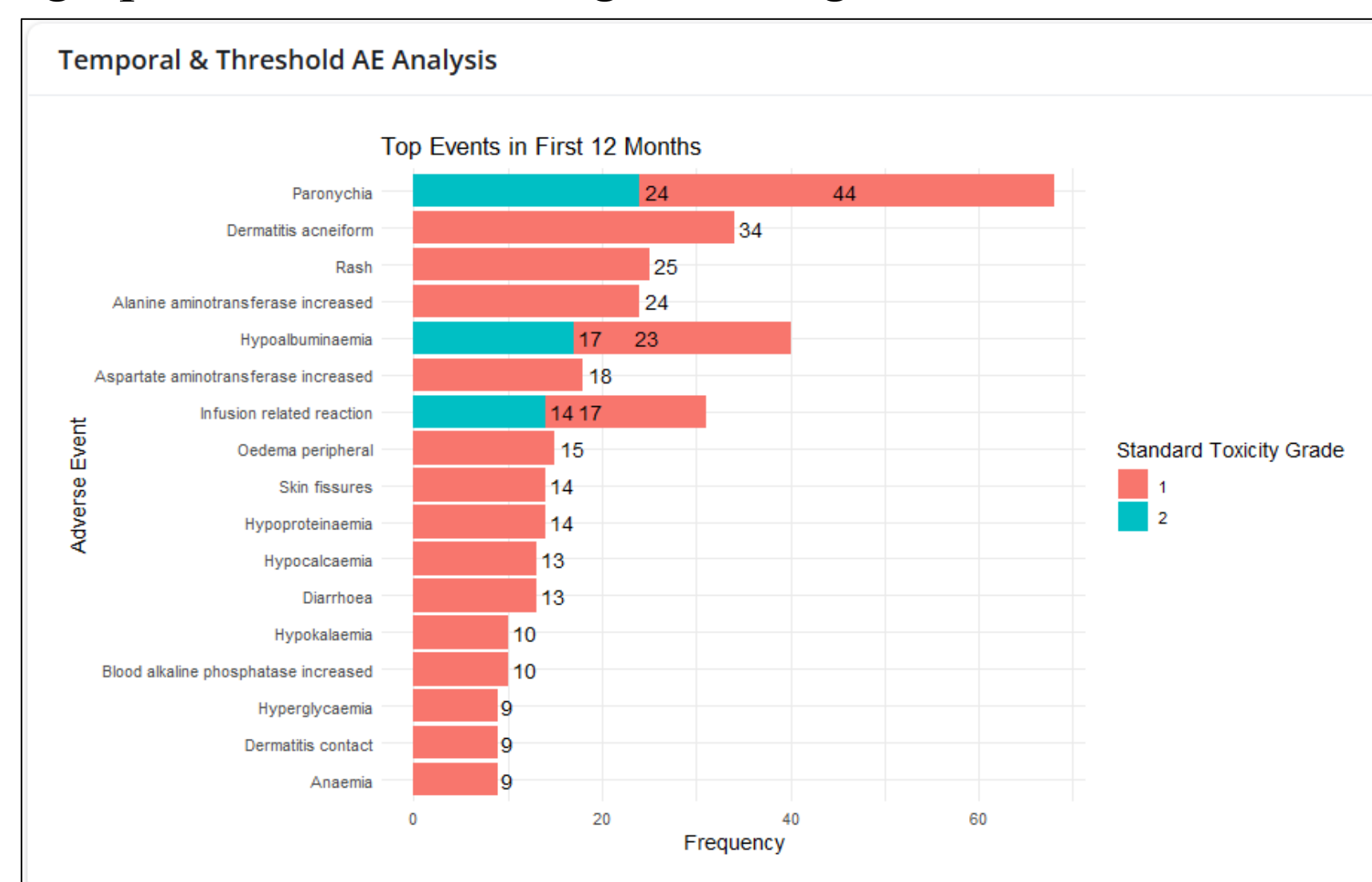


Figure 2: Top AEs in first 12 months based on toxicity

## J&J Chatbot

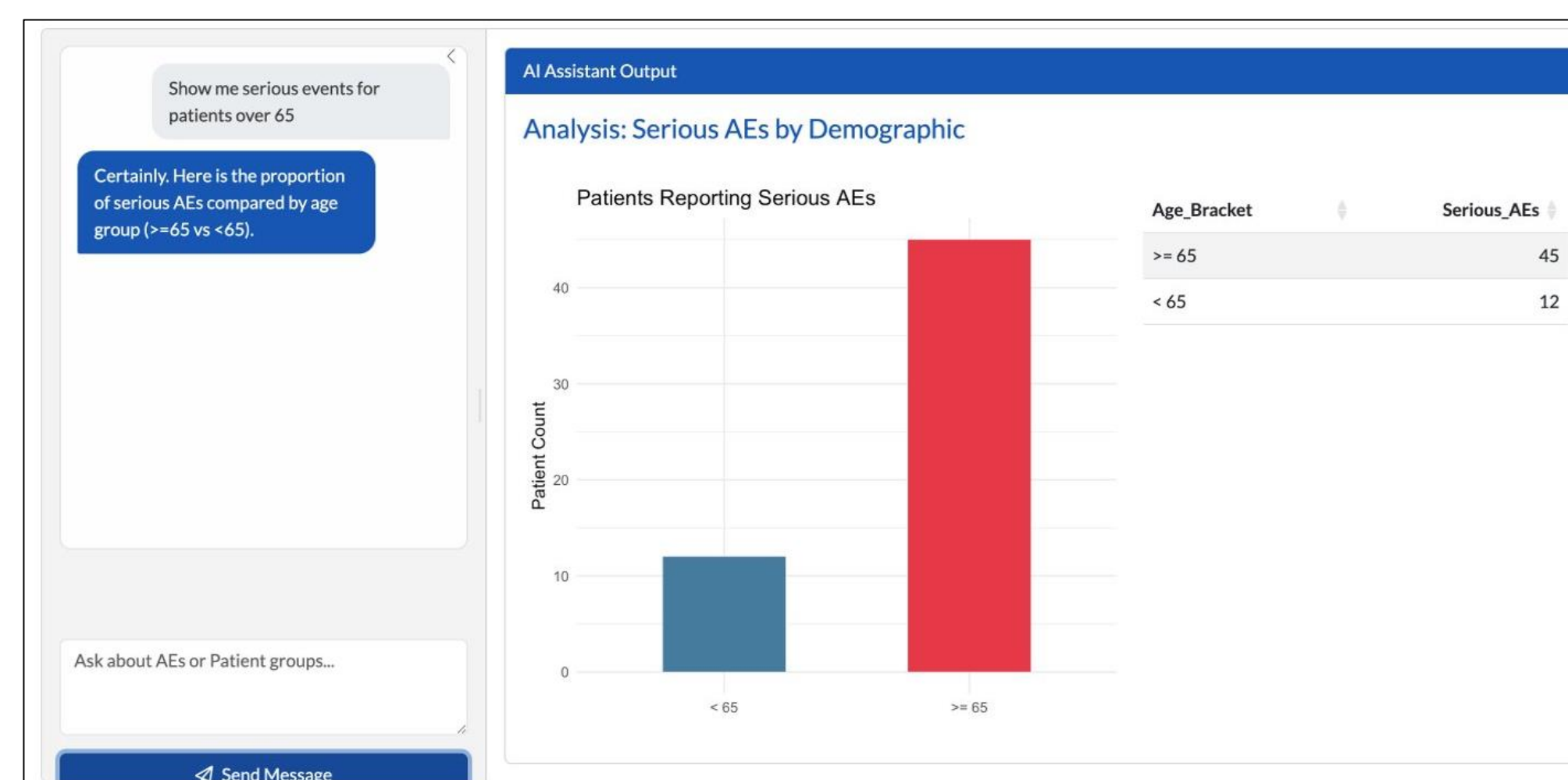


Figure 3: Chatbot UI analyzing Serious AEs

- Regex and pattern matching translate a user question into a SQL query, creating a graph and answer to respond.

## Conclusions

- Dashboard
  - **Scale:** Consolidates and analyzes over 1000 clinical data entries across 4 distinct trial datasets.
  - **Efficiency:** Reduces average data querying and visualization load times across dynamic searches.
  - **Precision:** Enables dynamic filtering across 50+ clinical variables (e.g., demographics, event duration) to pinpoint targeted medical treatments.
  - **Security:** Leverages a local PostgreSQL database to ensure secure, isolated querying of sensitive medical data.
- Chatbot
  - **Ease of Use:** Returns requested information from database by deciphering English statements.
  - **Memory:** Allows for viewing of past conversation including questions and the results.
  - **Expansive:** Searches all information within the database to find the best answer for the question.

## Future Plans

- Dashboard
  - Integrate chatbot into the dashboard app to expedite the data search process.
  - Feedback about the dashboard from clinicians could be gathered and used to decide the features that would be most helpful.
- Chatbot
  - Answer clinical questions from trained LLM to understand medical concepts.
  - Obtain keywords from user prompts to generate new graphs from SQL queries.

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