AI-Driven Boolean Query Generator for Healthcare

Efficient information retrieval is essential in healthcare for advancing research, improving diagnostics, and supporting clinical decision-making. However, creating accurate Boolean queries to navigate complex medical databases can be challenging due to the vastness of data and specialized medical terminology. This project aims to develop an AI-driven solution that automates the creation of precise, context-aware Boolean queries tailored to specific healthcare needs.x

MedEase is an AI-driven tool that generates precise Boolean queries, simplifying access to medical data for research, diagnostics, and patient care. It streamlines complex searches, enabling faster, informed decisions.

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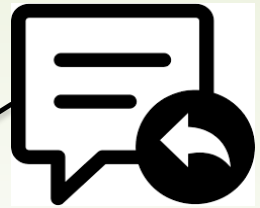
Domain: Machine learning

Proposed Solutions:

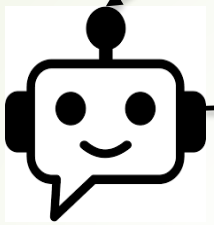
- **NLP-Powered Terminology Parsing**
  Automatically simplifies complex medical terms.
  Maps specialized terms into structured Boolean logic.
- **AI-Driven Query Precision**
  Context-aware algorithms reduce irrelevant results.
  Ensures accurate, precise data retrieval relevant to the healthcare context.
- **Flexible Query Templates**
  Provides adaptable templates to meet diverse information needs:
  - Research studies and clinical trial data.
  - Patient records filtered by symptoms or conditions.
  - Drug interaction and adverse event analysis.
  - Diagnostic data combining symptoms and lab results.
- **Symptom & Diagnostic Data Access**
  Retrieves data for complex cases involving multiple symptoms and test results.
- **Medical Chatbot with Image and Voice Recognition** Supports conversational interfaces with visual and auditory inputs.
- **YouTube and E-Commerce Video Links Recommendation**Recommends videos for education, training, and product information
- **Multilingual Support**Enables interaction across multiple languages for inclusive access.

ARCHITECTURE DIAGRAM



RESPONSE

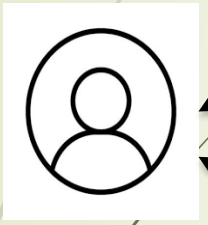
RECOMMENDATION ENGINE



CHATBOT UI

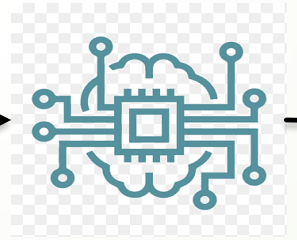
PROCESSING(NLP)

KNOWLEDGE BASE



USER

Query UI



CONTEXT AWARE QUERY

BOOLEAN QUERY

RESULTS

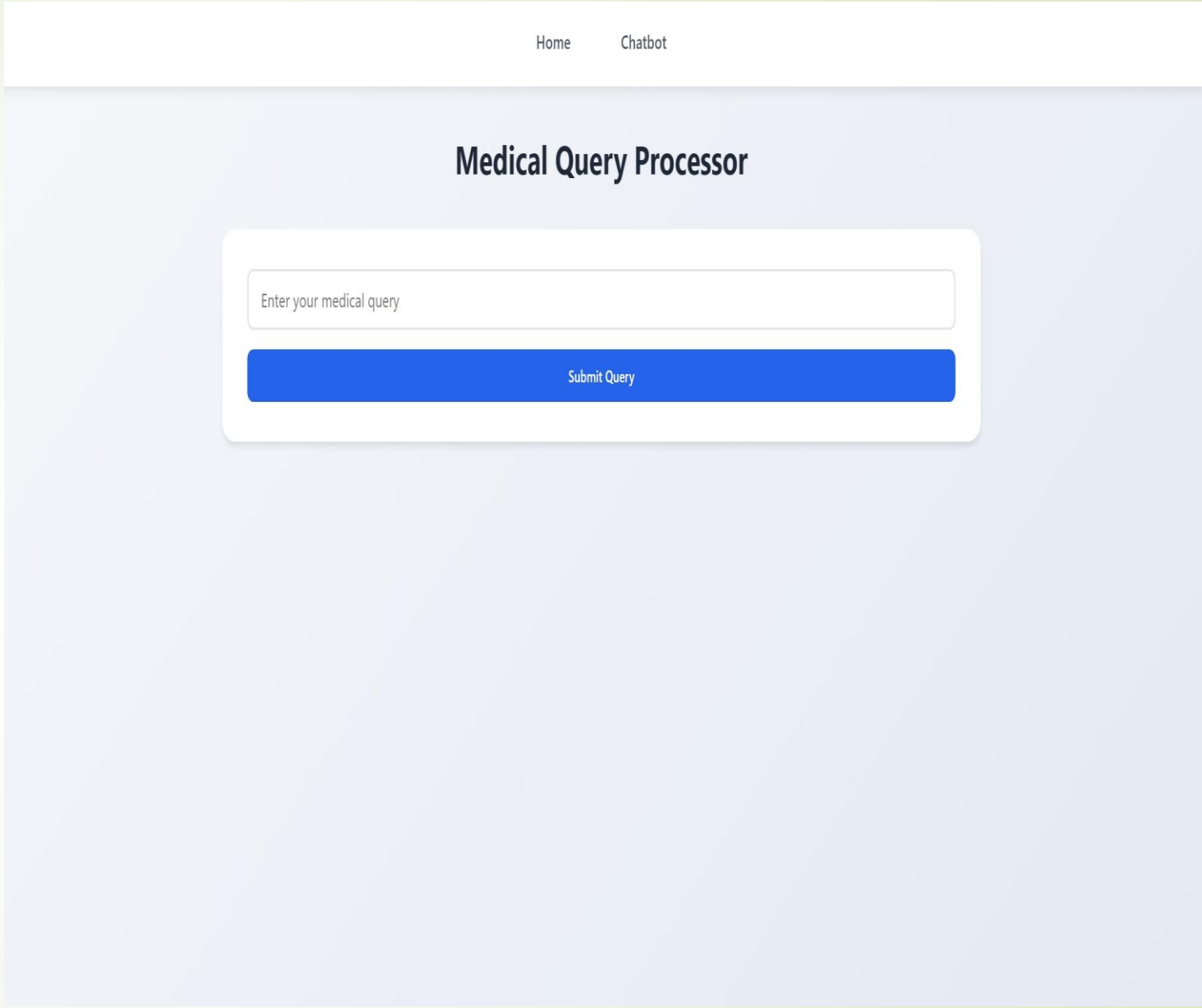
NLP

Tech Stack

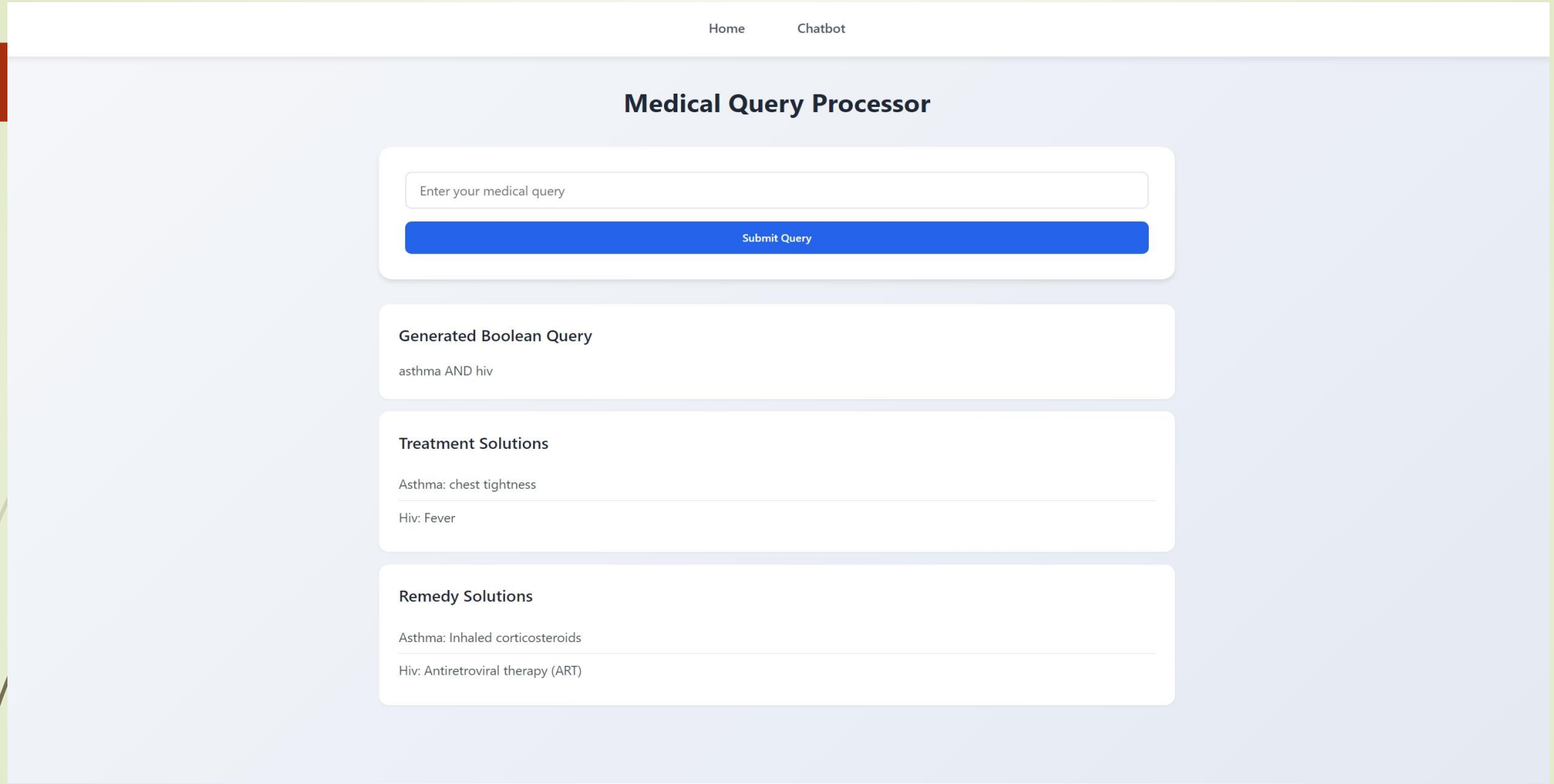
- **FRONTEND :** HTML or HyperText Markup Language is used to write the entire content of the webpage. CSS or Cascading Style Sheet is used to style the webpage such as color, font, background, layout, etc. JavaScript is responsible for defining the behavior of the webpage.

- **BACKEND :** Flask is a good choice for backend work in mobile applications. It supports rapid development, requiring less code and effort. Flask is also used by platforms like Uber, Netflix, and Reddit.

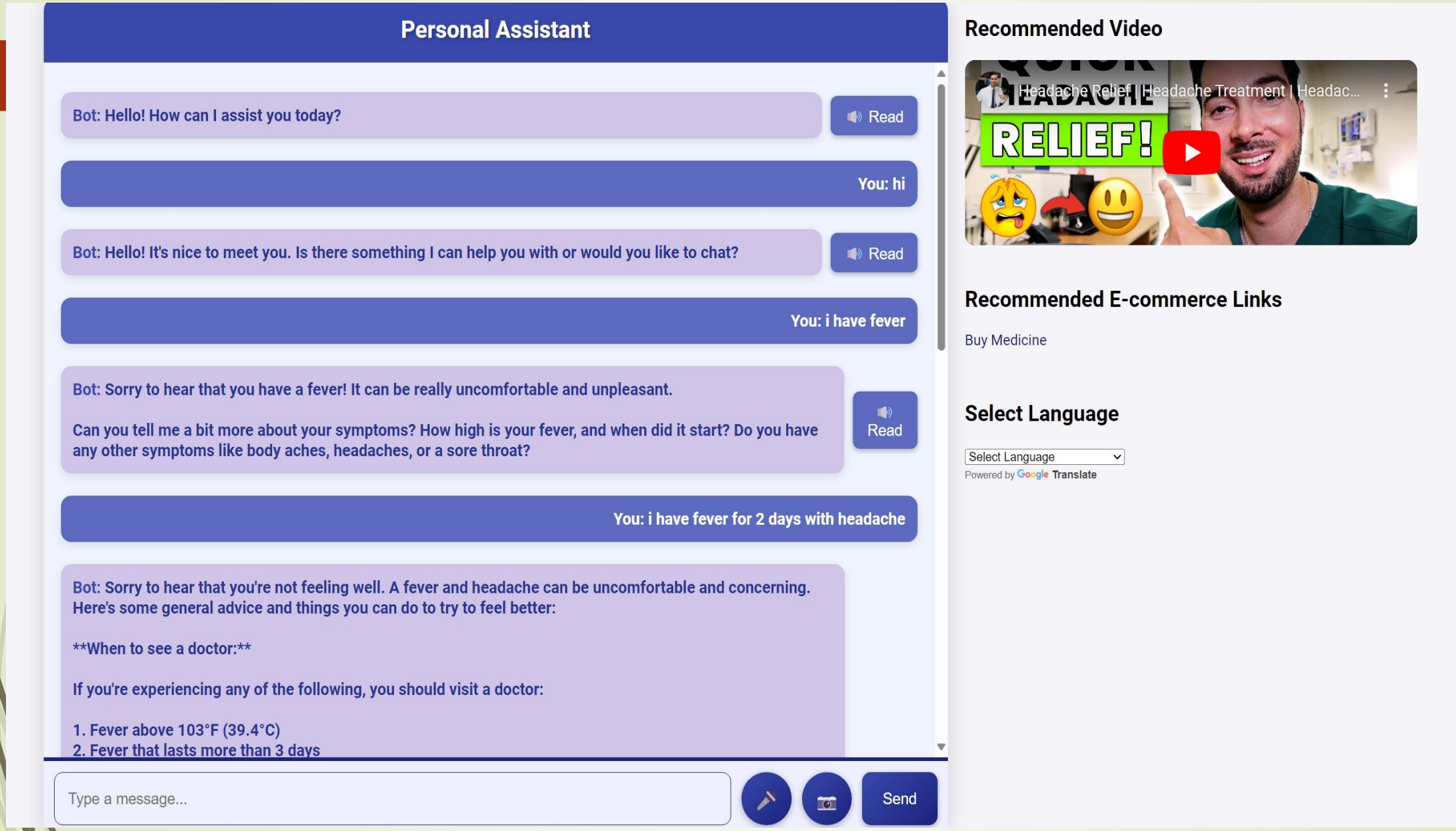
- **Large Language Model (LLM):** The LLM simplifies medical terms, generates precise Boolean queries, and adapts to new data, ensuring accurate, context-aware retrieval of healthcare information. It supports multilingual, voice, and image inputs.



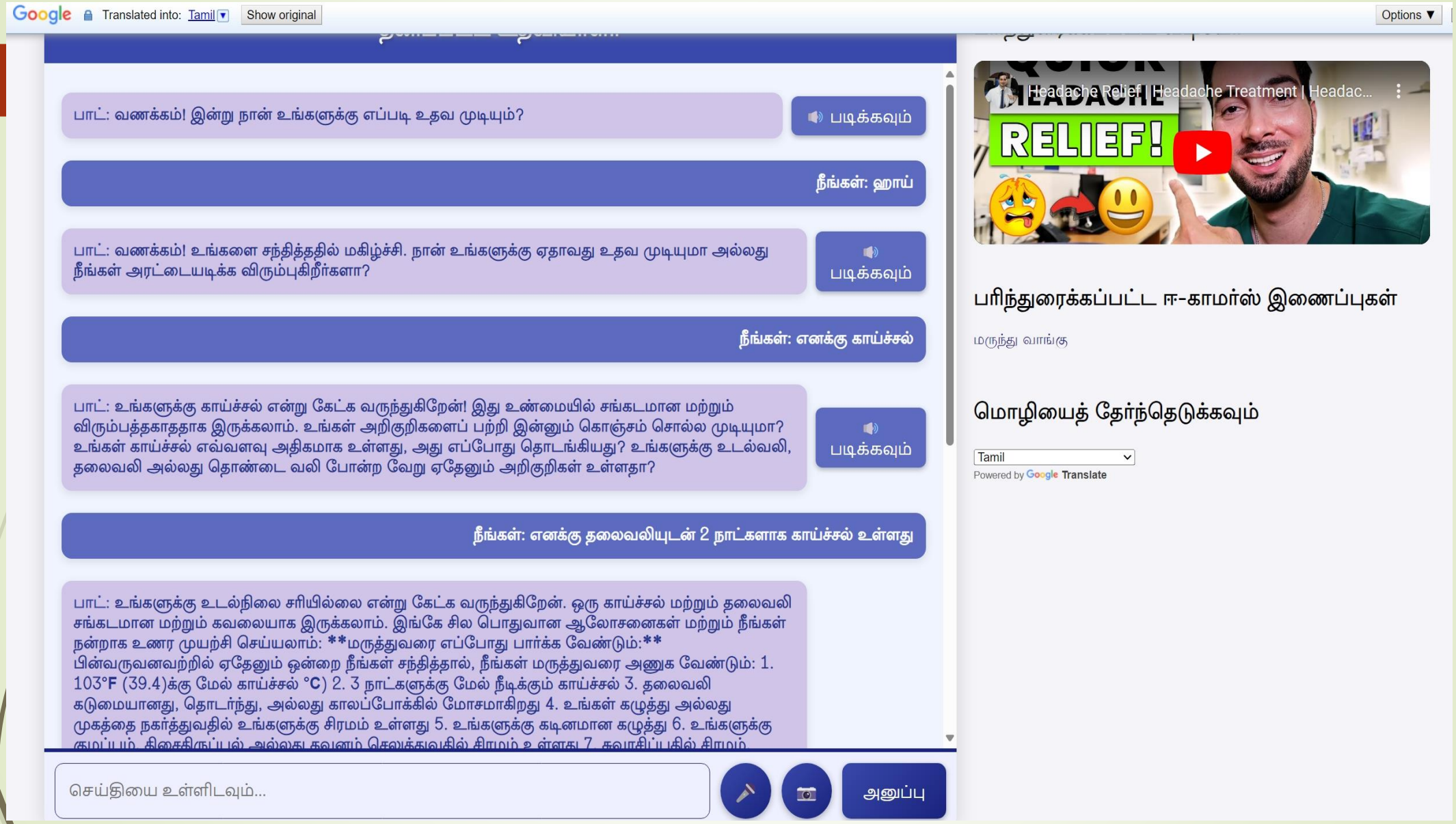
MEDICAL QUERY PROCESSOR UI



AFTER THE QUERY IS POSTED



CHATBOT FOR MEDICAL ASSISTANT : with image and voice recognition models



Snap OF the Prototype After Multilingual Support

Market Fit of the Solution

- **Addresses Data Overload**: Simplifies access to vast medical data, helping healthcare professionals find relevant information quickly.
- **Improves Decision-Making**: Provides accurate data for better diagnostics and treatment decisions.
- **Saves Time and Costs**: Automates complex query generation, reducing manual effort and speeding up workflows.
- **Stays Up-to-Date**: Learns from new medical data, staying relevant as knowledge evolves.
- **User-Friendly**: Supports multilingual and voice/image inputs, making it accessible for diverse users.
- **Supports Research Needs**: Aids in finding research and clinical trial data, useful for studies and regulatory compliance.

FUTURE SCOPE

- **EHR Integration**: Connect with Electronic Health Records for real-time patient data access.
- **Advanced AI Models**: Use newer, more accurate AI models for improved query precision.
- **Predictive Analytics**: Add features for diagnosing and treatment recommendations.
- **Multimodal Capabilities**: Enhance support for analyzing voice, images, and videos.
- **Mobile and Cloud Access**: Make it accessible on mobile and cloud platforms for remote use.
- **Better Multilingual Support**: Expand language options for global usability.
- **Continuous Learning**: Improve accuracy through user feedback and ongoing updates.
- **Data Security**: Strengthen compliance with privacy regulations for secure data handling.

Team Members

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