AI-POWERED MOBILE APPLICATION FOR BREATHING SOUND ANALYSIS AND DISEASE DETECTION

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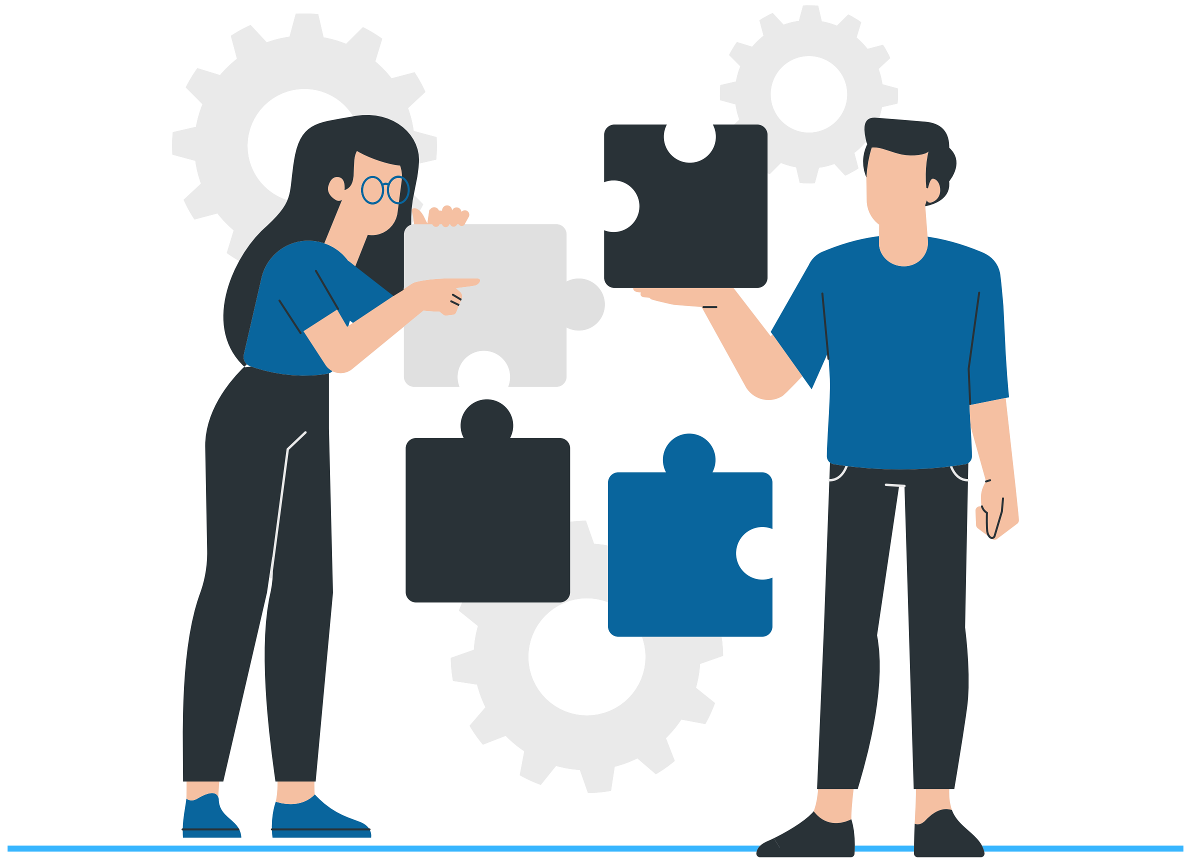
PLAN

1. Introduction
2. Technical Approach
3. Limitations & Perspectives
4. Demo & Conclusion

CONTEXT & MOTIVATION



“ The greatest wealth is health, yet millions still lack access to basic diagnosis. ”

The World Health Organization

PROBLEMS & SOLUTION

- Manual auscultation is subjective & skill-dependent
- Existing tools focus only on sound, ignore context
- Lack of explainability in predictions
- Limited access outside hospitals or clinics

- AI-powered mobile app for recording and analyzing breathing
- Multimodal analysis: audio + clinical documents
- Clear, explainable feedback with a conversational AI assistant
- Fully accessible via smartphone, secure & privacy-focused

METHODOLOGY

CRISP-DM

1. Business Understanding

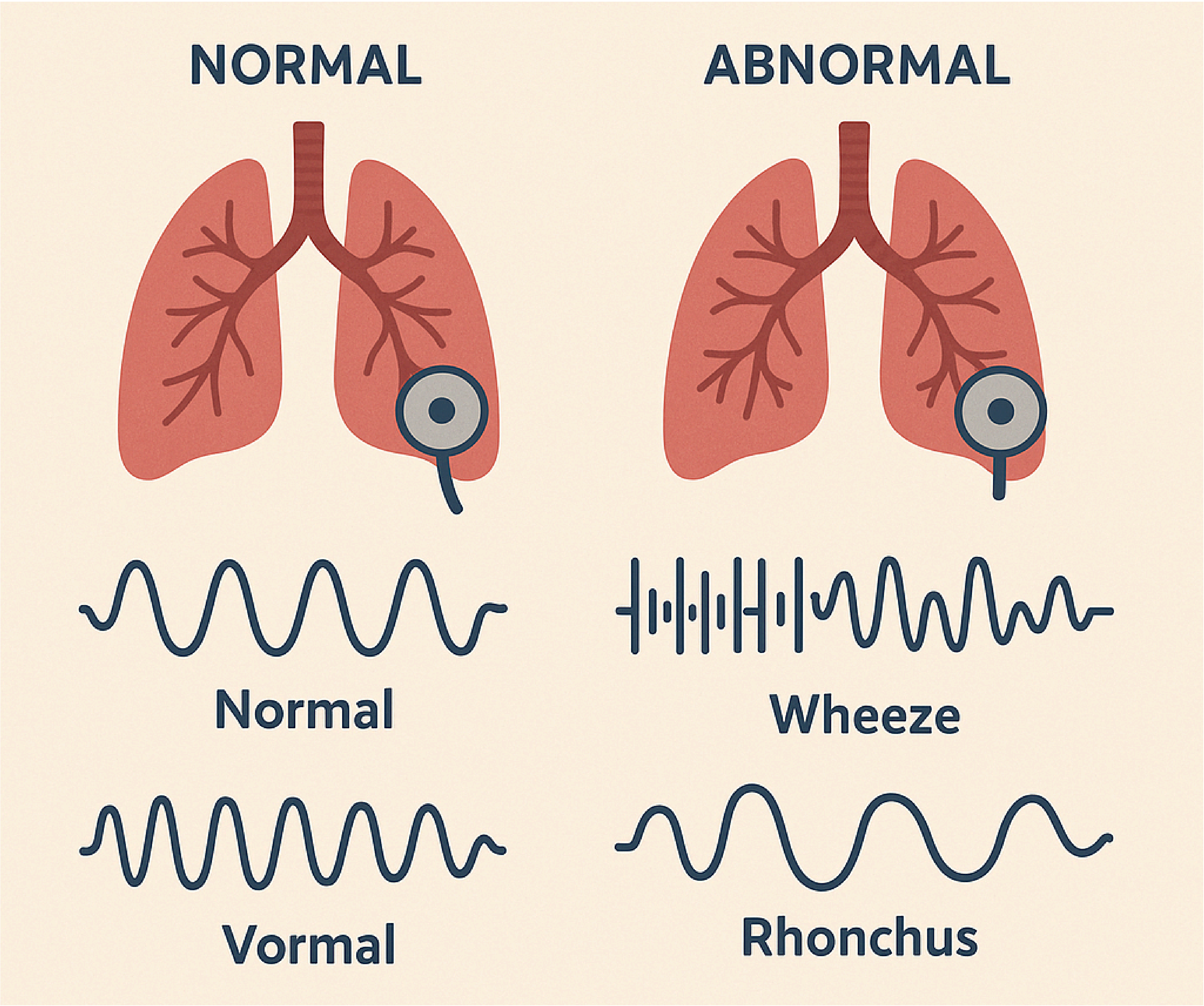
2. Data Understanding & Preparation

3. Modeling

4. Evaluation

5. Deployment

RESPIRATORY SOUND CLASSIFICATION

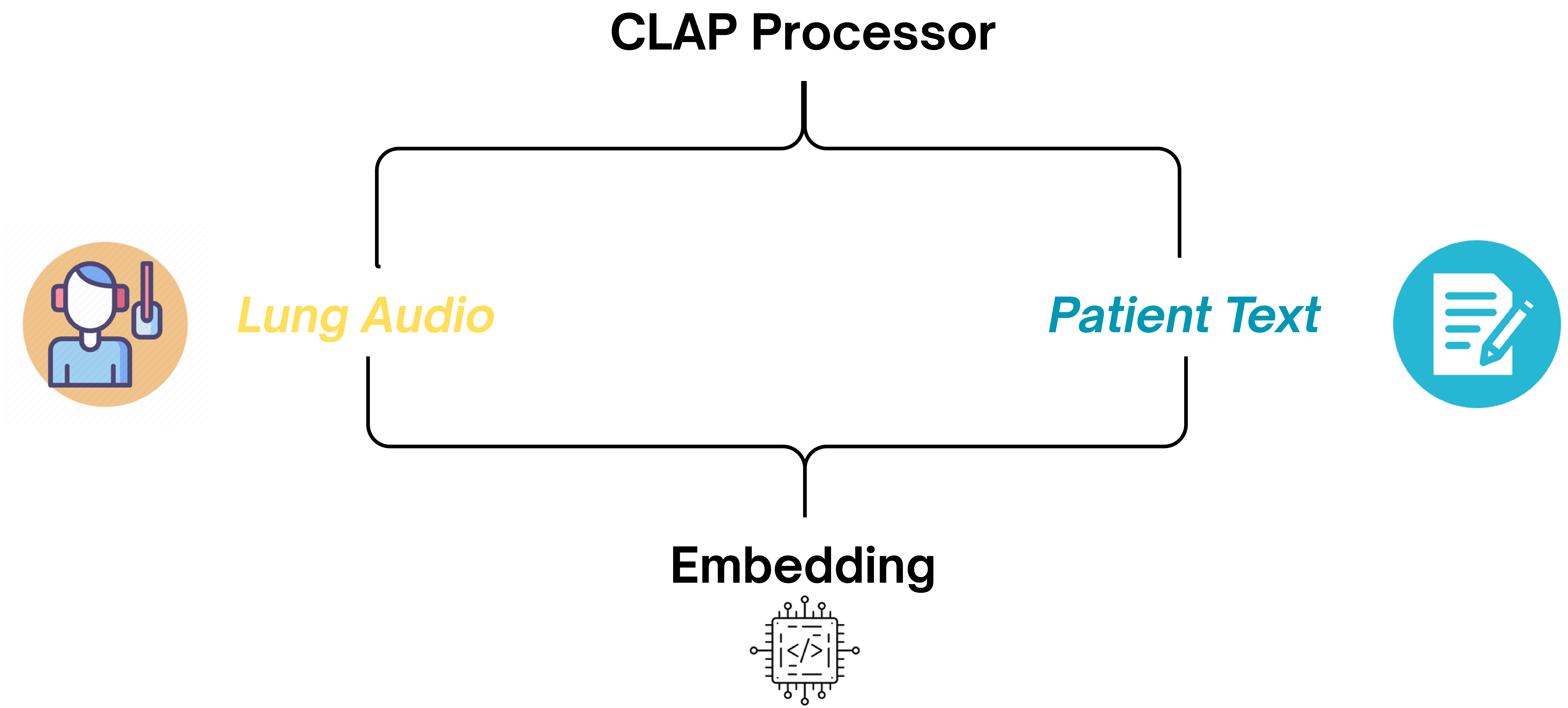


DATASET

ICBHI 2017 Respiratory Sound Dataset

5.5 hours of lung sounds from 126 patients

MODELING APPROACH



CLASSIFIER TASK

NORMAL

WHEEZE

CRACKLE

DEPLOYMENT

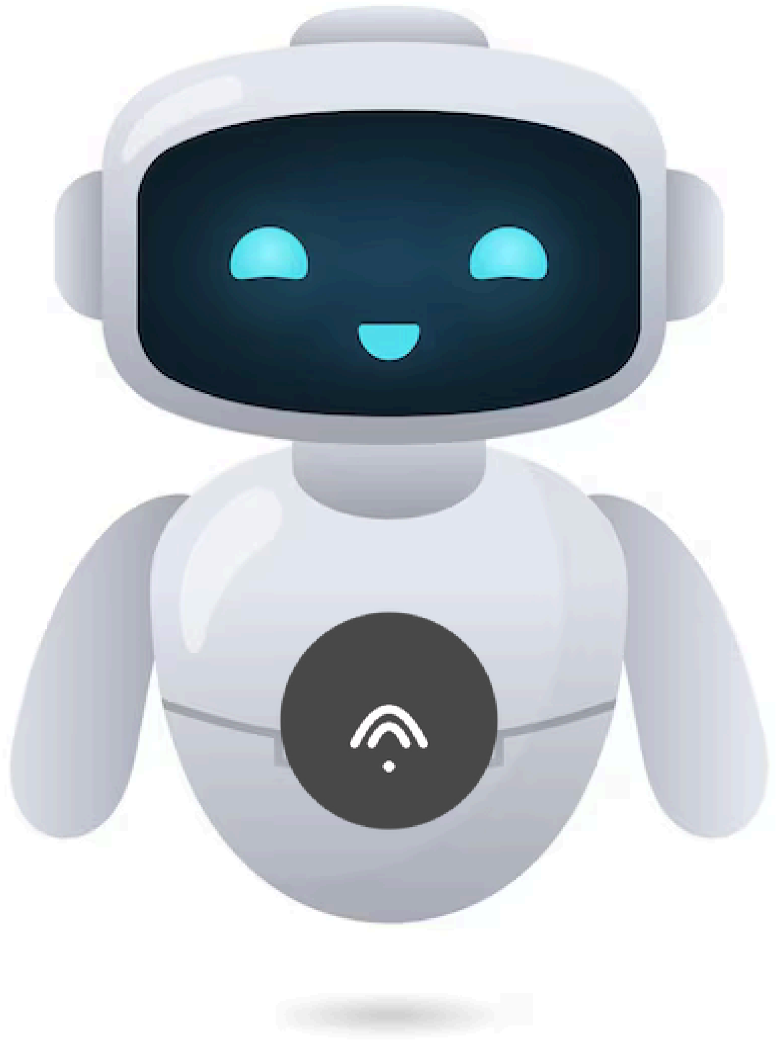
Built with FastAPI

Packaged & containerized using Docker

Ready for real-time inference via REST API

WHY WE BUILT AN AI ASSISTANT

WHAT THE AI ASSISTANT AIMS TO ACHIEVE



Designed with empathy. Powered by AI

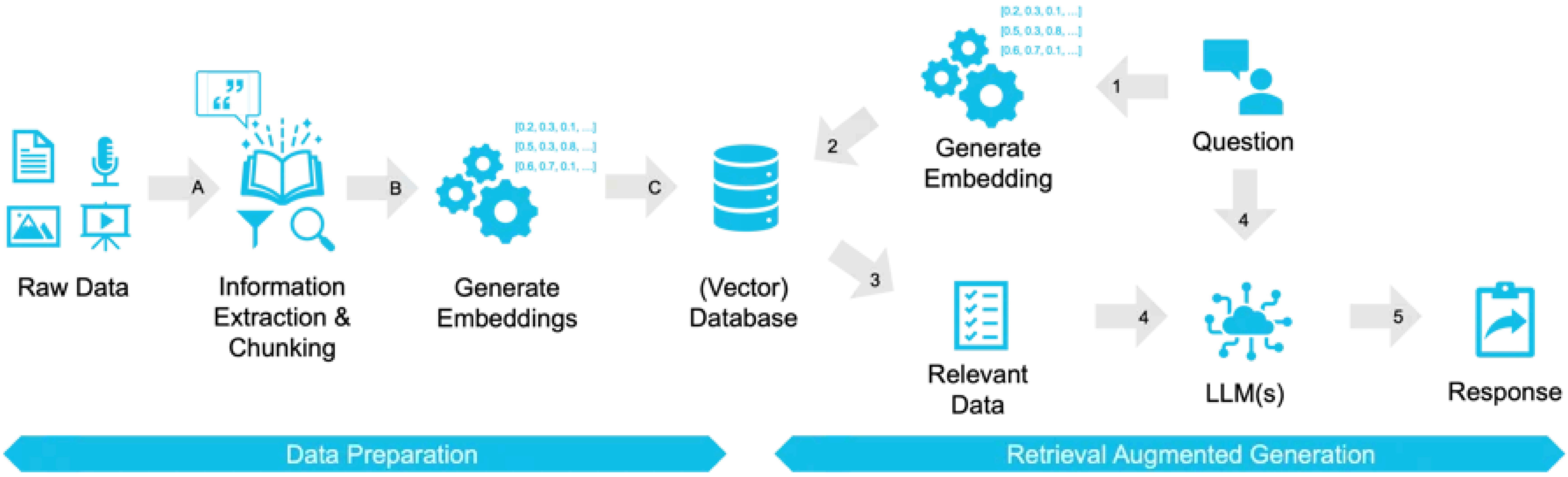
✅ Provide clear and understandable explanations of medical terms

✅ Answer health-related questions based on the user's symptoms.

✅ Guide users about what actions to consider next (e.g., seeing a doctor, monitoring symptoms).

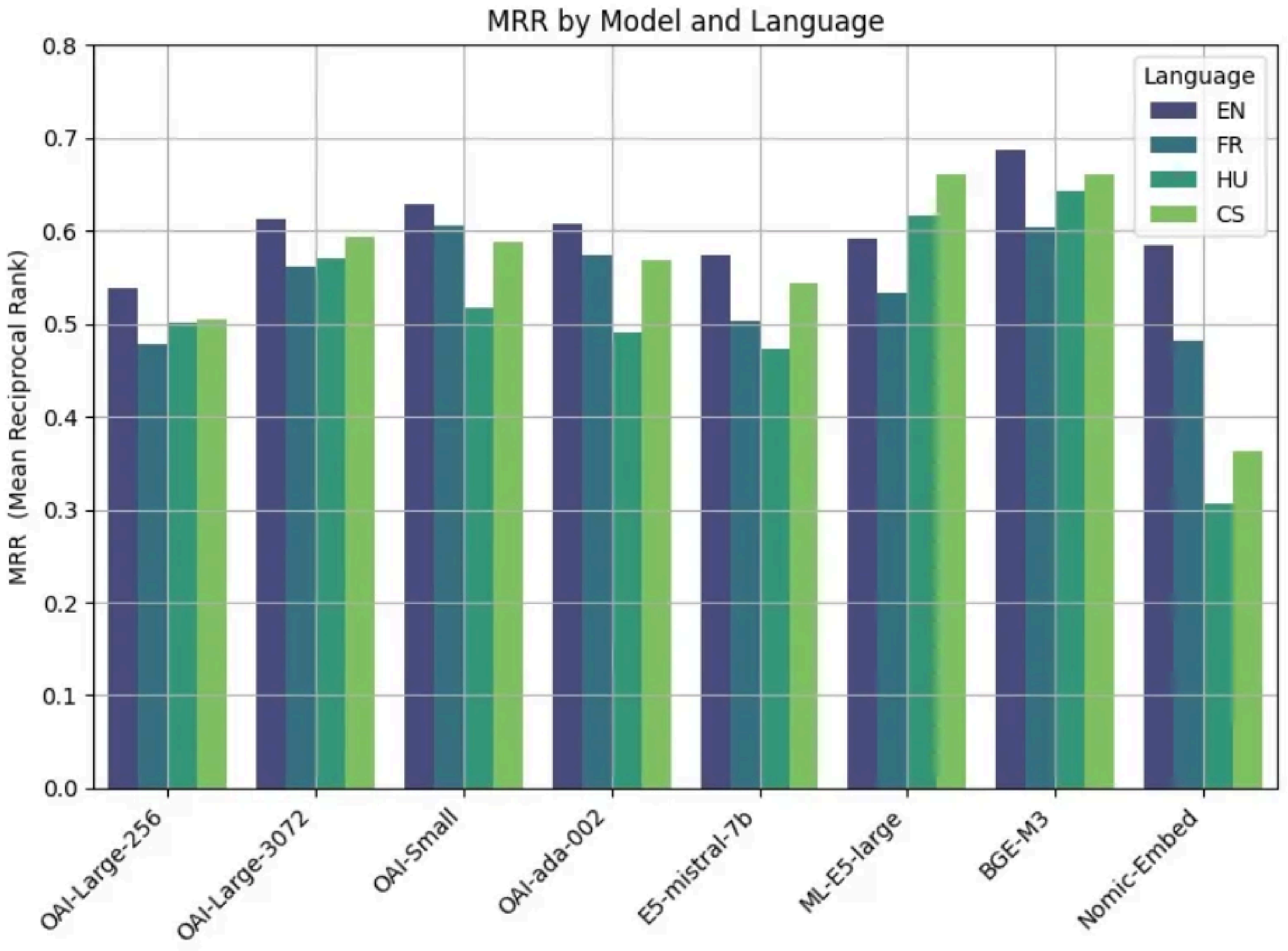
✅ Work offline, so that users have access to it anytime.

HOW IT WORKS — TECHNICAL OVERVIEW



EVALUATING THE EMBEDDING MODEL

Because good answers start with good context

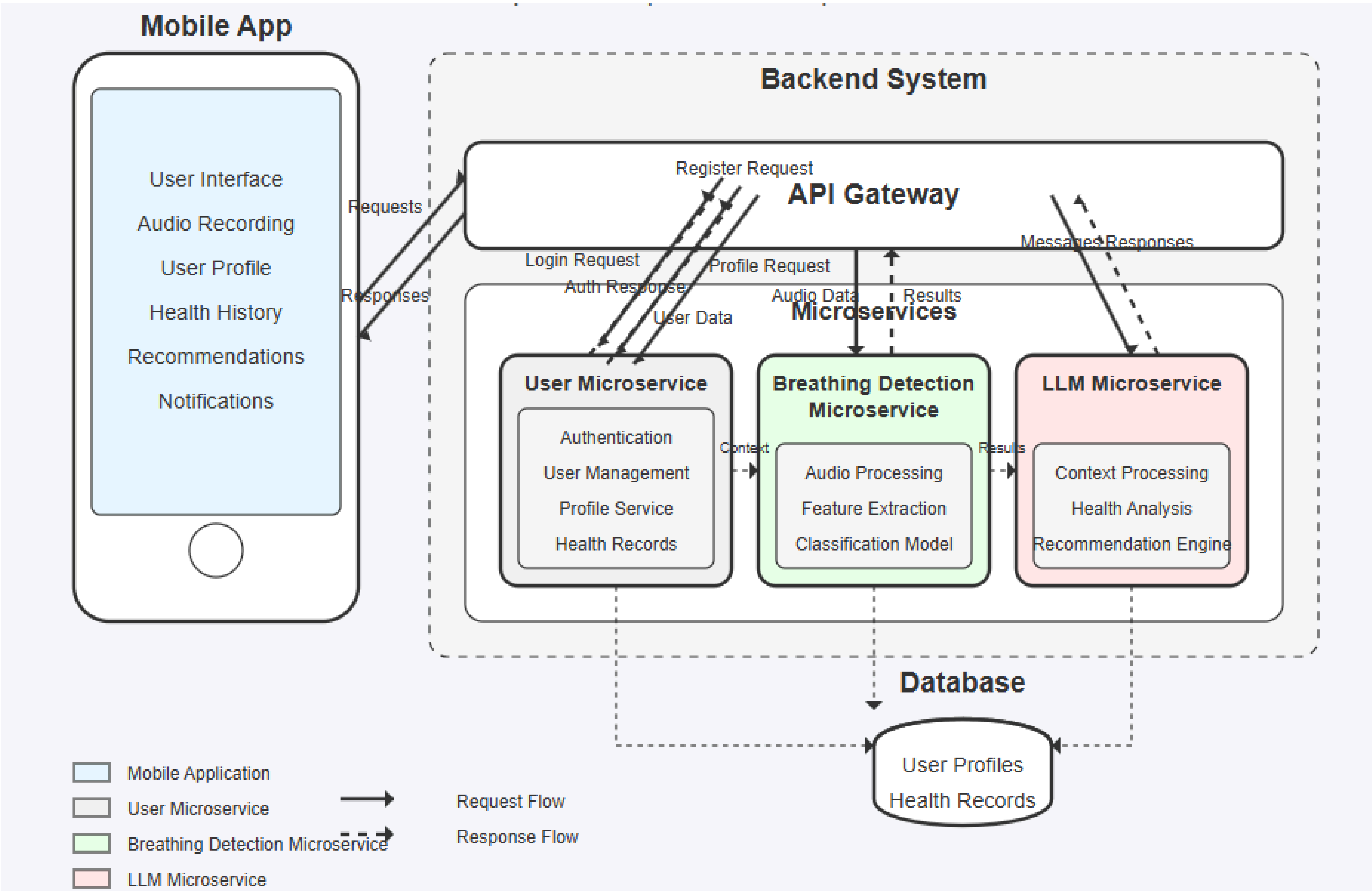


RAG VS. LLM ALONE

Does retrieval improve user support? Let's compare.

Metric	RAG System	Baseline
Groundedness	8.7	5.2
Correctness	8.5	5.5
Coherence	9.1	8.7
Relevance	8.9	6.3
Novelty	7.8	6.9
Overall Score	8.6	6.4

FULL SYSTEM ARCHITECTURE



LIMITATIONS & PERSPECTIVES

❌ Limited Dataset Diversity

❌ Imperfect Audio Quality

❌ LLM Hallucinations

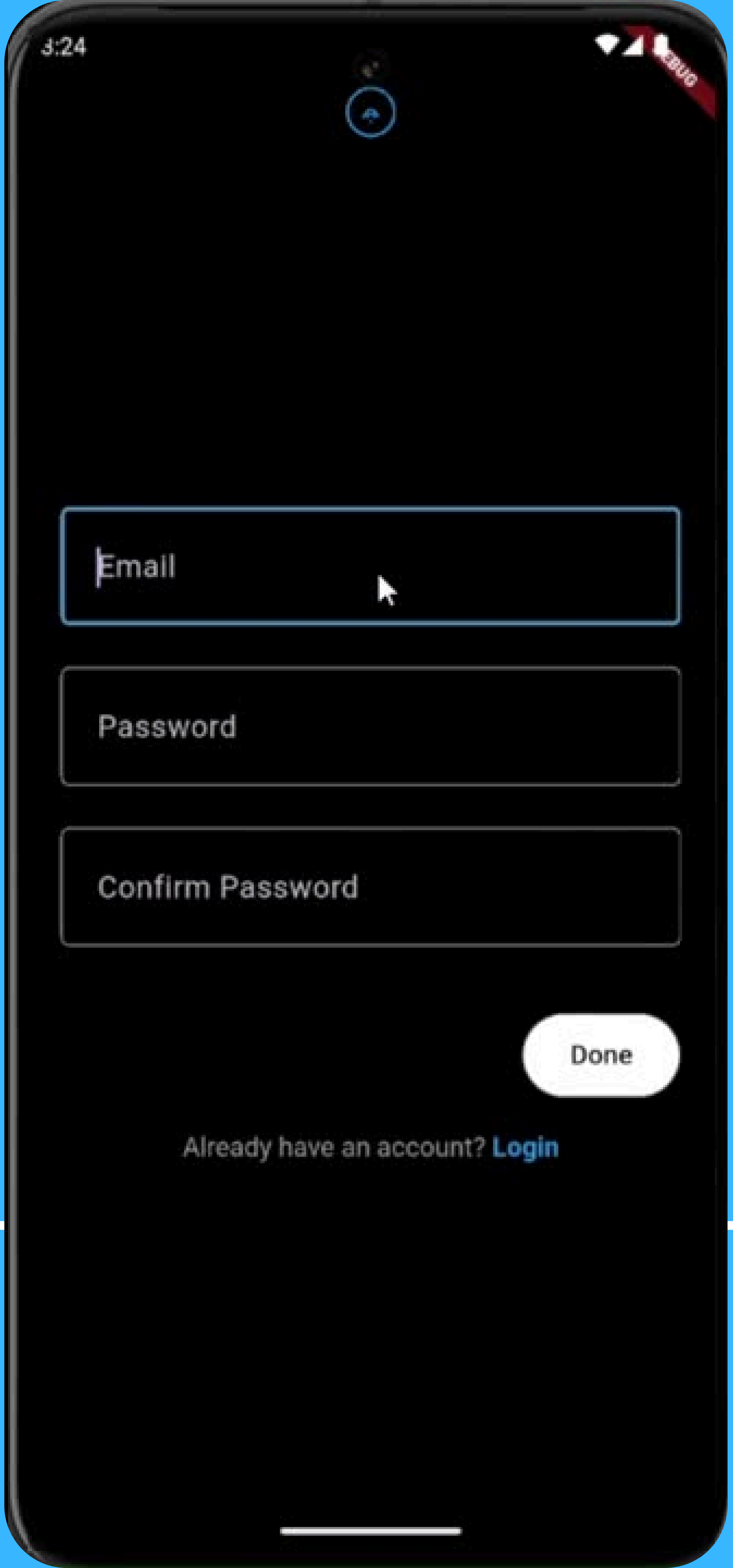
❌ Lack of Real Clinical Validation

🚀 Larger & More Diverse Audio Dataset

🚀 Fine-Tuning the Classifier

🚀 Enhanced RAG Pipeline

🚀 Clinical Collaboration


3:24
Email
Password
Confirm Password
Done
Already have an account? Login

DEMO

CONCLUSION

✅ Developed a complete, end-to-end AI system for respiratory health

🔄 Combines detection (classification) and explanation (assistant) in one platform

📱 Designed for accessibility on real-world mobile or edge devices

🧠 Contributes to the future of smart, explainable healthcare

THANK YOU FOR YOUR ATTENTION !

DO YOU HAVE ANY QUESTIONS?