AI GP Doctor

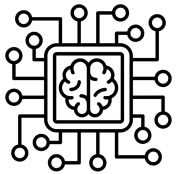
Orchestrating AI for Smarter Diagnosis

Untari

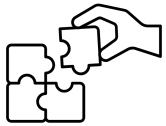
CM3070 Final Year Project
Template: Orchestrating AI Models

Why This Matters – Augmenting the Doctor's Perspective

Doctors' experience is limited, and enhancing their diagnosis with the aid of AI can help them deliver diagnoses that take into account much more data.



This is a preliminary experiment in that direction, not intended to be used by a doctor yet, but to set an example and direction for a future possible one.



The Doctor's Dilemma

Juggling Voice, Text & Images

Real diagnosis requires integrating multiple data types. Most AI tools handle only one.

Voice

Text

Image

Challenge: How can AI effectively simulate this multi-modal reasoning?

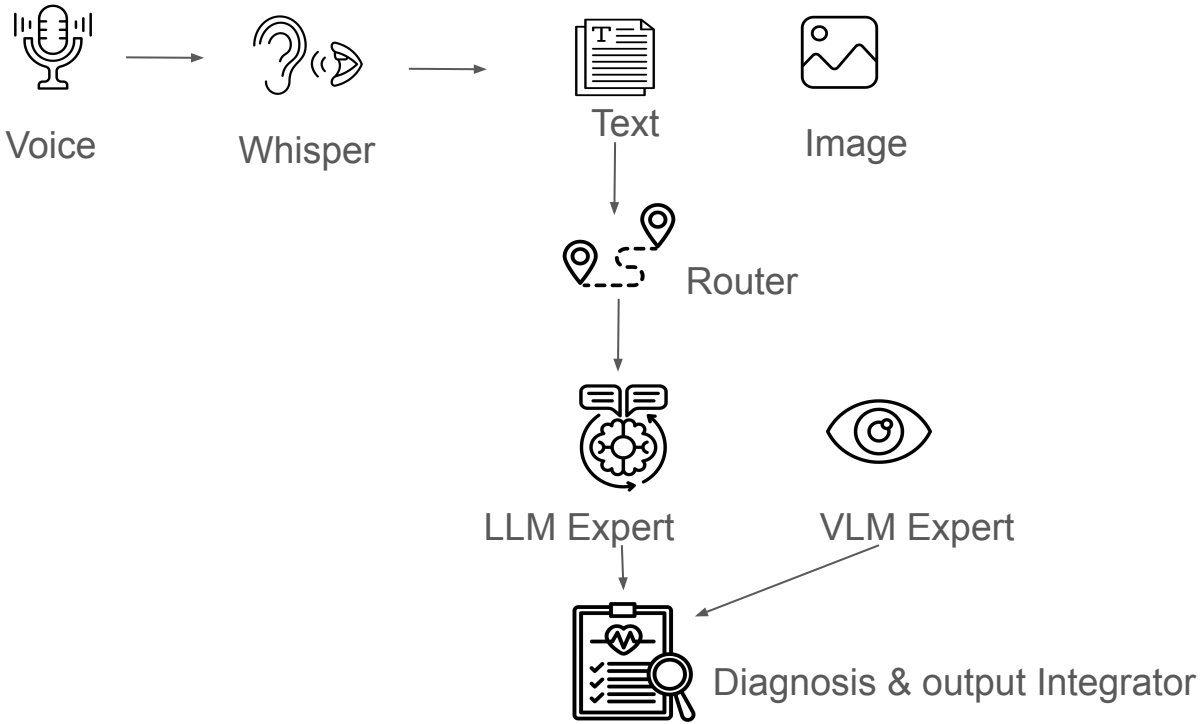
Our Solution: AI GP Doctor!

Multi-Modal AI Orchestrator

Building a prototype simulating a virtual GP consultation using a Mixture-of-Experts (MoE)-style orchestration layer.

- Integrates spoken symptoms, text, and medical images.
- Manages specialized AI models ("experts").
- Goal: Demonstrate a functional, user-facing system.
- Focus on system integration feasibility, not new model creation

A modular system connecting expert AI models



Toolkit & Evaluation Strategy

Using pre-trained models & a combined data approach

Model

- Whisper (Speech)
- ClinicalBERT/Med-PaLM (Text)
- CheXzero/ClinicalBLIP (Image)

Data

Construct a hybrid dataset simulating cases using:

- MIMIC-CXR
- ISIC
- EyePACS
- MedQA etc.

Goal

Align inputs across modalities:

- symptom + image + diagnosis

Explainability

- Grad-CAM
- Confidence Scores
- Potentially LIME.

Measuring Success: Holistic View

Evaluating the system, not just the parts:

- **Baseline:** Individual models working alone (single modality).
- **Core Question:** Does orchestration add value? (More coherent, context-aware insights vs. baseline?)
- **Metrics:** Accuracy, Latency, Explainability Quality, Uncertainty Communication.
- **Trust Factors:** Rigorous XAI, UQ, Bias/Fairness checks.
- Positioned as a technical simulation with clear disclaimers

Project Outcomes

- A functional software prototype (MoE-style workflow).
- Evaluation results (Orchestrated vs. Baseline on hybrid data).
- Detailed performance reports (individual models).
- Integrated explanations & confidence scores.
- Comprehensive final report (thesis).

Demonstrating the potential of orchestrated AI in healthcare!