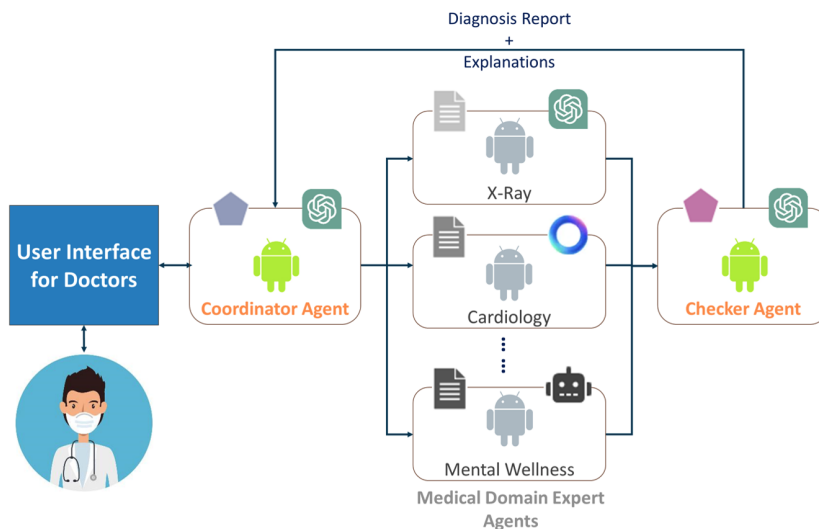


MASTER'S PROJECT AVAILABLE

MAC-Health: Multi-Agent AI Copilot for Healthcare



Motivation

Clinical diagnosis and patient treatment management require complex reasoning. Often, this necessitates collaborative decision-making among a panel of domain experts. While Large Language Models (LLMs) have advanced rapidly, single monolithic models frequently hallucinate or fail at multi-step clinical reasoning. Multi-Agent Systems (MAS) address this by assigning distinct roles (e.g., Cardiologist) to different foundation models, simulating an interactive expert panel [1, 2]. In this project, we aim to develop MAC-Health, a resource-efficient AI copilot designed to support doctors and medical students in diagnostic reasoning.

Objective & Methodology

This thesis focuses on building the MAC-Health architecture using modern, open-source agentic frameworks (e.g., CrewAI or LangGraph) that are feasible to run on limited GPU resources via API calls or quantized local models.

Key Tasks:

- **Architecture Design:** Build a MAS topology comprising a Coordinator, Domain Experts, and a Checker Agent.
- **Knowledge Grounding:** Implement Retrieval-Augmented Generation (RAG) to connect Expert Agents to local medical guidelines, minimizing hallucinations without expensive model fine-tuning.
- **Evaluation:** Benchmark the collaborative MAC-Health system against single-LLM baselines using open-source medical datasets (e.g., MedQA) to measure diagnostic accuracy.

Requirements

- Strong programming skills in Python.
- Foundational knowledge of Natural Language Processing (NLP) and Large Language Models (LLMs).
- Familiarity with API integration, agentic frameworks (CrewAI, AutoGen), or RAG pipelines is a strong plus.

References

- [1] Singhal, K. *et al.*, "Large language models encode clinical knowledge," *Nature*, 2023.
- [2] Wang, L. *et al.*, "A Survey on Large Language Model based Autonomous Agents," *Frontiers of Computer Science*, 2024.

Application

If you are interested in this project, please email your CV and a brief transcript to:
Dr. Behzad Bozorgtabar at behzad@ece.au.dk.

