

AI WOMEN MEDICAL ANALYZER - DETAILED PROJECT ABSTRACT

INTRODUCTION

Women's healthcare remains one of the most underserved areas across the world, especially in preventive diagnostics and early disease detection. Conditions such as Polycystic Ovary Syndrome (PCOS), uterine fibroids, and breast cancer affect millions of women annually, yet they are often diagnosed late due to the absence of continuous monitoring, lack of access to specialized healthcare, sociocultural barriers, and low awareness. The growing burden of these diseases highlights the urgent need for technological solutions capable of assisting women in early identification, risk assessment, and reliable medical guidance. Artificial Intelligence (AI) and Machine Learning (ML) provide transformative opportunities in this domain by enabling automated screening, predictive analytics, intelligent decision support, and scalable health assistance tools.

PROBLEM STATEMENT

The current healthcare environment lacks a unified, intelligent, and accessible system capable of predicting multiple women-specific disorders using medical and clinical data. PCOS often remains undetected for years as symptoms are inconsistent and vary between individuals. Fibroids, though common, are frequently ignored until they grow large enough to cause complications, while breast cancer continues to be the leading cause of cancer-related deaths among women due to late diagnosis. Existing digital tools operate in isolation and fail to combine prediction, verified guidance, and location-based medical access. These limitations stress the need for an integrated platform that uses AI-driven prediction, government-linked medical navigation, and medically verified conversational support to empower women with early diagnostic assistance and health awareness.

MOTIVATION

Early detection significantly improves long-term health outcomes for women. AI-driven systems can democratize access to expert-level medical understanding by combining clinical datasets, predictive models, information retrieval systems, and conversational interfaces. The motivation behind this project lies in bridging the gap between women and healthcare systems by delivering an AI-powered medical analyzer that is accurate, accessible, and intelligent. Integration with government health resources ensures women can instantly locate trusted medical facilities, reducing delays in seeking treatment. A Retrieval-Augmented Generation (RAG)-based Medical LLM ensures factual, verified, and safe medical responses—eliminating the issue of incorrect or hallucinated guidance prevalent in standard chatbots.

SCOPE OF THE PROJECT

The scope of this project includes predictive diagnostics, medical accessibility, and AI-assisted support for women's health. The system incorporates multi-disease prediction models, real-time medical map integration, and a medically verified chatbot to provide actionable insights and guidance. This system is scalable and can be expanded in the future to include additional conditions, languages, and EHR integration.

EXISTING METHODOLOGIES

Existing tools, such as symptom checkers and single-disease prediction apps, suffer from limited accuracy and narrow applicability. Generic chatbots without retrieval mechanisms often hallucinate and provide unsafe medical advice. Hospital locator tools lack curated medical information and do not focus on women-specific healthcare needs.

DISADVANTAGES OF EXISTING METHODS

- Lack of multi-disease predictive capabilities.
- Inability to generalize across varied symptoms.
- High hallucination rates in medical chatbots.
- No link to government healthcare facilities.
- Limited personalization and no cloud-based scalability.

PROPOSED METHODOLOGY

The AI Women Medical Analyzer integrates three main components: 1. Multi-disease ML models trained for PCOS, fibroid, and breast cancer prediction. 2. Government-linked medical maps for finding nearby hospitals, clinics, and schemes. 3. A RAG-based Medical LLM for factual, verified medical question answering. This system is deployed on Azure cloud to ensure scalability, resilience, and performance.

ADVANTAGES OF THE PROPOSED SYSTEM

- Unified platform for prediction, navigation, and AI guidance.
- Verified information eliminates misinformation.
- Real-time government healthcare access.
- Predictive analytics tailored to women's health.
- Highly scalable architecture.
- User-friendly experience suitable for all ages.

PROJECT FLOW

1. User enters clinical details and symptoms.
2. System preprocesses and validates input.
3. ML models generate risk predictions.
4. Maps module locates nearby healthcare facilities.
5. RAG-based LLM answers medical queries.
6. Dashboard displays results, insights, and recommendations.

MODULES

- User Authentication & Profile Module
- PCOS Prediction Module
- Fibroid Prediction Module
- Breast Cancer Prediction Module
- Government Healthcare Mapping Module
- Medical LLM (RAG) Assistant Module
- Admin Dashboard & Analytics
- Cloud Deployment & API Layer

TECH STACK

Frontend: React.js Backend: Node.js / FastAPI ML: Python, TensorFlow, Scikit-Learn
RAG + LLM: LangChain, FAISS, HuggingFace Cloud: Azure ML, Azure Functions,
Blob Storage Database: MongoDB / PostgreSQL

SYSTEM REQUIREMENTS

Software: Windows/Linux, Python 3.10+, Node.js 18+, Azure CLI,
MongoDB/PostgreSQL Hardware: 8GB RAM minimum (16GB recommended),
multi-core CPU, optional GPU