Bridging Healthcare Gaps with AI

(Project Proposal)

Project Code

BHG-AI-(25-26)

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1. Abstract

Healthcare systems around the world struggle with serious problems in providing accessible and affordable medical care, especially in developing countries where people face difficulties reaching doctors and understanding their health conditions. Patients face long waiting times, high costs, complex medical terminology, language barriers, and limited specialist access. To solve these problems, we will develop healthbridge.ai, an AI-powered mobile and web platform featuring an intelligent health assistant model that will be fine-tuned on individual user's medical data to provide personalized health guidance and respond to their specific health concerns. The platform will help patients upload and understand their medical reports through simple explanations in their own language, with the AI health assistant determining whether they need to see a doctor immediately or can manage at home. The system connects patients with specialists for consultations and provides medication reminders. This platform makes healthcare more accessible and affordable by reducing unnecessary visits, enabling direct specialist access, providing clear health explanations, and detecting issues early.

2. Background and Justification

In Pakistan, healthcare delays put lives at risk, especially with huge gaps between regions. The country's inequality ratio is 16.59 CHI, meaning people in better-off districts are over 16 times healthier than those in poorer ones [1]. In rural areas, emergency help often comes too late—response times average over 14 minutes, and in nearly 1 out of 10 cases, patients wait almost 30 minutes for EMS to arrive [2]. About 50% of the population does not have access to primary healthcare services, and approximately 42% do not have health insurance [3]. One in 89 rural women dies during childbirth due to inadequate care and delays [4], [5].

Digital healthcare platforms like Oladoc, Marham, Sehat Kahani, and EZShifa have emerged to address accessibility through telemedicine and appointment booking services [6]–[8]. These platforms enable video consultations and help patients schedule appointments with doctors across various specialties, reducing some geographical barriers.

HealthBridge.ai will break geographical and time barriers by giving people instant healthcare support whenever they need it. Our intelligent AI health assistant will provide quick and personalized guidance by explaining the medical reports in simple language and helping patients decide whether they need urgent medical care or can manage at home. When professional help is required, patients will instantly connect with qualified doctors through our web application, using video calls, audio calls, or text chat hence eliminating long waits. The platform will also include smart medication reminders and an automated appointment system that links patients to the right specialists for both telemedicine and in-person visits. HealthBridge.ai will make healthcare accessible, reducing critical delays, avoiding unnecessary emergency visits, and ensuring timely medical intervention that can ultimately save lives.

3. Project Methodology

We adopt the Agile (Scrum) methodology because our AI-powered healthcare platform requires iterative development, continuous testing, and regular refinement based on user feedback. The core AI health assistant must be trained and validated incrementally, with accuracy improving through each sprint. Agile's flexibility allows us to prioritize the primary AI assistant first, then systematically integrate secondary features (report analysis, doctor matching, medication reminders) while maintaining medical accuracy and user safety. This methodology is ideal for our 4-member team working on a complex, multi-component system within an 8 months academic timeline, ensuring we deliver a functional, tested, and validated healthcare solution.

4. Project Scope

In-Scope Deliverables:

Core Feature: AI Health Assistant

1. Natural language health queries (English & local languages)
2. Symptom assessment, preliminary guidance & medical terminology explanation
3. Personalized recommendations based on user history
4. Context-aware conversation with memory
5. Four-level urgency triage (Green/Yellow/Red/Emergency)
6. Automatic specialist recommendation
7. Chat-based interface
8. Image/PDF upload with OCR text extraction and plain language explanations of results
9. Interface in English & local languages and In-app language switching
10. Specialty & location-based doctor matching
11. Live video calling & real-time chat
12. Payment gateway integration, calendar sync & appointment reminders
13. Appointment history tracking
14. Manual medication entry (dosage, frequency, duration) with push notification reminders
15. Abnormal value alerts and AI-powered pattern detection

Out-of-scope Exclusions:

1. NO medical diagnosis, prescriptions, treatment plans, or test ordering.
2. NO medical imaging diagnosis or emergency dispatch.
3. NO integration with wearables, Bluetooth devices, or IoT sensors.
4. NO EHR, hospital system, insurance, pharmacy, or lab integration.
5. NO HIPAA/GDPR certification, FDA approval, or clinical trials.
6. NO health forums, social sharing, gamification, family accounts, or genetic test analysis.

5. High level Project Plan

PHASE 1: PLANNING & DESIGN

- Requirements gathering and system architecture design
- UI/UX design for mobile app and web platform
- Database schema design
- Setup development environment and tools

PHASE 2: AI HEALTH ASSISTANT DEVELOPMENT

- Train AI model on medical data and health queries
- Implement natural language processing (English & Urdu)
- Develop chat interface with conversation memory

PHASE 3: MEDICAL REPORT ANALYSIS

- Build report interpretation for common tests
- Create plain language explanation generator
- Develop abnormal value detection with alerts

PHASE 4: DOCTOR CONSULTATION SYSTEM

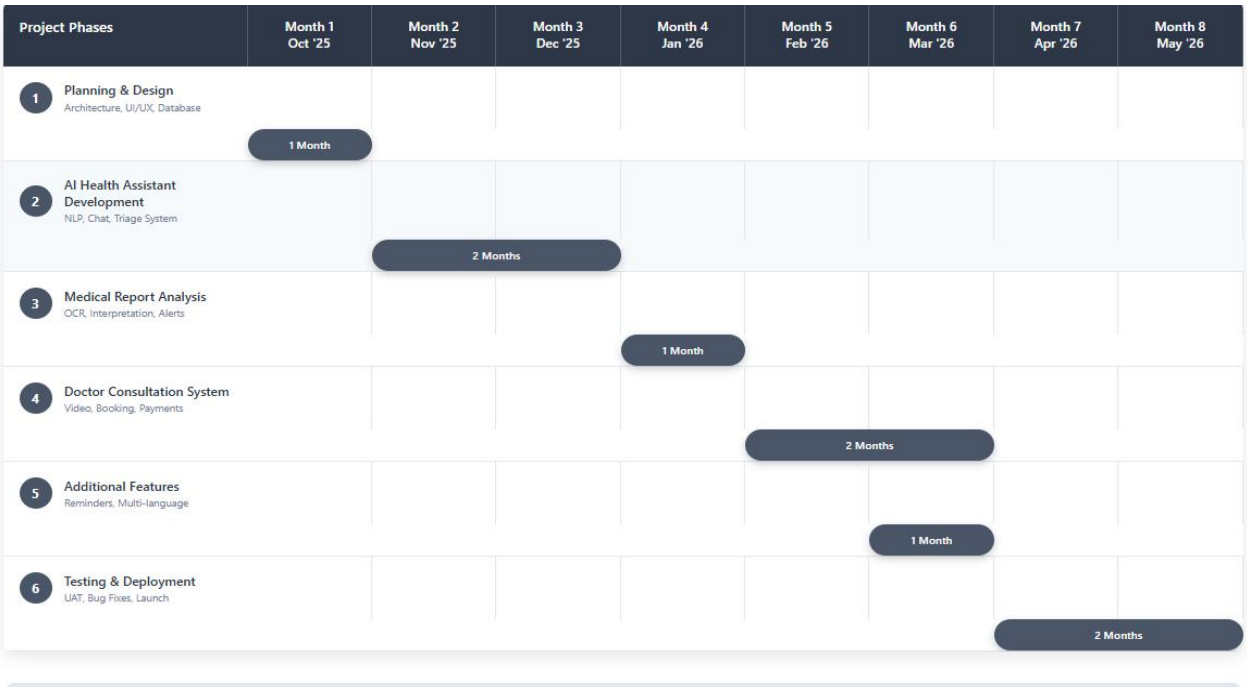
- Build doctor profile and specialty database
- Implement video/audio calling features
- Create appointment booking and calendar system
- Integrate payment gateway
- Develop doctor-patient matching algorithm

PHASE 5: ADDITIONAL FEATURES

- Build medication reminder system with notifications
- Implement multi-language support (translation)

PHASE 6: TESTING & DEPLOYMENT

- Comprehensive system testing (functional & security)
- User acceptance testing with real users
- Fix bugs and optimize performance
- Deploy prototype and prepare documentation



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