

AI HEALTH DIAGNOSIS

- **Problem Statement ID** – SIH25131
- ◀ • **Problem Statement Title** – (Student Innovation) - AI-Driven Preliminary Diagnosis & OPD Appointment System
- **Theme** – MedTech / BioTech / HealthTech
- **PS Category- Software/Hardware** – Software
- **Team ID** – -
- **Team Name** – Ad Astra



AI Health Diagnosis

The Problem & Our Solution

Addressing critical gaps in rural healthcare with an accessible, intelligent platform.

The Problem

The Doctor Deficit

A severe urban-rural divide leaves millions without access to timely medical advice.



The Cost of Delay

Without early guidance, minor issues escalate into crippling financial burdens.



The Communication Gap

Most digital health solutions are unusable for 400M citizens due to language and literacy barriers.



The Overburdened System

Public hospitals are overwhelmed, leading to long waits and compromised care for everyone.



Our Solution

AI-Powered Triage

Instant preliminary analysis to determine the urgency of care needed.



90%+ Triage Accuracy

Seamless OPD Booking

Intelligently books appointments at the nearest government hospitals.



Accessible to All

Designed to overcome connectivity and literacy barriers for rural India.



Supports all Indian Languages

The Prototype & Technical Approach

Visualizing the user journey, our prototype in action, and the technical stack powering it.



The Prototype

Symptom Checker

नमस्ते! मैं आपकी आज कैसे मदद कर सकता हूँ? कृपया अपने लक्षणों का सरल शब्दों में वर्णन करें।

मुझे बुरा सिरदर्द और उच्च बुखार है।

आपके लक्षणों के आधार पर, यह एक वायरल संक्रमण हो सकता है। कृपया आराम करें और हाइड्रेटेड रहें। यदि 3 दिनों में सुधार नहीं होता है तो डॉक्टर से मिलने की सिफारिश की जाती है।

Find nearest hospital

Self-care tips

AI Analysis Result

SERIOUS

Consultation Recommended

Analysis suggests a condition like psoriasis. A dermatologist visit is strongly advised.

Book OPD Appointment

Done

Technical Approach

Frontend

Core:

React & TypeScript

Styling:

Tailwind CSS

Architecture:

PWA (Progressive Web App)

Localization:

i18next for Multilingual Support

Backend

Runtime:

Node.js & Express

Authentication (Deployment):

Real SMS Gateway (e.g., Twilio/Exotel)

Integration (Deployment):

Govt. Hospital Systems APIs

AI Layer & Database

AI(skin Disease):

Google/Skinive APIs

AI(Symptom Checker):

Google/Infermedica APIs

Database (Prototype):

Local 'db.json'

Database (Production):

MongoDB Atlas

Caching (Production):

Redis

Use cases:

Hospital Lists, Temp Sessions

AI Health Diagnosis Feasibility & Risk Analysis

A balanced look at our practical approach, potential hurdles, and clear mitigation strategies.



Technical Feasibility



Built on mature, scalable web tech & Google's robust Gemini API.



Operational Feasibility



Complements existing workflows. PWA allows for rapid deployment without app store friction.



Economic Viability

Low
Operational Cost



High
Social Impact

Low-cost serverless architecture. Free for citizens, funded via public health grants.



Risk & Mitigation

- **AI Accuracy:** Positioned as a preliminary aid, not a final diagnosis.
- **User Adoption:** Multilingual UI & on-ground ASHA worker training.
- **Data Privacy:** Secure backend with JWT authentication & data compliance.

Proactive strategies address key challenges for successful implementation.



Impact & Unique Features

Highlighting the tangible benefits and core features that set our solution apart.



For Citizens

- ✓ Immediate, free healthcare guidance
- ✓ Reduces travel costs & anxiety
- ✓ Wait time: days → minutes



For the Healthcare System

- ✓ Reduces overcrowding & admin load
- ✓ Frees up staff for critical cases
- ✓ OPD wait: 4+ hours → <30 min



Seamless Journey

- ✓ End-to-end: symptom to appointment
- ✓ Ensures users get access, not just advice
- ✓ Integrated with public hospitals



Hyper-Local

- ✓ Supports all major Indian languages
- ✓ Simple UI overcomes literacy barriers
- ✓ Designed for rural user needs



Offline-First PWA

- ✓ Reliable on low-bandwidth networks
- ✓ Core features work with intermittent signal
- ✓ No app store needed for installation



Public Health Integration

- ✓ Intelligently guides patients to Govt. facilities
- ✓ Optimizes public resource use
- ✓ Builds trust in the public system



Research & Validation

Our solution is grounded in official data, academic research, and real-world stakeholder validation.

-  **Proof of Concept Validation:** We have secured a **Letter of Concept from New Civil Hospital, Surat**, confirming the viability of our approach and expressing official interest in a collaborative pilot program to integrate with their OPD systems.
-  **Rural Doctor Deficit:** An ~80% specialist shortfall in rural CHCs validates the need for accessible preliminary care. (*MoHFW, 2021-22*)
-  **AI Diagnostic Efficacy:** Studies in journals like *Nature* demonstrate AI's dermatologist-level accuracy for skin conditions, while research in *npj Digital Medicine* confirms conversational AI's triage efficacy.
-  **Out-of-Pocket Expenditure:** With OOPE at 47.1% of total health spending, our triage aims to reduce costs by preventing issue escalation. (*NHA, 2019-20*)
-  **National Strategy Alignment:** Our platform directly supports the **Ayushman Bharat Digital Mission (ABDM)** by providing an accessible entry point for citizens and creating a foundation for interoperable health records.
-  **PWA Viability:** Over 500M rural internet subscribers make a PWA the most effective delivery model, bypassing app stores and ensuring accessibility. (*TRAI, 2023*)
-  **ASHA Worker Integration:** The solution is designed to empower India's 1 million+ ASHA workers, leveraging their community trust to drive adoption and bridge the digital divide. (*NHM Guidelines*)

