SMART GUJARAT HACKATHON 2025

AI-Powered Maternal Healthcare & Monitoring Platform

Date:14/03/2025

Submitted By:

- Aishna Bhatia
- Anika Garg
- Gungun Agarwal
- Janhavi Patil
- Payal Durga
- Priyanka Lotiya
- Urvashi Ladva
- Viditi Joshi

Team Details

- **Team ID:** TM001032
- **Sector Name:** Social Impact
- **Department:** Women & Child Development Department
- **Problem ID:** PS000034
- **Problem Statement:** AI for Maternal Health Monitoring and Support
- **Team Leader:** Ladva Urvashi
    - Email: 202351074@iiitvadodara.ac.in
    - Contact: 9979981393
- **Faculty Mentor:** Dr. Bhupendra Kumar
    - Email: bhupendra_kumar@iiitvadodara.ac.in
    - Contact: 8802154551

Executive Summary

Maternal healthcare is a critical public health concern, especially in rural and underserved areas where access to timely medical care and real-time health monitoring is limited. Our AI-powered Maternal Healthcare & Monitoring Platform aims to bridge this gap by leveraging artificial intelligence, smart health tracking, and telemedicine solutions to improve maternal health outcomes. By integrating wearable smart devices, AI-driven mobile-based monitoring, and doctor-patient collaboration, we ensure continuous maternal health assessment, early risk detection, and timely medical interventions. The platform empowers pregnant women with personalized health insights while enabling doctors to provide proactive care, ultimately reducing maternal mortality rates and improving overall healthcare efficiency.

Problem Statement

Maternal mortality remains a significant challenge, particularly in rural areas where healthcare resources are scarce. High-risk pregnancies often go undetected due to the lack of real-time monitoring, leading to preventable complications.

Key Challenges:

- Limited access to healthcare facilities
- Delayed identification of high-risk pregnancies
- Lack of personalized healthcare support and education
- Inadequate emergency response mechanisms

Proposed Solution

Our AI-Powered Maternal Healthcare & Monitoring Platform offers a comprehensive digital solution to address maternal healthcare challenges:

- **AI-Driven Health Monitoring:** Real-time tracking of vital health indicators (BP, heart rate, oxygen levels, stress levels, etc.) using smart devices or mobile-based AI analysis.
- **Doctor-Patient Interaction:** Secure teleconsultations, AI-powered appointment scheduling, and real-time access to medical records.
- **Personalized AI Assistant:** Provides health insights, nutritional guidance, medication reminders, and emergency alerts.
- **Emergency Support System:** AI flags high-risk cases, alerts doctors, and notifies hospitals or healthcare workers.
- **Community Support & Education:** A dedicated space for maternal health discussions, doctor-approved content, and FAQs.

Objectives of the Project

1. Reduce maternal mortality rates by providing early detection and intervention for high-risk pregnancies.
2. Improve access to healthcare services for pregnant women in rural and underserved areas.
3. Enable seamless doctor-patient collaboration through AI-powered health tracking and telemedicine.
4. Provide an AI-driven personal health assistant for better maternal care and pregnancy guidance.
5. Enhance emergency response mechanisms through automated alerts and doctor notifications.

Technology Stack

- **Frontend:** HTML, CSS, JavaScript
- **Backend:** Django (secure and scalable backend framework)
- **Database:** Django ORM with SQL (storing patient records, doctor details, and health reports)
- **APIs/External Tools:** AI-based health monitoring APIs, Smart Device Integration APIs (for wearables), Twilio (for emergency alerts and notifications)

Methodology (Plan of Action)

1. **Research & Requirement Analysis** – Understanding user needs, conducting market research, and defining feature scope.
2. **Design & Development** – Developing UI/UX designs, setting up database architecture, and implementing core functionalities.
3. **AI Integration & Health Monitoring** – Training AI models for risk detection and integrating smart health monitoring features.
4. **Testing & Quality Assurance** – Conducting rigorous testing, ensuring security and accuracy in health monitoring.
5. **Deployment & User Training** – Launching the platform, onboarding users, and providing training for doctors and healthcare workers.

Expected Impact / Value Proposition

- **Improved Maternal Healthcare:** Timely detection of risks, better access to doctors, and AI-powered health insights.
- **Enhanced Doctor Efficiency:** Streamlined patient monitoring, AI-assisted diagnostics, and multi-doctor collaboration.
- **Reduced Emergency Response Time:** Automated risk classification and hospital notifications ensure faster medical assistance.
- **Increased Awareness & Education:** AI-driven guidance, community support, and doctor-verified educational content empower mothers.

Feasibility & Challenges

- **Technical Feasibility:** The platform is built using robust AI and telemedicine solutions, ensuring accurate health monitoring.
- **Challenges:**
    - Integrating AI-based health tracking without wearable devices.
    - Ensuring data security and compliance with healthcare regulations.
    - Encouraging adoption among users unfamiliar with digital healthcare solutions.

Team Roles and Responsibilities

- **Frontend Developers:** UI/UX design, implementing web-based user interface.
- **Backend Developers:** Building database architecture, AI integration, and API development.
- **AI Specialists:** Training AI models for health risk detection and chatbot assistance.
- **Doctors/Medical Experts:** Validating AI recommendations, assisting with medical guidelines.
- **Project Managers:** Overseeing development, testing, and deployment phases.

Future Scope (Post-Hackathon)

- Expansion to include postpartum care and neonatal health monitoring.
- AI-powered voice assistance for illiterate users in rural areas.
- Government and NGO collaborations for large-scale implementation.
- Mobile app development for wider accessibility.

Conclusion

Our AI-powered Maternal Healthcare & Monitoring Platform is a revolutionary solution that leverages AI, smart tracking, and telemedicine to enhance maternal healthcare accessibility, efficiency, and safety. By enabling real-time monitoring, early risk detection, and seamless doctor-patient collaboration, we aim to significantly reduce maternal mortality rates and improve pregnancy outcomes. With its scalability and future expansion potential, this platform is a step toward ensuring better maternal healthcare for all.