HACKSPHERE 2.0

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Overview

Problem Title:

Empowering Maternal Health: Lack of access in Prenatal and Emergency Care for Underprivileged Communities

Domain: HealthTech

Brief Description of the Problem:

Access to timely medical care remains a major challenge in underprivileged communities, especially for pregnant women. India's birth rate declined from 21.8 to 19.5 per 1,000 population between 2015 and 2020, yet maternal mortality remains high, with 70% of districts reporting MMR above the SDG-3 target of 70 deaths per 100,000 live births. The country accounts for 17.3% of global stillbirths. Rural areas face higher infant mortality, with Madhya Pradesh recording 47 infant deaths per 1,000 live births in 2020. Under-five mortality rates also fell, from 119 to 46 in rural areas and 75 to 32 in urban areas. Limited healthcare infrastructure, delays in reaching medical facilities, and a lack of trained personnel worsen emergency response. Addressing these gaps is crucial to improving healthcare equity and saving lives.

Idea Approach:

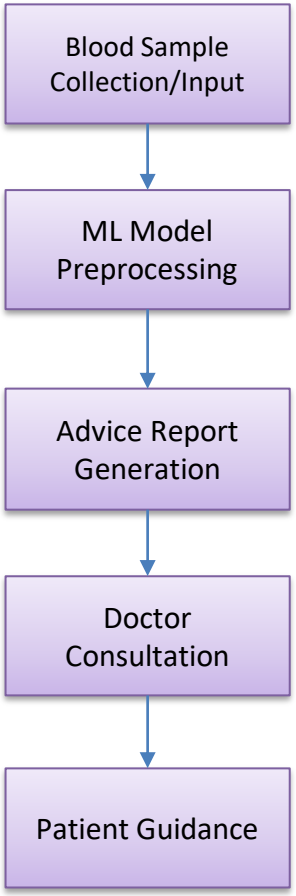
How does your project solve the problem?

Assumption: If done manually, we believe it takes more than 10 days for this process to complete for just a single patient i.e.
Collect Blood Sample (1) -> Generate Report (2) -> Wait for doctor consultation appointment (3) -> Get Advice (1) -> Travel Back (3) -> Communicate with the patient (1)

We are aiming to address the lack of prenatal care and early detection of pregnancy for underprivileged women by developing AI-powered solution.

Our system will analyze blood samples to identify of the patient is pregnant and predict potential complications.

Since we're virtualizing key steps, it'll significantly reduce the process time. Moreover, This will provide personalized advice and empower women with the knowledge and resources to make informed decisions about their health.



Technical Implementation:

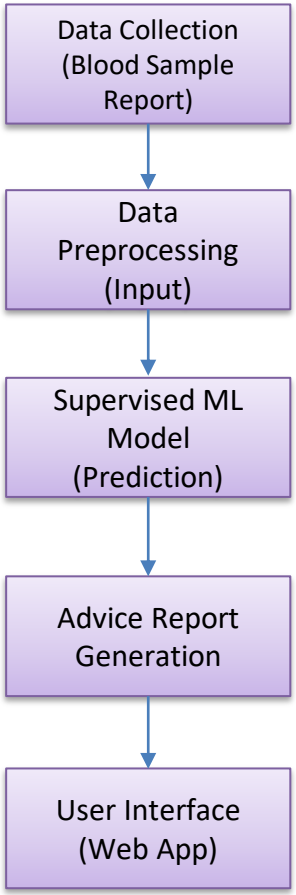
Technologies: ML-Libraries (scikit-learn)
Web App: HTML, CSS, JavaScript, React
Database: MySQL, Supabase

Data Pipeline: Blood sample data is collected (or uploaded) and preprocessed. This data is then fed into our pretrained ML model for pregnancy status and gestational age prediction. The model's output is a prediction.

Web App: A user interface built with React allows for data input (or upload) and provides secure access to generated advice reports.

MySQL will be used for secure storage of patient data, blood sample reports, and ML-generated predictions/reports.

Prototype: Agile – In development



Uniqueness of solution :

What Makes Our Solution Unique?

We're not just diagnosing or treating medical issues—we're identifying them early through AI-powered prenatal detection and real-time emergency guidance for underprivileged communities.

- **Predictive ML Model:** Determines if a woman is pregnant and estimates gestational age, enabling timely medical intervention.
- **Community-Powered Data Collection:** Works with NGOs, volunteers, and hospitals to reach women with limited healthcare access.
- **Holistic Emergency Support:** Covers pregnancy risks alongside critical medical emergencies like unconsciousness or severe bleeding.
- **Beyond Traditional Healthcare:** Unlike most healthcare platforms that focus on diagnosis or treatment, our solution leverages ML to predict pregnancy and generate reports, allowing early prenatal care before complications arise.

By combining predictive AI, real-time assistance, and accessibility-focused design, our platform ensures healthcare reaches those who need it most—before it's too late.

Effect & Value Proposition

Effect:

1. **Reduced Maternal Mortality:** Early detection and timely intervention will lower pregnancy-related complications.
2. **Faster Diagnosis with AI:** Machine learning will enable quick blood sample analysis and early complication detection, saving time and improving accuracy.
3. **Improved Healthcare Access:** Direct support from doctors, NGOs, and hospitals will increase access to prenatal care and emergency services.
4. **Better Health Outcomes:** Regular health tracking and guidance will improve maternal and child health.

Value Proposition:

1. **Early Detection and Prevention:** AI-based predictive analysis will identify health risks early, enabling prompt action.
2. **Affordable and Accessible:** Free/low-cost services through NGO and hospital partnerships will eliminate financial barriers.
3. **Scalable Model:** The platform can expand across regions, supported by automated health tracking and AI insights.
4. **Community and Support:** A strong support network will provide emotional and medical assistance to pregnant women.

Insights & References

- Research Paper:

Authors - Periyasamy Kuppusamy, Ranjan K Prusty, Itta K Chaaithanya, Rahul K Gajbhiye and Geetanjali Sachdeva (2023).
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