DEV{thon} 2.0

<!--Design Your Dreams into Reality-->

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Project Details

Project Title: Smart Baby LK

1. Project Overview

Our initiative aims to revolutionize child healthcare in Sri Lanka by developing a native, web-based platform to digitize infant health records. This platform will ensure accurate, accessible, and secure medical data management, empowering parents, healthcare providers, and policymakers with actionable insights to improve infant health outcomes. By leveraging cutting-edge technologies such as artificial intelligence (AI), the Internet of Things (IoT), and cloud computing, we propose a scalable and user-friendly solution to address the inefficiencies of the current paper-based system.

2. Problem Statement

Sri Lanka's current infant healthcare system heavily relies on paper-based health records, leading to inefficiencies, inaccuracies, and limited accessibility. Growth metrics such as weight and height are manually recorded and plotted by nurses, increasing the risk of human error. These inefficiencies make it difficult for healthcare providers to detect early signs of malnutrition, developmental delays, or other health concerns.

Additionally, the lack of a centralized digital system limits real-time monitoring, delaying critical interventions and making it challenging for the Ministry of Health to analyze nationwide data on infant nutrition, growth patterns, and vaccination coverage.

A significant issue parents face is **forgetting vaccination dates**, which can result in missed or delayed immunizations, putting infants at risk of preventable diseases. Without automated reminders, parents often struggle to keep track of their child's immunization schedule, especially with multiple vaccines required at different infancy stages.

Key challenges include:

Human Errors: Manual data entry and plotting of growth charts lead to inaccuracies.

Inefficient Monitoring: Lack of real-time tracking delays early detection of health issues.

Limited Data Accessibility: Policymakers lack aggregated, actionable data to inform healthcare strategies.

Missed Vaccinations: Many parents forget scheduled immunization dates due to a lack of reminders, increasing health risks for infants.

3. Proposed Solution

We propose a comprehensive web-based application that enables Sri Lankan parents to create and manage digital health profiles for their infants. This platform will serve as a centralized hub for tracking and managing critical health data, including growth metrics, vaccination schedules, and nutritional plans.

For healthcare providers, the platform will offer advanced data visualization tools to monitor infant health trends, reducing reliance on manual record-keeping and improving diagnostic accuracy.

4. Key Features:

Infant Health Records & Tracking

- Parent-Managed Profiles: Parents can create, update, and access their child’s digital health profile.
- Growth Monitoring: Automated generation of weight, height, and growth trend charts.
- Vaccination Records: Digital tracking of immunization schedules with automated reminders for upcoming doses.

Guidance & Educational Content

- **Infant Care Guidelines:** Evidence-based recommendations from WHO and local health authorities, covering:

- **Growth-Related Health Alerts:** If an infant is overweight or underweight, the app provides personalized precautions, dietary adjustments, and medical recommendations to guide parents in maintaining a healthy growth trajectory.Feeding: Breastfeeding, formula feeding, and transitioning to solid foods.

- Bathing & Hygiene: Safe practices for infant care.

- Common Health Issues: Management of fevers, colds, and digestive problems.

Parental Support & Community Features

- **Discussion Forum**: A platform for parents to seek advice from healthcare professionals and experienced caregivers.
- **Emergency Call Feature**: Direct access to local emergency hotlines

Reminders & Notifications

- **Vaccination Reminders**: Automated alerts for upcoming immunizations.
- **Health Checkup Reminders**: Notifications for routine medical visits.

Nutrition & Food Plans

- **Personalized Food Plans**: Age-specific dietary recommendations.
- **Allergy Alerts**: Track allergies and receive alerts about safe food options.

Development Tracker

- **Milestone Monitoring**: Track developmental milestones (e.g., motor skills, speech) and receive guidance on age-appropriate activities.

5. Technology Stack:

Frontend: React.js for a responsive, mobile-friendly user interface.

Backend: Node.js for scalable and efficient server-side operations.

Database: MongoDB for secure and flexible data storage.

Mobile Accessibility: React.js ensures compatibility with smartphones, making the platform accessible to a wide range of users.

6. Innovation:

AI-Powered Infant Health Insights

- **Smart Growth Predictions**: Use AI/ML models to predict an infant's expected growth patterns based on existing health data.
- **IoT & Wearable Device Integration:** Integrate wearable devices (like smart thermometers or baby monitors) to automatically log health data (e.g., body temperature, and sleep patterns).

7. Feasibility Analysis:

Market Feasibility

Sri Lanka records over 300,000 births annually, yet the majority of infant health data remains in paper format, leading to errors and inefficiencies. Studies show that a considerable amount of parents misplace or forget vaccination dates, highlighting the need for a digital solution.

Financial Feasibility

Development costs will primarily involve cloud hosting, IoT device integration, and AI/ML model training. Maintenance costs will include server hosting and platform updates. User adoption rates will impact revenue generation, and

reliance on government or NGO support might be necessary for initial scaling.

Technical Feasibility

The project is technically feasible due to the use of modern, well-supported technologies. The front end will be developed using React.js, which is ideal for creating responsive and mobile-friendly interfaces. The backend will utilize Node.js, ensuring efficient and scalable server-side operations. MongoDB will serve as the database, providing flexibility and security for storing health data

Legal Feasibility

The platform will handle sensitive health data, requiring adherence to data protection laws such as “Sri Lanka’s personal Data Protection Act”.

8. Impact Assessment:

The "Smart Baby LK" platform will revolutionize infant healthcare in Sri Lanka by digitizing health records and leveraging AI, IoT, and cloud computing. It will empower parents with tools to manage their child’s health, including automated vaccination reminders, growth tracking, and personalized care recommendations. Healthcare providers will benefit from real-time data visualization, reducing manual errors and enabling early detection of health issues like malnutrition or developmental delays. Policymakers will gain access to aggregated data on vaccination coverage and nutrition, enabling evidence-based decisions and targeted interventions.

9. Additional Information:

We consulted a medical officer to determine the most impactful features to include in our web application. She emphasized that many parents struggle to follow the recommended vaccination schedule, which can put their infant's health at risk. She stated,

"Many parents forget to follow the vaccine schedule correctly and therefore put their infant's health at risk. It would be of great use to have a web app that sends reminders and notifications in advance to remind them of their vaccination dates."

She highlighted that a reminder system would be highly in beneficial ensuring better adherence to the schedule.