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Pregamed: A Digital Health Companion for Expecting Mothers

Vikas Sharma, Ishan Jindal, Nilansh
Department of Computer Science
Dronacharya College of Engineering ,Gurgaon

Abstract: *Pregamed is a comprehensive digital platform designed to support pregnant women throughout their maternity journey. This research paper presents the motivation, design, implementation, and impact of Pregamed, a user-friendly web-based solution that streamlines appointment scheduling, vaccination tracking, and healthcare management for expecting mothers. The platform leverages modern web technologies to address the critical gaps in maternal health care accessibility, especially in underserved communities. Early-stage user testing indicates the potential of such tools in enhancing maternal healthcare awareness and compliance.*

Keywords: Pregamed

I. INTRODUCTION

Maternal healthcare remains a significant challenge globally, particularly in developing countries where access to timely medical advice and regular check-ups is limited. According to the World Health Organization, approximately 295,000 women died during and following pregnancy and childbirth in 2017, most of them in low-resource settings. Pregamed was conceived as a solution to provide expecting mothers with structured and timely support through a centralized platform. This paper discusses the rationale behind the application, its core features, and the technology used in its development. The goal is to bridge the gap between patients and healthcare providers using scalable digital tools.

II. PROBLEM STATEMENT

Many pregnant women face difficulties in tracking their vaccinations, scheduling routine checkups, and accessing reliable medical information. The lack of centralized digital health tools tailored specifically for pregnancy results in missed appointments, unrecorded vaccinations, and unnecessary complications. In rural and low-income urban areas, this issue is even more pronounced due to digital illiteracy and the absence of integrated healthcare records. Traditional methods like paper records are often misplaced or incomplete, leading to inefficiencies in care. Pregamed seeks to digitize and automate these processes while remaining accessible and simple to use.

III. OBJECTIVES

The objectives of the Pregamed platform are as follows:

- To provide a centralized digital space for pregnant women to manage their health-related appointments.
- To track essential vaccination schedules and send timely SMS/email reminders.
- To act as a digital companion by providing trimester-based recommendations.
- To integrate an optional educational library on pregnancy-related topics.
- To promote digital health literacy among new and expecting mothers.

IV. LITERATURE REVIEW

Various mobile health (mHealth) solutions exist, but few are focused exclusively on maternal health and even fewer integrate scheduling and vaccination tracking with a simple, intuitive interface. Applications like MomConnect in South Africa and mMitra in India have shown measurable improvements in maternal awareness. Studies by Sondaal et al.

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(2016) have demonstrated the effectiveness of SMS and app-based solutions in improving maternal outcomes. However, many platforms lack interactivity, multilingual support, or personalized scheduling. Pregamed aims to build on these foundations with broader functionality, higher interactivity, and a more modern UI/UX tailored to Indian healthcare needs.

V. SYSTEM DESIGN AND ARCHITECTURE

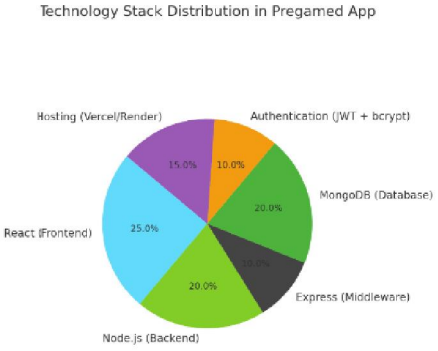
Pregamed follows a modular, component-based architecture built using the MERN (MongoDB, Express, React, Node.js) stack:

- Frontend: Developed using React with TypeScript to ensure type safety and maintainable code. Responsive design principles are applied to make the platform accessible across desktop and mobile devices.
- Backend: Built on Node.js and Express, offering a robust REST API interface. All routes are secured using middleware for role-based access control.
- Database: MongoDB is used as the primary NoSQL database to store user profiles, vaccination history, and appointment records. Data modeling is optimized for quick retrieval and real-time updates.
- Authentication: Implemented using JSON Web Tokens (JWT) and bcrypt for secure login and encryption of sensitive user data.
- Deployment: Backend is hosted on Render, while the frontend is deployed on Vercel to ensure scalability, uptime, and quick content delivery.

VI. FEATURES

The core features of Pregamed include:

- Appointment Scheduling: Users can book and manage medical visits. The system supports recurring appointments and provides push/email reminders.
- Vaccination Tracker: Displays a visual timeline of due and completed vaccinations based on the pregnancy stage. Automatic alerts notify users of upcoming vaccinations.
- User Authentication: Secure and intuitive onboarding experience with token-based access and encrypted storage.
- Responsive Interface: Fully mobile-compatible layout to ensure usability on all screen sizes.
- Informational Hub: An optional section that includes FAQs, government-approved guidelines, and trimester-specific tips curated by healthcare professionals.
- Feedback Mechanism: A feedback form allows users to suggest improvements or report technical issues.



VII. IMPLEMENTATION

The development process followed agile methodology with bi-weekly sprints and user feedback loops. Initial wireframes were designed using Figma and validated by healthcare professionals. The MVP was completed within six

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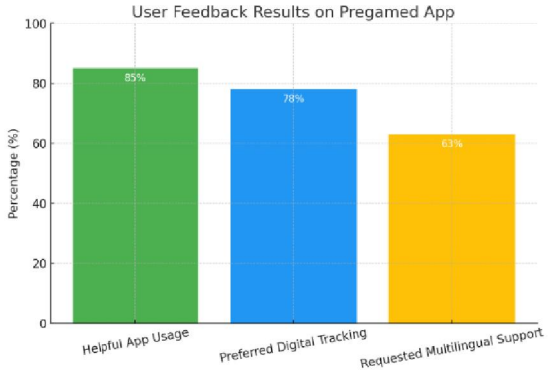
weeks and underwent user testing with a group of 30 users from urban and semi-urban areas. Insights from testing sessions were used to optimize the user flow, navigation, and readability. Performance was measured using Google Lighthouse to ensure accessibility and speed.

VIII. IMPACT AND FUTURE WORK

Early feedback shows that users find the platform intuitive and informative. Over 85% of test users reported improved awareness of their vaccination timelines. Healthcare providers expressed interest in a dashboard version of the app to sync with hospital EMRs. Future development plans include:

- Multilingual support in Hindi, Bengali, and other regional languages.
- Integration with telemedicine APIs for virtual doctor consultations.
- AI-powered chatbot to answer common maternal health queries.
- Offline-first capabilities using service workers for remote regions.



IX. CONCLUSION

Pregamed addresses a critical need in maternal health by providing a centralized and interactive platform for expecting mothers. Its emphasis on user experience, accessibility, and essential medical features makes it a strong candidate for large-scale adoption. With the right partnerships and funding, Pregamed can be expanded to offer nationwide support, especially in underrepresented and resource-constrained areas.

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