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Mhealth-Based Electronic Medical Record Platform for ASHA Field Workers

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Abstract

Digital technology is becoming more common in healthcare, especially when it comes to raising awareness about cancer and helping people learn about the disease. Special chatbots have been made to give information on cancer symptoms, what increases the risk, ways to detect it early, how it's diagnosed, available treatments, and care after treatment. These chatbots help users get clear and correct medical info fast, in easy-to-understand words, which makes it easier for them to learn and stay informed. They are always available, day or night, which takes some pressure off healthcare centers by handling simple questions. This support helps patients and their families make better choices about their health. These chatbots are built using different methods like rule-based systems, natural language processing, and machine learning. Rule-based systems give clear answers, while NLP helps chatbots understand what people are asking. But there are still issues to deal with, such as making sure the information is right, keeping personal data safe, dealing with ethical issues, and building trust with users. Overall, these cancer chatbots can be really useful in helping traditional healthcare services, especially if they are made with accurate medical knowledge and with the needs of users in mind.

Keywords: EHR, ASHA Workers, mHealth, Rural Healthcare, Cloud Synchronization, Smart Card.

1. INTRODUCTION

The ASHA workers are the backbone of rural healthcare in India as they connect villagers to the health system. These first-line health workers also collect data for family Surveys, guard pregnant and expectant mothers, monitor children's vaccination schedule and report contagious and non-contagious diseases. Traditionally, the question has been answered by means of one or more manual registers and handwritten documents. Although it has been employed for many years, this method has a number of limitations including inconsistency in recorded data, loss of records, delay in reporting to health facilities, and difficulty retrieving past information during emergencies. The transformation of rural healthcare documentation with mobile-based electronic systems can be realized in absolute potential due to rapid advancement in digital technology and the penetration of mobile services. Digital health record platforms can enhance transparency of healthcare, streamline reporting processes and improve data quality.

But digital health care in the countryside is still a hard sell, given spotty internet access. There are such real time-based cloud systems and rely upon only internet connection are not reliable due to poor network connection. This problem, in part, would be addressed through an offline-first design of the proposed Mobile-Based Electronic Health Record Platform. The platform supports the input of patient information, health records and health survey results for ASHA employees via an online or mobile-based application interface.

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First the information is stored in a local SQLite database on the device. The data is automatically synced to a central server once internet connectivity returns, provided by FastAPI on the backend. Supervisors and health centers can track, review AND report on the synced records via a web dashboard. At more senior levels of administration, the integrated digital environment supports formal decision-making procedures, strengthens health reporting and enhances availability of data.

2. METHODS

To ensure reliable healthcare data storage, a number of interconnected components are present in the proposed system including central DB, admin online dashboard, module and internet availability detection approach.

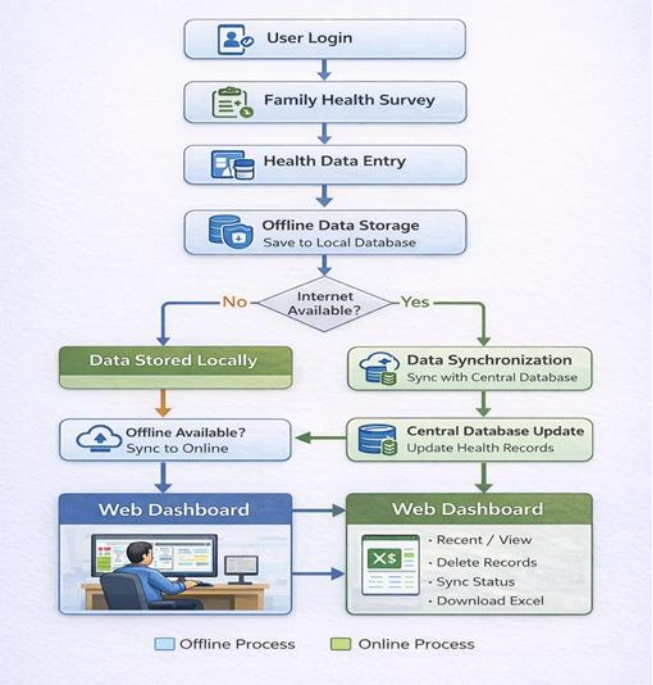

FIGURE 1. Flow Chart

2.1 System Overview

The proposed system is composed of a cloud-based back-end infrastructure and a mobile application. In order to make field visits to homes in the allotted community, ASHA worker would be using mobile application. The system can also store mother and child health information, update medical records and register patients electronically. The program syncs with the cloud database and works independently online when network is available. A central administrative dashboard is established for healthcare authorities to generate reports, track data and manage the health performance indicators at urban level. At the high level, we define a centralized cloud database, an API server for communication, applications (i.e., mobile app layer) as well as local-database layers for offline storage. These components guarantee scalable and reliable management of healthcare data.

2.2 Data Acquisition

Within the proposed method, accessing the data consists of retrieving patient health measurements (collected routinely during home visits). During the mobile operation ASHA enters demographic data similar to name, age, sex, addresses and Smart Card number. Clinical features are also established including weight measures, medical history, blood pressure readings, vaccination data and motherly health status. The Smart Card number acts as a unique linking element, which ensures an accurate replication of every single individual's past medical record and they prevent reuse of data. In order to prevent input crimes and ensure absoluteness, the data entered to the operation is examined. The technology enhances finesse, and reduces uncertainty currently built into paper-based registers by digital sameness accessible.

2.3 Offline Data Storage Mechanism

The architecture of the platform lends itself to an offline-first approach since internet availability can be intermittent in rural areas. The mobile stores your all information on a secure local database initially. The application even allows data entry without network access if needed. Once connection is back, the sync module automatically pushes end-device records up to the master cloud database. With this, ASHA workers can work continuously without any break and data from breaks is lost due to network connectivity issues. Verification controls are included in the synchronization process to avoid duplication and ensure the coherence of local and cloud storage.

2.4 Data Processing

Upon synchronization, the uploaded data is processed by the backend server. After validating and categorizing the incoming records by village and health, the server safely stores the incoming records in a centralized cloud database. Secure authentication measures are used to ensure authorized access to confidential health records.

2.5 Cloud Synchronization

Processed data of the cloud database is fetched and presented in well-organized shapes by the admin dashboard. In many communities, health workers can look at overall disease trends and rates of vaccination coverage and maternal health. In potentially dangerous circumstances up-to-the-minute data helps to take action in a timely manner, and supports decision-making.

2.6 Software Implementation

The mobile application is developed in Android Studio using python programming languages. The cloud database is kept in Firebase or MySQL, and libraries such as Flask or Node. js is used to develop the backend server. The application is designed to be user friendly and intuitive for ASHA workers well-versed with smar t phones. It includes automatic synchronization, automated record updating and allows to search for patients, with a secure login. Data security techniques are employed to protect the privacy of patients. The software architecture, based on a modular approach with the common well-documented interface definition also ensures that it can be easily saturated through further integration with the public healthcare portals in the future.

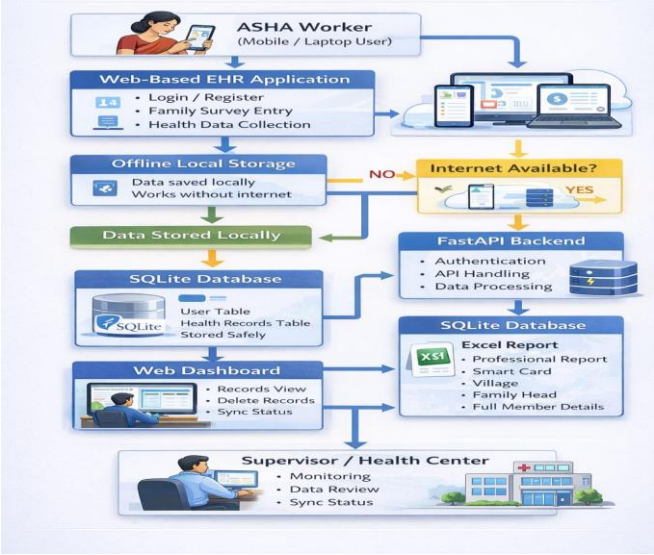

FIGURE 2. Block diagram of the Proposed Model

3. RESULTS AND DISCUSSION

3.1 Results

Create account screen', 'User authentication' were all features of the develop mobile-based electronic health record platform that successfully implemented which shows the dashboard featured of the synch exhibit -The modules include family information entry, record administering navigational panel. ASHA's staff only: In the Staff Registration System, ASHA employees can sign up securely using their username and password. Security is enhanced with: password protection, visibility toggles & hidden password fields. Patient health records will be encrypted, and only authorized personnel will have access through this module mentation and testing.

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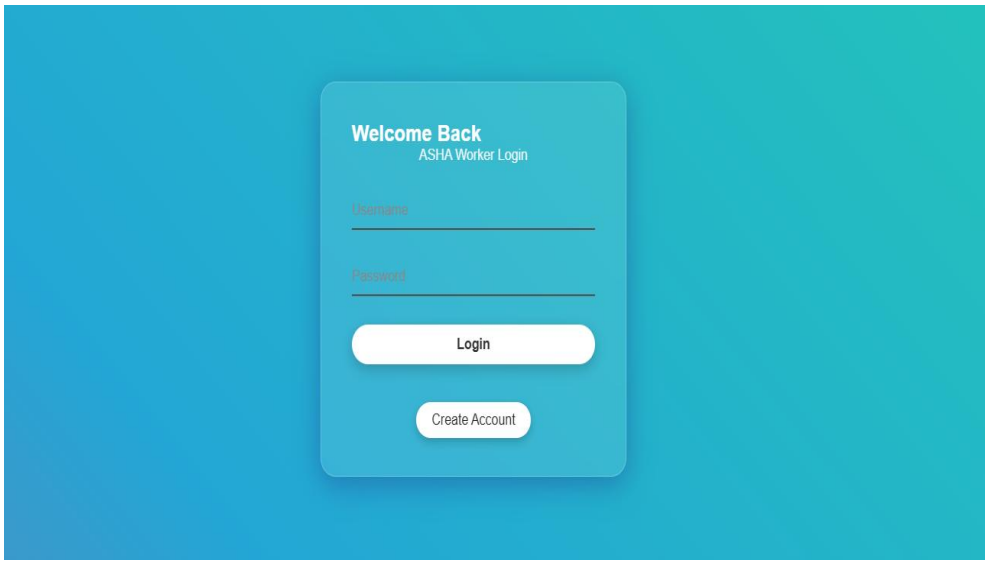

FIGURE 3. User Registration

Fig. 3, which depicts the Create Account screen, displays the user authentication module. ASHA employees can register securely using the system by providing their username and password. Security is improved with password protection features including visibility toggles and concealed password fields. Only authorized individuals will be able to access patient health records thanks to this module.

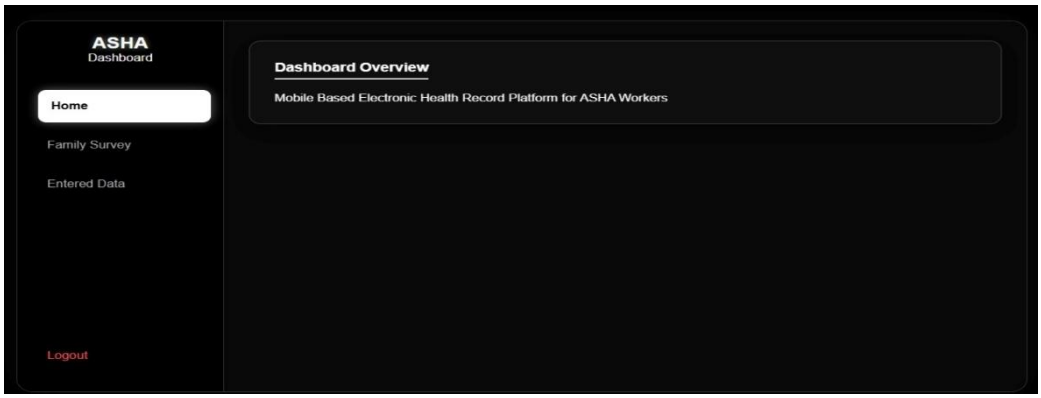

FIGURE 4. Dashboard

The ASHA Dashboard is shown in Fig. 4 following a successful login. Home, Family Survey and Submitted Data and Log Out are the organized navigation options on dashboard. An overview of the system title and operating summary is found in this section. The sidebar setup allows for drag-and-drop between modules and makes this module very user-friendly.

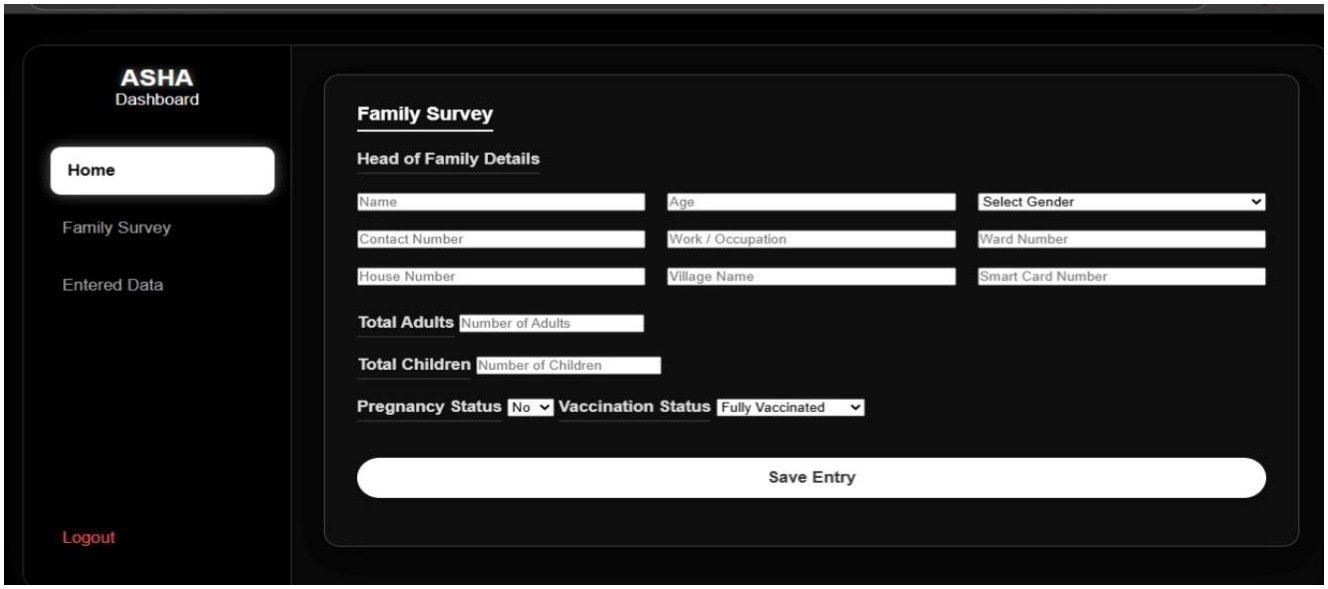

FIGURE 5. Family Survey Module

Fig. 5 is the data entry module for the Family Survey. This interface enables ASHA worker to input complete home based details such as name of head of family, age, sex, mobile number, Occupation, Ward no., House no:, Name of village and Smart Card no. Smart Card number has been used as a unique identifier to prevent duplicity of records. It also captures the number of people, children, pregnant women and immunisation. When the Save Entry option is selected, data is stored in local database for later handling.

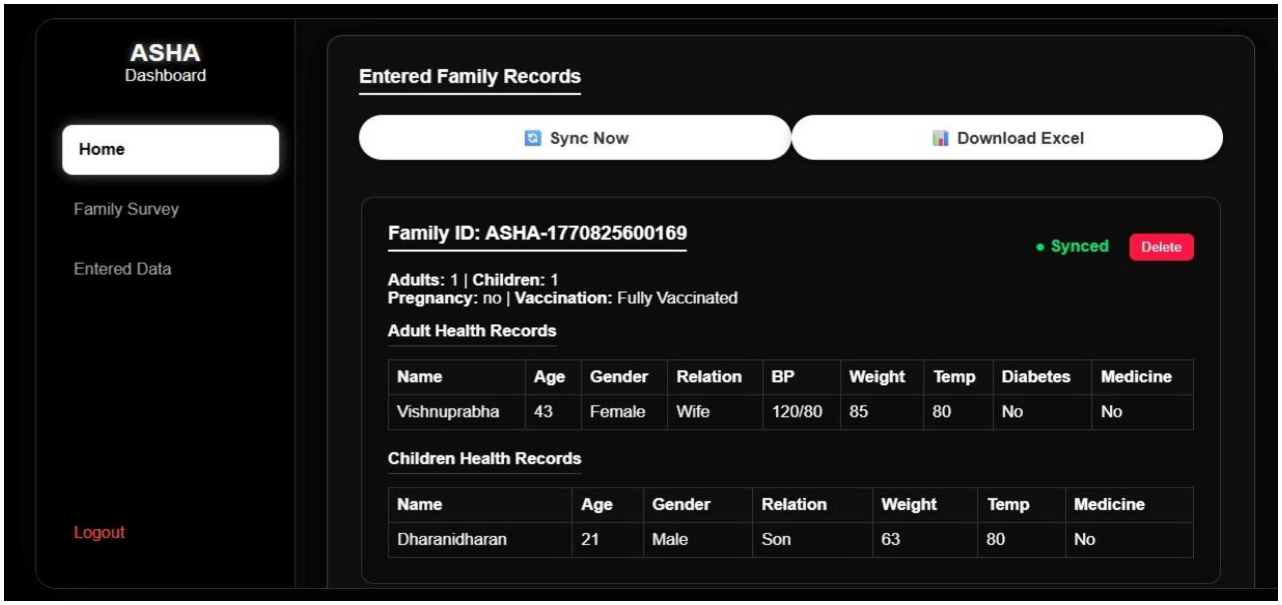

FIGURE 6. Entered Records Module

Fig. 6 shows the Entered Family Records page. Each family is assigned a unique Family ID and tracking number. So an adult's health records are divided from a child's for all to see. Health data will be displayed in table format, detailing blood pressure, weight, temperature, diabetes status and medication information. The synchronization indication indicates whether data has been uploaded successfully to the cloud database. When connected to dome with internet access, manual sync is possible with the Sync Now feature.

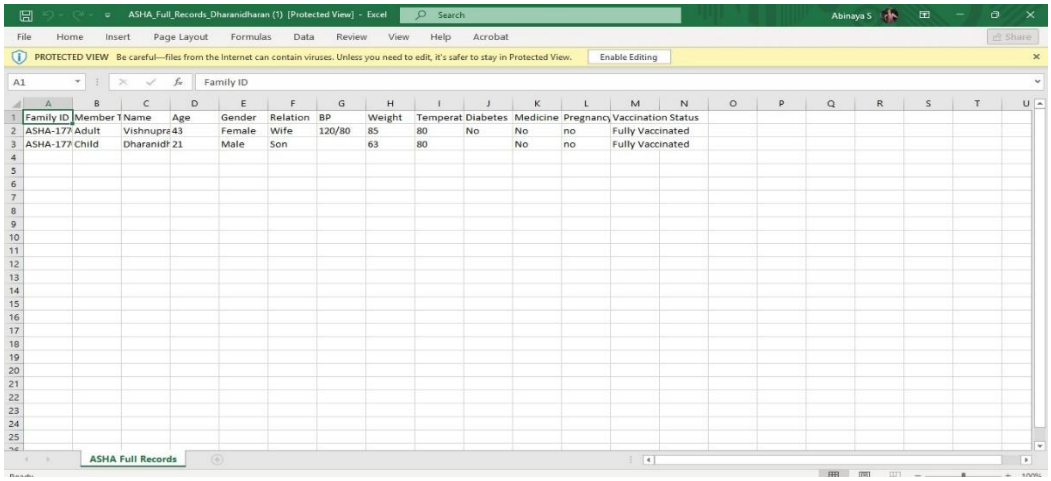

FIGURE 7. Excel Export Module

Fig. 7: Export To Excel Here, #Figure 7 depicts the Excel exporting. The system generates all the health information, such as family ID, member information, clinical parameters and pregnancy details and immunization status in the form of a spreadsheet file in structured format. Official reporting, documentation, submission to higher authorities in the medical field - all is possible with an exported file. This gives a large reduction in the level of manual documentation required.

3.2 Discussion

Integrating mobile tech into management of health records in rural areas has had demonstrably huge efficiency, access and data quality gains. The digitised system ensures structured data storage and retrieval, as opposed to simple manual methods of documentation. The off line synchronization technique is for the rural areas where connection will be stopped and cost issues raised. The proposed approach enables real-time tracking of mother and child health indicators and enhances accountability. It also helps healthcare officials make evidence-based decisions. With further verification and large-scale application, it can enhance the primary medical facilities in rural areas.

CONCLUSION

For rural healthcare data management automation, the ASHA Worker's Mobile-Based Electronic Health Record Platform is a feasible and scalable solution. Our solution ensures robust product delivery in resource limited settings leveraging offline data storage, Smart Card validation process and cloud synchronisation. The prototype demonstrates improved health information access and reduced documentation burden and increased workflow efficiency. Biometric) for authentication and reverting predicted trends of illness, and collaborating with national healthcare systems to facilitate larger health initiatives are the more futuristic improvements.

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