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Child Vaccination System

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Abstract: As India is densely populated country, there is a need of centralized and secure application which can be useful to track the infants and also their vaccination schedule. In most of developing countries vaccination tracking is done manually by using paper which is very tedious and also information of vaccination may go missing. This project aims to develop an application which will register personal information of infant/parent. This information will get stored in database and fingerprint in block-chain. To check schedule or to monitor status of vaccine fingerprint will be inserted on device. The main aim of the project is to track vaccination status of infant using fingerprint. This application will also notify about the upcoming vaccine schedule as a reminder to parents, reducing chance of any infant not being vaccinated. This project will help to reduce disadvantage of existing system where we used paper-based approach. To develop this project, we will be using fingerprint device and to store fingerprint we will be using blockchain which will store info using SHA256 encryption. Thus, the project reviewed will be helpful for parents, medical institutes, government bodies. This innovation will guarantee the monitoring of vaccination progress and that no infant is left who is not vaccinated.

Index Terms - SHA256, blockchain,Biometric,fingerprint,vaccination,encryption

INTRODUCTION

This Vaccine Tracker for Infants by using Block-Chain and Biometric Application assists parents to organize and keep track of the vaccination schedules for their children in addition to their immunization records. The main purpose of this application is to remind the parents, at appropriate times, when their children are due for vaccinations so that the children can receive the necessary immunizations in time. The system sends reminders through SMS to a registered user regarding vaccines due for a child, in addition to alerts about any outbreaks of diseases that may be present in the neighborhood. This ensures parents are proactive and up to date, and it minimizes chances of a child missing out on vaccination.[10]

A very important feature of this tracker is that it facilitates maintaining the updating of a record of the vaccination delivered to children. It is very helpful for keeping the updating record of vaccines that have already been administered and pending ones, which creates a level playing field for parents. The system schedules information to be viewed by parents, hence giving them transparency on the immunization status of their children and needs in the future. Through its systematic issuance of timely reminders by SMS, the tracker ensures that parents do not forget critical dates in vaccination, thereby improving vaccination coverage for each child and general child health.

Every individual should get vaccinated as it builds immunity and protects the body against most of the diseases. Vaccination is even more crucial among children. It prevents contagious diseases that may eventually result in keeping children unhealthy, unless controlled. The Child Immunization Tracker guards the parent by reminding them to take preventive measures in cases of an impending vaccine and other health risks like disease outbreaks. In addition to aiding individual families, this system serves a larger function in public health in general and often for underserved populations. In areas where there is significant flow of migration-from one rural to an urban center, or from one city to another and even across country lines-it can be challenging to maintain an updated health history for children. An example would be the Child Immunization Tracker, which creates a facility for continuous tracking of a child's health and vaccination status even if the family moves. That way, the continuity of care will ensure that healthy services, such as vaccinations, reach children despite where they stay.

It will be very important in providing full immunization coverage to communities usually left behind. The Child Immunization Tracker holds good records and provides timely alerts that ensure that the parents are aware of vaccines which the children will require, hence improving the chances of success in vaccination, which reduces the risk of vaccine-preventable diseases. This digital solution supports child health and public health initiatives since no child will miss immunization.

The Child Immunization Tracker is one of the most important aspects of modern health care, where help can be available to parents in order to manage vaccinations better in their children. Reminding parents about time, an updated record of vaccinations, and reaching children even in highly mobile communities are its functions. Therefore, it helps children get better vaccination coverage and disease outbreak prevention.

OVERVIEW

Creating a fingerprint-based infant vaccine tracker involves several key software technologies and components. Here's an overview of the technologies that could be utilized:

1. Fingerprint Recognition SDKs: Used software development kits (SDKs) like Veri Finger to integrate fingerprint scanning and recognition capabilities.
2. Enrollment and Matching Algorithms: Implemented algorithm for enrolling fingerprints and matching them against stored templates
3. Database Management: Child databases such as MYSQL for storing user records, vaccination history, and biometric data.
4. UI/UX Design Tools: Use tools like Java swing for designing user-friendly interfaces and ensuring a smooth user experience.
5. Push Notifications: Implement push notifications using email to remind parents about upcoming vaccinations.
6. Automated Testing Frameworks: Use frameworks like Selenium for automated testing of the application to ensure reliability and performance.

PROBLEM DEFINITION

Immunization against Child vaccine has formed the core of government health services in India. The present status of vaccination with Child vaccine is maintained in developing countries. in a paper, which is rather inefficient in many ways, information that might get lost, and the process of looking up data is tedious. To solve this issue, we will develop a project which will be automatic and secure by using biometric.

LITERATURE SURVEY

Low-cost mobile application for monitoring child vaccination coverage for rural communities. Proceedings of the 2013 IEEE International Conference on Health Care Information Technology. Jeev combines cellphone, cellular texture, QR code and public identity card. It is designed on a client-server model and uses inexpensive text messaging, and its feasibility was already demonstrated using data from the National Immunization Survey[1]

(Availability of online immunization registries in real time and its impact on tetanus vaccination.) This analysis reviewed the impact of access to online state Immunization Information Systems in a pediatric emergency department. Experts in informatics recommended that immunization content should be enhanced

by the capabilities of immunization prediction and reminders, but simultaneously there is an alert fatigue. [2]

Vaccination: Baby steps to Intelligent Healthcare. (2017). International Conference on Innovations in Green Energy and Health Technologies (IGEHT). The child medical history is maintained on the platform, and vaccination reminders are given. It provides access to reports through web-technology and on mobile, working in favor of both the parents and doctors. [3]

Routine Immunization with mobile phone and facility-based server technology Disease surveillance activities in Nigeria: Strengthening polio surveillance. Improvements in data collection and server-based surveillance for routine immunization were demonstrated in this study. Data visualizations could be an asset in quick decision making of outbreak responses. [5]

Parent reminder and planner for kids vaccination. (ICSET). 2019. Online system/ Allows monitoring a child's vaccination. Made in Agile Unified Process (AUP), this system has the backup support in Google Cloud to prevent loss of data[4]

Doctor-patient interaction system design and implementation. n.d. This system is an online appointment scheduling and doctor-patient query which the patient is giving his or her medical history directly. [6]

Fast interactive search system for healthcare services. n.d. This system requires user login information from patients to allow the access of a doctor to their medical history. Patients have to recall their login credentials which can be very challenging in critical situations. [7]

Anonymized naked healthcare identity privacy-preserving biometric-based authentication scheme environment. (n.d.). This paper explores the idea of a Naked environment where patients interact with smart hospital surroundings, identified through costly eye retina biometric technology.[8]

Biometric Technology. Universal patient identification for electronic medical records. (n.d.). In this paper, the author suggests the FIRD framework of biometric identification for electronic medical records but focuses on the benefits of each type of biometric instead of implementation. [9]

It allows the doctor/nurse to login to the system using his/her fingerprint and verifies patient identity by means of continuous monitoring of physiological data (e.g., ECG signals) in which verification of the patient identity is carried out automatically and at set intervals to detect physical theft of the sensor which may be hooked on to a different patient.

This paper propose the use of biometric technology within our fingerprint, iris, retina scan, and DNA (FIRD) framework, which is a multiphase system whose primary phase is a multilayer consisting of these four types of biometric identifiers: 1) fingerprint; 2) iris; 3) retina scan; and 4) DNA. This paper is not implemented iy have explain advantages of different type of biometric.

Sr.No.	Title ofPaper	Year	Methodology	Gap Identification	Key Finding	Dataset
1	A TraceableBlock-chain-Based VaccinationRecord Storage andSharing System	2022	A traceable Block-chain-based vaccination record storage andsharing system	For High security and to identify person, Biometric is not used.	The above project is resistant to replay and man-in-the-middle attacks, with better performance.	NA
2.	Development of an Internet-of-Healthcare System using Block-chain	2021	Mobile devices can download their own personal information using block-chain and AWS	This application isdeveloped for mobile and can only be used in android application. Accuracy of project is 70%.	A system design that stores and secures data in cloud using block-chain technique and manages identity of users through multimodal Biometrics.	NA
3.	Design & implementation of the doctor- patient interaction system based	2021	this paper they have presented doctor- patient interaction system based on Android.	This is only a chat application between doctor and patient.	It is only doctorand patient interaction. Patient has to tell about the medical history by his own.	NA
4.	Biometric Approach for Electronic Healthcare Database System by using SAML - A Touch free Technology	2021	provide Covid patient instant support for availability of necessary control through biometric	We can use this system only for onediseaset ie.Covid-19	Security Alert Over Mobile Applications.	WISDM Smartphone and Smart wat ch Activity and Biometric s Dataset
5.	Electrocardiogram Evaluation of Biometric Verification	2021	In this propose system a pipeline for ECG authentication	Biometric verification is done only for heart not for full body.	two public datasets collected from wearable & medical devices and propose pipeline	From wearable and medical devices two public datasets collected

	Models Based on Short Enrollment Time on Medical andWearable Recorders		n with limited data required for competitive usage across applications		for ECG authentication	using UCI repository
6	The Investigation of Biometric Authentication Healthcare Environment	2020	Eye, Fingerprint as biometric authentication comparisonis given.	Software captures periocular data is not developed. They have used dataset which have accuracy around 70%	Patient enterprise master patient index (EMPI), which is unique identifierused in healthcare information system to identifyevery patient.	ufpr-periocular Kaggle dataset https://www.kaggle.com/datasets/ruchi798/periocular-detection
7.	Survey on Biometric Authentication in HealthCare Sector:	2019	Different physical and behavioral biometric techniques are reviewed that are described in a different research paper	minutiae-algorithm worked effectively in 8-bit gray scale fingerprint images.	Health caresector, healthcare system, in-patient consideration	Fingerprint recognition https://www.kaggle.com/code/kairess/fingerprint-recognition
8.	medical record system Implemention with biometrics authentication in E- health	[2017]	For developing hospital information management system with fingerprint biometrics for authentication	Privacy and security of patients are concern as information is not encrypted.	Hospital management system with fingerprint biometrics for authentication.	Sokoto Coventry Fingerprint Dataset https://www.kaggle.com/datasets/ruizgara/socofing

Table 1:- Comparative Table of Literature Review

ARCHITECTURE DIAGRAM

This project is to implement algorithms which would be used to send email to the registered parents/users. Firstly, the input data is acquired from the biometrics of the parents and the first vaccination is provided after the registration when the child is born.

Admin will register the child using personal information. Personal information will be stored in database and then fingerprint of child will take. Fingerprint will be encrypted using AES so that fingerprint data cannot be hacked. Notification will be sent on parent email id for the upcoming schedule. Fingerprint will be matched and history of vaccine will be display.

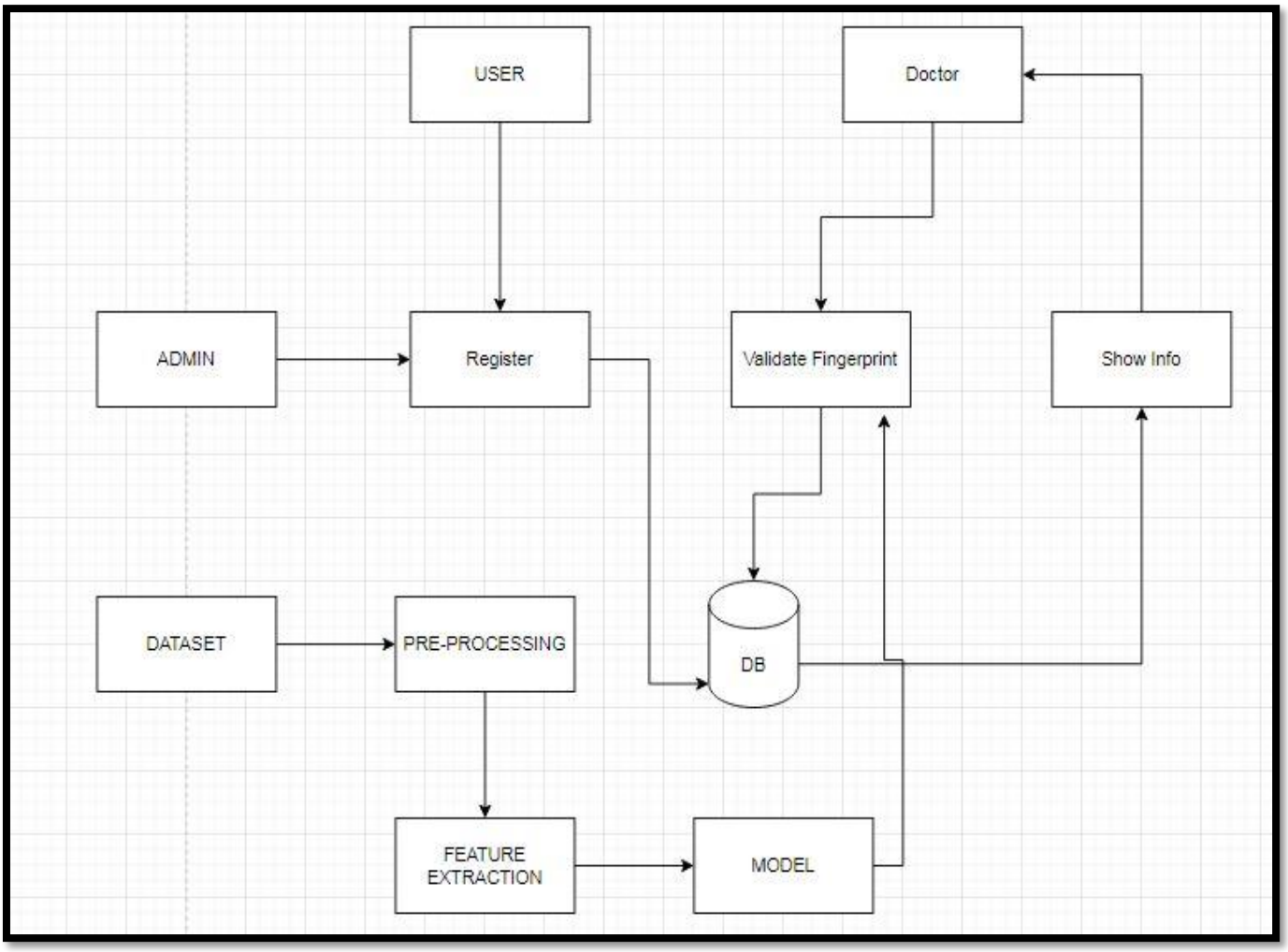
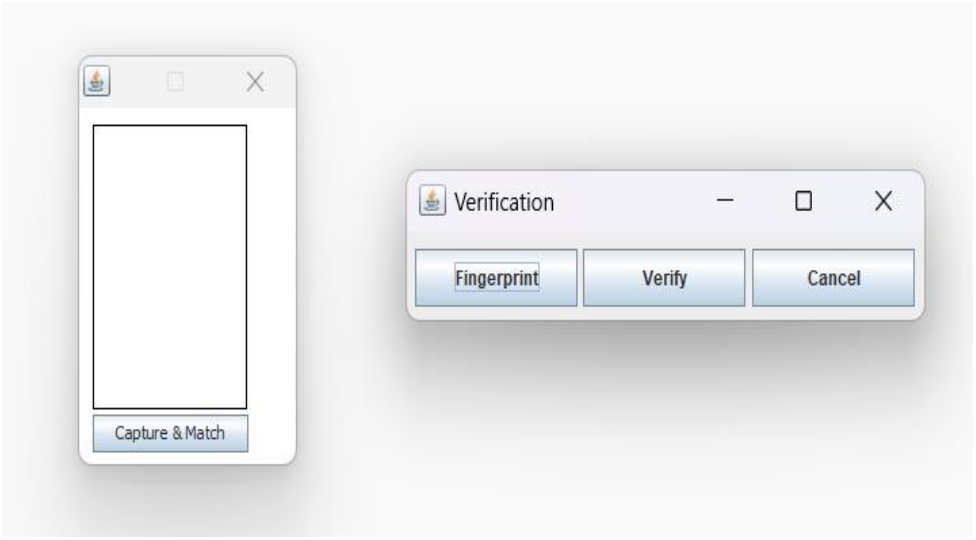


Fig 1. System Architecture

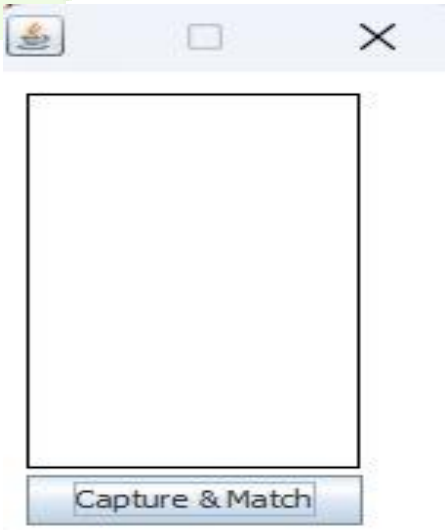
RESULT AND ANALYSIS

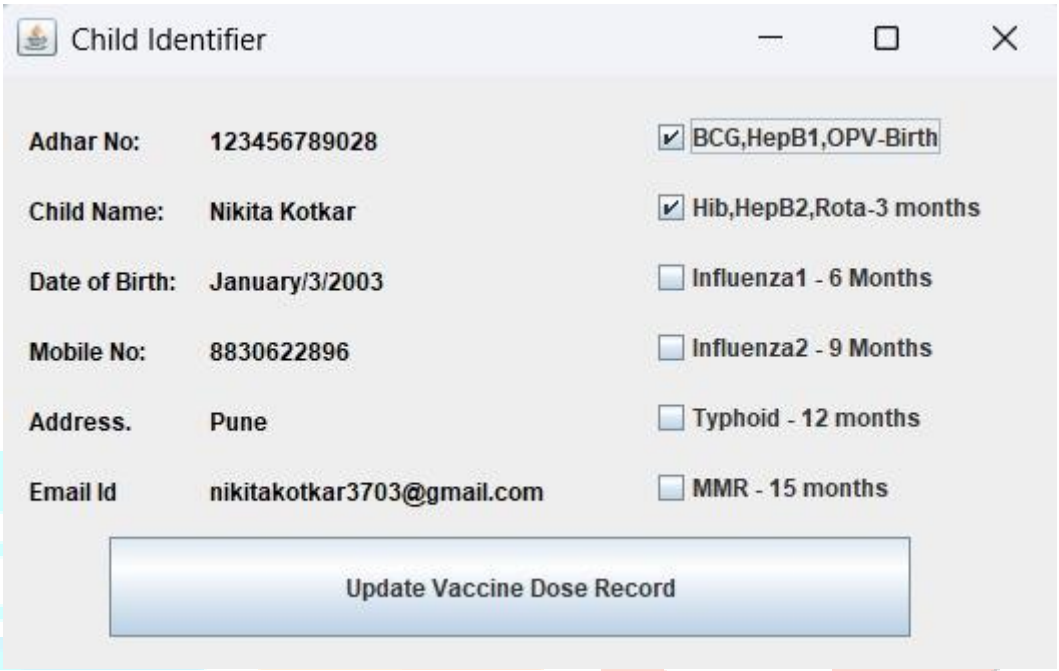
MODULE 1: LOGIN PAGE:

MODULE 2: REGISTRATION



MODULE 3: VERIFICATION





Enhanced Accuracy: Ensures that all vaccinations are recorded accurately, reducing the risk of missed doses or incorrect administration.
Timely Reminders: Provides reminders for upcoming vaccinations, helping parents keep their child's immunization schedule on track.
Improved Record Keeping: Maintains a comprehensive and easily accessible record of all vaccines administered, which can be useful for school registrations, travel, and medical consultations.
Health Monitoring: Allows healthcare providers to track the child's vaccination history and identify any gaps or needs for booster shots.
Emergency Preparedness: In case of medical emergencies, having an up-to-date vaccine record can provide crucial information for healthcare professionals.

CONCLUSION

Vaccination is one that is important for every individual since vaccination gives immunity and helps to prevent from various diseases. Migration among cities, states, rural to urban, it is essential to track the health record so that health services can reach up to such people in the form of continuum of care. This Child Vaccine Tracker is done to predominantly provide an efficient reminder for the parents to remember their kid's vaccination. The system also keeps the vaccination record for every child registered and alerts the parents for upcoming vaccines via email messages.

FUTURE SCOPE

1. We can also add face verification along with fingerprint to provide more security.
2. We can also make android app for more easily detection of unvaccinated user

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