

Smart Vaccination Reminder System for Children Using Cross Stack Development

Abstract. The Smart Vaccination System provides an SMS-based vaccine reminder framework for kids (SMS). This method is used to get the word out to guardians about the need of keeping their children up to date on their vaccinations. Vaccination appointments are now organised according to a written schedule. Yet, this approach wouldn't be sufficient since, during their hectic lives, parents can fail to remember. A web - based system that sends out reminders when it's time for a kid to get another injection is called a vaccine reminder web application, and it's designed to make parents' lives easier. By keeping parents more organised, knowledgeable, and proactive about their child's health, vaccine reminder web apps may lessen the likelihood of missed vaccinations and increase the likelihood that their children will be protected from avoidable illnesses.

Streszczenie. Inteligentny system szczepień zapewnia oparte na SMS-ach ramy przypominające o szczepieniach dla dzieci (SMS). Ta metoda służy do informowania opiekunów o potrzebie informowania ich dzieci o szczepieniach. Wizyty na szczepienia są teraz organizowane zgodnie z pisemnym harmonogramem. Jednak takie podejście byłoby niewystarczające, ponieważ podczas gorączkowego życia rodzice mogą nie pamiętać. Internetowy system, który wysyła przypomnienia, kiedy nadszedł czas, aby dziecko dostało kolejny zastrzyk, nazywa się internetową aplikacją przypominającą o szczepieniach i ma na celu ułatwienie życia rodzicom. Utrzymując rodziców w lepszej organizacji, wiedzy i proaktywności w zakresie zdrowia ich dziecka, aplikacje internetowe przypominające o szczepieniach mogą zmniejszyć prawdopodobieństwo pominięcia szczepień i zwiększyć prawdopodobieństwo, że ich dzieci będą chronione przed chorobami, których można uniknąć. (Inteligentny system przypominania o szczepieniach dla dzieci korzystających z funkcji Cross Stack Development)

Keywords: Vaccination, SMS, Remainder System, Nodejs express, MySQL

Słowa kluczowe: ststem prztpominania, medycyna, szczepienia

Introduction

A drug used to boost the immune system's defenses against disease. The regular and necessary vaccinations are designed to shield your children and those around them from diseases like rubella, polio, pneumonia, measles, tetanus, whooping cough and tetanus. Meningitis and numerous other grave illnesses. Children may be more at risk from these illnesses. Most vaccines are given by needle injection, but some can also be taken by mouth or sprayed into the nose. Immunity to a disease is provided by vaccinations without the need for prior illness. They are created using the disease-causing germ's parts or weakened, killed versions of the germ (called antigens). The antigens used in some vaccines are created using genetic engineering. To increase vaccination rates against smallpox and curb the epidemic, India passed the Compulsory Vaccination Act in 1892. Except during epidemics, the "Act" largely remained in paper form. According to records, the law was in effect in about 80% of British India's districts in 1938. Nowadays vaccination for children is the important requirement." There is a quote called prevention is better than cure". By taking vaccines before the attack of the disease is a good step to prevent from many diseases. Due to several work pressure the parents may forgot about their child's vaccination.

To overcome this issue, we proposed a solution. Nowadays everyone is having a mobile phone along with an internet so it will be easy for the parents to register their child details in the web application and the web application remains them two days before the vaccination. The remainder sends to the parents by SMS. In our web-based system, we use NodeJS and MySQL. Nodejs is used for server-side programming particularly to run a web-based application. MySQL is used to store the data in the database.

Scope of the System

A proper vaccination schedule should be followed to keep a child healthy and protected from potential deadly disease risks in the future. However, a lot of parents either are unaware of the schedule or forget about it, which makes

their child more susceptible to illnesses. A system should be put in place to send parents a mobile SMS prior to the vaccination schedule to prevent child deaths solely due to this cause. Depending on the specifics of the child, the system would need to be built to handle various vaccination schedules. Prior to each scheduled vaccination, the system would be set up to send parents or guardians SMS reminders at the appropriate intervals. To ensure that the messages are effective in encouraging parents or guardians to bring their child for vaccination without becoming overwhelming or obnoxious, the frequency and timing of the messages must be carefully considered. The system would need to be created to guarantee that private and secure personal health information about kids and their families is maintained, and that the necessary safeguards are in place to prevent unauthorized access or use.

Literature Survey

Yuhanis & Asam (2018) [14] In this paper, first, the parents must register the children's details at a partner health care or clinic. In the clinic, the staff members or admin will register the details of the children (name, surname, phone number, email, and password). The children's and parents' details will be saved after registration. Then, two days before the SMS will be sent based on a default option before the scheduled vaccine, a reminder will be sent to the registered mobile number [15]. Information about the child's name, the vaccine type to be administered, and the appointment date would be included in the SMS message that was received. In this paper for the server-side SQL environment they use (Ado.net) and Visual code. There are two techniques that are used in Visual Basic.Net (Ado.net). The two techniques are most useful for programmers. These techniques are mostly used on the Ado Net. Entity Framework and query integrated language. The first technique provides the ability to object to orient data bases directly and write queries within the code Visual Basic. The second technique provides model objects which are powerful and new and has new features and tools to make the databases free [10][16]. The administrator of the respective hospital will be able to see the message status

whether it is (received, not received). The administrator will send the message again if it is not received. It is useful for parents because there is a chance of forgetting about the schedule at that time. This system will automatically alert the parents about the schedule.

Robert et al. (2020) [2][8] The studies had created a positive view for SMS warning system in immunization inclusion. Introducing this extent is main as more countries make one's home as 2YL (2nd old age of growth) approach, this approach has more urgent necessities for first two age of growth. Without proper enhanced mcv2 coverage, many underdeveloped countries need measles campaigns for every 2 or 3 years. It will be helpful for donors and governments of the country for accompanying profitable in SMS projects. If the country has weak completion rates means, then it should be needed to grant permission for SMS projects [12]. SMS creates a gateway for many immunization reminders. There is a review on Cochrane it states about the dial calls, document ideas, and ideas for autodial in the reminder system. e.g., There are many effective postal methods is in exercise. Some are exhaustive for labour, as in fact health traders in underdeveloped countries are frequently lacking time. When the best plan includes beginning enrolment, a SMS warning are best for potential work and creates opportunity for inventors or caregivers having access to telephones. In Burkina Faso, SMS accompanies as an electronic additional dose for vaccine registers and act as the best reminder for vaccination which is said by their health administration. Those registers bring business related benefits on funds. Voice message is also a good alternative method for sending reminders and it also needs a constant signal.

Kassahun et al. (2019) [3][11] As the use of facts and ideas sciences (ICT) Using ideas of sciences and facts makes health organizations stronger and brisker. SMS is a thing which included in health interference, to provide a messaging service; it is a telecommunication code which is used for sharing of ideas and important things. This application has become common in nowadays and each cellular telephone has many applications. A health laborer has become convenient through this method and increases their caring behaviour [9]. This method has to be applied in the existing health orders to increase the attendance of caregivers up-to-the- minute additional doses of vaccine in Ethiopia. This paper is best to cultivate an automated keepsake plan for the immunization in the context of Ethiopian. This study gives the significance for getting feedback on this content of ideas and experimented before the real deployment. In this, research verdicts are too disclosed that stitching the warning for whole established client choices and asking for diversified modalities results in better incidents. More evidence shows that content ideas should combine patterns of guaranteeing that the text ideas are grown and proven in the most appropriate habit before they are redistributed.

Siti et al. (2019) [4][14] The Reminder for child's vaccination is done by methodology of agile. Unified process of agile is applied for the development phase. This method is good in understanding, and it has very simple descriptions, so it is not tough to apply, moreover it is applied for developing software or system. The system utilizes VS Code (2010), google cloud & the computer network, sms123.net. The main purpose for utilizing VS code is to make this network- located plan in asp.net register expression that is accessible in VS Code.

Hussain et al. (2017) [3][13] To determine if SMS reminders on smartphones are more helpful at ensuring that children receiving visits on 2, 4, 6 months based on the

schedule. To create an inexpensive automatic SMS text messaging computer application with easily comprehensible texts based on preferred languages. It is a randomized clinical study, and our research design consists of three parts: a baseline survey of parents and carers to learn about their preferences for SMS immunisation reminders. The scheduling of SMS reminders will be handled by a computer programme. The mobile number, text message, language changing settings, based on the date the message will be send to the user. To send the message, it will interface with the gateway. If the Mobile number is valid then the SMS will be sent successfully.

RK Pejaver (2020) [5][10] A national sort code was used to develop a piece of software. Anyone can register through this number 566778 by giving the child's name and the DOB of the child (Vaccination->Name->DOB). Every time youngster is due for a vaccination for the following 12 years, reminders will be sent to the same phone. There will be three reminders—two remainders before the week of the schedule and one is after the vaccination. This is available everywhere in India on all mobile networks. The client is not charged for it. In order to support the initiative, Indian Academy of Paediatrics (IAP) joined together with Immunize India Charities. With more than 30,000 members, the Indian Academy of Paediatrics is a professional organization. IAP serves as a motivator and distributor. Immunize India Charities is still handling the program's administrative tasks. For kids who have finished their vaccine schedule, there is the option to join the programme. A family has the choice to reject the programme

Existing System

In the existing system, the administrator created a web-based application. In that web-based application the admin created registration page where the user was required to enter information that would be stored in the database. Some of them used Google Cloud to store the information, making it easy to retrieve and eliminating the risk of data loss. Once the registration process was complete, the user could log in using their credentials and gain access to vaccination-related information. Finally, the patient is informed through SMS that the time has come for their second immunisation. In the other paper they add the child's immunity and vaccination schedule, enrol with mobile number. Get notified to follow the schedule of upcoming vaccination as per the IAP (Indian Academy of Paediatrics) Recommendations. Personalized messages ensure that the patient never forget vaccination dates. Create the Child's Vaccination Schedule with date of birth. Periodic warnings about the schedule and keep vaccination records current. The first step in prevention is immunisation against diseases that can be prevented.

Need for Proposed System

The initial vaccination appointments are only made in writing. There are many circumstances in which parents may forget about their child's vaccination schedule. For example, if a paper is missed, the children's vaccination schedule may be collapsed. Another scenario is when parents are too busy with their demanding work schedules and forget about the child's schedule. The SMS reminder was developed to solve this problem by sending the message to the right person at the right time. However, some security was lacking when sending messages, so we planned to develop this vaccination system. We send the message in a secured way.

Implementation of Proposed System

In this web-application the admin registers the child's information's in the register page. Registration is must to get the message and only for the valid mobile numbers the message will be send. Next it goes to vaccination page and admin enters the user's vaccine details.

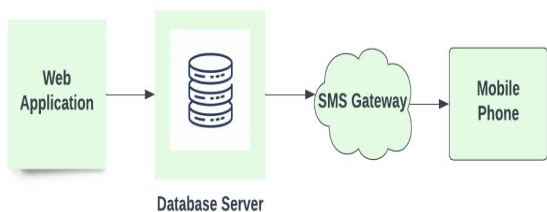


Fig. 1: Architecture Diagram for our proposed system

After that the admin can login with the specific application id of users which is generated to user through SMS along with their next vaccination shot. Figure 1 shows the pictorial representation of our vaccination reminder system. The entire proposed system is developed using Nodejs express and MySQL. The Nodejs express which is used to connect with the backend and MySQL is used to store the data information.

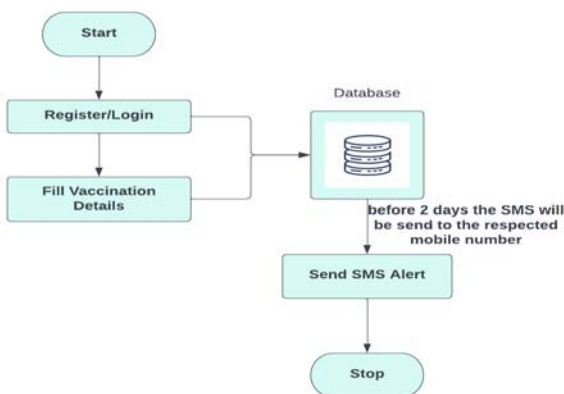


Fig 2: Flow Chart Diagram for Vaccination Reminder via SMS.

We can also view the individual profile and there is an update button where the admin enters the current vaccine information, and this method is beneficial for both doctors and childcare facilities. It is very helpful for the doctors to check the records. There is a potential factor that the signal might be lost, in such case the message won't be delivered correctly on time. The administrator of the respective hospital will be able to see the message status whether it is (received, not received). The administrator will send the message again if it is not received. It is useful for the users because, there is chance to forget about the schedule at that time and this system will automatically alert the users about the schedule. The below diagram represents the flow of process Figure 2 shows the diagrammatic representation of our vaccination reminder system.

Result Analysis

Profile Page : To access the system, the admin enters the application ID of users. The system will show the home page if details are accurate. After the admin logged successfully it moves to the vaccination page to check the status of child regarding vaccination. This makes reminder for parent to take care of their child before they get affected.

The Figure 3 shows the user profile page of our web-application. The admin can log with user's credentials on this user profile page to access information about the immunisation schedule.

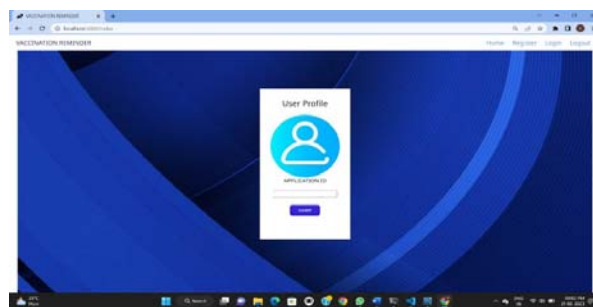


Fig 3: User Profile for our vaccination reminder system

Registration Page

The details about each individual carer and their infants will be entered in this window. The admin needs to complete the registration process by entering the information requested on this registration page. Information includes name, father name, mother name, gender, parent's contact information, and email ID. The data gathered in this webpage will be saved to enable SMS reminders from the database and the text message contains the vaccination schedule and if the child vaccinated then they receive vaccination successful message. The below Figure 4 shows the registration page of our web-application

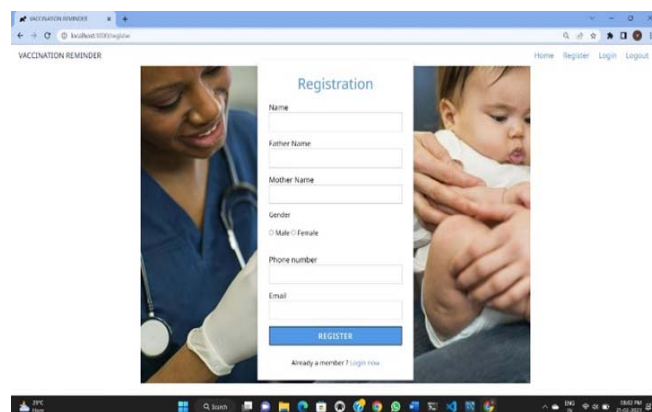


Fig 4: Registration Form for our vaccination reminder system.

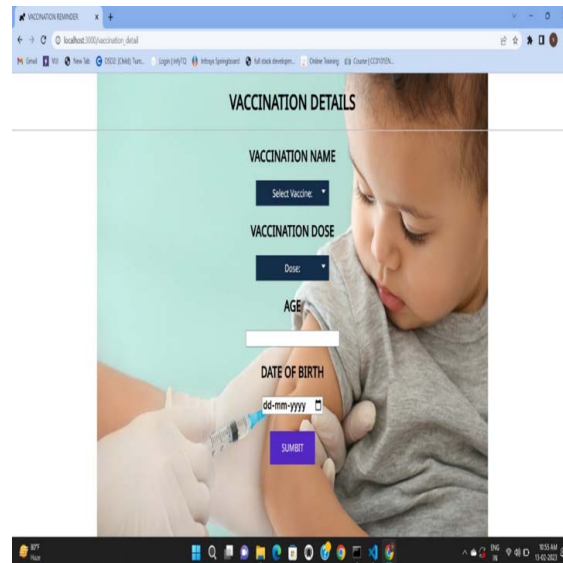


Fig 5: Vaccination Details for our vaccination reminder system.

Vaccination Scheduling Setup

Once the admin login to the page using user's application id means it automatically redirects to the vaccination details page and the admin fill the users details correctly. The admin enters information about vaccination name, dose number of that vaccination, age, and birthdate of the children. This information will be stored on the database and based on the date given in the vaccination details the date will be automatically updated and message will send to the corresponding mobile number. The Figure 5 shows about the vaccination details.

Statistical Report for Children Vaccination in India

Figure 6 shows the Statistical report for the children vaccination till 2019. Though the vaccination inception average was up to 80 to 90 percent only. By using the proposed system, we can increase the up to 5 percentages.

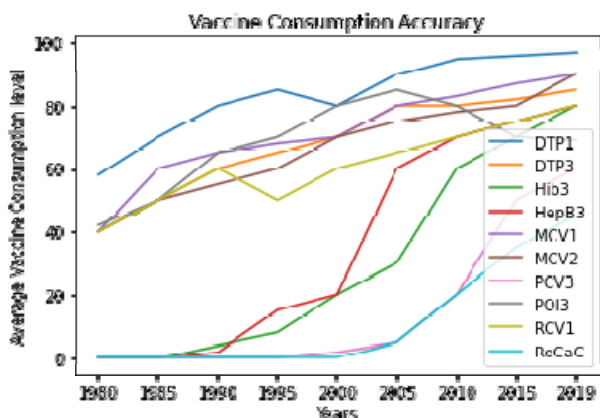


Figure 6: Statistical report for the children vaccination.

Conclusion

The proposed system is designed to notify parents when it is time to vaccinate their kid. Then, have them SMS the remainder to their parents. Despite their hectic schedules, it has proven to be helpful. Using this web app, the user can rest easy knowing their kid is up to date on vaccinations. Because the timing of the communication is optimal for the recipient, as the date of the last dosage is recorded in the system, the notification to the parents will be sent two days beforehand. Protecting a child's health with timely vaccination is crucial. Thus, the requirements of the users will be fulfilled by this application.

In the future, we may employ this method of delivering notification reminders to help diabetic patients take their prescription on time, since they often need more pharmaceutical drugs than are typically provided by government hospitals. In addition, we may work this into our routine of administering the injections required for the Rabies vaccine on the specified days.

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