

Medical Care Reminder for Infants Using Android Application

Abdulrahman Alkandari¹, Dana Aladem², Somaia Asaad³, Samer Moein⁴

^{1,2,3}Computer Science Department, College of Basic Education, Public Authority for Applied Science and Training, Kuwait City, Kuwait.

⁴Electrical and Computer Engineering, University of Victoria, Canada

aam.alkandari@paaet.edu.kw, aladem.dana@gmail.com, somaia.asad@gmail.com,
samerm@uvic.ca

ISSN: 2231-8852

ABSTRACT

Recently, smartphones become the language of communication and have great importance because they provide applications to facilitate people's work, save time and effort. Smartphones provide the user with reminders through the available applications. A lot of people suffer from health issues. Working people always have a busy schedule, and today's life is full of responsibilities and stress. This makes people more prone to different kinds of diseases. Our duty is to make ourselves stay fit and healthy. Healthy Reminder Application is designed to solve these problems. It can be very helpful as a reminder to take medications on time, dosages, and vaccination dates as an example, and it can spread health care awareness. Medical reminder helps in decreasing medication, Reducing errors and wrong dosage. In this paper, the Healthy Reminder Application is introduced and it plays an important part in our daily lives that help people staying fit and healthy.

Keywords: *Notification System, Healthy Medical Reminder, Automatic Alarm*

1. Introduction

In the past few years, handheld devices became the fastest growing communication devices. This huge leap of progress has changed the communication in general. There are a lot of devices that fall under the handheld category such as laptops and most importantly smartphones.

Smartphones have helped us a lot and its popularity has grown in the past few years where as now most of the population owns a smartphone. One of the most important key features of smartphones is the mobile applications. Smartphones and mobile applications are used by different types of ages mostly by the youth but some studies have proven that the elderly also use Smartphones. Mobile Applications and the government have given a big proportion of

money to help the elderly by developing programmes and applications to help them. Most of the senior citizens have a weak memory and they have a hard time remembering important appointments. There are some applications that help them to remember their schedule and daily routine. These applications have memory aid such as calendars and personal alarms (Gao & Koronios, 2010).

Smartphones are very important in our daily life. It is used constantly on a day to day basis. It is also used by a people of different ages. Mobile applications and smartphones have also helped people to monitor model and promote well-being. The main challenge is to develop new technology that can help individuals to maintain a good and healthy life style. Also, monitors and sensors that have been invented in a new and high tech smartphones that can help track our everyday behaviours. Be Well is an Application that monitors users daily activities and daily routine. This is only one of the enormous numbers of applications that have been developed to help people to keep a healthy life style (Lane et al., 2011).

There are no differences between mobile application and web application in smartphones. They use the same method - using same media to access smartphones or tablets. The definition of mobile application is the application programmed in a programming language to do something and it is installed in the mobile and called Applications. The web application is a website as simple and accessed by the internet browser. The user can easily use both in the same way but the method of access is quite different. The user can visit the web application by the URL in the navigation bar of the browser. Users can use many kinds of internet browsers as Google Chrome or Safari internet Explore etc., by mobile or computer, the user does not have to install any additional application or program or surfing in the web application but it-needs to be connected to the internet.

The user of the mobile application must first to download the application from the store if the user using Android OS must visit Google Play to search for the application and download it for the platform, and if the user using IOS must visit App Store to download the application on the Smartphone or tablet. Many of these applications can be used offline and do not need to be connected to the internet except the mobile applications that are designed for communication or social networking. A mobile application has one purpose that the user uses it repeatedly and makes some loyalty if it gives the customer satisfaction.

Web applications are easy to use and have large visitors or audience but sometimes they have limited viewing especially most of the web applications converted to mobile applications. The web applications do not need to be updated by the end user or the customer, the owner of the web application has authorization to update it and the user when visiting the web application will see the changes, or refresh the page in the internet browser. In Mobile Application the system shows to the user that the new updates are available. Where the user is free to choose between updating the application or leaving it. So, the authority is available to the user more than they are to the owner of the application (Han, 2012).

2. Problem Description

Patients always face problems when not taking the medicine on time, especially elderly and ill people who are taking multiple medications daily. Most of the doctors are giving notes that

must be followed by the patient during the medication. There are medications such as antibiotics must be taken for a certain period and a certain number of hours and the patient must adhere. Some mothers are unawareness about how to deal with their baby after taking the vaccination.

People get chronic diseases and illness and don't know how to deal with the condition. Absenteeism of a Doctor's appointment is a common problem these days and is caused by forgetfulness or lack of arranging their schedule marks the time of an appointment with a doctor other work. One of the problems facing parents when they have a new born is forgetting the dates of vaccination, especially when parents have children of approximate age.

3. Related Work

Automatic Alarm Ringing System is an Android-Based. Patients can set an alarm with a note for the immunization dates and medication timing. The alarm can be set for multiple medicines and multiple people. The Alarm Ringing Application shows time, date, and medicine description. A notification will appear on the screen as an alert. Many medical reminder systems have been developed where a new hardware is required. The user can only find an application to remind them of medicine time or immunization date. An Android Application that has been developed to combine between all of the most important things such as medicine reminder timing, dosage and immunization date for each child through an alarm ringing and notification system. The system focuses on easy navigation and friendly user interface so the user can easily use the application. The application is suitable for most of the people. Medication reminders help in decreasing missed medication timings and wrong dosages (Deepti et al., 2015).

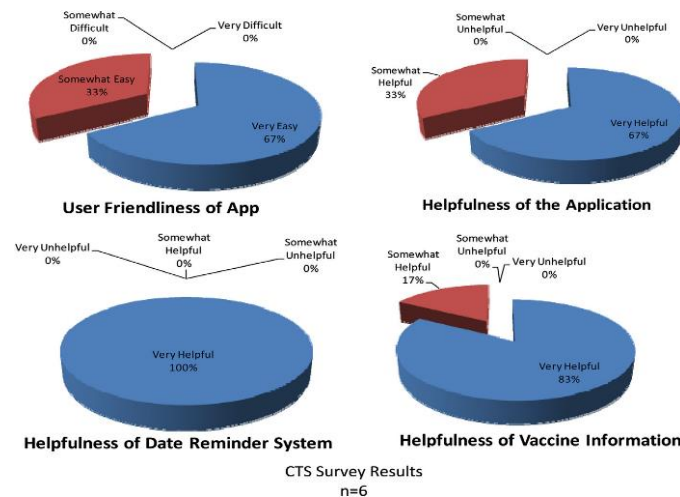


Figure 1: Statistics show the most people prefer to use smart phones to communicate through

Preventing diseases with vaccination is one of the greatest achievements of modern medicine and avoids deaths of children due to disease. These diseases have a vaccine to immunize children, that's why this study shows the advantages and importance of healthy reminder, especially for mobile applications for children. These applications identify certain age groups and offer statistics showing that most people prefer to use smartphones to communicate as shown in figure 1 (Peck et al., 2014).

Today everyone moved towards using smartphones. That is the reason why this paper has introduced a system to be an Android Application. The main benefits of using an android application are to make it easy for everyone to use it, and to save time. Users of the app can get the opportunity to use technology in a better way. Through the navigation, the user can set an alarm with a note for medicine timing and dosage, so they can easily get proper treatment time. Set the immunization date for different children by entering each child birth date and the system will calculate the age and alarm for the date, they can benefit from the medical fields and health care tips. Also, the user can activate and deactivate the notification and alarm accordingly (Czuszynski & Ruminski, 2014).

The Computerized Automated Reminder Diabetes System (C.A.R.D.S) for short is a website that sends E-mails and SMS (cell phone text messaging) that reminds and helps to support Diabetes management mobile phone. Nowadays, they are more portable and very inexpensive and are used mostly by the youth and adults. The (C.A.R.D.S) web site targets that category and helps them to manage their sickness by reminding them to check there (Bg) levels encouraging monitoring. In a survey this website was used by 40 participants 22 were randomized to receive cell phone text message reminders, and 18 to receive email reminders 18 in the cell phone group, and 11 in the e-mail group used the system but during the first month cell phone users submitted twice as many B.g as Email user conclusions. BG monitoring by cell phone text messaging is more acceptable between the young adults and adolescents with diabetes (Hanauer et al., 2009).

4. Healthy Reminder Application Design

Healthy Reminder Application provides many services for different age groups and it benefits new born babies as they have many vaccinations and appointments. Healthy Reminder application helps the user track their baby's vaccinations. And provides them with reminders and notifications for vaccination due dates. The Application is designed to be simple and easy to use.

The Applications is not only for children. Parents also can use it. Healthy Reminder Application helps users by reminding them about the date of their medications and periodic visits to the doctor. In addition, it provides advice and guidance for children after vaccination we'll show each service separately to clarify this application's services and how to use it. The design of Healthy Reminder starts with a fixed screen that appears for few Seconds when users enter the application and then it disappears. Then the first page is the registration page which includes quick registration tables. In this page, users have to enter their personal information such as their name, E-mail and Password.

In the registration process, when creating an account, case users can use the E-mail address only one time, if the user wants to create another account the user cannot use the same email. In the case of the user enter the same E-mail when creating an account, there is a message will appear on the screen. The message includes the following error note: "Can't add a member, E-mail already exists, please use another email". Next, if the registration process is done the user will enter their information to log in to the application.

In login process, the user has to enter the correct E-mail, and the correct password and they must match according to the database of the users' accounts information. After the login

succeeded there is a message appears which includes the following: “login successful welcome the user name”. The next screen is the services categories screen. The user can access and use the services of the application. The services are:

1. Medicine Dates: It works as a reminder tool for medicine time for children and adults.
2. Vaccination dates: This service is especially for children to remind parents of the dates to vaccinate their children.
3. The periodic consultation: For Scheduling doctor visits. This service is very useful for a pregnant woman.
4. Instructions: It can help in two ways: the medicine

And the vaccination .user can find in the instructions information about some medicines and vaccination. The service category interfaces as shown in figure 2.



Figure 2: Service Categories

5. Implementation

Medication date Diagram - The first service is the medication date process as shown in figure 3. When the user clicks on the medicine date button in the main page of the Application, the system checks if there is any medical information that exists, data is retrieved from the database of the medicines. After data is retrieved, notification of medicine information is displayed which are the medicine name, time and date of the medicine, dose amount and medicine notes. The medicine name is the name of the desired and saved medicine. In the time and date of the medicine, it shows the exact time in hours and minutes and the dates that the medicine should be taken. Knowledge of the amount of the medicine dose is crucial. Medicine notes provide more description and important notes about the medicine. Different medications have different storage instructions, for example, insulin needs to be stored in a cool, dry place. On the other hand, if the user enters this service for the first time, the application gives the ability to insert the medicine information details like the medicine name, the time (Hour, Minute, Am or Pm) to take the medicine. The dose of medicine needed, and if there are any notes that the patient has to know about while taking the medication for example, like “take this medicine 30 minutes before eating”. The user can write it in the note section. When all is done there is a notification alert on the phone that appears on the home screen to remind the patient about the medicine that should be taken.

The Application is implemented to give the user the ability to add an unlimited number of medications needed, and also can delete a medication that is no longer needed.

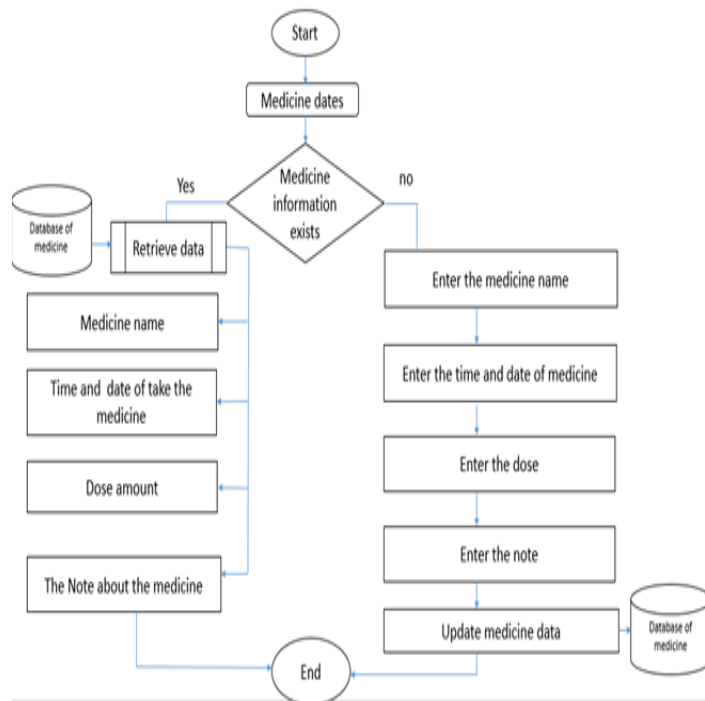


Figure 3: Medication Date Diagram

Vaccination date diagram - the second service is the vaccination date process as shown in figure 4. The vaccinate process targets the children at most it is important to have the knowledge of the vaccinate dates for the children to prevent them from illness and any other complications. When the user clicks on the vaccinate date button, if the child data exists then the child information will be retrieved from the database of the children's' list and the child information will appear on the screen. The child information including the child's name, the vaccine name and time to administer it. On the other hand, if the child's information is not available, then the application asks the user to enter child's information. The child information is the child's name and date of birth. When the user inserts the date of birth the program will count automatically child's age. After that, the newly updated data is saved in the database of the child information list to be retrieved when needed by the user. Next vaccination date and a table including three years and a half vaccine date with a reminder for each table. This service provides the ability to the user to add more than one child by clicking on add new baby. Then the user follows the same steps that followed when adding the first child.

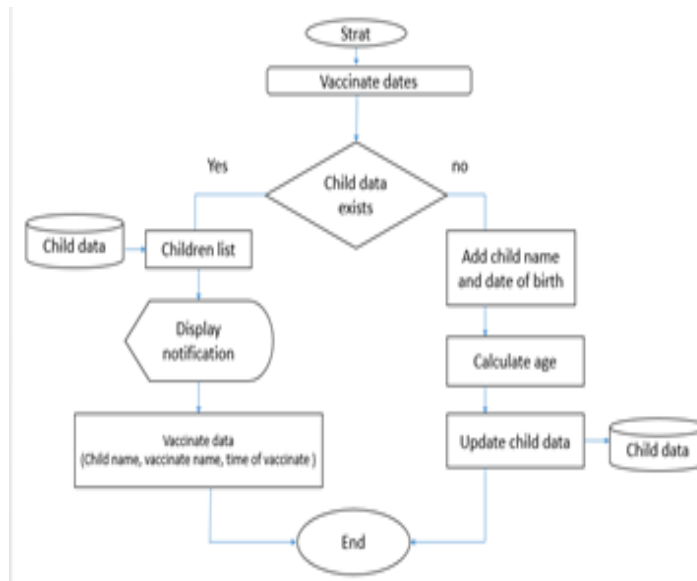


Figure 4: Vaccination Dates Diagram

The instruction service is implemented to encourage parents to know and learn how to deal with the side effects of vaccination that appears on the child after each vaccination. The instruction process also explains and shows some information about some medicines for chronic diseases like (Diabetes and blood pressure). The instruction service process goes as follows: when the user enters the instruction page link from the main page that displays the four services, the user selects the type of the instruction. The types of instructions that are available in the application: the instructions for the child and instructions about the diseases. Users select the desired instruction link and then the app redirects the user to the desired page. The instructions about the child display are important and informative and simple to be understandable by the majority to create a friendly user interface. The instructions about the diseases page contain important and on the point instructions about some specific diseases like diabetes and blood pressure. This service is dedicated to giving specific awareness to the users. The process of the instruction service flow charts is shown in figure 5.

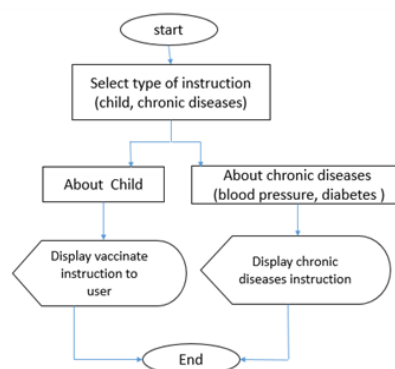


Figure 5: Instruction Diagram

Periodic consultation diagram, one of the main services is the periodic consultation service. This service helps the user to remember the Doctor's appointments. The periodic visit date process goes as follows: first, the Application checks if the visit information of the user

exists, if it does then the data is retrieved from the database of the users' visit. In this process, it shows the doctor name, the clinic name, time and date of visit in hours and month and the time of notification. When the user enters the periodic consultation service and sees that there is no information available, the user can make a list by adding the name of the doctor, the clinic name the date, time for the visit and the notification like (alert before one day and alert again in the same day). Then the new data is updated to the database of the visits so that the user can return to it when needed. This service works as a reminder tool that reminds the users constantly. The periodic consultation process is shown in figure 6.

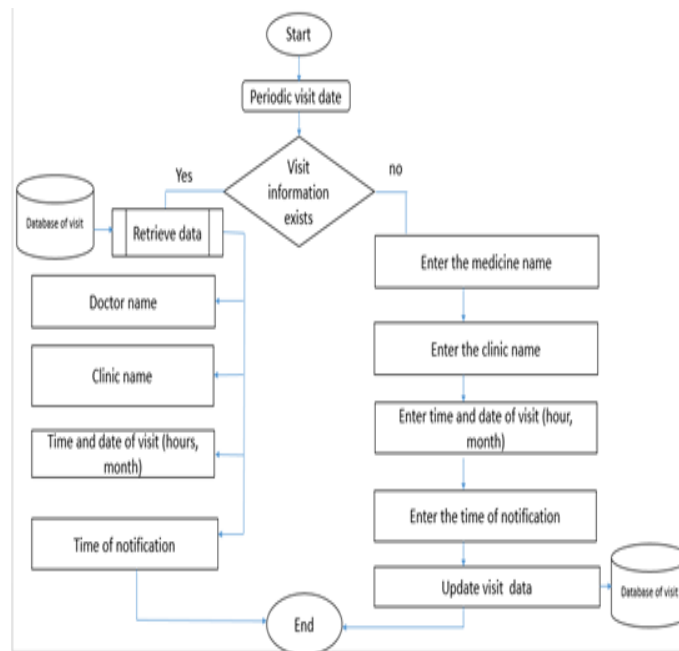


Figure 6: Periodic Consultation Diagram

6. Results and Discussion

Healthy Reminder Application is an Application for the medical reminder. It has several benefits and advantages for children and adults. And it also helps the elderly address the problem of forgetfulness and lack of medical awareness. It reminds patients of their deadlines medication times. Healthy Reminder Application helps mothers who are suffering from the pressure of many responsibilities driven by the lack of attention to their children during the period of illness, such as forgetting the date of their medications or dosage. There are many elders who take more than one type of medication a day. So this application helps in organizing the dates of their medications to avoid health problems that occur due to mixing or switching medications. Lack of awareness of the vaccination is an issue that causes diseases and death of children. When parents use this Application it maintains the health and lives of their children. The missing of the date of the periodic visit is solved by the Healthy Reminder Application that provides a specific service to the periodic visits reminder.

As a result of medication dates service, the medication date entry interface as shown in figure 7. The medicine information is added by the user. The Healthy Reminder Application interface is easy and simple to use. It helps the user to remember the names and dates of the

medicine and the doses that should be taken. And how often should the medication be taken a day. In other services of the application like the periodic consultation and vaccinate date services have the same process to enter the desired information. In the periodic consultation service, the applications check if the visit dates of the user exist if not, the application directs the user to a page to enter the medicine name, the clinic name, date and time of consultation and enter the notification dates. The directed page of the information entry is similar to the medicine date page entry which is simple and easy to enter. The vaccination dates service provides the same process for the user to follow but a different information entry might be required depending on the user.

Figure 7: Adding Medicine

As shown in Fig 8, The notifications that appear on the home screen because of using the services in the application as shown in figure 8. The notifications feature is one of the most important features in the application. It helps people to notify them about their important dates and appointments. For example the user will be asked to enter the medicine information as described previously in the medicine page process .such as the user who has to take the medicine daily for three times in the morning at 8:00 am after breakfast, afternoon, at 2:00 pm after lunch and at night at 8:00 pm after dinner. Then the user will receive notifications of which alerts the user to take the medicine three times and reminds of time and date of medicine.

There also is a very useful service which is called the instructions service. This service provides tips and medical advice. It also provides awareness to people for vaccination in general.



Figure 8: Home Screen Notification

7. Conclusion

The new technology helps people to feel more comfortable in their lives. This application's main aim is to help users to Schedule essential vaccinations for kids. It is important to avoid the disease. In this application, as we explained will help each user to re schedule their time table, and the application will remind users to take the vaccination and update the information on the application of the users. This application helps many users and allows them to save money, time and effort. It helps to decrease medication errors and wrong dosages. So it plays an important part in our lives to stay fit and healthy.

8. Future Work

There are many promising features to be added to the Application. The application in the future will be updated to support many OS types, and it will be helpful by adding the map of hospitals in Arabic language or what is preferred by the user. The application will be connected and updated by the ministry of health in Kuwait by the civil ID number to make sure that all records of the users will be correct and without mistakes. Extracting certified information of medicines from search engines in case medication was not found in the database. Since the application is connected to the MOH, an emergency button is to be created within the application that when pressed, will send location and call an ambulance to the area for immediate health care.

9. Reference

1. Czuszynski, K.; Ruminski, J. (2014) "Interaction with medical data using QR-codes", Human System Interactions (HSI), 2014 7th International Conference on, On page(s): 182 - 187
2. Deepti Ameta, Kalpana Mudaliar and Palak Pate (2015). Medication Reminder and Healthcare- An Android Application: (IJMP ICT) Vol.6, No.2, June 2015.
3. Gao, J. and Koronios, A., (2010), July. Mobile application development for senior citizens. In PACIS (p. 65).
4. Han Rebekah Wong, S., (2012). Which platform do our users prefer: website or mobile app?. Reference Services Review, 40(1), pp.103-115.
5. Hanauer, D.A., Wentzell, K., Laffel, N. and Laffel, L.M., (2009). Computerized Automated Reminder Diabetes System (CARDS): e-mail and SMS cell phone text messaging reminders to support diabetes management. Diabetes technology & therapeutics, 11(2), pp.99-106.
6. Lane, N.D., Mohammod, M., Lin, M., Yang, X., Lu, H., Ali, S., Doryab, A., Berke, E., Choudhury, T. and Campbell, A., (2011). May. Bewell: A smartphone application to monitor, model and promote well-being. In 5th international ICST conference on pervasive computing technologies for healthcare (pp. 23-26).
7. Peck, J.L., Stanton, M. and Reynolds, G.E., (2014). Smartphone preventive health care: Parental use of an immunization reminder system. Journal of Pediatric Health Care, 28(1), pp.35-42.