



Faculty of Computer Science and Information Technology

MedSeen (Your Personalized Medicine Reminder & Tracker)

Mobile Application

NUR HAFIQAH BINTI MOHAMAD NAWAWI

**Bachelor of Computer Science with Honours
(Network Computing)**

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NUR HAFIQAH BT MOHAMAD NAWAWI

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Dr Harulifah Sidi Anuar
Lecturer
Network Computing Programme
Faculty of Computer Science and Information Technology
Universiti Malaysia Sarawak

Neohafiqah

(AUTHOR'S SIGNATURE)

Permanent Address

Lot 49, Sebelah J.P.J.,
Kampung Bandariang,
33320, Gerik, Perak.

(SUPERVISOR'S SIGNATURE)

Date: 11/08/2020

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.....

Nur Hafiqah Binti Mohamad Nawawi (58968)

Faculty of Computer Science and Information Technology

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ABSTRACT

As the use of technology is increasing, everything can be done by using a smartphone. Through the use of mobile applications, the user has several features that will enable them to meet their needs and make their life more manageable. MedSeen is a simple and reliable mobile drug reminder application for those who need technological help in taking care of their health. It is a personalized medicine reminder and tracker that is designed to help older adults but does not limit the use of the app by anyone else. For older adults, managing medications can be a burden and could lead to medication non-adherence especially for parents who are living separately from their children. Besides, there are also people who are always busy with their schedules, which makes them forget about their medication. Thus, MedSeen is proposed to help the user to take the right medicines and correct doses of the medicines in order to prevent errors in medicines and to remind the user of the time to take medicine at the prescribed time.

ABSTRAK

Oleh kerana penggunaan teknologi semakin meningkat, semuanya dapat dilakukan dengan menggunakan telefon pintar. Melalui penggunaan aplikasi mudah alih, pengguna mempunyai beberapa ciri yang akan membolehkan mereka memenuhi keperluan mereka dan menjadikan kehidupan mereka lebih terkawal. MedSeen adalah aplikasi peringatan ubat mudah alih yang mudah dan boleh dipercayai bagi mereka yang memerlukan bantuan teknologi dalam menjaga kesihatan mereka. Ini adalah peringatan dan pelacak ubat yang diperibadikan yang dirancang untuk membantu orang dewasa yang lebih tua tetapi tidak mengehendkan penggunaan aplikasi oleh orang lain. Bagi orang dewasa yang lebih tua, menguruskan ubat boleh menjadi beban dan boleh menyebabkan ubat tidak patuh terutama bagi ibu bapa yang tinggal terpisah dari anak-anak mereka. Selain itu, ada juga orang yang selalu sibuk dengan jadual mereka, yang membuat mereka lupa tentang ubat-ubatan mereka. Oleh itu, MedSeen dicadangkan untuk membantu pengguna untuk mengambil ubat yang betul dan dos ubat yang betul untuk mengelakkan kesilapan dalam ubat-ubatan dan untuk mengingatkan pengguna masa untuk minum ubat pada waktu yang ditentukan.

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CHAPTER 1: INTRODUCTION

1.0 TITLE

MedSeen (Your Personalized Medicine Reminder & Tracker) Mobile Application

1.1 INTRODUCTION/BACKGROUND

The mobile application is a type of software program developed for mobile devices like smartphones and tablets [1]. Through the usage of mobile applications, the user has various features that allow them to fulfil their needs and help to facilitate their lives. The increasing range of mobile application, especially those available in mobile application stores, in particular mobile health applications, makes these applications a promising tool to help reduce the global problem of non-adherence to long-term medicines.



Figure 1.1 Wide Vision of Mobile Applications Integration Services [2]

This project focuses on the development of a health mobile application to remind users or patients to take their medication based on their prescription, following a review of relevant factors for patients and existing software. A study of previous work and already existing applications has also been carried out to ensure that the application can effectively meet the need of users. In addition, this mobile application has the mobility features that the application possess so that the user can use on the go the functionality for as long as the user have the smartphone and the application are installed.

1.2 PROBLEM STATEMENT

As people get older, the tendency to be exposed to several age-related illnesses is increased and required intensive treatment and medication. In Malaysia, three common diseases such as heart disease, diabetes, and hypertension were of major concern, especially among older adults and the need to give more priority to these diseases [3].

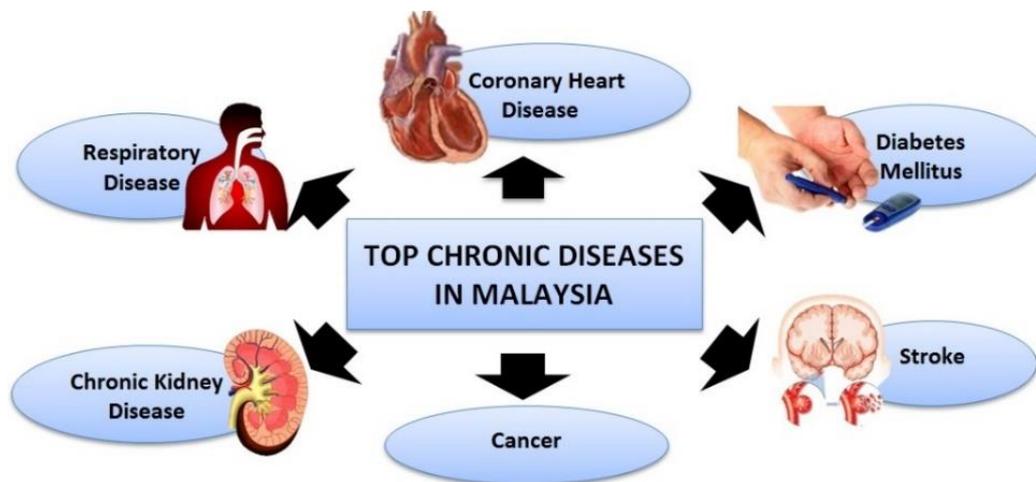


Figure 1.2 Top chronic diseases in Malaysia [4]

In order to avoid serious consequences, it is important to take the right medications at the right time. However, it is easy to overlook and lose track of the medications with multiple health conditions and with the increase in the number of medicines. For older adults, managing medications can be a burden and could lead to medication non-adherence especially for parents who are not living with their children. Besides, there are also people that are always busy with their schedule which leads to forgetting about their medication.

These results provide guidance for mobile application design that provide beneficial features for managing medications and supporting the health for older adults and other users. This personalized medicine reminder and tracker application focus on to be especially useful for users who are taking several medications at a given time, or those who are managing medications on behalf of another user. It will be straightforward and clear in providing information and reminder not only for the patient but also for other users that want to monitor pills taking by that patient.

1.3 SCOPE

The scope of this project is only support android platform where the development of this project is using Android Studio and as a backup will be use any Android application development. This project focus on older adults that have high tendency to lose track of their medications with multiple health conditions and with the increase in the number of medicines. It will be straightforward and clear in providing information and reminder, not only for the patient but also for other users such as family member that want to monitor medicines taking by that patient.

1.4 AIMS AND OBJECTIVES

The objective of this project is to design and develop a mobile application that will benefit target user especially older adults to take their medicines at the prescribed times. The main function of this mobile application is reminding users to take the correct medicines and correct doses of the medications to prevent errors in medication administration. Another feature that include in this mobile application is enabling other users such as family member to monitor medicines taking by the patients.

1.5 BRIEF METHODOLOGY

Rapid Application Development (RAD) is chosen as the approach for this project. There are four main phases in RAD methodology, which are analysis and quick design, prototype cycle, testing, and deployment. In the analysis and quick design phase, the developer carried out research related to the mobile application development and medicine reminder applications available in application stores. Besides, this phase enables the developer to approach end user to collect and record all the end user's requirement. The prototype cycle phase has three cycle processes which are develop, demonstrate, and refine. This phase is the initial development of the prototype in order to have a tangible view of the design. The development of prototype is in frequent improvement iteration until it meets the requirements of the product. In the testing phase, developer will be able to detect errors or problems that occurs during mobile application operation. The deployment phase is the phase in which the mobile application is in the steady-state production and can be installed on end user devices.

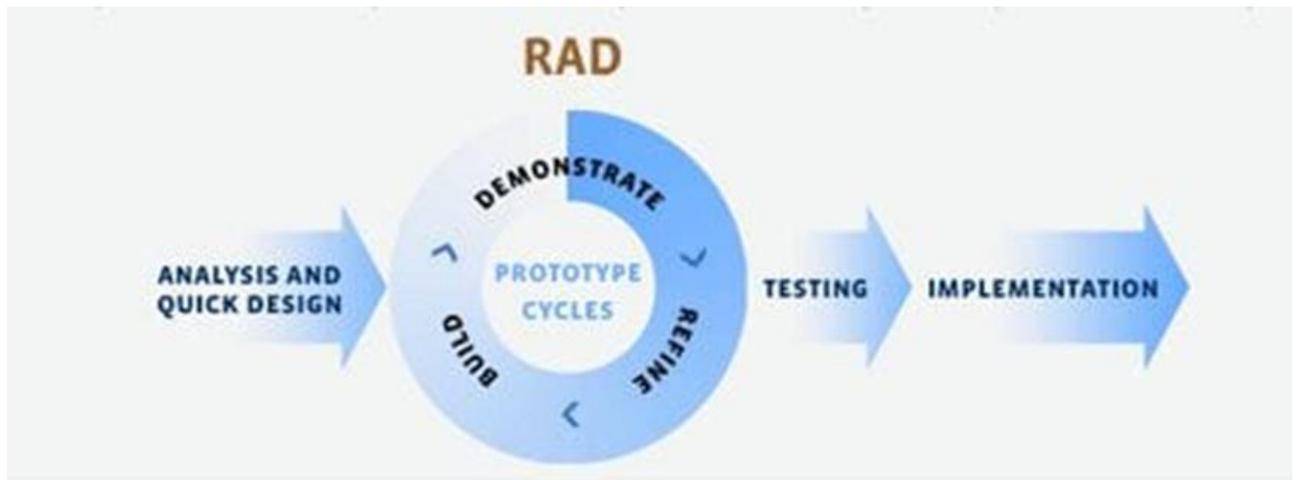


Figure 1.3 Rapid Application Development Methodology [5]

The reason why this methodology is chosen because this methodology is based on prototyping and iterative development without requiring complex planning. Since there is no detailed preplanning, it makes it easier to incorporate the changes within the development process. The other reason is time constraints, too. The time allocated for the execution of this project is only eight months, and the timeframe is not sufficient for the development of Android application if the other methodology is chosen. RAD methodology is chosen because of the rapid prototyping design where the development of the mobile application could be done in the early stage where the users' requirement and demand of the users could be addressed earlier at the development stage.

1.6 SIGNIFICANCE OF PROJECT

This personalized medicine reminder and tracker application developed to remind the users or patients to take their medicines on time. Besides, this application enables other users such as family member to monitor medications taking by the patients.

1.7 PROJECT SCHEDULE

The project schedule is used as a guideline and reminder to develop the proposed project. Gantt chart is used to show the length of the project duration, to estimate the period of each task. Figures below show the project schedule for developing the proposed project using the Gantt chart.

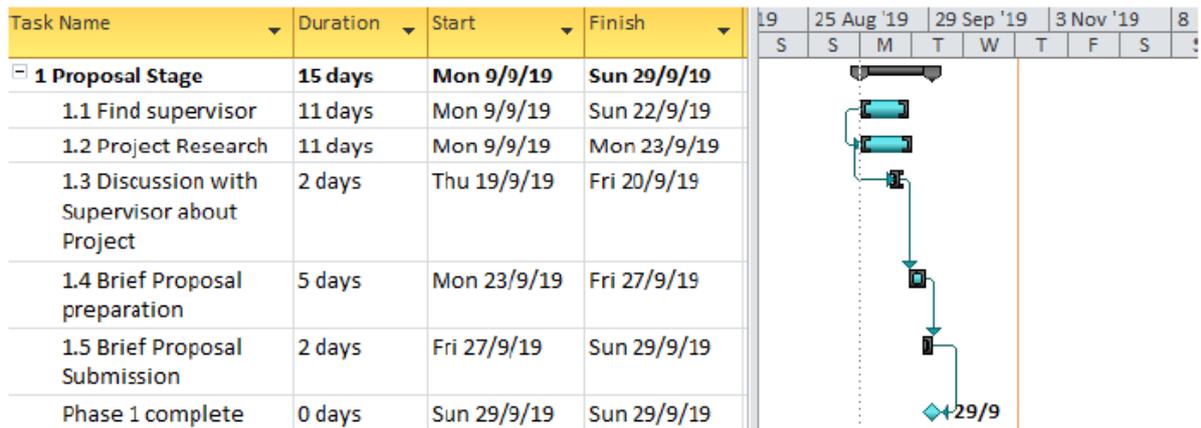


Figure 1.4 Gantt Chart for MedSeen

1.8 EXPECTED OUTCOME

To develop a mobile application that will help an older adult in taking their medications in the prescribed quantity and at the specified time. MedSeen has simple and easy to use user interface and supports a lot of features based on medicines. This application is not at all complex and can be easily understood by the user.

CHAPTER 2 LITERATURE REVIEW

2.1 INTRODUCTION

This chapter will cover the literature review and comparison of the selected existing mobile applications for medicine reminders that have similar functions and processes to the proposed mobile application that will be developed. The selected existing mobile applications will be reviewed and analysed for their strengths and weaknesses in order to improve the proposed mobile application. In order to review those applications, goals must be set to that features that will be tested are in line with the implementation objective. The main objective of this project is to design and develop a mobile application that will benefit target user, especially older adults, to take their medicines at the prescribed times.

In Malaysia, older adults are classified as those who are 60 years and above [6]. This proposed project focuses on the patients, especially older adults who need to take several different types of medicines to treat one or more health condition. For instance, diabetes, hypertension, and heart disease are the three most commonly diseases in Malaysia. These diseases are related to each other and for that reason, they are also called the three-strand disease. According to a study conducted by the National Health and Morbidity Study, an estimated 3.5 million or 17.5 percent of the country's population has diabetes in 2017 [7]. These diseases may lead the patients to take more than one type of medicine to treat their health. For instance, the patients need to take a statin to lower their cholesterol, and a beta-blocker to control their blood pressure [8]. The more medications the patients need to take, the easier to forget and lose track of medications which can result in serious health effects for the patient.

This proposed project would encourage or enable patients to take the right medications and correct doses of the medications to avoid medication administration errors. Through the growing use of technology, anything can be achieved using smartphone only. Hence it is

important to develop a mobile application of medicine reminders in order to make life easier for people.

2.2 REVIEW ON EXISTING APPLICATION

In this section, three current applications for medicine reminder had been selected to be reviewed and compared in order to identify the similarities, advantages, and drawbacks of the selected mobile applications. The medicine reminder applications that were chosen are MediSafe by MediSafe International [9], DoseCast by Montuno Software [10], and MedHelper by EarthFlare[11]. The features of the existing and proposed mobile application will also be discussed in this section.

2.2.1 MediSafe

MediSafe has been developed by MediSafe International. MediSafe is a prescription tracking tool that compiles all of the user's medical and health information in one location, such as pill and medicine reminder, drug-to-drug interactions, refill, doctor appointments and health journal with trackable health measurements. When the user opens this application for the first time, it is directed to a very simple and easy to read screen. The user has two options whether the user is a returning user or a new user for this application. After selecting the option, a simple and clear tutorial is provided on how to use the application. This helps the user to perform basic and important functions in the application such as adding medication to the calendar, recording measurements and adjusting doses. These three functions are the main components of the application.

The main screen for this application consists of a one-week calendar and the button to add the medication in the middle. The middle layout on the main screen focuses on what medication needs to be taken soon or might have been missed recently. It is reasonable to do so, as people are unlikely to be concerned about what they should be taking the next day and are unlikely to remember if they forgot to take the medicine the day before. However, this application does not provide a way for the user to check their medication that needs to be taken over a longer period of time.

The process of adding medication is quite clear and intuitive. Although the addition of medications requires a few fields that need to be filled in, the interface does not send all of these fields at the user at once. The interface breaks down the steps of adding medication to the name of the medication, setting the reminder times and the schedule for the medication, and adding a small symbol to represent the medication on the main screen. In addition, this application comes with selectable present schedules for common medication schedules such as insulin and pill. It is very easy to set regular intervals for medication. However, the irregular intervals may require more detail that to be filled in by the user.

The location of the adding process for new medications, measurements and doses is indicated by a large circle with a plus symbol in it on the bottom right corner of the screen. Even the functionality of this button does not immediately appear, but when the user clicks on the button, the options mentioned above will appear.



Figure 2.1 Main screen of MediSafe

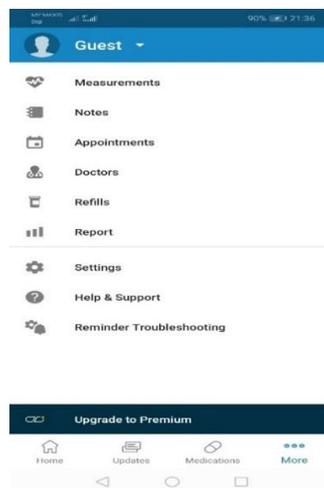


Figure 2.2 Options screen of MediSafe

2.2.2 DoseCast

Dosecast is a pill reminder and medicine tracker mobile application developed by Montuno Software. When the user opens this application for the first time, he or she will be directed to the screen with a few options, such as the option for settings on the lowest part of the screen and the option to add the medicine indicated by the plus symbol on the top right of the screen. This application reminds the user in the free middle space that the user needs to

press the plus symbol to add a new medicine. This is a good addition to helping the user to be clear about what needs to be done first.

Users are taken to a new screen after pressing the plus symbol button to add a new medicine. This screen contains a few sections that need to be filled in about the latest medication prescribed by the patient. DoseCast comes with two versions that paid version and a free version. The user will see the difference between the paid version and the free version in the attach medication tab, such as the drug type option is being greyed-out. For the free edition, all the important features are still available, but it is not clear that the greyed-out options are not available they have a very similar colour to the available options.

In each section of the add new medicine screen, the user is taken to a separate screen for adding the information. On each of these screens, there are two options at the top of the screen on both of these screens that are back button and a save button. This is not necessarily a bad thing but the problem is that both of these buttons appear to do the same thing that could lead to a very dangerous situation in which the user could click the back button after entering some medication information incorrectly and thinking that the information they received was deleted. This could lead to dosage errors that could potentially leading to overdose.

This application will remind the user of the time to take the medicine with a push notification. There are several options for push notification that allow the user to decide how they want to deal with it.



Figure 2.3 Main screen of DoseCast

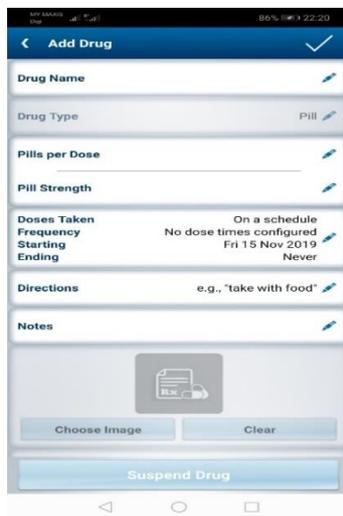


Figure 2.4 Add drug screen of DoseCast

2.2.3 MedHelper

EarthFlare had created MedHelper. MedHelper is a mobile application helping to keep track of the medication prescriptions and when the doctor's appointment is scheduled. This initially this application opens with a list of Schedules, Take as Needed, Med Log, Prescriptions, Vitals, Notes, Doctors, Pharmacies, Appointments, Profiles, and Reporting options. The user needs to add a prescription through the prescription option that is unintuitive

and adds unnecessary difficulty to the initial setting up of this application. It is not clear what is meant by several features in this application, such as reporting and profiles without further investigation, which is not ideal. Most of the buttons on the launch screen lead to an empty screen with no text or information displayed which is obviously clearly a bad design and requires the user to understand what is going on

The most important features, such as setting up an alarm and adding medications are difficult to access due to many features inside it that are shown-in one screen. In addition, this application does not offer any options relating to taking medicines time such as before or after meals, or other important notes for certain medications that may be important for patients on more complicated prescriptions. Although this application displays information on the remaining prescriptions and includes a tracking feature, it does not offer any options for warnings such as when a medicine is running low.

The first impression of this application is poor, but this application has an effective design for displaying and storing information on medication with different tabs for different information such as the supply of medicines and the prescription information. The schedule for medication can be viewed in a calendar that shows the prescription of over the next few weeks. This is a good feature that can help users to plan and visualise their medication needs in the short term.

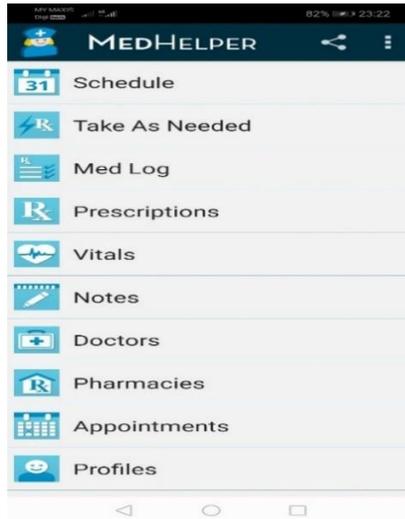


Figure 2.5 Main screen of MedHelper

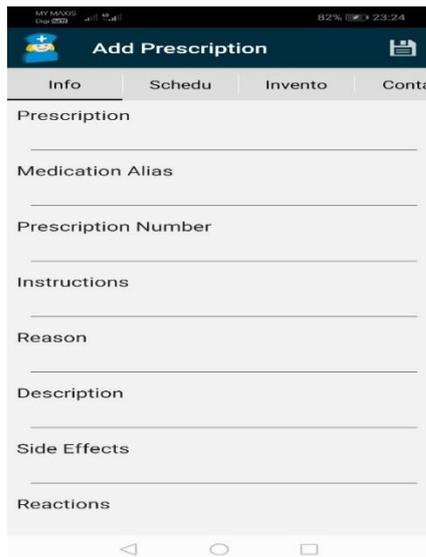


Figure 2.6 Add prescription screen of MedHelper