Development of Mobile Royal Thai Armed Forced Personal Information Software on Android

Neramit Archaapinun, Rangsit University, Thailand
Paniti Netinant, Rangsit University, Thailand

Abstract
The purpose of research is to develop Mobile Royal Thai Armed Forced Personal Information Software on android devices. According to Thai military regulations, it clearly stated that all military personnel officers are required to submit their updated personal profiles for example name, surname, address, etc. basically once a year as a standard practice not only on computer information system but also hardcopy to keep personal data accurate and up-to-date. Thus, it will be more convenience to verify their own personal information via mobile application. They can access anywhere and anytime via the internet. Our development of the software is to apply software engineering model, a rapid application development as a software-development approach designed to produce high-quality products quickly. A rapid application development is the best selected to develop a mobile software as it is easily to apply for adaptive software, usability, and flexibility. To ensure the result of our development, we use technology acceptance model (TAM) to use as a tool to conduct responses of user's satisfaction in the development of the system to meet user's requirements and expectations. TAM is required to proceed two major factors, user responses which are to perceive usefulness and to perceive ease of use, and a perceived usefulness that user believes the technology could help to improve the performance and efficiency. Perceived ease of use is what an extent the user to be comfortable when using the features of the technology. Our software system development is mainly to be comprehensively, effectively, easily and flawlessly to use for users of the royal Thai armed forces. In this paper, we present the overall system design of the Thai military personal information software on mobile devices. It would be a prototype of the mobile applications development of the royal Thai armed forces.

Keywords: Mobile Software, Software Design, Rapid Application Development, and Framework

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Introduction

Royal Thai Armed Forces Headquarters is the leading modern enterprise in co-ordination defense and military operations to retreat confidently of government and people for acceptance friendly countries. Royal Thai Armed Forces Headquarters is composed of five groups in which Directorate of joint communications has responsibilities for planning, development of connecting information all departments in country together. Information of Royal Thai Armed Forces also aims to exchange all over any allied countries. It commutes not only signs of electronic warfare but also information technology as the center of information technology and communication of the Royal Thai Armed Forces. In the past people use mobile devices to communicate between each other. Mobile devices have many functions such as SMS messaging, calendar, alarm clock, camera, FM radio, music player, GPS and etc. There are other features that mobile devices can apply; moreover, it can install software in devices in order to use variety of functions. In the past mobile phones were restricted to phone calls only, not text messaging, no internet browsing, no camera, etc. It was used mainly for making and receiving calls. From time to time, mobile device truly began to help and support works. It became smaller and slimmer in dimensions, and with longer battery life as well as it became an instant smash with publics. Furthermore it became less expensive over the following decade, and more-advanced facilities, such as internet access, so that called a third -generation (3G) [1]. Nowadays, mobile devices mature very widespread in many countries. These are primary part of our lives. This means that a mobile technology brings many advantages. Mobile applications are becoming so functional and popular among consumers.

As the market industrial mobile devices have many type of mobile operating systems such as Android OS, Symbian OS, Windows phone and iPhone OS (Apple). In the digital era many manufacturers need to step up their adoption as these developments will fundamentally change individual companies, as well as transform market dynamics across a full range of industries due to the use of mobiles devices have become a vital part of our daily lives. There are many smartphone manufactures, likewise various mobile operating systems for example Android OS, Symbian OS, Windows phone and iPhone OS (Apple) but the highest growth potential of mobile operating systems is belonging to Android OS as be shown on Figure 1. Android OS is available to develop by many languages e.g. Java, Kotlin, C/C++ and C# using android operating system kit, however, the official programming language of Android development is Java language because the largest part of Android is written in Java language. In the below graph shown operating system market share worldwide from July 2017 - August 2017, the Android OS has been the leading over the iOS.
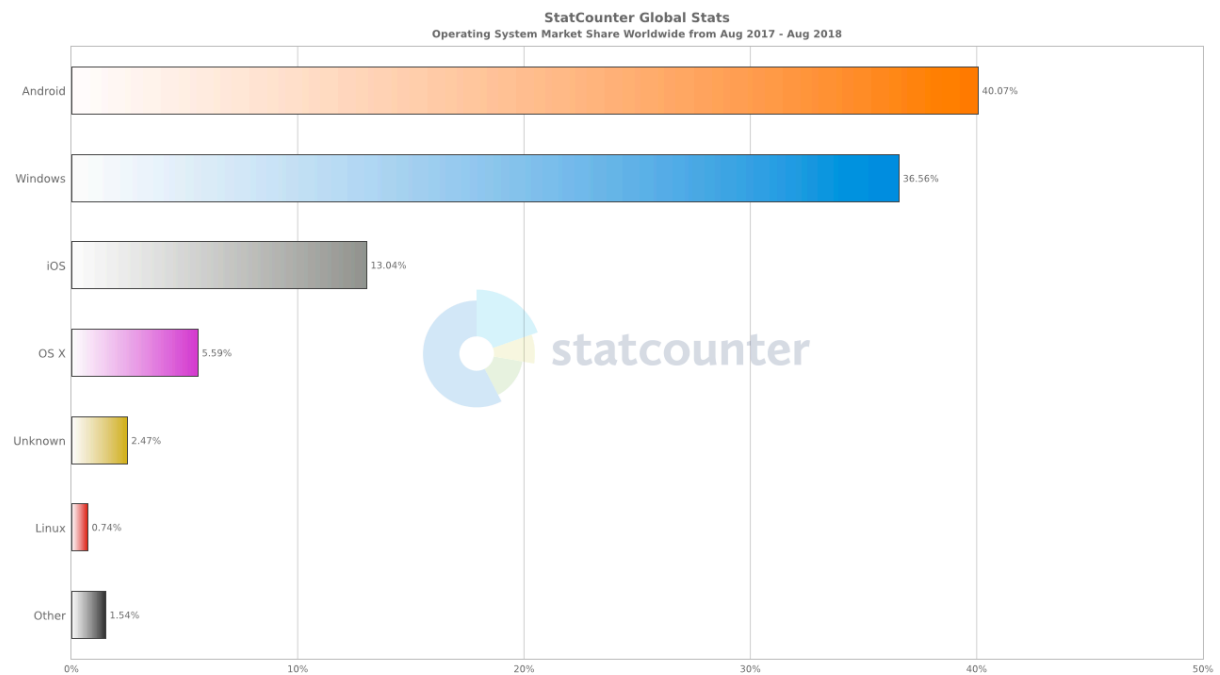
Figure 1. Operating System Market Share Worldwide from July 2017 – Aug 2018
(Source from http://gs.statcounter.com)

This is a major reason that Java language is also selected to develop software on this paper. In addition, the researcher realized that Java language has significant advantages over other languages and most Android mobile application around the world have been applied by Java language. Java language is simply the official language of Android application development that the most supported languages by Google Play store and the most application are built. The purposes of our research, researchers who served in Royal Thai Armed Forces Headquarters have aimed to develop the software system on Android for all Thai military personnel. They could submit their yearly personal information without any difficulty on their updating personal information annually on their birth-date by themselves anywhere and anytime through the internet. The concept of development and implement of software system has been used rapid application development model (RAD) [3] [4]. To ensure result of any development, researching teams will take a technology acceptance model (TAM) to verify our development. TAM is a tool that uses to survey responses and user satisfactions after they use a prototype of the developed application [5].

Literature Review

A. Software Development Life Cycle Models and Methodologies
Once upon a time, software development consisted of a programmer writing code to solve a problem or automate a procedure. Nowadays, systems are so huge and complex that Teams of Architects, Analysts, Programmers, Testers and Users must work together to create the millions of lines of custom-written code that drive our enterprises. The researcher will be use SDLC as a framework for development software system. The software development life cycle is a defining tasks performed at each step in the software development that has a beginning and termination of the project. The software development life cycle is also known as the software development process. SDLC consists of following activities [6]:

1. Planning: The most main parts of development. In this stage consist of consider the needs of the project, Priority of necessity, Define resources such as budget, Staffs, Tools and Determine the team to develop the project.
2. Analysis: Refines project goals into defined functions of the intended application. Analyzes end-user information needs.
3. Designing: Consider the acquirement of hardware and software. Including the development of all specifics of the system.
4. Implement: In this phase the code is produced emphasis by developer. For building a system (coding) to test the validity of the data as a result of the system.
5. Testing: After the code is developed it is tested against the requirements to make sure that the product is working properly.
6. Deployment: After complete testing the product then teaches customer for how to use it.
7. Maintenance: Once when the customers starts using the developed system then the actual problems comes up. This phase have to repair, and needs to be solved from time to time.

B. Rapid Application Development Methodology

RAD was selected as the appropriate for developing mobile software in this research. It is designed to give maximum advantage of powerful development software and higher-quality results than those achieved with the traditional lifecycle [7]. We use RAD to develop a mobile software because it does not require specific planning, and reduced development time. RAD was developed from waterfall model that consists of resources, developers to design and implement, particularly all every stages of development require interviews from users. As the RAD methodology can describe below.
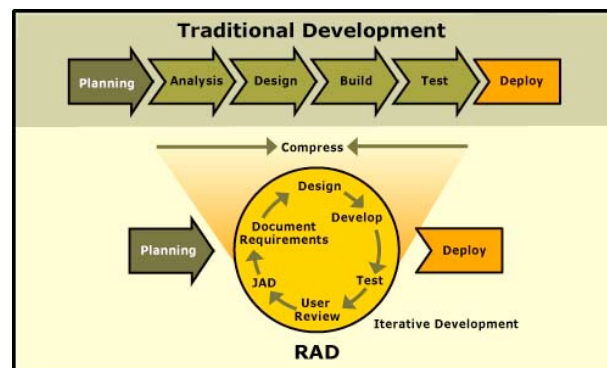

Figure 2. Rapid Application Development Methodology
(Source from http://swenassignment.blogspot.com/2008/01/rapid-application-development-rad-model.html)

C. Type of mobile Application

Mobile application is a type of software designed to run on a mobile device. These days we see the mobile devices mainly running on Android OS, iOS or Windows. These are known as operating systems. In this information will help you to understand and differentiate these applications: Mobile web application are the web applications to render/deliver pages on web browsers running in mobile devices. Native application are built for a specific operating system. Hybrid application are a combination of both native application and mobile web application [8]. This type of application has cross-platform compatibility nevertheless can still access on mobile device.

D. Android Operating System

Android is a mobile operating system (OS) that is initially released around in September 2008.The OS is developed by Google [9]. Most applications that run on the Android platform are written in the Java programming language.

E. Technology Acceptance Model

TAM is an information systems theory explain that model how users come to accept and lead users for accepting a technology. TAM include two factors [10]: Perceived Usefulness (PU) is meaning as the potential user's that use of a certain system. Perceived Ease of Use (PEU) is meaning as the user's believes that using software will be effortless. "Perceived usefulness" (PU) and Perceived Ease of Use (PEU) will be effect to attitude, behavioral and intention for all the users.

Our System Design

In this section, we show aspect of how we designed and developed software system to develop this software as a very first prototype for RTARF HQ. Our design methodology follows a pattern of SDLC methodology as well as applies model of RAD to develop the software because agile model does not focused on the plan together with information technique professionals and user groups.
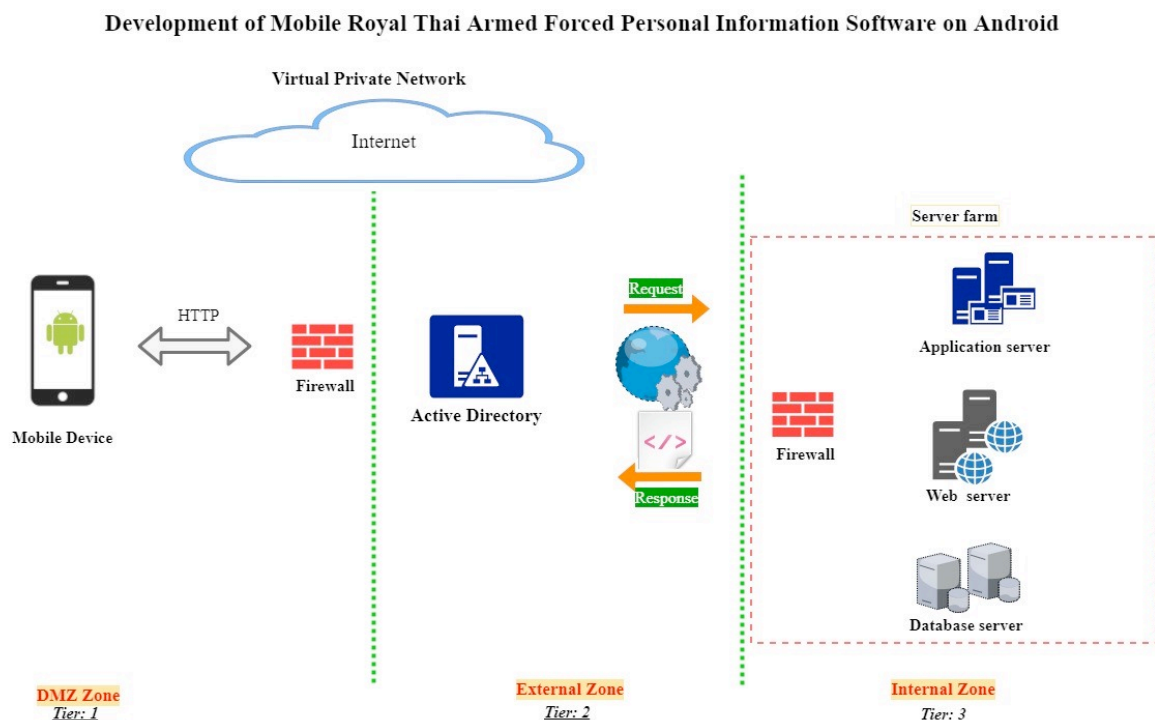

Figure 3. Conceptual of development software system in Royal Thai Armed Forces Headquarters

The conceptual framework shows the journey to develop is consisted of two (2) parts. First part is an operating software system and another part is an example of a software system design as illustrated in Figure 3.

1. An operating software system - as presented in figure 3 above has active directory that means management resource information and authentication. All the Users must

log-in by username & password through the virtual private network. It could be connect the server securely that means all data in RTARF HQ will be encrypted and has specific gateways to send information. The software will be send a request message from user to API on HTTP protocol. It means some functions processing to get data from data center for showing information personal on the screen mobile device.

2. An example of software system design – as present in figure 2 above is based on 3-tier application according to international standards. In many years ago software was connected the database directly. It means a data was not secure, nevertheless in this research will be design prototype software system in RTARF HQ for the future as follows.

- Part 1 Presentation tier – this tier means represents user interface of Android devices. There are plenty of languages to develop the software. The researcher was selected java language to create the software because it is one of the most popular programming languages especially open sources and also supports multiple levels such as server computer, desktop computer until mobile device.

- Part 2 Business tier – This tier is an intermediate presentation tier and data tier that has some functions processing to connect between each other. The researcher has written code on server side as PHP language because of its known for excellent performance and scalability as well as be able to use with many operating systems e.g. Windows Unix, Linux. In the interface on this software system have selected the standard as the REST format because of the REST always used to make less data transfers between client and server, return XML, JSON or even in HTML format response. And also has a comprehensive library, supports the expansion of the various system. Besides, it could be appropriate to operate with mobile devices [11]. The principles described above is called an application programming interface.

- Part 3 Data tier – this tier considered as data center because it is a logical database to provide store and retrieve data in the organization. It's consisted of many server such as server application, web server, and database server.

Login Page   Main Page
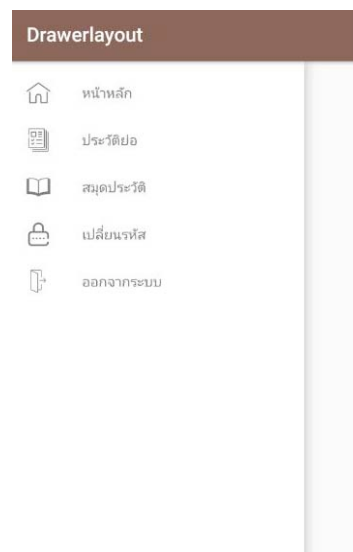
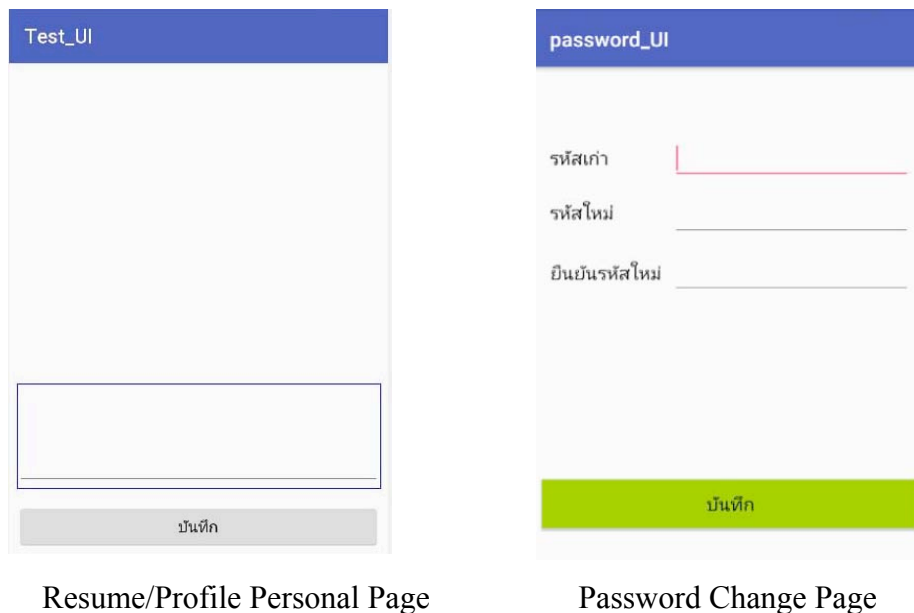Resume/Profile Personal Page   Password Change Page

Figure 4. The Prototype for a Development Software Personal on Mobile System.

We create a prototype for a development software personal on Mobile System that presents in Figure 3. The prototype of software has consisted of 4 screens. The software development phase is based on functional requirements from users. The login screen allows all military of Royal Thai Armed Forced entering their username and password. After all the user have allowed to access will be simply show the main screen including information such as rank, first-name, last-name and position. When a user selects the slide bar menu, a menu list of options appears to slide out from the left edge of the screen. However, this menu list is hidden most of the time. Resume/Profile Personal Page could be used for submitting their update personal information annually on their birth-date accurately and will be notice in the RTARF mail of the users once the data personal have been updated. In the final screen, users could make a change of their password. Then the password will be change automatically. After the users select a logout menu, it will close the application and a login screen will be displayed.

Conclusion

In this paper, our primary research uses a technology acceptance model (TAM) as a tool to verify the result of our software development ensuring responses and user satisfactions. Using the TAM model [12], it consists of two main factors: perceived usefulness and perceived ease of use. Firstly, Perceived usefulness refers to a user to believe that the technology will help to improve the performance and efficiency. Then our prototype version of our application could be verified the correct usefulness and perceived ease of use. Secondly, perceived ease of use is defined as what extents the user to be comfortable when using the features of the technology. This paper describes our framework for developing a mobile software system development for the royal Thai armed forced personal information software.

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Contact email: killer_champ77@hotmail.com