

**DEVELOPING AN ANDROID-BASED IMPLEMENTATION OF THE COMMUNITY  
HEALTH INFORMATION TRACKING SYSTEM**



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**DEVELOPING AN ANDROID-BASED IMPLEMENTATION OF THE COMMUNITY  
HEALTH INFORMATION TRACKING SYSTEM**

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## **ABSTRACT**

The rapid increase of population here in the Philippines is a growing concern of every medical institution. As population grows, the number of patients in ailments, diseases or sickness is rapidly spreading such that it should be addressed immediately. Hospitals are the primary infrastructures that carry the responsibility of life and health. Aside from hospitals, there are also medical institutions like health centers that operate on a particular community. The development of a free and open source electronic recording system, hereinafter referred to as CHITS, is a useful tool in maintaining the medical records in a community. This system is already being implemented on selected barangay health centers here in the Philippines that confirm the benefits of the system in a community.

By utilizing this Open Source technology, the proponents centered its study on the application of this system for health workers by developing an Android based implementation of the system which caters to the demands of a local barangay health worker. Android, as an Open Source Operating System, is also an emerging technology. Furthermore, this study utilized the added value of merging the Open Source Health Care Application and the mobility that is provided by Android by distributing its benefits to a larger community and expands its domain of beneficiaries.

**KEYWORDS:** Android, HealthCare Information System, CHITS, Mobile, Community.

## **Chapter I**

### **INTRODUCTION**

#### **1.1 Background of the Study**

The existence of Health Centers here in the Philippines is vital to provide the community its basic needs and address its immediate concerns. It aims to cater every individual and provide them adequate information that helps them avoid habits which are potentially hazardous to their health. However, some information is not accessible in real time, hence vital and complex information remains unknown. Moreover, health workers are usually deployed in the communities/localities to work, thus the development of a mobile application provides mobility and ease of access to health workers. In addition, since some health centers are deployed in rural areas, mobile devices are better means of accessing information.

The growth in population increases the number of records in the database which also intensifies the need of a system that easily maintains these data. Thus, the implementation of an efficient healthcare information system is a growing necessity in every medical institution. Currently, there are a lot of open source programs being developed and designed for health care services, but here in the Philippines, the Community Health Information Tracking System (CHITS) is the one in use by local health centers.

Aside from CHITS, there are a lot of different open source applications available in the market. However, through thorough comparison with different Open Source health care information systems, all applications operate on a

desktop environment wherein it is controlled by a single user that is operating in its central server. Patients who wish to view their medical records have to ask for inquiries from the one who is currently accessing the application. In effect, lines in health centers are long, thus wasting so much of the patients' time. So the development of a mobile based application for CHITS is beneficial by saving the patients' time and effort as it provides a more effective and efficient way of interaction with the community. The said application communicates with the central application in the health center to ensure that the application retrieves relevant and trusted information that is up-to-date and stores records of data simultaneously in the server.

Furthermore, mobile applications before were dedicated to the domain of communications only, sending, deleting and filtering messages, voice or video calls, conference calls and etc. Nowadays mobile phones or gadgets transcended its own purpose and the domain of its applications extended to games, entertainment, multimedia, productivity/office tools and other meaningful applications. Seeing this expansion, the proponents see the opportunity to extend an Open Source Health Care Information System to expand its area of usage and market of clients.

Lastly, the Android Operating System (OS) is becoming popular in the realm of Mobile Computing. A lot of mobile manufacturers are adopting Android as the main OS on their mobile phones. It has already beaten the number of iPhone users in the market making it an efficient technology of research and implementation.

## **1.2 Technology Application Context**

In recent developments of CHITS as an Open Source Application, extending such open source with another open source technology further adds value on the existing application by addressing the limitations of this application. It also provides flexibility by mobilizing it to operate on a different environment wherein the process of accessing information is simplified.

The implementation of CHITS on selected local health centers was a success, having met the demands and expectations. Those health centers attested that the use of such information system brought efficiency and improved the process inside their respective health center. However, there were limitations in this application. First, the application only operated inside the domain of the health center. Second, the use of this system did not provide efficiency in the recording of information and did not ensure that the data collected were updated. Third, although the usage of papers were more likely reduced, barangay health workers still needed to utilize forms in paper before inputting these records inside the system. In addition, long lines in health centers were still apparent and information of each patient was not immediately accessed by the community. Furthermore, the system did not provide a better way of interaction between the health center and the community. Lastly, there was a higher probability that not all members in the community were recorded in the database because not all members consulted the barangay health center in its medical-related concerns. We, the proponents solved the limitations and problems mentioned above by developing an Android based mobile application which would be used specifically

by barangay health workers. This application enhanced the process in and outside the local health centers as its usage was not anymore centralized.

With the utilization of different technologies, this study did not only help programmers in developing an application, but more importantly the health workers and patients by giving them the convenience of the application through its mobility.

### **1.3 Objectives of the Study**

The main objective of this research is to develop a Mobile based Android application of Community Health Information Tracking System (CHITS).

Moreover, the specific aims of this study are:

- To study the distinct tasks of local health centers.
- To identify existing open-source health care information systems that can be used in local health centers.
- To create a mobile application by extending the capabilities of an existing open-source health care information system.

### **1.4 Significance of the Study**

This study is significant in improving the maintenance of a health center's database by managing its information in a central repository wherein every barangay health worker is able to update the existing records in the database simultaneously. This study is also beneficial to barangay health workers in their day-to-day labor when they perform recording, updating and disseminating of information in the community. The use of the Mobile Application assists in

pushing and pulling some basic information. Moreover, this research attempts to provide an improved way of interacting with the community wherein health workers reaches out to the community in a way that eases the normal process of operation. The development of this application also attempts to eliminate the long lines of patients in a health center by filtering those patients whose purpose are accommodated by the mobile based application. Furthermore, the data collected in the database acquires much updated information about the current status of the members of the community, providing health centers a more detailed report. The application also has an easy to use Graphical User interface which simplifies recording, updating and looking up of patient.

In the technical world of Open Source technologies, the significance of this study is also exemplified by showing that the uses of Free Software are also relevant in the Community and that its value proposition is able to compete with those proprietary software's in the market. Moreover, this study shows the advantages of Open Source applications because merging two different technologies is more easily done with the help of the source codes available in the market. This study also tries to overcome the limitations of a mobile application in terms of its storage capacity by using an alternative way of handling databases and maintaining records.

The innovation of this study is helpful in barangays wherein a lot of patients and families reside. With this technology application, it stores information in the area and see to it that all members of the community are recorded. It attempts to replace the use of papers in obtaining information in the community.

More importantly, this research helps barangay health centers and workers to engage more interactively with the community. It is also significant in validating whether a person is really part of the community which is essential during relief goods distribution or any charity works. The study further assists the health centers by producing computer-generated reports that eliminate the tedious process of manual tallying. Furthermore, this study serves as a future reference for researchers on the subject of developing an information system in an Android environment and most importantly, this research educates health workers that the use of technology not only provides better and efficient output but also provides adequate solutions to problems.

### **1.5 Scope and Limitations of the Study**

The focus of the research is on healthcare information systems wherein the central application of the study is the Community Health Information Tracking System (CHITS). The development of a mobile application is limited to CHITS wherein the forms and database is dependent on its current architecture. The application uses the model of client-server architecture as a structure on the way the mobile interacts with the application. Moreover, the proponents are using Android as the Mobile Operating System to extend the functionalities of CHITS.

This application covers patient profiling, vital signs recording, family profiling, barangay recording and announcement handling wherein it operates as an application in which health workers are able to provide patients ease of access to real time information.

The proponents uses Open Source as against to proprietary software because using such is easier to extend, customize and modify since the codes is accessible and there is an existing helping community that helps the proponents achieve their objectives.

The Development of the mobile based application is on an Android Device which requires internet connection via Wireless Fidelity (Wi-Fi) or High-Speed Downlink Packet Access (HSDPA). The said application connects to a remote server wherein the data transacted across the network simultaneously reflect in the CHITS database. Furthermore, the development of this mobile application is designed for local health workers; an application that is an extension of what CHITS already has.

## **1.6 Definition of Terms**

**Mobile Phones** – a portable communication device.

**Operating System** – a software platform on top of which other programs, called application programs, can run.

**Database** – an organized collection of data for one or more purposes, usually in digital form. The data are typically organized to model relevant aspects of reality, in a way that supports processes requiring this information.

**Android** – an operating system for mobile devices such as smartphones and tablet computers. It is developed by the Open Handset Alliance led by Google.

**CHITS** – a modular and extensible LAMP-based electronic health record intended for the use of rural health centers in the Philippines. CHITS runs over

the Generic Architecture Module Enterprise (GAME) engine which was created by Dr. Herman Tolentino.

**Wi-Fi** – a mechanism for wirelessly connecting electronic devices.

**HSDPA** – an enhanced 3G (third generation) mobile telephony communications protocol in the High-Speed Packet Access (HSPA) family, also dubbed 3.5G, 3G+ or turbo 3G, which allows networks based on Universal Mobile Telecommunications System (UMTS) to have higher data transfer speeds and capacity.

**Community** – social groups of any size whose members reside in a specific locality, share government, and often have a common cultural and historical heritage.

**Health Center** – a clinic staffed by a group of general practitioners and nurses.

**Health Worker** – people engaged in actions whose primary intent is to enhance health. These include people who provide health services – such as doctors, nurses, midwives, pharmacists, laboratory technicians – as well as management and support workers – such as hospital managers, financial officers, cooks, drivers and cleaners.