

PERVASIVE ELECTRONIC HEALTH RECORD

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PERVASIVE ELECTRONIC HEALTH RECORD

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This report is submitted in partial fulfillment of the requirement for the Bachelor of
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2011

DECLARATION

I hereby declare that this project report entitled
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Is written by me and is own effort and that no part has been plagiarized without citations.

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DEDICATION

This thesis is dedicated to my beloved parents who have supported and care of me all the way since the beginning of my studies.

Also, the thesis dedicated to my friends, I feel thankful of your encourage and guidance during the period of my study in UTeM.

Finally, the thesis dedicated to all of my lecturers, I appreciate the inspirational guidance and advice that given by you all to make me become a better student all the time in UTeM.

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ABSTRACT

Pervasive Electronic Health Record (EHR) is implemented in a stand-alone application. The purpose of this project is to improve the medical record keeping process in healthcare medical center or clinic. There are seven chapters in this report. Chapter one describes the background and the purpose of Pervasive Electronic Health Record project. Chapter two illustrates the literature review and project methodology. Domain of this project is focus on the electronic health care. The software development life cycle that applied in this project is Incremental model. The user requirements of this project are identified in the Chapter three. The results of detail design for this project is defined in Chapter four. The system configuration and system testing for this project is described in the following chapters. As conclusion for this report, the preposition improvement of this project is discussed in the last chapter. In the future, further improvement for this project is to develop the electronic health record in the mobile phone. It is to improve the quality of delivery care for the patients in medical health care center.

ABSTRAK

Pervasive Electronic Health Record (EHR) dilaksanakan dalam aplikasi yang “*standalone*”. Tujuan projek ini adalah untuk memperbaiki proses penyimpanan rekod kesihatan pesakit di hospital dan klinik. Laporan ini terdiri daripada tujuh bab. Bab pertama menerangkan latar belakang dan objektif projek Pervasive Electronic Health Record. Bab kedua menyentuhkan topic tentang kesusasteraan kajian projek dan methodologi projek. Domain projek tersebut adalah bertumpu dalam electronic penjagaan kesihatan. Kitar hayat pembangunan perisian yang digunakan dalam projek ini adalah model “*Incremental*”. Bab ketiga adalah untuk mengenalpastikan keperluan pengguna projek ini. Bagi keputusan reka bentuk yang lebih terperinci dalam projek ini adalah ditakrifkan dalam Bab keempat. Ujian sistem konfigurasi dan sistem pengujian bagi projek ini adalah dihuraikan dalam bab-bab berikutnya. Sebagai kesimpulan untuk laporan ini, peningkatan aras projek ini akan dibincangkan dalam bab terakhir. Pada masa depan, penambahbaikan bagi projek ini adalah untuk membangunkan rekod kesihatan elektronik di dalam telefon bimbit. Ia adalah untuk meningkatkan kualiti penyampaian penjagaan bagi pesakit yang di hospital.

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CHAPTER I

INTRODUCTION

1.1 Project Background

Pervasive Electronic Health Record (EHR) provides a secure and private health history record for each individual within a health system. The record is available electronically to authorize health care providers and the individual anywhere, anytime in order to provide a high quality care. Pervasive Electronic Health Record system is implemented in the stand-alone application. It can monitor the system disaster event and dispatch the signal to the application for further action. The network connectivity status can be displayed in the application to notify the users that the application is not connected to internet. Besides that, pervasive EHR system plays a Rescue Manager role. It means that to transmit the offline transaction to the back-end system and batch-online update. Pervasive EHR system can temporary save the offline transaction (clinical patient record) in the local database until the application is connected to the internet. Moreover, the patient's health history record and general medical record can be stored in alternative portable storage device such as thumb drive. Furthermore, Pervasive EHR system can

manage the patient's electronic health record. Thus, the physicians or doctors can open the file and view the patient's medical record in the application.

1.2 Problem Statement

Computers have been utilized for many years within the healthcare field. Most of the department in medical center has been also integrated computer technology to improve their daily operation. Since there is a growing culture of consumer empowerment and widespread computer literacy, generating an electronic health record is a need for patients and physicians. It is to enable them to easy access to the medical data. Currently, there is few patients deal with only one healthcare provider. This is particularly true for those who have complex health problems or for those who move frequently for working purpose. Thus, they have to bring along with their personal medical history report themselves. It may bring inconvenience to the patients and physicians. Besides that, most of the patients could not be able to remember their medical history or medication details. From old days until now, most of the individuals' medical health history is record on the paper. Keeping medical information record on paper is insecure because they can be destroyed easily in the natural disaster such as flooding or in fire. In addition, using paper is not environment friendly and space consuming. On the other hand, keeping patient's medical information on paper not only brings a lot of inconvenience for patient but also physicians and clinicians. Based on these problems, this project is proposed to enhance the current medical health care center and to improve the quality of delivery care for the patients.

1.3 Objectives

- To make sure the doctors can diagnoses correctly because they can immediately refer to the past record and medical report of the patient.
- To improve the quality and safety of patient care by reduce duplication of diagnostic testing, imaging and history taking and recording errors occurred.
- To provide high security on the patient's medical history report or personal medication report. It is because personal medical data is a confidential and privacy document for each individual.
- To bring benefit for the healthcare medical center to have more efficient in collection of demographic data. It can improve the clinical department in manage the patient's details and medical history record.

1.4 Scope

This project is aimed to enhance and improve the quality of delivery care for the patients. The focus of this project is primarily on the doctors, physicians and administrative user at healthcare medical center, hospital or clinic. Pervasive EHR system only provides view medical health record from portable storage device such as thumb drive. The medical health record can only be stored into thumb drive. Other aspect like printing health record will not be covered in this system.

1.5 Project Significance

Electronic Health Record offers a number of potential benefits to patients, physicians and the health care system. EHR improves quality of care to patients by continuous and comprehensive care with better coordination between patients and physicians. The physicians can have a quick follow up with the particular patient by referring to the EHR. Besides that, it is more efficient in delivery of care to patients. It can avoid duplicated testing and unnecessary services occurred. It provides more efficient communication between patients and physicians. In addition, storing the medical information into storage devices or electronic devices is more secure and safe than paper records. It can avoid risk like natural disaster and etc. Moreover, the physicians can often update the patient's health information in advance. Thus, it can keep track on the patient's latest health condition.

1.6 Expected Output

The expected output for this Pervasive EHR project is to develop an enhanced system. The development of this system will fulfill the system requirement to improve the quality of delivery care for the patients in the medical health care center. Besides that, document that consists of description and details of introduction, literature review, analysis, design, implementation, testing and conclusion about the system will be generated.

1.7 Conclusion

In conclusion, this project is to improve the quality of delivery care for the patients in medical health care center and enhance the procedure of the medical health care center. This chapter describes the project background, problem statement, objectives, scope, project significant, and expected output of the system. The next chapter covers the literature review and project methodology that will be applied in this project.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

The aim of this chapter is to illustrate the literature review, project methodology and project requirement for this project. This chapter consists of three sections which are literature review, project methodology and project requirement. The first section of this chapter is literature review. Literature review is an account of what has been published and conducted in a particular field of study by researchers. It is a summary to evaluate the previous journal research on the topic with related to this project. The purpose of literature review is to convey the knowledge and ideas that have been established on the topic which is related to this project. The literature search that used in this chapter is found from all relevant materials such as journals, books and electronic database. The second section of this chapter is project methodology. Project methodology gives an idea about how the project is carried out from the start until the end of the development of project. The purpose of the details explanation project methodology that applied in this

project is to make this project complete and working well. In order to evaluate this project, the methodology is based on System Development Life Cycle (SDLC). The methodology for this project is selected based on the analysis and comparison of the variety of methodologies which meets the requirement of this project. The last section of this project is to describe about the project requirement. The software and hardware that required in this project will be explained in detail. The required software, hardware and other requirement will be used and developed into this project.

2.2 Fact and findings

This section is for discovery and determination of facts or accurate information which is related to this project. The paper research is used to discover the similar concept which is also used for developing the Pervasive Electronic Health Record. It is to prove that the information that being used to develop for this project is accurate and precise.

2.2.1 Domain

Pervasive EHR is related to the healthcare domain. This project is more focus on the electronic healthcare (eHealthcare). eHealthcare is a comprehensive concept to position the use of ICT in a healthcare system. The goal of eHealthcare is not just for electronically implement existing healthcare processes. However, eHealthcare provides significant opportunities for healthcare providers to deliver technologically effective healthcare services to their consumers and provide consumers with ways to access the information of the consumers need.

“Electronic Health Record (EHR) system is the latest evolution of healthcare Information and Communication Technologies (ICT) and countries such as Australia, United Kingdom and USA are working on plans for national EHR systems.” (T.Gunter,

2005) This EHR system can be treated as a database application which stores and manages the data of patient health records. Designing electronic medical devices require an in-depth knowledge of the healthcare market, end user requirements, safety and regulatory compliance.

2.2.2 Existing System

Recently, most of the medical healthcare facilities are using the traditional paper-based medical health record to store the patient's medical record. The existing systems which are slightly similar with this related project are used as a reference to improve the management of patient health care record. There are three related to electronic health record case studies are discussed in the following.

The Design of Flexible Front End Framework (FFeF) for Accessing Patient Records through Short Message Service

The design of this project is to store the patient's health records continuously and enhance the paper-based patient's health record. The framework uses the portable devices to access the patient's health records and store the summary of patient's health records via the Global System for Mobile (GSM) and Short Message Service (SMS).

The Flexible Front End Framework (FFeF) component is installed on the doctor's computer at health centers. The GSM mobile phones are attached to all computers to enable sending and receiving the health records data between the doctor's computer which is at the health centre and the central back end system. The SMS application plays transmission data role in this framework. The SMS server located at the back-end system is a gateway to send and receive SMS messages from a doctor's computer to the health record management system.

The health records data is also store on the local data storage in a journal file for auditing purposes and backup. When the system is restored or recovered back from off-

line transaction, any pending transactions from the journal file transmits to the central back-end system through the landline telecommunication network or SMS. (M.K. Abd Ghani, 2007)

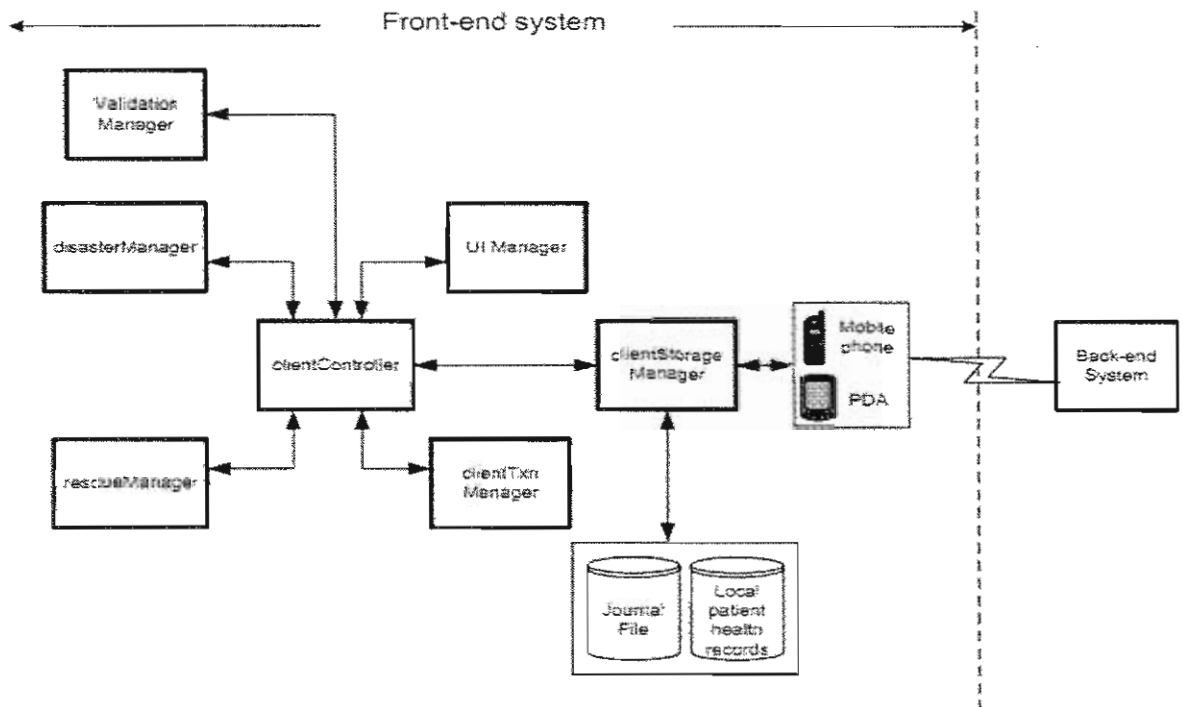


Figure 1: The FFeF component diagram (M.K. Abd Ghani, 2007)