SUPERVISOR'S APPROVAL

CONTEXT-AWARE DIABETIC PATIENT REMOTE MONITORING USING WEARABLE AND MOBILE APP

By

MOHD IZZAT BIN ISMAIL HASHIM

2016329239

This project was prepared under the supervision of Assoc. Prof. Dr. Syed Ahmad bin Sheikh Aljunid. It was submitted to the Faculty of Computer Science and Mathematics and was accepted in partial fulfillment of the requirements for the degree of Bachelor of Computer Science (Hons.).

Approved by:

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Assoc. Prof. Dr. Syed Ahmad bin Sheikh Aljunid

Project Supervisor

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ABSTRACT

The rise of busy lifestyle has made it difficult for caregivers to effectively remote monitor diabetic patients when they are away from them. With recent advancement of smartphone and wearable technology, it would improve the adoption of mobile healthcare. Previous studies have shown that context-aware techniques have been widely used in healthcare application. This paper introduces a context-aware android mobile application, titled LoveHealth, with smartwatch integration that would be use by diabetic patients and caregivers. The goal of this mobile application is to provide a tool for caregivers to remote monitor diabetic patients, even when they are not nearby. Context-aware algorithm is applied in this application, where a criticality reading threshold is defined, classifying the readings criticality levels. By applying this algorithm, LoveHealth is able to detect critical glucose reading, which are inputted by the patients manually, or heartrate readings captured from the patients' smartwatch, and notifies their respective caregivers, informing them that they require medical attention. Once the app has been developed, testing is done to ensure each functionality works as expected. Also, the app undergoes one-week evaluation period by real diabetic patients to get their feedback and recommendations regarding the app.

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CHAPTER 1

INTRODUCTION

This chapter provides the background and rationale for the study. It also gives details of context-awareness and the growing wearable technology, the issues and problems, and its application in its respecting field that led to this research.

1.1 Background of Study

Rapid evolution of personal mobile devices such as smartphones, tablets, smart watches and other types of wearable allows an avenue for new researches and projects on various domains. One of the domains is patient monitoring. Designs and developments of wearable for health monitoring has received lots of attention in the scientific community and the industry (Pantelopoulos & Bourbakis, 2010).

As the technology is advancing in health care applications, changes in method of remote monitoring patient is needed in order to fully utilize the abundant of techniques in modern technology (S., Nagaratna, Pushpa, & Venkataram, 2016). Such technique that are aware of the context of its surrounding are called context-aware systems (CAS). This system gathers contextual information from its surrounding, whether it is from its users or by using sensors. Nagaratna et al. (2016) also state that time are also important factor for timely and efficient retrieval of existing and appropriate data regarding the patient.

Thanks to modern technology, context-awareness is now easier to be implemented, as there are many devices that are capable in capturing contextual information. Such example is wearable. Smartwatch is one of the category of wearable. This device is lightweight, convenient, and cheap, while also have the capability of gathering data from the wearer through sensors (Nascimento, Oliveira, & Tam, 2018).