

RFID-based Body Sensors for e-Health Systems and Communications

Vijey Thayanathan
Computer Science Department,
Faculty of Computing and Information Technology
King Abdul Aziz University, Jeddah 21589,
Saudi Arabia
thayanathan@live.co.uk

Ahmed Alzahrani
Computer Science Department,
Faculty of Computing and Information Technology
King Abdul Aziz University, Jeddah 21589,
Saudi Arabia
Ahmed_azahrani@hotmail.com

Abstract— Body sensors for e-health applications are involved in patients’ health monitoring and risk prediction systems. They can be used with RFID tags in some e-health applications which may be either internal or external. Body sensors are implantable and easy to fit around the particular organ in the human body. Long term diseases such as cancer, diabetic etc. need permanent body sensor. In this paper, RFID based body sensors are considered for e-health system and communications. This paper proposes a theoretical model of e-health system for people with diabetic and other long term diseases. In the theoretical model of risk prediction system, biosensor (glucose sensor) is considered as a body sensor. Quick care and resolution may be considered with latest technologies such as wireless networks, sensors and 2G-RFID system. Through this model, patients will be able to manage their life as normal because it is simple to use.

Keywords—Body sensors; e-health system; RFID; risk prediction.

I. INTRODUCTION

In e-health systems and communications, RFID-based body sensors can be used in many e-health applications not only for risk prediction. This device based on risk prediction system can be used easily with low-cost, and handy because this new system can be integrated within mobile phones. It means that the additional feature will be added to the mobile phone. Body sensors observe all behavior of the body conditions whenever we need. If any abnormal condition is diagnosed, body sensor reports to patient through the mobile phone. If patient’s condition gets serious or risk factor is higher than normal conditions, message will be reported to risk monitoring staff who works close to area. Here, patient’s location at the time may be different from his normal registered residence, but patient’s current location can be identified using latest communication technology.

The body sensor, e-health system and communications, are mainly depending on the e-health applications, which show quick risk predictions. This system is not only for patients but also it fits to others who really want to monitor their body conditions and fitness daily. In addition to these benefits, it could be used anywhere and during the travelling

or on the move. Some risks are age dependent, but this paper focuses on common risks predictions for all ages. In the human body, palms and feet have sensible area where prediction system can be used to monitor some risks through the e-health systems and communication.

The proposed theoretical model of e-health system can be applied to people with diabetic and other long term diseases. In this model, communication aspect of risk prediction system is designed with RFID-based body sensor. Through this model, patients’ quick care and possible resolutions during the emergency situations can be delivered quickly and accurately. This model is targeted to patients with incurable long term disease such as diabetic and cancer because the risk factor of damaging other organs in the body is very high.

Wireless body sensor network (WBSN) is widely used in patient’s monitoring, and risk prediction of e-health system [4]. When patients use WBSN nodes around the body randomly, constraint communication channel (CCC) is considered with transmission latency. In order to provide efficient e-health system, the improvement of CCC depended on resources and delays are necessary in terms of quality and quantity. Wearable sensors are introduced that RFID tags embedded with sensor are allocated to each position where risk is predictable.

Active RFID tags integrated with sensors use battery during the communication. Passive RFID tags integrated with sensor don’t use battery because they receive necessary operating power from the RFID reader. In most of the e-health systems, passive RFID tags with sensors are used to implement the wireless environment around the patient. Further, advantages of passive RFID tags such as lower cost, smaller size, longer life time etc. are useful.

The remainder of this paper is organized as follows. Section II explains the RFID-based e-health systems and overall tasks of body sensors. Section III introduces the theoretical model for monitoring and risk prediction system with ADCA techniques. In Section IV, wireless networks for e-health systems are given with general discussions and recommendations. Overall conclusions will be in Section V.