Cost Effective Design of an RFID Based Healthcare Service System

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ABSTRACT

Healthcare industry confronts many challenges in a pursuit to give safe, cost-effective and highly-valued healthcare services; Radio Frequency Identification (RFID) is considered as one of the rising mechanism which helps in addressing the challenges, currently faced by Mobile Healthcare Service System (MHS). This article focuses on the contribution of cost-effective RFID deployments in healthcare sector that broadly categorize tracking of items, patients and items associated to patient; providing solutions for improving the auditability and accountability, reducing human errors, eliminating the risks of misidentification, identifying treatment errors and keeping the inventory updated. It explores certain parameters that can play an important role for the cost effective deployment of an RFID system such as security and privacy concerns, social and ethical aspects. Moreover, the article analyses the main challenges faced and investigates how security threats and vulnerabilities are a red flag to RFID technology. Furthermore, different solutions are highlighted that can streamline the operation and can optimize the workflow services in healthcare system. RFID represents next-generation enhancement over bar-code technology. Based on performance evaluation and comparison, differences between the two technologies are identified. This article also provides an overview that how RFID is a key enabler to build-up the healthcare service system and an efficacious affirm in optimizing and transforming healthcare practices.

Keywords: Healthcare Industry, MHS System, Radio Frequency Identification (RFID), RTLS

INTRODUCTION

Mobile Healthcare Service System (MHS) is an emerging industry that encompasses the use of wireless telecommunication to provide practice of medicine and public health. It has emerged the use of information and communication technology for services that aims at strengthening the security of patients, better use of medication, upgrading pharmaceutical inventory and identification of patient system.

Radio frequency identification (RFID) is a small electronic device that transmits and receives several types of data using electromagnetic radiations. It is an evolutionary technology which is based on storing and in relative manner retrieving information passively through wireless radio
communication (Ahsan, Shah, & Kingston, 2010). RFID consists of Transponder for sending data particularly Tags, Interrogator/Reader for the interpretation of data and middleware interface for forwarding data. The RFID schematic system is represented in figure 1. The device serves the same purpose as a magnetic strip on the back of an ATM card or credit; provides a distinctive identifier for an object. In order to extract the identifying information of the object, RFID device must be scanned same as a magnetic strip (“RFID Solutions | Selectamark Security Systems plc,” n.d.).

The RFID-based system components specifications are illustrated in Table 1.

Towards Smart Mobile Healthcare Service System

In the recent year, it has been prevailed that the RFID devices can be used as an “expendable” control or inventory device, even though RFID technology has been available for more than thirty years (“What is RFID?,” n.d.). There is a remarkable growth of analyzers and practitioners focusing on implementing RFID in healthcare service system endorsed by the use of RFID in different fields. The implementation of RFID in healthcare sector provides new capabilities as well as efficient methods for several applications such as health care, access control, manage, store, information inventory analysis, business processes, and security controls through access to information. It has offer immense potential for change healthcare management tasks by monitoring inventory and providing secure, accurate data automatically. Moreover, RFID’s distinctive attributes immensely gives each asset globally distinctive digital identity; as it interprets from a large interspace without either using a battery or visible sightline capability required and provides new platform of incorporating the real world into management information system.

Figure 2 represents an overview of Mobile Healthcare Service System (MHS) using RFID.

The primary contribution of RFID in healthcare sector was carried out in a tertiary hospital (Ngai, Poon, Suk, & Ng, 2009). An imminent evaluation was conducted to verify the precision of assets utilization, increase apt charge capture and to minimize the time spent tracing assets by using infrared/RFID tracking system. Infusion pumps, sequential compression and beds were the three types of assets used for assessment. The asset tracking system uses electronic tags attached to the mobile pieces of asset. The electronic tags utilize emitted radio frequency and infrared signals. These signals uniquely identify the serial number and the type of distinctive pieces of assets. The received signals via antennas in corridor and patients rooms are transmitted to a networked computer. The computer can then trace and locate asset, display graphically asset location on a screen, manage a data log of asset movements, and generate tagged equipment instant

Figure 1. Schematic of an RFID system
Organizational Factors Influencing the Use of Clinical Decision Support for Improving Cancer Screening Within Community Health Centers
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