

Chapter 59

User and Data Classification for a Secure and Practical Approach for Patient–Doctor Profiling Using an RFID Framework in Hospital

Masoud Mohammadian

University of Canberra, Australia

Ric Jentzsch

University of Canberra, Australia

ABSTRACT

Utilization and application of the latest technologies can save lives and improve patient treatments and well-being. For this it is important to have accurate, near real-time data acquisition and evaluation. The delivery of patient's medical data needs to be as fast and as secure as possible. Accurate almost real-time data acquisition and analysis of patient data and the ability to update such a data is a way to reduce cost and improve patient care. One possible solution to achieve this task is to use a wireless framework based on Radio Frequency Identification (RFID). This framework can integrate wireless networks for fast data acquisition and transmission, while maintaining the privacy issue. This chapter discusses the development of an intelligent multi-agent system in a framework in which RFID can be used for patient data collection. This chapter presents a framework for the knowledge acquisition of patient and doctor profiling in a hospital. The acquisition of profile data is assisted by a profiling agent that is responsible for processing the raw data obtained through RFID and database of doctors and patients. A new method for data classification and access authorization is developed, which will assist in preserving privacy and security of data.

DOI: 10.4018/978-1-4666-6339-8.ch059

1. INTRODUCTION

Application of innovative architectures for secure access, retrieval, and update of data in healthcare systems continues to be needed for cost reduction and quality of service. To this end the use of Radio Frequency Identification (RFID) has been shown to be a viable and promising technology in the health care industry (Finkenzeller, 1999; Glover & Bhatt, 2006; Hedgepeth, 2007; Mohammadian & Jentzsch, 2008; Schuster, Allen, & Brock, 2007; Shepard, 2005; Angeles, 2007; Pramaturi, Doukidis, & Kourouthanassis, 2005; Qiu & Sangwan, 2005; Mickey, 2004; Whiting, 2004). RFIDs has the capability to penetrate and add value to many areas of health care. RFIDs can lower the cost of some services as well as improve services to individuals and health care providers. The real value of RFID is achieved in conjunction with the use of intelligent software systems such as intelligent multi-agent systems. The integration of these two technologies can benefit and assist health care services.

Radio Frequency Identifiers (RFID) have been around for many years. Their use and projected use has only begun to be researched in hospitals (Fuhrer & Guinard, 2007). This research study considers the use of RFIDs and its potential in hospitals and similar environments. RFIDs can be more effectively used to collect data at the source thereby providing the data for monitoring patients well being in order to provide a higher level of patient health care. There are four areas where using RFIDs in their data collection role can have significant positive benefits in hospitals. These four areas are:

- **Care Tracking:** This is getting the right care to the right patient at the right time;
- **Quality of Care:** Improving the services given to the right patient at the right time in a timely manner;
- **Cost of Care:** Finding ways to be effective in the use of available resources such

that the cost per patient per incident does not adversely increase to the cost of the resources; and

- **Service of Care:** More timely information to enable a more informed decision by providing more knowledge about an individual's need for care (Mohammadian & Jentzsch, 2007, 2008).

RFID tags and readers are commonly associated with inventory and tracking goods in such places as manufacturing and warehousing, but hospitals are starting to apply RFID to new purposes (Kowalke, 2006). RFID technology does not require contact or line of sight for communication, like bar codes. RFID data can be read through the human body, through clothing, read wirelessly, and through non-metallic materials and are wireless. This makes RFIDs an appropriate technology to fit into the health care environment.

Both research and practical application of the use of RFIDs in hospitals continues to be of importance. For hospitals, this has meant the potential of managing inventories in a more efficient manner. Inventories in hospitals take on a variety of differences roles than those found in manufacturing. The nature of the inventory and assets in a hospital can include various types of equipment (that is often very expensive, comes in many sizes, and uses), drugs (that come in a variety of sizes, shapes, color, and governing regulations), beds, chairs, as well as patients (the primary reason hospitals exist) and staff.

People tracking can be looked at from three perspectives:

1. **On-Going Full Time:** This is often referred to as human chipping. People are tagged such that the tagging is an integral part of the person 24/7. This type of human tracking (chipping) is not considered herein.
2. **Part Time:** People acquire some type of tag as part of their work and/or task environment.

20 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/user-and-data-classification-for-a-secure-and-practical-approach-for-patient-doctor-profiling-using-an-rfid-framework-in-hospital/116267

Related Content

Big Data in Healthcare

Yiannis Koumpourou (2015). *Healthcare Administration: Concepts, Methodologies, Tools, and Applications* (pp. 23-46).

www.irma-international.org/chapter/big-data-in-healthcare/116206

Impact of External and Internal Circumstances in Managing Medical Services

Antoaneta Petrova Stoyanova and Velichka Peeva Marinova (2023). *Handbook of Research on Quality and Competitiveness in the Healthcare Services Sector* (pp. 1-21).

www.irma-international.org/chapter/impact-of-external-and-internal-circumstances-in-managing-medical-services/320839

Modelling Patients' Contribution to Healthcare: A Dynamic Performance Management Application

(2020). *Managing Patients' Organizations to Improve Healthcare: Emerging Research and Opportunities* (pp. 116-153).

www.irma-international.org/chapter/modelling-patients-contribution-to-healthcare/246997

Reflection and Construction on the Operation Mode of Medical Data Management Platforms in the Context of the COVID-19 Pandemic

Farzad Sabetzadeh and Dingyue Zhang (2023). *Revolutionizing Digital Healthcare Through Blockchain Technology Applications* (pp. 97-121).

www.irma-international.org/chapter/reflection-and-construction-on-the-operation-mode-of-medical-data-management-platforms-in-the-context-of-the-covid-19-pandemic/320968

Workarounds: Risk or Benevolence for Patient Safety?

Nada Nadhrah and Vaughan Michell (2015). *Healthcare Administration: Concepts, Methodologies, Tools, and Applications* (pp. 285-322).

www.irma-international.org/chapter/workarounds/116221