Framework for Information Sharing with Privacy and Priority Control in Long-Term Care in Japan

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ABSTRACT

In this paper, the authors present a framework for information sharing with privacy and priority control in long-term care designed to promote appropriate information sharing among the people who are involved in long-term care for provision of better care service. The authors’ framework includes four agents (user agent, local information system access agent, authentication/access control agent and priority control agent) and two databases (user database and care record index database). The LIS (local information system) access agent creates and updates the care record index database, which act as an index when user agents try to access to care recipient’s record, based on the Open Authentication protocol. It also acts as a query interface from each user agent. The authentication/access control agent allows sensitive information to be shared in accordance with the policy defined by care recipient. The priority control agent judges the urgency of the information for either periodic or immediate notification. The authors also propose an implementation of this framework using the Resource Description Framework Site Summary, and demonstrate how our framework works with the scenario of care recipient’s unexpected injury. In summary, this framework is designed to help people who require long-term care and provides an effective system for each staff that is in charge of administering long-term care services. The authors’ information sharing system incorporates a multi-agent architecture to facilitate information sharing and privacy/priority control. The authors believe that this research provides an important first step for researchers who intend to build a prototype to automate the processes of information sharing for long-term health care.

Keywords: e-Health, Information Sharing, Long-Term Care, Multi-Agent System, Research

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INTRODUCTION

The objective of this study is to propose an effective information-sharing scheme for long-term care. Long-term care is an intervention to people whose condition is rather stable, but need various kinds of care and support for daily living at home. This is in contrast to acute care, which is mainly performed at medical institutions for medical treatment that is aimed at restoration. Integrated treatment of long-term care requires cooperation among multiple healthcare professionals. Information exchange is important to practice the treatment, but it is not only for healthcare professionals. Information sharing between care recipient and healthcare professionals is also fundamental to achieve care recipient’s participation in decision making (Bugge et al., 2006). In addition to this information sharing, we have to consider the protection of sensitive information from casual information sharing. We propose an information sharing framework for long-term care that consists 1) information sharing among multiple healthcare professionals, care recipients and his/her family and 2) information flow control depending on the urgency of the subject with 3) care recipient-centered access control of information about the care recipient.

There is a large body of literature discussing the pros and cons of digitalizing medical record for medical institutions. The need for digitalization pushes the improvement in services due to effective information sharing, while there is concern of the privacy risks of an ill thought-out digitalization scheme or security issues. Some literature points out that over-restricted access to personal health information with privacy consideration increases the risks to quality of care and health status (Detmer, 2000; Hoven, 2000; Willson, 2000; Etzioni, 1993). Moreover, with regards to long-term care, though it is a much more complex situation that multiple organizations collaborate to provide care, it is considered as another big challenge to develop safe and effective information sharing scheme with privacy protection. In this paper, we present an agent-based information sharing framework. This framework implements privacy control to help care community members’ transparent access to shared information and priority control for timely notice of the update of the information source.

The number of people who require such kind of long-term care support is increasing along with the aging of population in Japan. The Japanese Government started the Long Term Care Insurance System in 2000, which provides the framework of integration among services from multiple healthcare professionals (Tamiya et al., 2011). There are more than 29.75 million people (23.3% of the population) who are over 65 years old in Japan in 2011. 5.7 million (17.1%) of them are currently certified as requiring long-term care with the number increasing every day (Cabinet Office, Government of Japan 2012). In Japan, healthcare services are classified into two categories: services covered by public medical insurance and those covered by public long-term care insurance. Every citizen is mandated to participate in the public medical insurance scheme, which provides most medical services at a 30% of copayment ratio. The public long-term care insurance covers people from 65 years old as well as people 40 to 64 years old who have specified diseases associated with aging such as terminal cancer and rheumatoid arthritis etc. Insurers are local governments of municipalities and special wards in the metropolitan area. The central government, prefectures, health care insurers and pension insurers shall provide continuous support and assistance to them.

When starting long-term care service use, the certification committee of long-term care, an affiliated organization of each municipality will investigate the mental and physical condition of the insured person with the opinions of a primary care doctor and make a judgment of levels of long-term care need based on nationally uniform criteria for long-term care (seven levels including the levels of support need). After the level of long-term care need is set, a care manager who belongs to care provider or community general support center develop a long-term care service plan (care plan). The
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