Encrypted NFC-Emergency Tags for German Telemedicine

Author

Sebastian Dünnebeil   – Research Assistant at the Technische Universität München
                        Chair for Information Systems
                        Boltzmannstrasse 3
                        85748 Garching
                        Germany
                        Email: sebastian.duennebeil@in.tum.de

Co-Authors

Felix Köbler   – Research Assistant at Technische Universität München
Philip Koene   – Research Assistant at Technische Universität München
Jan-Marco Leimeister – Full Professor at the University of Kassel
Helmut Krcmar   – Full Professor at Technische Universität München

Abstract

Patient data, particularly emergency data, must be available to doctors within a short time frame and independent of potential interruption of network connections. At the same time medical data is confidential information must not openly be available to anyone with physical access to the storage media. The German Electronic Health Card (EHC), planned to be introduced as a smart card, is supposed to hold emergency data. However, the smartcard is not always available to caregivers in case of patient with, e.g. loss of consciousness. The card can further not be duplicated, customized and rapidly read without physical contact, which is often necessary within a clinical pathway or during an emergency.

The proposed work utilizes Near Field Communication (NFC) technology and shows how smart cards can interact with NFC tags to hold encrypted medical information. Caregivers have the opportunity to store encrypted information on a tag for a particular group of addressees for emergency cases or patient logistics in a hospital. The tags can be placed on highly visible sights in hospital spatiality, e.g. hospital beds. The process of reading the tag is integrated in a particular treatment process. The necessity for ubiquitous network access and exact positioning can be avoided, which shows beneficial for care facilities without modern communication infrastructures. Hence HFC tags can be regarded as an information and identification tool, employed as an alternative to distributed information systems for collaboration of caregivers.

A technical presentation of the research work shows the storage and encryption process of emergency data on a NFC tag. Later the addressee reads the decrypted data from the tag with a mobile tablet device. The presentation is embedded into a care process to illustrate the benefits of the NFC application within medical treatment.

Conference Stream

Adoption of Technology Outside of Mobile Phone Applications

About the Author

Sebastian Duennebeil holds a Bachelor's Degree in Computer Science and Master's Degree in Information Systems. He worked in the Embedded Systems Industry, located in Thailand, Taiwan, The Netherlands and Germany, between 2004 and 2008. Since January 2009 he is a research assistant and Ph.D. student at the Chair for Information Systems at Technische Universität München. His research focuses on the introduction of the German Electronic Health Card (EHC) in Germany, the biggest telemedicine project in the world. The projects attempts to connect more than 200,000 caregivers and 80 million patients in German healthcare over a common secure network infrastructure in order to improve efficiency and quality of care. The smart card infrastructure enables patients and caregivers to communicate encrypted and signed medical data within a patient centered authorization environment. The infrastructure aims to enable various value added medical applications to diffuse scientific innovations within the public health system.