ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 2, February 2017

Survey on NFC in Healthcare Sector

Gunjan V. Ukalkar

M. E Student, Dept. of Computer Engg, MITCOE, Kothrud, Savitribai Phule Pune University, Maharashtra, India

ABSTRACT: Near field communication is a short range wireless communication technology. It is an extension of several RFID proximity communication standards. As Usage of Mobile devices is vastly increasing due to its advance technology and features. Therefore, it will play huge role in Healthcare sector. Rising countries like India, where there is mass population to handle in hospitals. Healthy healthcare processes are necessary. A well-organized, reliable and secure health flow is important to manage patients and their health records. This will maintain quality in healthcare sector.

KEYWORDS: NFC, Operating modes, Communication modes, Healthcare.

I. INTRODUCTION

NFC stands for "Near Field Communication". It enables short range wireless communication between compatible devices. It establishes Radio communication i.e. RFID (Radio frequency identification) technology uses magnetic field induction which allow to exchange data between reader and target with recognizable distance of 10 cm. It operates in the 13.56MHz frequency band at a speed of 106 kbps to 424 kbps.NFC is a bidirectional, proximity coupling technology based on the smart card standard ISO14443 it includes both Type A (normal) and Type B (banking/short range),and Felica.

A. *THERE ARE TWO TYPES OF COMMUNICATION MODE I.E. ACTIVE MODE AND PASSIVE MODE*

These communication modes are categorized by self-radio frequency area. Devices that can create its radio frequency are called as active devices. A device that uses other devices radio frequency is called as passive devices.

When working in active mode, the initiator and target both generate their own energy to generate their own RF field to transmit the data so it isn't necessary for the initiator to send power to the target to allow the target to perform useful tasks. It always be the same for both initiator to target and target to initiator. A device deactivates its RF field while it is waiting for data. In active mode, the two devices use an Amplitude Shift Keying (ASK) pattern to avoid crashes, only the transferring devices produces an electromagnetic field. Advantages Compare to passive mode is a bigger working distance and upper broadcast speeds.

In the passive communication mode, Target device has no power supply of their own RF signal. They are powered by the field generated by the initiator .The initiator is responsible to generate its RF field. Advantage of passive communication mode in NFC, act as a single mode of communication similar to RFID tag and NFC is better replacement for RFID tag to reduce the cost of the system.

B. *OPERATING MODES :*

NFC devices are unique and can perform any operating mode establishes the specific kind of task at a given time. There are three operating modes in which NFC enabled equipment can work they are reader/writer mode, peer-to-peer mode, and card emulation mode.

- Reader/Writer mode: The NFC device behaves as a reader for NFC tags, such as the contactless smart cards and RFID tags. It detects a tag in close proximity by using the collision avoidance mechanism. An application on an NFC device can read data from and write data to the detected tag using the read/write mode operation. The reader/writer mode is about the communication of an NFC enabled mobile phone with an NFC tag for the

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 2, February 2017

purpose of either reading or writing data from or to those tags. It internally defines two different modes reader and writer mode. The NFC must also detect tag type ISO 14443 and FeliCa and interact it properly.

- Peer to Peer mode: Peer-to-peer mode acts as Bluetooth. It enables two NFC enabled mobile devices to exchange information such as a contact record, a text message or any other kind of data. Peer to peer mode is standardized the ISO/IEC 18092 standard.
- Card Emulation mode: Card Emulation mode function as contactless smart card. It itself acts as an NFC tag. Mobile devices can even store multiple contactless smart card applications in smart card. The leading examples of emulated contactless smart cards are credit card, debit card, transport cards, identity or access cards. It removes need of carrying cards.

II. RELATED WORK

In [1] system design is inspired by the necessity of ongoing project in Karachi, Pakistan. One such disease they are targeting for close observation that is pneumonia in young children. Due to vast number of increasing patients .It is becoming inconvenient to provide facilities in low resource area. Hence, by using NFC enable phones it provides facilities such as tracking care of patients in low resource area and to overcome challenges, patient identification disease and permit improvement in data quality and emergency response. The proposed system will improve information flow in previously information-poor environments, reduce medical spending, avoiding human error and increase medical team response times.

In [2] presents NFC in healthcare areas, use cases, potential benefits and barriers. It focuses on healthcare and security application that are patients identification and medication control. It improves healthcare quality, Existence of standards and interoperability with far-reading technologies.

In [3] presented a NFC based technology to perform several nursing tasks such as to help nursing students to perform patient care tasks and simple interactions including medical administrations clinical tests and supervision among them. The interaction between NFC mobile devices and NFC tags are distributed by environment. Nurses can get in natural way. It has provided a mechanism to perform more complex tasks and need to transfer patient history data to a computer. It provides awareness in healthcare and also provides needed services according to health workers.

In [4] Patient Health Record management is important both for patients as well as hospital management. There is no centralized management of health records in the developing countries like India. The patients' records which are retained in the paper format are cumbersome and unreliable. Work is still being in progress for secure maintenance, patient records as a Health card on a Smartcard in developing countries like India and other nations. Most of the hospitals issue a Health card, which only tries to stores just the primary information of the patient and major part of the records are stored on a centralized medical storage server.

In [5] propose the use of mobile phones with NFC technology to exchange patient data between doctors and nurses. In [6] paper it describe how tag stand writer is used to write patient unique id in NFC tag and Doctors using NFC enabled smart phone to retrieve patient information when placed near NFC tag. Mobile devices use cloud server to store and retrieve patient information. GCM is used to give notification to patients about their medicines. WEB MD is used to check patient disease by their own.

In [7] proposed NFC based secure mobile healthcare system. Introduced two applications in system that is i) Secure medical tags for reducing medical errors and ii) Secure health card for storing Electronic health record based on secure NFC tags, mobile device using P2P Mode and Card Emulation mode.It improves healthcare process for secure medical object identification and patient health card on an external tag or mobile device itself. But the system faces security issues while accessing health card. In our work we have designed health secure service on a hybrid cloud and also solved problem of security issues.

In [8] Ergonomics design of healthcare NFC based System based on QoE metrics. It improves access to patients medical history and improved medical checkups by automatically updating information access to entire patients medical records. It added knowledge to our record.

In [9] it presents the design of an intelligent system which will allow for the identification and monitoring of patients in health centers it keeps track of patients which increase security and minimize medical errors which improves the quality in healthcare.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 2, February 2017

In [10] authors adapted NFC technology to a quality of life questionnaire and focused on engineering an easy user interaction. Evaluations show that patients accepted inSERT as a system that is easy to use and effective for reporting of the patient current condition. Through the active participation and integration of patients, better documentation and an improved basis for medical treatment and nursing care could be achieved, through an intensified integration, patients gained better understanding of their medical condition and were able to more actively participate and cooperate in the treatment and consultation processes. The example of inSERT shows the potentials and possibilities that technical support systems can offer to patients.

Survey Table

Sr. No.	Paper Title	Technique	Description	Advantage	Disadvantage
1.	NFC based secure mobile healthcare system *Transaction paper IEEE*	Secure medical tags and secure health card	Working of secure healthcare application	It provides hybrid cloud for storing large medical information and also it improves security	Attacks like data modification ,eavesdropping, Relay attack
2.	Conditional Privacy preserving security Protocol for NFC Applications *Transaction Paper IEEE 2013*	Conditional Privacy Method	Security	The proposed method will help users to protect their privacy	Time consuming
3.	Mobile Identification NFC in healthcare system *IEEE 2012*	Use of NFC in healthcare system	Patient's identification and modification control	Improve care quality of patient	Deployment costs , technology limitation
4.	RFID Systems Integrated OTP security Authentication Design *IEEE 2013*	Authentication mechanism of RFID security	One time password	NFC tag security for user	Attacks like Relay attack and data modification

III. CONCLUSION

Presented data provides an overview of the NFC technology in healthcare sector, currently developed NFC applications classified into NFC modes. NFC technologies in healthcare environments have contributed to improve user's life. This is possible because, NFC is designed for simple communication between initiator and target devices. These advantages can also be taken in many other situations for trying to make people's life as easier as possible. Thus, in the future focus of our research will be to develop services for improving people's quality of life.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 2, February 2017

REFERENCES

1. Marcus, A. et al. “Using NFC-Enabled Mobile Phones for Public Health in Developing Countries.” Near Field Communication, 2009. NFC '09. First International Workshop on. 2009. 30-35. © 2009 IEEE.
2. J. P. Puma, M. Huerta, R. Alvizu and R. Clotet, "Mobile Identification: NFC in the Healthcare Sector," *2012 VI Andean Region International Conference*, Cuenca, 2012, pp. 39-42.
3. J. Fontecha, R. Hervas, J. Bravo and V. Villarreal, "An NFC Approach for Nursing Care Training," *2011 Third International Workshop on Near Field Communication*, Hagenberg, 2011, pp. 38-43.
4. Smart Card Technology in U.S. Healthcare: Frequently Asked Questions, http://www.smartcardalliance.org/resources/pdf/Smart_ Card _ Technolog yjn_HealthcareJA□FlNAL_096012.pdf, 2012.
5. Benelli.G, Pozzebon .A , “NFC and health : Turning a mobile phone into an interactive multipurpose assistant in healthcare scenarios” ,communication in computer and information science 2010(52):p.356.368.
6. Deesha Vora, Amarja Adgoankar , Anil Chaturvedi , " Mobile Health Monitoring Privacy System based on Cloud" , International Journal of Application or Innovation in Engineering & Management (IJAIEM) , Volume 4, Issue 6, June 2015 , pp. 129-134 , ISSN 2319 - 4847.
7. D. Sethia, D. Gupta, T. Mittal, U. Arora and H. Saran, "NFC based secure mobile healthcare system," *2014 Sixth International Conference on Communication Systems and Networks (COMSNETS)*, Bangalore, 2014, pp. 1-6.
8. Danco Davcev, Goran Jakimovski, ”Ergonomics Design of Healthcare NFC-based System, Procedia Manufacturing”, Volume 3, 2015, Pages 5631-5638, ISSN 2351-9789.
9. Vasquez, Monica Huerta, Roger Clotet, Ricardo Gonzalez, David Rivas, Victor Bautista, "Using NFC Technology for Monitoring Patients and Identification Health Services.” (2015).
10. Prinz, P. Menschner, M. Altmann and J. M. Leimeister, "inSERT -- An NFC-based Self Reporting Questionnaire for Patients with Impaired Fine Motor Skills," *2011 Third International Workshop on Near Field Communication*, Hagenberg, 2011, pp. 26-31.