

IoT based Secure Medical tags for Reducing Medical Errors and Drug Interaction with EHR System Using NFC Technology

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Abstract – Android based mobile devices usage has recently increased especially in developing countries. They can be used effectively for healthcare management. In this project, we have proposed a design for upgrading health care system with an assistance of android mobile devices with Near Field Communication (NFC) for preserving credentials, secure data and health data management. NFC technology is a lay of transmission protocols that authorizes two electronic devices. NFC devices can operate as a contactless card. For demo concern, NFC tag employs electromagnetic fields to recognize and trail tags attached to an object. The need of this project is to secure data, reducing medical errors and make proper monitoring mechanism to retain track of patient's medicine in-take.

KEYWORDS: Healthcare-Near Field Communication-Protocols-Medical errors-Electronic Health Record

I. INTRODUCTION

Systematic, authentic, vigorous and stable healthflow is predominant to organize patients in overpopulated hospitals. Simple touch NFC authorized android mobiles can convenience both the patient also the medical executives by providing a strong and steady health flow [1]. It also furnishes portability of devices and usability for health administration in crisis conditions and isolated situations. Here an android application which receives message from patient depending on the variety of request and that received data stored in database by using web server concept is developed [2].

The patient can preserve all records and can control the privacy concerns to be attainable. The records can intermittently sync to the centre server for assistance or collecting past history of patient [3]. Healthcard on a ambulatory device can be helpful for a patient who can communicate to a doctor or nurse by sitting in home. EHR on Healthcards is maintained by humankind can also assist in providing the virtuous care in crisis condition when the patient is insensible. The career logic of using Healthcard on android devices can be favorable to a medical executive since it can securely recognize patients using elementary compact android devices and also acquire an incisive health record [4].

II. EXISTING SYSTEM

An Existing System shows the Radio Frequency Identification (RFID) which plays a major role in controlling medication errors. This technology aims to reduce errors by avoiding the potential of patient misidentification during the medication

administration stage. In the mobiles we use simple interfaces of RFID and Bluetooth for credential storage and communication. This system uses Renesas microcontroller RL78 series which has low power characteristics and enables customers to build concise and energy efficient systems [5]. In android application the language Java is used in receiver section. The disadvantages in growing countries, that there are challenges like expensive infrastructure, connectivity problem for retrieving centralized medical records.

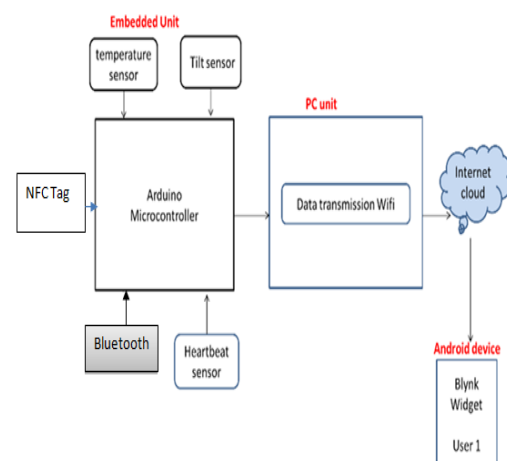
III. PROPOSED SYSTEM

We have proposed a stable healthcare assistance like Health Secure on a hybrid cloud to which all hospitals can subscribe. The Health Secure hybrid (composite) cloud furnishes service for preserving Cryptographic servers for steady substructure and Storage server to yield backup also capacity for Electronic Health Record (EHR). Mobile ADMIN is an android device of permitted medical admin.

Android application is the patient's android mobile with the Healthcard and Mobile Doc is the doctor's android mobile device. Mobile Doc could be an NFC enabled mobile device, for portability. The mobiles utilize effortless interfaces of NFC and Bluetooth for missive storage and communication. With the help of android application and with patient related data stored in database using in local server it helps to understand the patients better.

IV. METHODOLOGY

BLOCK DIAGRAM



HEARTBEAT SENSOR

Software type of heart rate sensor used for Arduino. It is nonsegregated optical increasing circuit and noise removing circuit sensor. It has an Arduino demo code that make it effortless to utilize [6].

TEMPERATURE SENSOR

The LM35 is a nonsegregated loop sensor that is used to compute temperature with an electrical output corresponding to the temperature. It can compute temperature more exactly than utilizing a thermistor. The LM35 produce a high output voltage and not need to the voltage be intensified.

TILT SENSOR

A tilt sensor can calculate the bending in repeatedly two axes of a source plane in two centre lines. Tilt sensors also compute the bending source to weight and are utilized to literary use [7]. They authorize the effortless recognition of direction or tendency.

ARDUINO MICROCONTROLLER

Arduino is unsecured source computer hardware. Arduino microcontrollers are preprogrammed with a field boot loader that clarifies uploading of programs to the on-chip flash memory. Arduino has 14 digital (electronic) input/output pins and 6 analog (continuous) inputs. Arduino furnishes a quality appearance factor that splits out the basis of the microcontroller into a more attainable package.

LCD DISPLAY

Liquid crystal display used to exhibit in notebooks and computers. It is devised of several layers which include two polarized panel filters and electrodes. LCD holds a liquid crystal to make a visible image. LCD needs backlight as they do not emit light by them. LCD's utilizes less amount of power contrast to CRT and LED.

WEB SERVICE

A Web service is a technique of transmission with one electronic device to other electronic device above a lattice. It is a software basis furnished at a web address with the assistance always on as in the idea of feasibility enumerating.

MySQL

It is an unsecured origin relational database administration system. It is established on the structure query language, which is utilized for attaching, detaching, and altering statistics in the database. Degree SQL commands can also utilised with MySQL.

NFC TAG

Near field communication is a lay of that authorize two operating electronic devices, one of transmission protocols which is typically a compact device to start transmission by conducting them [8]. NFC tags are compliant statistics supply which can be peruse and beneath some conditions registered by an NFC device.

DESCRIPTION

When the power supply of 12V is provided, the device is activated. Heart rate, Temperature and fall detection of patient can be measured. This information is sent to the Arduino (Atmega328). Then the information shown in the LCD display and it is stored in an electronic health record of patient.

EHR is synced with the central server for abandon or accumulating the past history of patient. Here, NFC enabled devices provide a secure healthflow. Bluetooth can be utilised through NFC to furnish quick access of substantial information from android device. We can receive the data from the patient and can be stored in database by using web server.

V. RESULT

This paper described the development of the android application in an NFC enabled android mobiles. In this case the parameters such as heart rate, temperature and insensibility can be measured and EHR of patient is shown in android application. The simple and compact of the system to be portable and sample output is shown in below.

SAMPLE OUTPUT



VI. CONCLUSION

This project is developed within the growth of mobile devices for an effective healthcare management. The patient records are maintained by an Electronic Health Record. NFC acts as a contactless card that yields greater control of distributing records with the doctor and it preserves secure credentials and Health data management. NFC furnishes rapid access and it can reduce the effort made by the patient. The future work can be made by detecting the pressure changes to prevent insensibility of the patient and wireless can be used for better convenience and cost effective.

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