Security System for Reducing Medical Issues and Drug Interaction with EHR System

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Abstract
In present days cell phones are utilized for various applications such as smart guide, to learn different programming software, web based learning classes, medical applications and so on. In this attempt, a design for updating the social protection system using NFC-enabled Android-based mobile phones and Bluetooth interfaces, smartcard development based on safe secure segment for qualifications, secure data and comfort secure administration on a crossbreed cloud for security and welfare record administration. If embraced by healthcare organizations, electronic health records (EHRs) can provide numerous benefits to physicians, patients and healthcare services. However, concerns about patient information privacy and security may cause a number of health institutions to adopt EHRs at a slower pace. One of the major issues of EHR is securing a large amount of sensitive health data in multiple places and formats.It shows how healthcare facilities have dealt with IT security challenges. This will aid us in comprehending these security and privacy challenges as well as the available answers.

Keywords:
NFC stands for Near Field Communication and EHR stands for Electronic Health Record.

1.Introduction

The fundamental purpose of this study is to promote the use of clinical tags to reduce restorative blunders, and to show how a secure health card can be used to track Electronic Health Records (EHRs) utilizing Secure NFC Tags using Card Emulation Mode or NFC P2P Mode. We gift a propelled molecular smartphone utility deliberate to assist sufferers avoid those mistakes. Secure healthcare is a requirement for developing countries where the rate of human corporations is high and security and safety are key concerns, as well as developing countries like India, where there is a vast population to care for and stable human corporate procedures are critical. To properly regulate patients, their prospering data, and for the ideal attention to reach the affected person at the best time, a proficient, trustworthy, liberal, and stable achievement move is essential . The entire EHR, including reports and tests, can be stored on a smart phone. A supported accommodating supplier can safely store the allowed bit with just a tap of the phone. Because of the computational constraints, the records can be filtered through in order to make a quick decision.

2. Literature Survey

The present system is to see the pulse rate of patient body. The system stores parameter of pulse rate into cloud. In this sensor is connected to microcontroller which acts as source of data. The data will be measured from sensor through microcontroller. In data pro-processing,

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data model obtained are identified as a label and used to send the information to cloud database for further purpose of utilized in data analysis. Data which is stored is collected for further observation.

Other system proposes a patient health monitoring system using IoT and android. It consists of temperature sensor ECG sensor, Heartbeat sensor and accelerometer. These sensors are attached to Arduino board. The readings from microcontroller are given to web with the help of Ethernet shield. The parameters can be seen by android app which will be installed in doctor's smart phone. The health parameter value is saved and uploaded online.

Another system show called "Secured Smart Healthcare Monitoring System based on IoT" and here Microcontroller PIC16F877A is used, to collect sensor data. Then it is sent through Internet of Thing. The data is protected. It can be accessed by the doctors at any time in any browser at Laptop, Tablet and Smart phone. Then it is possible to check the health status of the patient. LCD is connected to PIC16F877A.It displays the healthcare data. HTML webpage is automatically refreshed in each 15 seconds, hence the status of health can be regularly sent to the caretaker.

3. Problem Statement

The ability to accurately identify patients is critical to providing safe care. Despite this, doctors are still intimidated by electronic health record (EHR) systems that are riddled with errors and ineffective. The problem of insufficient patient identification becomes more difficult and dangerous as more data is collected and more apps are introduced into the healthcare system. With the rising use of technology in almost every aspect of healthcare, the risk to patient safety is only going to increase. The identification errors, according to the ECRI Institute, are likely a small percentage of the real wrong-patient errors.

4. Components

- Arduino
- Wi-Fi Module
- RFID Tag
- Temperature Sensor
- Blood Pulse Sensor
- Pulse Sensor
- SPO_2 Sensor
- Bluetooth Module
- Android Phone

RFID Tag

Radio Frequency Identification System (RFID) is an abbreviation for Radio Frequency Identification System. It is a "wireless identification system" that allows data to be transferred between "RF Tags (or Data Carriers)" worn by individuals or affixed to objects and "Antenna (or Reader/Writers)." It's a radio communication system of some sort. RFID systems are used for a variety of purposes. The use of an RFID system allows for the management of objects and information to be centralized. The following applications are among the most common reasons for deploying RFID in a manufacturing facility. Can easily construct a sorting system that reads the information from the sorting box's RF tag using a Reader/Writer installed on the branching point and switches the point using a control system such as a Programmable Controller. By interpreting work instructions automatically, it prevents errors in part identification and thereby reduces losses due to faults. Performs work as directed by the RF tags' work instructions and records the outcomes in the appropriate procedures. The RF tag contains data about operators, manufacturing dates, and inspection results with a time stamp, which helps with production history management. Information such as that included within the RF tag aids in the accomplishment of productivity, quality, traceability, and preventative maintenance goals.

Temperature Sensor

Sensors that monitor the temperature of a medium are known as temperature sensors. Temperature sensors are divided into two categories: contact sensors and noncontact sensors. The thermometers, resistance temperature detectors, and thermocouples are the three main types. Each of these sensors measures a physical attribute that varies in response to temperature. Aside from the three major types of temperature sensors, there are a plethora of different temperature sensors to choose from.

Blood Pressure Sensor

It's simple to connect a blood pressure sensor to an Arduino or a microcontroller using UART. The Arduino or microcontroller is programmed to communicate at 9600 baud in this example. As illustrated in the circuit schematic picture below, the sensor is connected to the Arduino. Do not connect the Rx pin of the Arduino to the Tx pin of the sensor module while dumping the code. Both of these pins are connected after the code is spilled. The blood pressure sensor is the equipment that detects blood pressure. Sphygmomanometer is another name for it. The systolic stress, diastolic pressure, and pulse rate are all used to calculate blood pressure. The blood pressure sensor outputs data in an 8-bit ASCII format with values ranging from 000 to 255. The systolic, diastolic, and pulse rate characteristics are separated by a comma and a space. The last byte of a packet is always 0x0A in hex and 10 in decimal, allowing each sensor reading to be displayed on a separate line. Initially, the serial transmission speed is set to 9600 bps. Many people, especially those with high blood pressure, find it useful to monitor their blood pressure at home. Blood pressure does not always remain constant. It adapts to your body's requirements. Body position, breathing, emotional state, exercise, and sleep are all elements that influence it. When taking your blood pressure, it's ideal to do so while sitting or lying down.

Pulse Sensor

This sensor is also known as a heartbeat sensor or a heart rate sensor. This sensor can be used by connecting it to an Arduino board via a fingertip or a human ear. So that heart rate can be estimated quickly. A 24-inch color-coded wire, an ear clip, Velcro Dots-2, transparent

stickers-3, and other accessories are included with the pulse sensor. The header connectors are connected with a color code cable. As a result, without soldering, this sensor can be quickly attached to an Arduino in the project. An ear clip is the same size as a heart rate sensor and may be hot glued to the sensor's backside to wear on the earlobe. At the hook side, two Velcro dots are totally sized toward the sensor. These come very handy for building a Velcro strap that covers about a fingertip. This is used to wrap around the finger and cover the sensor. Transparent strikers are layers of protection that shield the sensor from sweaty earlobes and fingers. Three holes are located on the sensor's external edge, allowing it to be readily connected to anything.

SPO_2 Sensor

SPO2 is a measure of the health of the cardiovascular and respiratory systems that is taken at the periphery, commonly on a finger. The oxygen saturation of a patient's blood is measured non-invasively with a pulse oximeter. A red and infrared light source, photo detectors and a probe are used to transmit light through a translucent, pulsing artery bed, which is usually a fingertip or earlobe. Deoxygenated hemoglobin (HHb) absorbs red and infrared light differently than oxygenated hemoglobin (O2Hb). Measurement of light absorption changes induced by arterial blood flow pulsations can be used to measure the percentage of saturation of hemoglobin in arterial blood. Skin diseases, pigment, lesions, scar tissue, tattoos, nail polish, cold, anaemia, medicine, light interference, and movement can all impair the accuracy of SPO_2 measurement. A sensor is frequently placed to the patient's finger to measure SPO_2. SPO_2 technology is divided into two types: transmissive and reflecting. The transmissive approach is the one that is most widely utilized.

Bluetooth Module

The HC-06 Bluetooth module is designed for short-range wireless data transfer (less than 100metres). It's really simple to use and communicate. Because it uses an UART interface, it can be connected to practically any microcontroller or processor. This module uses the Bluetooth 2.0communication protocol to deliver files at a speed of up to 2.1Mbps. This Bluetooth module, unlike the HC-05, can only be used as a slave device. Connect your laptop or computer to the USB-TTL Serial converter module. If everything is working properly, the LED on the converter module should light up. When not linked with another device, the HC-06 Bluetooth module is setto slave mode and is always in AT mode. A device must be able to interpret particular Bluetooth profiles in order to use Bluetooth wireless technology. Bluetooth profiles are definitions of possible applications and general behaviours that Bluetooth-enabled devices use to connect with other Bluetooth devices. From the start, these profiles have settings to parameterize and govern communication. Adherence to profiles reduces the time spent re-transmitting parameters before the bi-directional link is operational. There are numerous distinct Blue tooth profiles that represent various applications or use cases for devices.

Smart Phone

A Smart phone is a high-tech smart phone that operates on Google's Android operating system (OS), which is utilized by a number of different phone manufacturers. You will have access to hundreds of excellent apps and the ability to multitask with ease if you choose an smart phone. You'll also receive monthly software updates that will enhance the functionality of your smart phone. Smart phones range in price from high-end models to low-cost models. HTC and

Samsung, for example, have created fantastic smart phones for those wishing to spend a little less money, as well as smart phones for those trying to save a little money. If you buy one out right, the top-end versions cost roughly £500-£600 or more. As a result, the vast majority of people choose to buy one on a two-year contract and spread the cost over that time.

5. Block Diagram

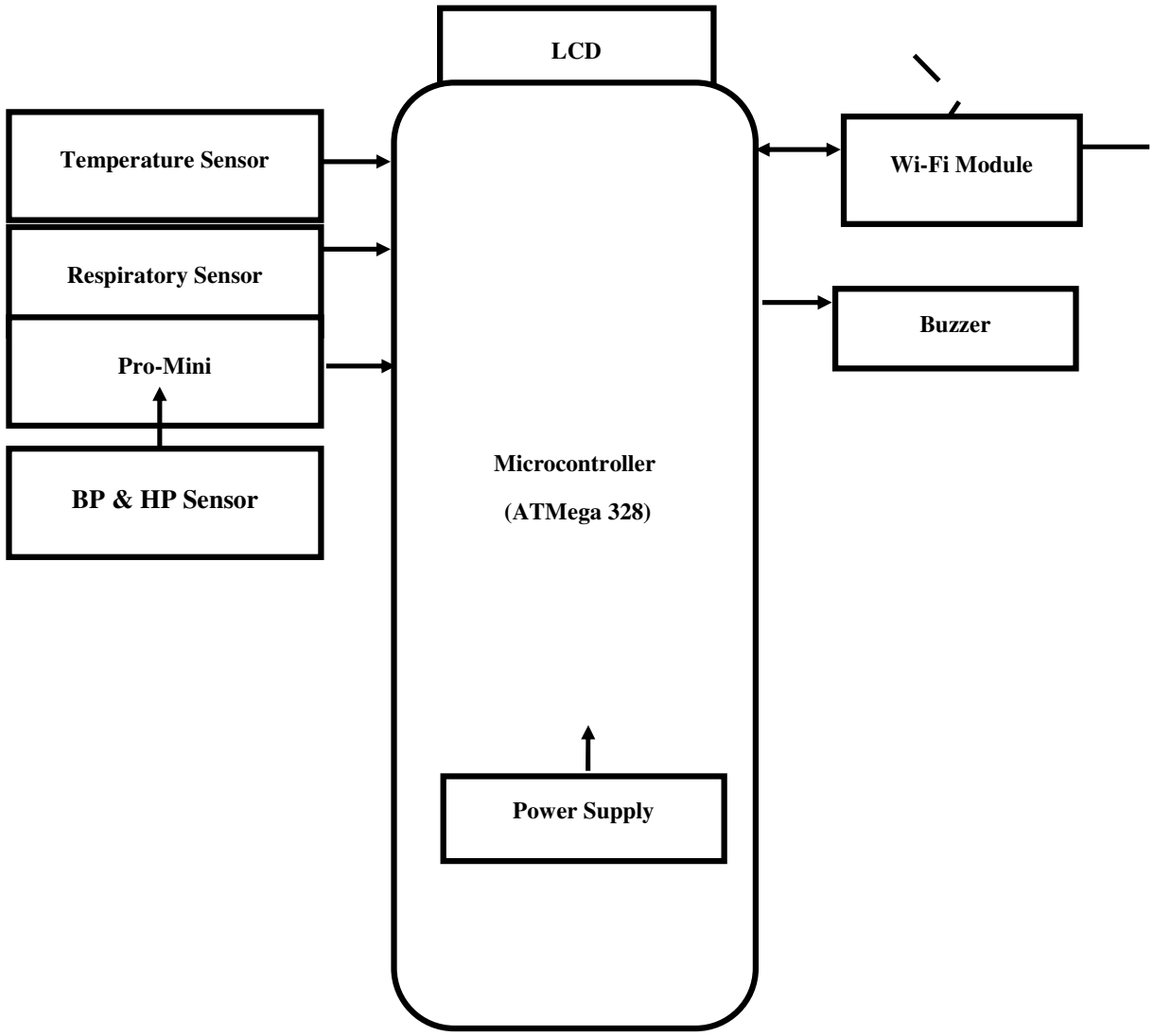

Fig 1: Block Diagram

6. WorkingPrinciple

All hospitals will have access to Health Secure, a secure healthcare solution that works on a hybrid cloud platform. An EHR backup and extra EHR storage are both supported by the Health Secure hybrid cloud, which also offers support for cryptographic servers. Mobile ADMIN is the name given to an authorized medical administrator's mobile device. The Android app on the patient's phone is called Health Card, while the Android app on the doctor's phone is called Mobile Doc. When it comes to mobile health records, a bigger screen would be preferable, such as a tablet or laptop with an external smartcard reader. For NFC P2P and card emulation based healthcare, we utilize the patient's and doctors public and private keys. An asymmetrical shared key is used to encrypt the message. It's possible to use a mobile device and the hospital's Mobile ADMIN application to securely read and write smartcard-based tags and other patient health information using a mobile device. Health Secure, a cloud service that generates security keys for our hybrid cloud architecture, maybe registered by Mobile ADMIN. Using NFC and Bluetooth, mobile phones store and exchange credentials. Using an Android app and a data base on a local server with patient-related data makes it simpler to comprehend the patient.

7. Future Scope

A hybrid cloud-based Health Secure solution may help mobile devices and healthcare providers offer services that improve security and save medical information for longer periods of time. As time goes on, we will be working on the Health Secure service's architecture. In addition to healthcare, the proposed architecture's safe IDs and secure data flow across devices allow it to be utilized for other applications as well. It's been suggested that a basic security framework is needed. The present security architecture is based on the PKI. In the future, it will be possible to compare identity-based versus attribute-based encryption systems. We need to work on the security problems of NFC and Bluetooth to access secure Health cards in the future to address security concerns such as theft, cloning, a man in the middle and relay attacks and the loss of a mobile device. On a hybrid cloud with replicated Kerberos cryptography servers and a Hospital Information System (HIS) for EHR backup, we plan to construct Health secure service architecture for future use.

8. Results and Discussion

In this solution, we've proposed using NFC-enabled Android phones to improve the Healthcare process by securing medical object ID and patient health cards on an exterior tag. Otherwise, the health cards secure association can support health cards on a half-cloud basis, allowing administration to re-design security and expand storage space for secure records. Later, we want to take over the design of the Well-being Secure Organization. Because of the easy touch of NFC for secure communication, the applications are simple to use. This would transform the thriving stream in overcrowded manufacturing facilities in places like India. Patients and restorative masters will benefit from the method since they will be able to make good use of their commonly carried cellphones. Using short scope SD cards or UICC cards with built-in NFC radio wire can reduce the building's cost. These SEs can also be given out as cards on a large scale to save money and to be usable on non-NFC mobile phones.

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