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IOT BASED ELECTRONIC HEALTH SMART CARD

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Abstract - In order to reduce health risks and provide a better solution to the patients that have visited the hospital, there is a need for keep an eye on the patients after being released and providing the data submitted by the patient Health card enables to the medical staff. This article proposes an architecture for providing the assured sharing of data between the patient mobile application and the hospital staff with the help of IOT (Internet of things).

To develop social health it is seen that in current year the use of information and communications technology has been able to get through in the various discipline of medical science. In this intrest the IOT Based electronic health smart card project has been introduced that is a replacement for insurance booklet and some countries have executed system with IOT.

IOT Based Electronic health smart card shall have many advantages in, reducing the number of clerical and paper operations, prices, medical faults, more accurate follow-up of cases, integrity of patient information, decreasing the issue of illegible prescriptions, etc. Of course, this card also has scope and challenges. This paper was first named as the electronic health smart card and its benefits. Then the challenges to execute this system will be assessed and we can find solutions for some of these challenges.

Key Words: — Health card system , Smart patient health record card ,smart health card ,electronic heath card ,IOT based electronic heath smart card, health monitor card, health file recorder.

1. INTRODUCTION In recent years created very positive changes in the civilized and economic life of human being. And also with creating proper contexts, it will give new chance and new surrounding to economic and civilized activities to increase their activities and to deliver them much better. Because of information and communications technology has numerous benefits that some of them are: save time, improving in productivity and execution, decrease costs, gives better services to citizens, creating new job opportunities, economic growth, new management methods, development of international business, etc.

Growing in various fields such as healthcare, business, banking, tourism, education, government and industry in different countries is increasingly universe. In the present situations, governments can't fulfill their social needs. And their position among the people and even international communities will lose. Very important parts is designing and installation of smart service tools based on the civilized. One of the existing tools to provide smart services is the smart cards. Depending on the uses of these cards which is designed with various architectures.

With the help of new technology will provide chances of store, retrieve, maintenance, and processing and information management. Today the process of issuing smart cards for various applications is expanding day by day and this topic will lead the society to the situation that each organization can issue more than one smart cards according their uses.

In this regard, insurance organizations in various countries has proceeded to create IOT Based electronic health smart card and replace it instead of paper insurance. This means that each person will have an IOT Based electronic health smart card instead of paper insurance booklet. Therefore all medical and healthcare operations will be performed via this card.

IOT Based Electronic Health smart card will have many benefits just like reducing the number of clerical (paper) processes, costs, medical errors, more accurate follow-up of disease cases, integrity of information, etc. Rather than advantages and uses mentioned to IOT Based electronic health smart card. This system has also some challenges that in this paper we will discuss about these challenges. After this introduction, paper is organized as follows: offers a general survey on smart cards and electronic health.

IOT Based electronic health smart card, benefits as well as challenges are discussed. Opportunities and challenges of IOT Based electronic health smart card system will be discussed. Finally conclusion of this study is presented.

2. LITERATURE REVIEW

In Indonesia and any country when an emergency occurs the administration takes precedence and takes time. The administration is done first so that hospital staff can know the medical record and the right treatment for patients. Therefore, there are need a technology that can be inserted important data in it, easy to carry and can facilitate hospital administration, that is only a IOT Based electronic health smart card. At present, the use of IOT Based electronic health smart cards has become a daily necessity in the community such as identity cards, electronic money, attendance, health insurance, and other needs.

Even the people who live in the rural areas are worried about the basic needs of their daily life; sometimes they depend on their local health facilitator who has no academic knowledge of medicine. Health care facilities available in the Government hospitals are having not enough seats for patients and there are always a lack of doctors, nurses, proper medical instruments and free medicines.

Local pharmacies are selling medicine with or without prescription from the doctors. So the abuse of selling medicine that affects the general people suffering different diseases and young generations getting addicted which spread out over the country. Most of the doctors prescribe medicine on a hand written prescription paper and giving suggestion to make the laboratory test to the patients to verify their diseases. Mostly, patients lose their previous prescription and also the laboratory test report which will create problem to doctors to verify their previous diseases and to make decisions.

3. PROPOSED MODEL

In this chapter we have presented the components of the proposed PDA based IOT Based electronic smart system. We introduce to modern equipment such as IOT Based electronic smart card. Therefore we have stated how these two devices would influence to eliminate the limitation in the existing e-Health care system in Bangladesh.

After our proposed system can be implemented on two main parts, the system first receives the requests of examination from doctor and laboratory reception. IOT Based electronic smart cards with RFID is used to take the requests. Then the system identifies the clinical examinations using RFID tags on IOT Based electronic smart cards and from the bracelets placed on the arm of hospitalized patients.

The system is consists of three principal modules as of following, A. Module of Doctor The doctor will request for examinations and check the result. B. Module of Reception

The laboratory reception department will register samples, print results and check the status. C. Module of Administrator The system administrator will monitor the system and have peripheral entries to the entire system.

Due to low cost and independence of requirement of a battery, a passive tag was chosen for the project. When the reader sends data the tag receives energy provided by the capacitor. The RFID reader used in this system is the RC522 card reader.

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4.METHODOLOGY

4.1 Study Area

The study has been conducted in a developing our country. The population of India is 1,380,004,385. The urban population of India for 2019 was 471,031,528, a 2.33% increase from 2018. In this highly density people's country, health is an important issue to consider. It is found from the reference data that there are, "1,289 Hospitals of which Upazila Health Complex and Rural Health Complexes are 398; hospital beds 43,143; registered physician 30,864; households per physician 674"and the below map represent a total country geographical overview.

4.2 Selection of Study

This project is selected as an appropriate to introduce the e-health card system since the density of population is very high and the general people are deprived of adequate healthcare service. For this reason, respondents from different medical colleges of the country have been selected to complete the survey for the research work. It is essential to take the potential doctors' and patients' views and suggestions regarding the IOT Based electronic health smart card system to find the possibilities to introduce the proposed system for the improvement of better healthcare system.

4.3 Working Principle

When patient went to the doctor, Patient will give His /Her Smart card to the Doctor which is IOT Based electronic health smart card and doctor will scan patient's smart card through RFID (Radio frequency identification). The system will detect patient card Through Arduino. If patient's card number is registered on the cloud server then all previous medical data will be displayed on computer or laptop which was saved on cloud server.

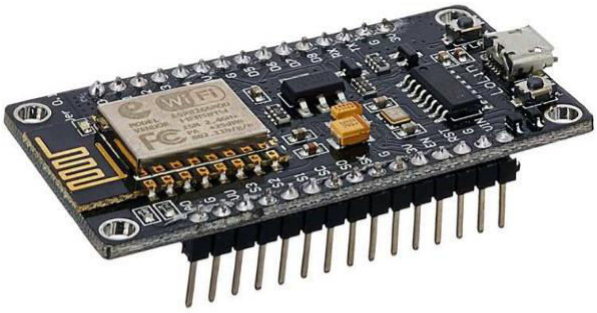
5 Components

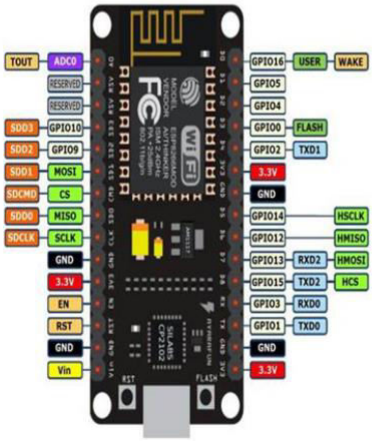
Node MCU ESP8266 development board

The Node MCU ESP8266 development board comes with the ESP-12E module containing ESP8266 chip having Tensilica Xtensa 32-bit LX106 RISC microprocessor. This microprocessor supports RTOS and operates at 80MHz to 160 MHz adjustable clock frequency.

Node MCU has 128 KB RAM and 4MB of Flash memory to store data and programs. Its high processing power with in-built Wi-Fi / Bluetooth and Deep Sleep Operating features make it ideal for IOT projects.

Node MCU can be powered using Micro USB jack and VIN pin (External Supply Pin). It supports UART, SPI, and I2C interface.





Node MCU ESP8266 Specifications & Features

- Microcontroller: Tensilica 32-bit RISC CPU Xtensa LX106
- Operating Voltage: 3.3V
- Input Voltage: 7-12V
- Digital I/O Pins (DIO): 16
- Analog Input Pins (ADC): 1
- UARTs: 1
- SPIs: 1
- I2Cs: 1
- Flash Memory: 4 MB
- Clock Speed: 80 MHz
- USB-TTL based on CP2102 is included onboard, Enabling Plug n Play
- PCB Antenna
- Small Sized module to fit smartly inside your IoT projects.
- SRAM: 64 KB

Node MCU Development Board Pin out Configuration

Pin Name	Description	Category
Power	Micro-USB, 3.3V, GND, Vin	**Micro-USB:** Node MCU can be powered through the USB port **3.3V:** Regulated 3.3V can be supplied to this pin to power the board **GND:** Ground pins **Vin:** External Power Supply
Control Pins	**EN, RST**	The pin and the button resets the microcontroller
Analog Pin	A0	Used to measure analog voltage in the range of 0-3.3V

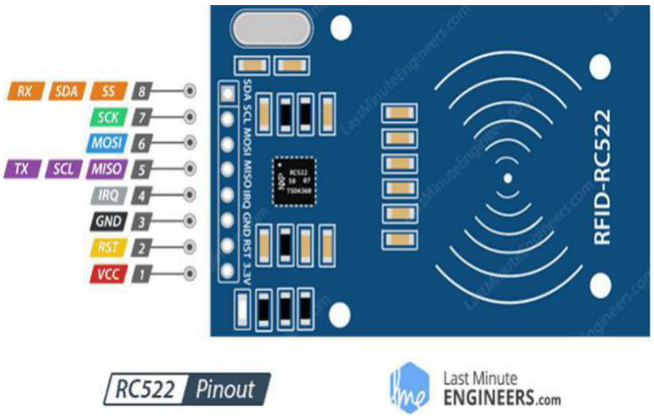
RFID (Radio frequency identification)

RFID or Radio Frequency Identification system consists of two main components, a transponder/tag attached to an object to be identified, and a Transceiver also known as interrogator/Reader. A Reader consists of a Radio Frequency module and an antenna which generates high frequency electromagnetic field. The powered chip inside the tag then responds by sending its stored information back to the reader in the form of another radio signal. This is called backscatter.

The backscatter, or change in the electromagnetic/RF wave, is detected and interpreted by the reader which then sends the data out to a computer or microcontroller.

RCF522 RFID Module Pinout

The RC522 module has total 8 pins that interface it to the outside world. The connections are as follows:



VCC supplies power for the module. This can be anywhere from 2.5 to 3.3 volts. You can connect it to 3.3V output from your Arduino. Remember connecting it to 5V pin will likely destroy your module!

RST is an input for Reset and power-down. When this pin goes low, hard power-down is enabled.
This turns off all internal current sinks including the oscillator and the input pins are disconnected from the outside world. On the rising edge, the module is reset.

GND is the Ground Pin and needs to be connected to GND pin on the Arduino.

IRQ is an interrupt pin that can alert the microcontroller when RFID tag comes into its vicinity.

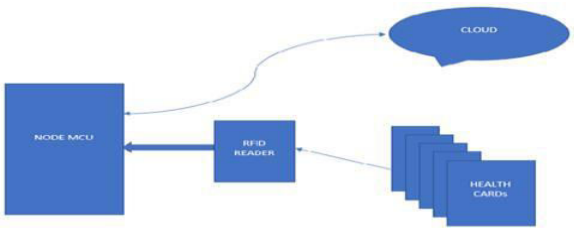


Fig: diagram of IOT based electronic health smart card

Explaination of block diagram

The block diagram of IOT Based electronic health smart card is nothing but a saving medical data in the cloud system as shown in figure. The node MCU ESP8266 is used in the circuit. RCF522 RFID Module is connected with the pin of Node MCU. The health smart card is scan by the RFID module and RFID module fetch and display the previous data of the patient If patient is not registered it will show the patient is not registered his card with the cloud.

6. CONCLUSIONS

The IOT Based electronic health smart card have been successfully implemented in well developed countries and most of the countries are taking the advantage of health card for their medical security , Thus they are saving their time and doing paperless work.

This card system has been successful in Bangladesh, Because the government of the Bangladesh has understood the benefits of this health card and about their necessity.

This technology can be used in the situation of COVID-19, and the cost of this smart card is also very less so that any citizen can afford and they can take advantages of this smart card.

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