IoT BASED ICU MONITORING SYSTEM

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Abstract - *Intensive Care Unit or ICU is where the patients who are critically ill and admitted for treatment. For such critical conditions the Doctors need to have an all-time update patients health related parameters like their blood pressure, heart pulse and temperature. Doing manually is too tedious a task and also for multiple patients it becomes close to impossible. For this type of situations this IoT based system can bring about an automation that can keep the doctors updated all time over the network. IoT Based ICU Monitoring System is an Arduino Nano based system which collects patients information with the help of few sensors. It uses Wi-Fi module to communicate this information to the internet. Setting up a smart and pervasive environment is one of the main challenges being investigated in several research topics. Among the panoply of applications enabled by Internet of Things (IoT), smart and connected health care is an important one. The sensors which are networked, either worn on the patient's body or embedded in our living environments, change the gathering of data inductive of our physical and psychological state.*

Key Words: **Internet of Things, Arduino Nano, Wi-Fi Module, ICU Patient Monitoring Sensors (Temperature, Blood Pressure, Heart Pulse).**

1. INTRODUCTION

Medical field is the backbone of any country. Medical field technology place a big role when it comes to patient care. Technology is big when it comes to giving the patient the best type of quality care when they are in the hospital. In the old days doctors or nurses would just communicate with patient manually which causes mistakes. Now with the electronic health systems those mistakes are drastically declining. Statistics have shown that using the electronic health systems has lowered nursing mistakes as well as improved patient care. Our society has progressed through the years and has been introduced with the electronic health care systems which has drastically improved our health care systems. Electronic health care systems are changing rapidly the market is globalized, society is concerned with medical issues, missing of patient data from records, too much.
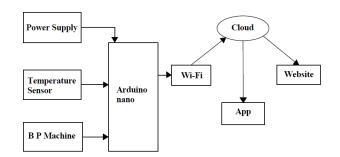
The work developed in this paper focuses on the study of the development of intelligent health care system. Health monitoring is the major problem in the todays world. Due to lack of proper health monitoring system, patient suffer from serious health issues. There are lots of IoT devices now a days to monitor the patient over internet. Health experts are also taking advantage of these smart devices to keep an eye on their patients in the hospital. IoT based ICU monitoring system which records the patient's heart beat rate, body temperature, blood pressure and also send a SMS alert whenever those readings goes beyond critical values.

Developing an Effective healthcare monitoring system, several factors need to considered, such as data availability, consistency, and reliability. However, the most important factor is data freshness that needs to be well supported during runtime by the healthcare systems which deals with the people health. More precisely, when authorised people monitoring patient's symptoms, the data has to be refreshed with high frequency so that doctor's platform update continuously to pull the latest data from the patient's warbles. Arduino board collect the data from sensors and then it transfer through wired network to IoT website.

2. METHODOLOGY

IoT Based ICU Monitoring System using Arduino which collects patients information with the help of few sensors. It uses Wi-Fi module to communicate this information to the internet.

FIGURE 1: Block diagram of ICU Monitoring System using Arduino Nano

In this way IoT based ICU monitoring system is an enhanced system that helps in monitoring ICU patients without any manual intervention. In this paper, we have temperature, blood pressure and pulse rate reading results are monitored. These sensors signals send to Arduino via wired cable. Arduino is a micro-controller board which runs dedicated program, there is no OS, just your code. Here patients body temperature, blood pressure and pulse rate is measured

using respective sensors and it can be monitored in the monitor screen of computer Using Arduino as well as monitoring through anywhere in the world.

2.1 Temperature Sensor

LM35 is a temperature measuring device having an analog output voltage proportional to the body temperature. It provides output voltage in Celsius. It does not require any external calibration circuitry. The sensitivity of LM35 is 10mV/degree Celsius. It is a 3-terminal sensor wont to measure surrounding temperature starting from -55 °C to 150 °C.

2.2 Blood Pressure Machine

Blood Pressure & Pulse rating are shown on display with serial out for external projects of embedded circuit processing and display. It shows Systolic, Diastolic and Pulse Readings. Compact design fits over your wrist sort of a watch. Easy to use wrist style eliminates pumping. Intelligent automatic compression and decompression is Easy to figure and switching button to start out out measuring 60 store groups memory measurements can read single or all measures 3 minutes automatic power saving device Intelligent device debugging, automatic power to detect Local tests for wrist circumference as 135-195mm Large-scale digital liquid monitor , Easy to Read Display Fully Automatic, Clinical Accuracy, High-accuracy Power by External +5V DC Serial output data for external circuit processing or display.

2.3 Wi-Fi Module (ESP8266)

The ESP8266 Wi-Fi Module may be a self contained SOC with integrated TCP/IP protocol stack which will give a microcontroller access to the Wi-Fi network. The ESP8266 is capable of hosting an application or offloading all Wi-Fi networking functions from another application processor.

2.4 Arduino Nano

The Arduino Nano may be a small, complete, and breadboard-friendly board supported the ATmega328 (Arduino Nano 3.x). It has more or less an equivalent functionality of the Arduino Duemilanove, but during a different package. It lacks only a DC power jack, and works with a Mini-B USB cable rather than a typical one.

3. RESULTS

Technology plays an important role in today's world like industries, person's life and environment. Among this field health care process is the most important field and crucial also. From this paper we can help to improve our health care system. The patient in the ICU should need the proper treatment and care from the respective Doctors or from the Nurses. As per the ICU monitoring system the patient is being cared well by checking his/ her health condition continuously. And also the datas collecting from each

simulation are storing in the cloud parallely. From this process the data can't be deleted permanently from the records. Using this technology development, patient's record about health status will send to particular mobile application or websites which can handle by the respective Doctors.

4. CONCLUSION AND FUTURE WORK

IoT (Internet of Things) based ICU (Intensive Care Unit) patient monitoring system may be a system, which measures the patient vital sign, pulse rate and temperature constantly who is admit in ICU. After measuring, this technique also sends this data to dedicated website through IOT system. Where every respective doctor could easily see their respective patient data all the time from anywhere. This system is less costly and more precise as compared to the other systems. Patient health parameter datas are stored over the cloud. So, it is more beneficial than maintaining the records on printed papers kept in files.

Future work can include many areas. We can add a GPS module in IoT patient monitoring using Arduino Nano and Wi-Fi module project. This GPS module will determine the position or the situation of the patient using the longitude and latitude received. Then it'll send this location to the cloud that's the IoT using the Wi-Fi module. The doctors can find out the position of the patient in case they have to take some preventive action and also we can send the location or the alert messages to the smart watches. So, we can easily find out the things when the condition is bad.

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