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HEALTHCARE MONITORING SYSTEM

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Abstract : Nowadays, due the pandemic people are concerned about their health hence it becomes a major issue to monitor their health on regular basis. The paper represents the plan and implementation of Health-Care Monitoring System which helps to monitor the heart rate, oxygen , temperature of the body and sends these parameters to the android app via Wi-Fi. It also gives a SMS on the registered mobile number via Android Application. The purpose of this system is it will assist the doctors to monitor the people's health conditions by just sitting in a room and provide immediate care.

IndexTerms -Arduino UNO, LM35 Temperature Sensors, Heartbeat Sensors, WiFi Module, Bluetooth Module, LCD, Potentiometer.

I. INTRODUCTION

In this situation where the hospitals are crowded and it becomes a very tedious task for patients to visit hospitals for minor symptoms. Visiting hospitals daily also rises the traveling expenses. Also, the use of smart phones are increasing so this system will help patients to check their temperature, heart rate and oxygen without any involvement of the doctor.

Recently, the enlarge interest in suitable sensors supplementary accessible in market for fewer overpriced charged for self healthcare as well as activity realization. [1]

As this system is easy to use so elderly patients can use this system effortlessly. The parameters measured will be displayed on the LCD display, android app via Wi-Fi as well as a notification will be sent to doctors via the android application. If the temperature, heart rate or oxygen surpasses the minimum or maximum standard range the LED light will start blinking and will give a alert. All the parameters displayed on the android app will be refreshed automatically every 10 seconds.

A. Block Design

Figure 1 represents the figure of healthcare tracking system. Temperature, Heartbeat and Oxygen sensors are attach to the Arduino Uno to monitor the parameters of the patient. All the measured parameters are displayed on the LCD and on the android app via Wi-Fi module like ESP8266-01. An SMS will be sent to the doctor via the android application which makes to monitor the patients easy for the doctor.

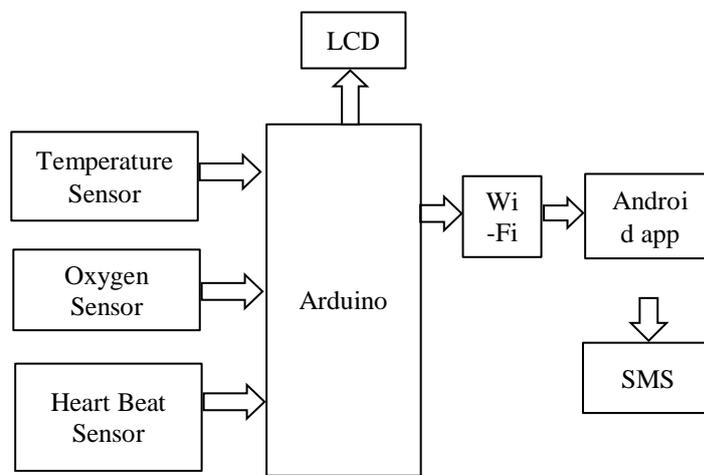


Figure 1: Patient Health Monitoring Using Arduino Uno

B. Hardware used in proposed system

1. Temperature sensor (LM35) -

Figure 2 is an illustration of the LM35 temperature sensor. This sensor is used to measure body temperature. LM35 converts body temperature to voltage and then converted to Celsius. It displays Celsius on LCD screen as well as on Android app. Temperature is measured more accurately than any thermistor.

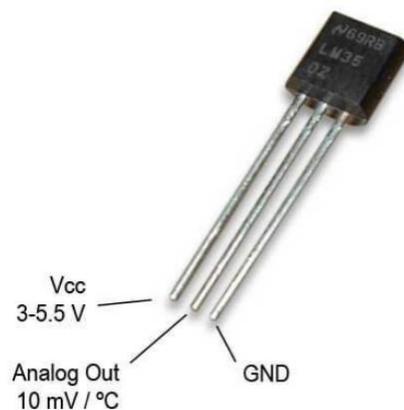


Figure 2: Illustration Of Lm35 Temperature Sensor

2. MAX30102 Heart Rate Sensor Module

Fig.3 represents the illustration of MAX30100 Heart Rate Sensor. The MAX30100 is a combined pulse and heart rate monitor sensor. It combines two LEDs, a photosensor, advanced optics, and deep-sound analog signal processing to recognize pulse oximetry and heart-rate signals. [2]



Figure 3: Illustration Of Max30100 Pulse Oximeter Heart Rate Sensor Module

3. Arduino UNO

The ARDUINO shown in Figure 4. is a prototype vehicle that includes both hardware and software called the ARDUINO IDE that works to set up computer code and downloads it to a physical and circuit board, which can be programmed program under the name microcontroller.



Figure 4: Arduino UNO

4. ESP8266-01 WI-FI MOD

ESP8266-01 Module is used for monitoring of patients continuously. We can give a microcontroller internet approach like the Wi-Fi protection does to the Arduino, or we can simply program the ESP8266 to not only have approach to a Wi-Fi network, but to act as a microactuator as well. This makes the ESP8266 very flexible. [4] It is a wireless module which is habituated to transmit the details from the Arduino UNO till app.

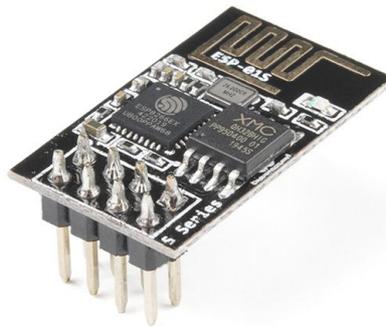


Figure 5: Illustration Of ESP8266-01 Wi-Fi Module

II. RESEARCH METHODOLOGY

1. Literature Survey

A. Researcher's Work

IEEE Xplore, 11 March 2019: - — Health Monitoring System using Internet of Things In this article presented by ETL Vaishnavi on March 11, 2019, a health monitoring system is proposed that uses non-invasive biomedical sensors to measure five parameters such as ECG, heart rate, respiration, temperature and arterial pressure. The proposed method uses the Arduino Mega Controller to connect non-invasive biomedical sensors. The output is displayed on any digital surveillance system using the Arduino Mega. The data obtained from the sensors is uploaded to the ThingSpeak cloud for storing and accessing patient information by the physician or their affected people for the necessary real-time monitoring. [5]

IEEE Xplore, 04 May 2017: -Internet of things (IoT) healthcare monitoring system using RFID This paper represented by ETL Sarfraz Fayaz Khan on May 2017 presents a complete monitoring cycle and monitoring system Effective healthcare is designed at using IoT and RFID tags. The test results in this paper show strong production ability against various medical emergencies. In this system, to get honest assessment results, monitor and take into account the patient's health condition and increase the power of IoT, the combination of a microcontroller with a presented sensor display. [6]

In the paper represented by etl Shreyaasha on November 23, 2017, the system is proposed to monitor important health parameters and transmit the data through wireless communication, which is then transmitted over the network through WiFi module. [7] The data can be accessed at any time to obtain the current status of the patient.

IEEE Xplore, April 12, 2021: Internet of Things (IoT)-based Smart Healthcare Tracking System

In a paper presented by ETL Shalini on April 12, 2021, a system that follows Smart health monitoring is put into practice using heart rate and blood pressure sensor in combination with ARDUINO UNO card to monitor patient's health status. In case the system notices unexpected changes in the patient's heart rate and blood pressure, the system automatically notifies the doctor by short message service (SMS) of the patient's condition with the assistance of The help of the Global System of Mobile Communications (GSM) additionally regulates and displays the complexities of a living patient's heart rate and blood pressure. [8]

B. Existing System

Various health care monitoring systems have been developed till date and some of them are listed below.

Comfort devices form a type of wireless sensor network in which scans from multiple comfort devices are systematically sent to a master node (such as a smartphone), and then transmitted data to a server or cloud-based backend for analysis and investigation. [8] Health care providers may review health care accreditation information to evaluate any healthcare exceptions. Commonly used body sensors include body temperature, heart rate, oximeter oxygen saturation (SPo2), blood pressure, electrocardiogram, motion, and EEG.

RFID tags are used to initiate a wireless conversation. The RFID reader transmits the request signal to the tag and accepts the signal presented by the tag, which is then passed to the database for storage. [6] The RFID tag transmits the signal to the receiver of the stationary node, and the receiver of the stationary node transmits the signal to the mobile base station, directly to the mobile phone. Then using GPRS and over the Internet it is transmitted to the server for display.

It monitors health specifications using the Arduino Mega. It is a main controller of the proposed system. [5] The technical parameters accessible in this system are temperature, heart rate, electrocardiogram, respiration and blood pressure. These specifications are measured by the respective sensors and accessed using the Arduino Mega. After connecting to the internet with Arduino Mega, it acts as a server. The data which is monitored by Arduino Mega is showed on the website automatically by the server.

The wireless body sensor network mainly contains comfort sensors (namely, temperature sensor, ECG sensor and heart rate sensor). [7] They act as data acquisition units, collecting physiological signals from the patient's body through sensors. This collected data is then transmitted to the base station or gateway server via a WiFi module. At the base station, the transmitted data is stored as a file for future use. If needed, the data can be viewed at any time by entering the same IP address on the end user's device (PC, laptop, tablet, etc.).

I. System Architecture

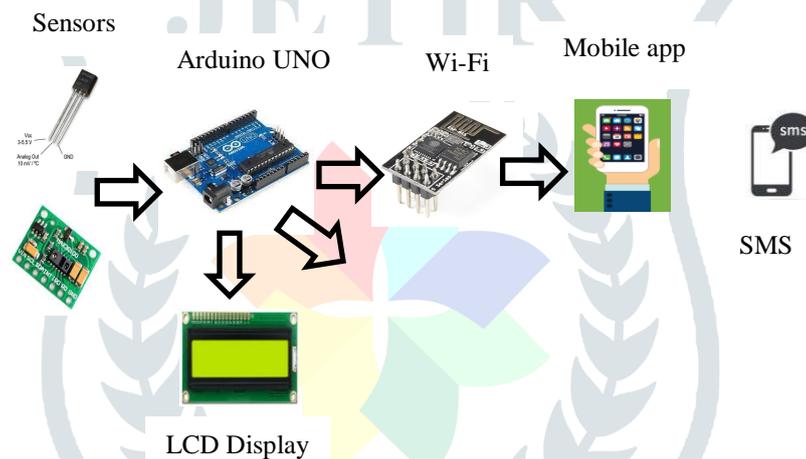


Figure 6: System Architecture Of Health Care Monitoring System

II. Proposed Methodology

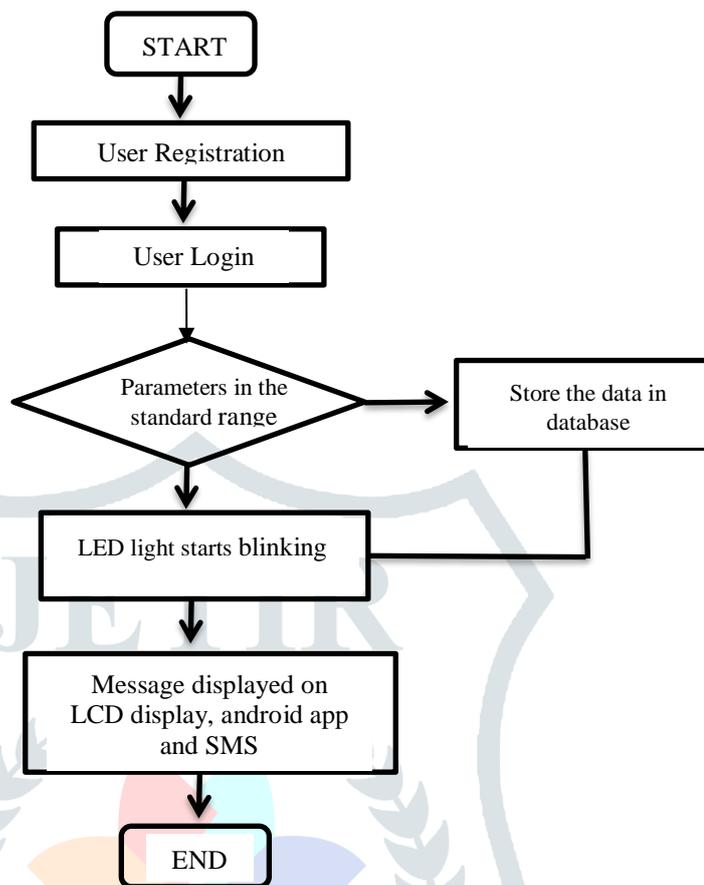
The body's vital signs (heart rate, temperature, oxygen) are important factors in determining a patient's health status and help in observing treatment strategy and recording treatment response is going on. We present a digitally calibrated, real-time life-saving meter that can operate in real time, record data and send it to an expert for later review. The goal of this device is to improve healthcare excellence and competence.

But the key issue in remote patient monitoring is that the details are securely transmitted to the target terminal and the device is designed to allow a single authorized user to access the data. Whether. [9] The sensors used are oxygen, temperature and heart rate sensors. The system includes the Arduino UNO, a WiFi module for transferring data to the application. [6] The combination of microcontrollers with smart sensors offers benefits such as built-in precision capabilities, low power consumption, and easy to use GUI.

Step Wise Procedure of the proposed system

- START
- Step 1: User first needs to register on the app
 - Step 2: Login
 - Step 3: The user needs to attach the sensors to his body
 - Step 4: All the parameters of the patient will be displayed on the LCD screen and on the app via Wi-Fi module.
 - Step 5: A message would be sent to the doctor via Android Application.
 - Step 6 If parameters of patient are in the desired range, then the data will be saved in the database for future reference.
- ELSE
- Step 7: The LED will start blinking and will give an alert. A SMS will be sent to the doctor immediately for further treatment
 - Step 8: STOP

III. Proposed System's Work Flow



Benefits of Health Care Monitoring System

i. Better access to healthcare.

As the system is portable it collects patient's basic hint and communicate to the android which is carried by the patient. [11] The mobile phone securely collects, stock and transmits the data to the trusted medical professionals

ii. Optimize time

The patient does not need to visit hospitals for daily checkups it eventually saves time and money. It ensures peace of mind and daily assurance.

Healthcare monitoring approaches

Track healthcare, reduce pharmaceutical and labor costs. With new conveniences, server-based implants have truly taken our healthcare to the next level, so that everyone can manage their daily routine visits at home.

In this segment, we focus on another technique used to monitor health. Several strategies for improving courtesy of care considering various specifications are discussed in this section. Smart health monitoring systems have both advantages and disadvantages that need to be considered. In the system described below, different communication conventions are used. [12]

Future Scope

According to a great analysis, the global telehealth monitoring market is expected to grow from \$58. billion in 201 to over 300 billion in 2022. [10]

Over time This system will provide mobility to the sick and elderly who are unable to move, saving time and energy. strength and help them recover quickly. It will give alerts in emergency situations so that treatment can be initiated immediately.

Conclusion

To achieve good patient care in the hospital, [11] verifying patients at home with the interaction of body sensors is a useful solution for patient access. It reduces healthcare costs and long waiting times in the hospital. Several patients can be consulted at the same time. Sensors on the body continuously collect the technical parameters of the patient's body and immediately transfer it to the hospital. Thus, it reduces the risk of abuse and improves treatment conditions.

Related Work

Such fitness management handiest may be accomplish if the laptop primarily based totally light-weight tracking devices with clever sensor automation are available [7] A growing quantity of research paintings is being directed in this area in order that the device may be operated on an character degree i.e. after the affected person has been acquit from the hospital. Also for the xright functioning of the device, studies paintings is being completed to attempt to triumph over any runtime challenge and device mistakes of the numerous far off improvements being used.

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