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REMOTE PATIENT HEALTH MONITORING SYSTEM BASED ON IOT USING ARDUINO UNO

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ABSTRACT

Today, healthcare has developed science and knowledge based on wireless sensor node technology. Patients who face untimely death from causes such as heart disease and stroke due to inadequate access to emergency medical care. Its purpose is to monitor especially elderly patients and inform doctors and relatives. Therefore, we propose an innovative project to avoid these sudden death rates using a patient health monitoring system that uses sensor technology and uses the internet to communicate with loved ones. in case of an accident. The system uses temperature and heart rate sensors to monitor patient health. Both sensors are connected to his Arduino Uno. Patients are alerted via IoT when their heart rate or temperature changes abruptly. The system also displays time-stamped live patient temperature and heart rate data on the connected network. Therefore, an IoT-based patient health monitoring system leverages the Internet to effectively monitor patient health and help userstrack dormitory work to save lives.

Keywords: Arduino UNO, GSM Module, Node MCU, MEMS Sensor.

I.INTRODUCTION

Health care facilities always require special care. A database of all patients should serve you well. Either way, you need a way to circumvent the information. Similarly, tolerance information should be kept confidential during the event Social Security isperhaps the most important entitlement issue for many nations in space. Improving the lives of vulnerable segments of society, especially those with chronic diseases, as well as the elderly, those with physical and mental disabilities, will be a future focus. Existing systems store this information when a document is requested or a shared host is searched. However, generally all employees and doctors have access to this information. Then you'll need help recommending acceptable alternative routes. In addition, doctor matching is also possible through flexible requests and web requests. Healthcare facilities need resources to support ongoing screening of patients in need. Heart rate should be monitored continuously. Accessories to test these settings when trading at home may not be available. In addition, there is a high probability that the

disease will recur. Patient data (temperature, heart rate, location) are measured continuously and transmitted via an internet server. Delivery times (for example, every 3 minutes) can be localized. Personal authentication has one particularly mild advantage. Roughly speaking, the acceptable normal body temperature is 37°C, and only the Insight feels warm when the body temperature is 37.0°C. Using moderately long averaging techniques, the witness can present these thresholds to the patient. The same layout as before, advanced mobile phones for doctors, therapists can assess the patient's health. A warning message is displayed for each dive parameter that exceeds critical calculations. Then, with the help of Android accessories, patients have so many smartphones available to their caregivers that even the most tolerant can see their health. Furthermore, detecting life-threatening physiological accident conditions such as heart attack requires continuous monitoring of patient health, simulating clinic-to-home transitions. Studies show that 30% of patients discharged with heart failure require at least 90 interventions within 4-6 months to be readmitted with grades 24-55%. These types of requirements are inconsistent, so health screening frameworks always offer lowcost outcomes. Such constructs also include physiological information that is stored, transformed and associated via nearby means such as a smartphone. Such frameworks need further improvement to meet stringent security, reliability, and tolerance requirements that are consistent over time. In the proposed framework, we present a health observation framework that uses sensory nodes to collect information from patients, intelligent classes to predict people's health status, and a versatile device to bring the senses of doctors. Patients participate in human service processes. Finally, Tom browses across multiple devices so he can edit his health data anytime, anywhere. Today we have to be critics and stars in our daily routine. We need to change the way individuals exist, contemplate, accept and make money. Multiple versions of his web server for motivation, business, career, production, entertainment, social networking, shopping, e-commerce areas, etc. The next new superweb model is the Web of Things (IoT). Imagine our current reality. A few questions can broadcast the majority of data, talk and challenge. Private web protocol (IP) or open network. These linked questions collect information on a regular basis, examine what is most commonly used to trigger compulsions, and provide a practical system for analyzing, organizing, and making decisions. . These will be the planets of the Network of Things (IoT). Most of these IoTs can be identified in a similar way to web interface questions, and individual questions can also be controlled or remotely monitored using this link. This definition may have already been proposed, but today, the evolution of IoT is needed to enable these machine-on-machine businesses. But the true purpose of IoT may be to create shiny, unobservable systems that can be detected, tuned, and programmed. Outcomes produced in the light of the IoT include embedded technical organizations that can exchange information with each other (not the outcome of the web, but by 2020 there will be 8 billion to more than 50 billion entities with potential associations).). Because these devices are online, a special kind of terminology has been introduced to make them safer, attract more groups and revolutionize social security. The whole idea of IoT is all about sensors, and there are also remote organizations that allow their respective customers to receive additional applications/information.

II.LITERATURE SURVEY

This paper presents the design and implementation of a health monitoring system using the Internet of (ings (IoT). In present days, with the expansion of innovations, specialists are always looking for innovative electronic devices for easier identification of irregularities within the body. IoT-enabled technologies enable the possibility of developing novel and noninvasive clinical support systems. (is paper presents a health care monitoring system. In particular, COVID-19 patients, high blood pressure patients, diabetic patients, etc., in a rural area in a developing country, such as Bangladesh, do not have instant access to health or emergency clinics for testing. Buying individual instruments or continuous visitation to hospitals is also expensive for the regular population. (e system we developed will measure a patient's body temperature, heartbeat, and oxygen saturation (SpO2) levels in the blood and send the data to a mobile application using Bluetooth. (e mobile application was created via the Massachusetts Institute of Technology (MIT) inventor app and will receive the data from the device over Bluetooth. (e physical, logical, and application layers are the three layers that make up the system. (e logical layer processes the data collected by the sensors in the physical layer. Media access management and intersensor communications are handled by the logical layer. Depending on the logical layer's processed data, the application layer makes decisions. (e main objective is to increase affordability for regular people. Besides sustainability in the context of finance, patients will have easy access to personal healthcare. (is paper presents an IoT-based system that will simplify the utilization of an otherwise complicated medical device at a minimum cost while sitting at home. A 95 percent confidence interval with a 5 percent maximum relative error is applied to all measurements related to determining the patient's health parameters. (e use of these devices as support tools by the general public in a certain situation could have a big impact on their own lives.

III.EXISTING SYSTEM

The outbreak of COVID-19 has attracted people's attention to our healthcare system, stimulating the advancement of nextgeneration health monitoring technologies. IoT attracts extensive attention in this advancement for its advantage in ubiquitous communication and sensing. RFID plays a key role in IoT to tackle the challenges in passive communication and identification and is now emerging as a sensing technology which has the ability to reduce the cost and complexity of data collection. It is advantageous to introduce RFID sensor technologies in health-related sensing and monitoring, as there are many sensors used in health monitoring systems with the potential to be integrated with RFID for smart sensing and monitoring. But due to the unique characteristics of the human body, there are challenges in developing effective RFID sensors for human health monitoring in terms of communication and sensing. For example, in a typical IoT health monitoring application, the main challenges are as follows: (1) energy issues, the efficiency of RF front-end energy harvesting and power conversion is measured; (2) communication issues, the basic technology of RFID sensors shows great heterogeneity in terms of antennas, integrated circuit functions, sensing elements, and data protocols; and (3) performance stability and sensitivity issues, the RFID sensors are mainly attached to the object to be measured to carry out

identification and parameter sensing. However, in practical applications, these can also be affected by certain environmental factors. This paper presents the recent advancement in RFID sensor technologies and the challenges for the IoT healthcare system. The current sensors used in health monitoring are also reviewed with regard to integrating possibility with RFID and IoT. The future research direction is pointed out for the emergence of the next-generation healthcare and monitoring system.

IV.PROPOSED SYSTEM

The proposed method monitor's health parameters using Arduino Uno. Arduino Uno is a principal controller of our proposed system. The parameters which are monitored in this system are temperature, Heartbeat, MEMS, These parameters are measured using respective sensors and monitored using Arduino Uno, it acts as a server. The data which is monitored by node MCU is showed on the website automatically by the server. Patient's health status can be monitored easily. Detecting, Transport and Application layers are the three layers in the design of IoT applications.

A.In the detecting layer, we measure the body parameters like temperature, Heartbeat, MEMS.

B. The process of sending information to the cloud by utilizing Arduino Uno with Wi-Fi module ESP8266 is done in the transport layer. To access the information in the cloud we use open cloud server named "Thing Speak". Thing Speak provides the facility of creating our own account and a channel by the name of our project .To compose information to the cloud we get an id and API-Key.

C. At the Application layer, the information can be recovered using API-Key so as to obtain the information from the server.

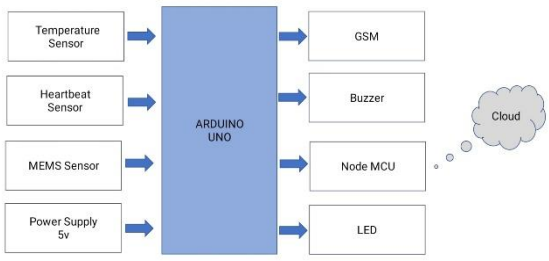

Figure1.1 Proposed system

Arduino Uno

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

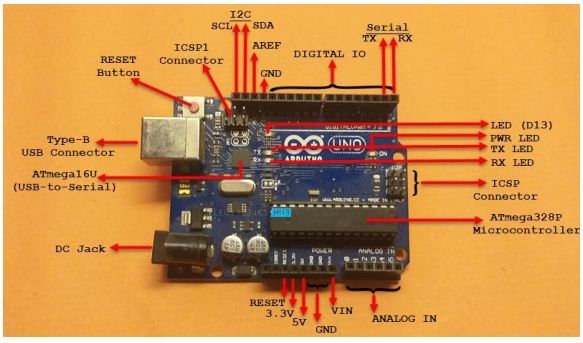

Figure1.2 Arduino UNO

Node MCU (ESP8266)

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

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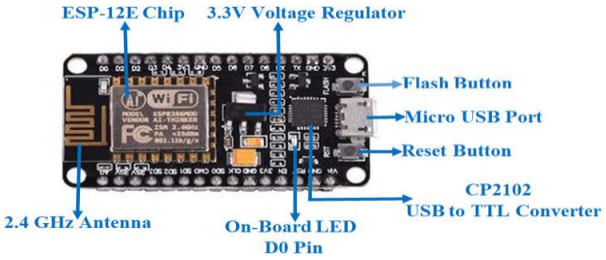

Figure1.3 Wi-Fi Module - ESP8266

GSM Module

A customised Global System for Mobile communication (GSM) module is designed for wireless radiation monitoring through Short Messaging Service (SMS).

This module is able to receive serial data from radiation monitoring devices such as survey meter or area monitor and transmit the data as text SMS to a host server.

It has SIM phonebook management,Fixed dialing number (FDN),Real-time clock with alarm management,High-quality speech, International roaming.

Figure1.4 GSM Module(SIM900A)

GSM MODEM APPLICATIONS

Figure1.5 GSM Module(SIM900A)

SOFTWARE MODULE

A. Arduino IDE
B. Embedded C Language

V. Role of IoT in Health Monitoring

This tool collects, analyses, and transfers the various data parameters related to the service condition of the equipment, structure, or machine.

To monitor the health parameters of the patient remotely, the set of various sensors are used. These sensors are used to sense the data and then that data will be sent to the server using wifi module. The patients are monitored by the doctor in real time on the basis of the data received through the server.

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VI. RESULT AND ANALYSIS

The proposed intelligent health monitoring system is being deployed and tested over a patient whose personal details are entered into the web portal. The patient is connected with uor health monitoring system which consists of a heart rate sensor ,MEMS sensor and a temperature sensor. The live graph of the patient's heart rate, X-axix position and temperature is being monitored on a Thinkspeak based database server. The IOT device used here is Node MCU board.

The index or the Home page of the the web portal consists of various tabs including the Login, Services, About Us, Contact and Uplaod. Fig. 4. Sytem web portal Admin Page The Admin page of the web portal allows the user to enter the personal details of the patient including his name, age, blood group and various other essential details in order to maintain the records systematically.

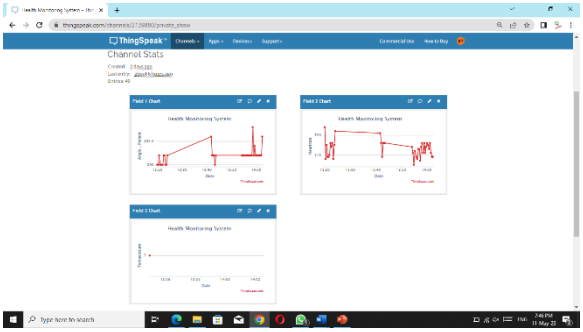

Figure1.5 Thinkspeak Data Dashboard

This figure shows the full structure of the database which is being hosted currently on the local host and further can be connected to the whole world via IOT. The database has full details and record history of each and every patient through which a statistical graph is plotted in real time which is used for patients further analysis and tracking.

VII. CONCLUSION

This project present and test a prototype of an automated system that ensures continuous monitoring of various health parameters and prediction of all kinds of diseases and disorders, saving patients from the pain of frequent hospital visits. . The proposed system can be installed in hospitals and can collect vast amounts of data and store them in an online database. You can also access your results on mobile via ThinkSpeak software. The system can be further improved by adding artificial intelligence system components to assist doctors and patients. For example, if a patient's health parameters change according to the same pattern as previous patient health parameters in the database, the outcome can also be estimated. If you have a similar pattern found repeatedly, it would be easier for the doctors and

medical researchers to find a remedy for the problem.

FUTURE SCOPE

Multiple parameters like Blood Pressure, retinal size, age and weight can be included as controlling parameters in the future.

The whole health monitoring system, which we have proposed can be integrated into a small compact unit as small as a cell phone.

This will helps the patients to easily carry this device with them wherever they go.

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