



Residency Based Emergency Patients Monitoring and Alert System Using IoT

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ABSTRACT

This project suggests creating an Internet of Things (IoT)-based emergency patient Monitoring and alarm system for residency Settings. Patients' vital signs and activity levels Will be tracked by the system during their Residence, and it will utilize data analytics to Spot any unusual trends and send an alarm to the healthcare practitioner or emergency Services. The system will make use of inexpensive, non-intrusive sensors that are connected to a Wireless network and a platform that uses the Cloud to store and process data. The suggested Approach might enhance patient outcomes, lower hospital readmission rates, and boost the efficacy and efficiency of emergency Response in the event of life-threatening medical emergencies.

KEYWORDS: Emergency, Medical, Patient

INTRODUCTION

The term Internet of Things (IoT) was invented by Kevin Ashton in 1999 and refers to data on the Internet that are connected to evolving global service architecture. IoT is the product of Advanced research on information and communications technology. It can potentially enhance Urban residents' quality of life. Since the global population is increasing at an astonishing rate, And the prevalence of chronic diseases is also on the rise, there is a growing demand for designing Cost-effective healthcare systems that can efficiently manage and provide a wide range of medical Services while reducing overall expenses . The IoT has become a key development area Recently, enabling healthcare-monitoring system advancement. The IoT healthcare-monitoring System aims to accurately track people and connect various services and things in the world Through the Internet to collect, share, monitor, store, and analyze the data generated by these Things. However, the IoT is a new paradigm where all connected physical objects in any Intelligent application, such as smart city, smart home, and smart healthcare, are addressed and Controlled remotely. Diagnosing disorders and monitoring patients is essential to providing Medical care, and applying sensor networks to the human body will significantly assist in this endeavor. In addition, the information is readily accessible from any location in the world at any given time.

PROPOSED SYSTEM

The Residency-based Emergency Patients Monitoring and Alert System is a system that uses IoT to continuously and in real-time. Monitor patients' vital signs and activity levels while they are Residing in or receiving care in assisted living facilities. The technology gathers data from the patients and transmits it Wirelessly to a cloud-based platform using inexpensive, Non-invasive sensors. The gathered data is then examined in real-time using data analytics and machine learning algorithms to look for anomalous Patterns that could point to a serious medical occurrence. The methodology places a strong emphasis on the value of early diagnosis and intervention in important medical events, improving patient safety, and giving patients and their families Peace of mind.

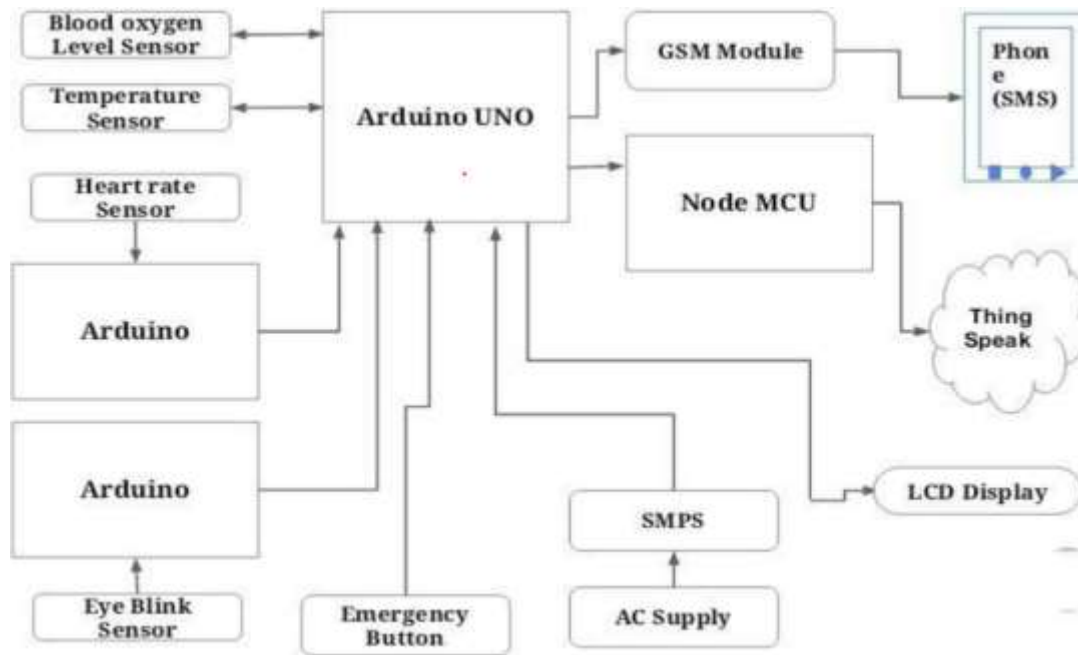
BLOCK DIAGRAM

Fig.1 Block Diagram

BLOCK DIAGRAM DISCRIPTION

SMPS stands for Switched-Mode Power Supply. It is a type of power supply that uses high-frequency switching circuits to convert electrical power from one form to another. SMPS is commonly used in electronic devices that require a stable and efficient source of DC voltage. SMPS is widely used in electronic devices due to its high efficiency, small size, and low weight compared to traditional linear power supplies. However, SMPS can produce electromagnetic interference (EMI) and require careful design and filtering to meet electromagnetic compatibility (EMC) requirements. This SMPS steps down the incoming 230 V supply to a 12V supply. This is then sent to the Arduino for further distributing the power to the system

The supply is then sent to the main Arduino where the power supply is split and then sent to the other components. The power supply is regulated through a regulator and is sent to the Sensors and other components. The other components takes for supply of 5 voltage to 3.3 volt from the SMPS power supply

The heart rate and eye blink sensor in the heart rate sensors use different development board for data processing. They need instantaneous processing of the datas. They will be then sent to the main arduino which then transfer the data to the node MCU module which then connects with the cloud data server where all the data is stored. The temperature sensor and LCD module or connected to the main arduino which acts as the processor in the system. The data has stored in a tabular format which contains instantaneous values, the values for every second and it also the GSM module which since emergency messages to the mobile phones. The message is sent to the phone are through regular messages so they do not required any form of internet connection just proper tower connections is more than enough for receiving the signal. The data that is sent and can be retrieve that any moment of time through authorized personals a and the ones with the credentials.

WORKING

The Internet of Things is not the result of a single novel technology; instead, several complementary technical developments provide capabilities that, taken together, help to bridge the gap between the virtual and physical world.

These capabilities include:

- Communication and cooperation
- Addressability

- Identification
- Sensing
- Actuation
- Embedded information processing
- Localization
- User interfaces

COMPONENTS USED

OXIMETER

Maxim's MAX30100 integrated pulse oximetry and a heart-rate sensor are included in the Heart Rate click. It's an optical sensor that measures the absorbance of pulsating blood through a Photodetector after emitting two wavelengths of light from two LEDs, a red one and an infrared one. This particular LED colour combination is designed to allow data to be read with the tip of One's finger.

A low-noise analogue signal processing device processes the signal before sending it to the target MCU through the mikroBUS I2C interface. Excessive motion and temperature changes can affect the readings, thus developers of end-user apps should keep that in mind. Furthermore, Too much pressure can limit capillary blood flow, reducing the data's trustworthiness. There's also a programmable INT pin. The device runs on a 3.3V power supply

TEMPERATURE SENSOR MODULE

The ultra-small size, low hardware overhead, powerful anti-interference capability, and high Accuracy of the DS18B20 Waterproof Temperature Sensor Module, among other features, have Increased its appeal among customers. For electronic enthusiasts and hobbyists who wish to learn about and build.

The working principle of the DS18B20 Waterproof temperature sensor is similar to any other temperature sensor. The resolution of the sensor ranges from 9-bits to 12-bits. But 12-bit is used as the default resolution to power up this sensor. It measures temperature, as well as the conversion of Analog-to-Digital (A-to-D), which can be done with a convert-T command. The output temperature value can be stored within the 2-byte register in the sensor, and after that, this sensor returns to its inactive state. The DS18B20 Temperature Sensor has three wires/pins (Vcc, ground, and data wires) for operation. But in parasite mode, only the ground and data lines are used to operate the sensor, the input voltage of the sensor is supplied through the data line.

20x4 LCD Display

A 20 x 4 character LCD display with white text on a vivid blue backlight LCD. The pictures don't do justice to the bright blue background with the clear white text of this display. Here is brief data for the Systronix 20x4 character LCD.

At 5V the resistor Rf should be 91 K ohms. At 3V it should be 75 K ohms. Using a 3V display at 5V is acceptable from a voltage standpoint (the display can operate on 3-5V) but the oscillator will then be running too slowly. One fix is to always check the busy flag and not use a fixed time delay in your code, then it will work regardless of the LCD speed. The other option is to always allow enough delay for the slower display.

POWER SUPPLY MODULE

This switching mode power supply for the isolation industrial-grade built-in power supply Module, with temperature protection, over current protection and short circuit full protection, AC110 ~ 240V wide voltage input, high and low voltage isolation, DC12V/1000mA and DC5V/500mA dual isolated output voltage, with input and output EMI filter circuit, with mounting holes. This SMPS is especially designed to interface directly with Arduino and sensors.

WI-FI MODULE

ESP8266 is an impressive, low-cost Wi-Fi module suitable for adding Wi-Fi functionality via UART serial communication. Features include 802.11 b/g/n protocol, Wi-Fi Direct(P2P) soft-AP, Integrated TCP/IP protocol stack.

GSM MODULE

The SIM800L is a widely used GSM (Global System for Mobile Communications) module that provides cellular connectivity for various Applications. It is a compact module that allows communication over the cellular Network using the Global System for Mobile Communications (GSM), General Packet Radio Service (GPRS), and Short Message Service (SMS) protocols. The SIM800L module is designed to be integrated into embedded systems, allowing Devices to communicate wirelessly over the cellular network. SIM800L GSM/GPRS module is a miniature GSM modem, which can be integrated into a Great number of IoT projects. You can use this module to accomplish almost Anything a normal cell phone can; SMS text messages, Make or receive phone Calls, connecting to internet through GPRS, TCP/IP, and more! To top it off, the Module supports quad-band GSM/GPRS network, meaning it works pretty much Anywhere in the world. At the heart of the module is a SIM800L GSM cellular Chip from Sim Com. The module supports baud rate from 1200bps to 115200bps 21

PCB ANTENNA

A 2.5 dB (decibels isotropic) antenna is a type of omnidirectional antenna Commonly used in wireless communication applications, including in PCB (Printed Circuit Board) designs. A PCB 2.5 dBi antenna is designed to radiate and receive radio frequency (RF) signals equally in all directions, creating a Spherical coverage pattern. This makes it suitable for applications where signals Need to be transmitted and received from multiple directions, without requiring Precise aiming or alignment. This is quad-band GSM / GPRS, 3G / UMTS & ISM Tuned antenna, designed to resonate to a high level at ISM 868MHz and 915MHz; GSM 800, 900, 1800, 1900 and 3G 2100MHz. This PCB antenna manages a peak Gain of 2.5dBi at 2100MHz (3G) so is, therefore, a high performance, wide Frequency band antenna, suitable for a host of wireless M2M applications that Require an embedded solution. Its wide operating frequency band allows for Worldwide cellular applications over the quad-band GSM/GPRS networks and High data transfer rates via 3G/UMTS. The antenna can be either vertically Polarized or horizontally polarized, depending on the application requirements and the orientation of the other antennas in the system. The polarization of the module usually comes with a Helical Antenna and solders directly to NET pin on PCB. The board also has a U. FL connector facility in case you want to keep the antenna away from the board.

ARDUINO UNO

Arduino is an open-source electronics platform that is designed for creating interactive projects. It is a user-friendly platform that is widely used in the development of electronics projects, particularly for hobbyists and beginners. In this article, we will explore the features of Arduino, its advantages, and how it is used in electronic projects. It consists of a simple baseboard that has the microcontroller and its support circuitry with connectors to connect to plug in modules and a USB interface to download code from the PC. The commonest one is called Arduino Uno, which uses Atmel ATmega328P microcontroller, but there are now several others; its baseboard does not do much on its own and you need to plug in expansion modules called shields to do analysis meaningful. Arduino is an open-source electronics platform that is designed for creating interactive projects. It is a user-friendly platform that is widely used in the development of electronics projects, particularly for hobbyists and beginners. In this article, we will explore the features of Arduino, its advantages, and how it is used in electronic projects.

WIFI MODULE

n ESP8266 Wi-Fi module is a SOC microchip mainly used for the development of end-point IOT (Internet of things) applications. It is referred to as a standalone wireless transceiver, available at a very low price. It is used to enable the internet connection to various applications of embedded systems.

BSERVATION AND RESULT

The mobile phone numbers are registered to the GSM module and registered mobile number receives data and all the emergency alerts while the person with the login credentials capable of retrieving and taking care of the store the data in the cloud at any moment of time the store data is then sent to the hospitals cloud and can be retrieve that any point of time. Early intervention and better patient outcomes are made possible by prompt detection and reaction to key changes in the health state of emergency patients.

- Increased effectiveness and efficiency of healthcare professionals due to the system's ability to automatically monitor patient conditions and notify healthcare workers of changes, which eliminates the need for manual monitoring and speeds up reaction time.
- Improved patient satisfaction and faith in the healthcare system since patients know that staff is always monitoring their health and will be made aware of any possible problems.

PULSE	SPO2	TEMP-1	TEMP-2	LogDate	LogTime
78.13	94.00	93.93	0.00	4/10/2023	12:03 PM
0.00	0.00	94.53	0.00	4/10/2023	12:03 PM
0.00	0.00	93.54	0.00	4/18/2023	10:13 AM
0.00	0.00	95.51	0.00	4/10/2023	12:04 PM
0.00	0.00	96.11	0.00	4/10/2023	12:03 PM
0.00	0.00	95.71	0.00	4/10/2023	12:03 PM
66.24	94.00	93.93	0.00	4/10/2023	12:05 PM
64.07	0.00	95.12	0.00	4/10/2023	12:05 PM
0.00	0.00	57.98	0.00	4/10/2023	12:05 PM
101.95	94.00	93.54	0.00	4/10/2023	12:05 PM

Fig.2 Result in Cloud

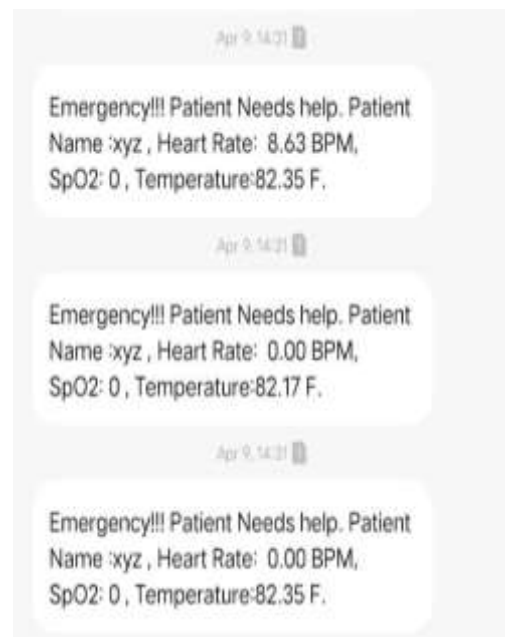


Fig.3 Result in SMS

HARDWARE PICTURE FOR PROPOSED SYSTEM**Fig.4 Hardware****CONCLUSION**

The “Residency-based Emergency Patients Monitoring and Alert System utilizing IoT” has the potential to completely change the way emergency patients are cared for. The system may enable real-time monitoring and early intervention by utilizing the power of IoT technology, improving patient outcomes, boosting efficiency, and raising patient satisfaction. Even if putting such a system into place could be difficult, there are many advantages, and more study and development in this field might have a big impact on how healthcare is provided in the future.

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