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COVID ICU-PATIENT TRACKING SYSTEM USING BLUETOOTH

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Abstract - During this pandemic, we need to keep each other safe and secure. The rapid spread of communicable illnesses, On the contrary, requires more hospitality and doctors, follow up on infectious patients. Our project will let
Doctors monitor patients suffering from COVID-19 and alert those affected person.
In this case, sensor technology is used to keep an eye on patients in critical care in case of an emergency or if a worst-case scenario requires quick action to help the patient recover. To maintain tracking of the patient, sensors such as body temperature, fall detection, pulse sensor, and wetness detection sensors are used. If the patient's condition deteriorates, the system will send a Bluetooth alarm to the relevant person.

Key Words: Covid, Bluetooth, Fall detection, Wetness detection, Body temperature.

1.INTRODUCTION

With the advancement of technology, health monitoring systems are now employed in a variety of settings including hospitals, home care units, and sports. This health monitoring system is used for people with chronic conditions who undergo daily check-ups. Normally, manually keeping track of abnormalizes in heartbeat count for a patient is challenging. Different biomedical sensors, such as a temperature sensor and a heart rate sensor, are used to monitor a person's health and are all integrated into a single system on-chip. Any time there is a significant change, it is reported. This notification would assist in taking proper action at a specific point in time. Patients would be spared from future health problems as a result of this. This would also assist the patient's primary care physician in taking the required action at the appropriate time. ICU patients are constantly monitored by healthcare workers while getting care in hospitals; yet there are no clinical processes for accurately analyzing and understanding pose changes from observations (e.g., films) or the impact of time-based pose patterns on patient health.

Even among patients with identical baseline health issues, ICU patients' recovery varies greatly and frequently inexplicable. A small number of clinical investigations based on body placement and controlled movements have shown that proper positioning can improve patient recovery, but improper positioning can have negative consequences and exacerbate patient health.

Health monitoring systems are being employed in every industry, including hospitals, home care units, and sports, as the globe has progressed.

Most monitoring equipment, on the other hand, are still based on technologies from the 1970s. Patient monitoring is defined as "repeated or continuous observations or measurements of the patient, his or her physiological function, and the function of life support equipment for the purpose of guiding management decisions, including when to make therapeutic interventions and how to evaluate those interventions." Continuous monitoring of patient parameters such as heart rate, saline level, and ICU room environment for patient safety, among others, has become a frequent aspect of critically ill patient care. Medical institutions would be compelled to reduce nurse personnel for patients due to rising labour costs. Our project intends to provide innovative nursing care improvements. The typical heartbeat per minute for a 25-year-old is 140-170 bpm, whereas it is 115-140 bpm for a 60-year-old, with a body temperature of 37 degrees Celsius (98.6 degrees Fahrenheit). Patients are unfamiliar with manual treatment, which is typically used by doctors to keep track of heartbeats. To keep track of internal body changes, various instruments are available on the market. However, due to their high cost, instrument size, and patient mobility, there aremany limitations in terms of maintenance. Various biomedical sensors, such as a temperature sensor, a heart rate sensor, a wetness detection sensor, and a fall detection sensor, are used to monitor the health condition and are integrated into a single system on-chip.

2. EXISTING SYSTEM

In the existing system there is no proper system to monitor ICU COVID Patients health conditions in a remote place.Many people might be careless, and it will affect other people also. In the existing system COVID patients in ICU or Hospital Room are quarantined. Sometimes only doctors visit to check the health status. So, their continuous health monitoring system is essential.

3. PROPOSED METHODOLOGY

In this proposed system can be used to monitor the covid patient in ICU. Here temperature sensor is placed to keep track on the patient's body temperature.

Because temperature is an important for covid patients. Covid patient's temperature varies based on corona level. For covid patients, heartbeat indicates the patient's health status. If pulse rate gets low, it indicates they are in too critical conditions. Mem's sensor attached in this project which is used to find outthe fall detection of the patients in ICU. Wetness sensor is usedhere to detect the blood bleeding because for glucose trips theneedle is injected in the nerves so due to long duration may have a chance for blood bleeding. If it is abnormal the device initiates to the required person through mobile by using Bluetooth technology and alarm for alarming, buzzer is used toindicate the abnormal. If sensor achieves the threshold value microcontroller sends the information to the doctor.

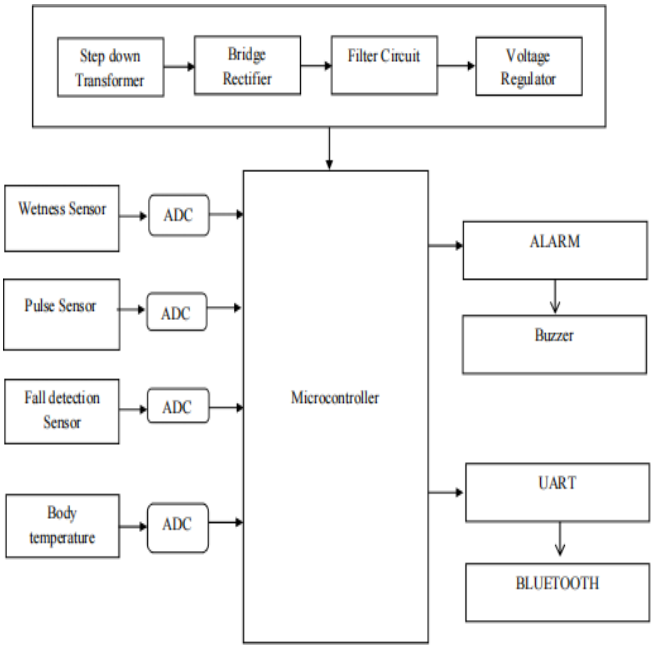

Fig 1: Block Diagram

4. HARDWARE & SOFTWARE USED

4.1 Hardware:

- Arduino Uno
- Heart Rate Sensor
- Wet Sensor
- Fall Detection Sensor
- Body Temperature Sensor
- Bluetooth
- Power Supply
- Buzzer

4.2 Software:

- Embedded C
- Arduino IDE coding

5. COMPONENTS

5.1 Arduino UNO:

The Arduino Uno is an ATmega328-based microcontroller board. It features 14 digital input/output pins (six of which might be used as PWM outputs), six analogue inputs, a 16 MHz oscillator, a USB port, an influence jack, an ICSP header, and a button. It includes everything you need to get started with the microcontroller; simply plug it into a computer via USB or use an AC-to-DC adapter or battery to power it. The Uno is exclusive in this it doesn't employ the FTDI USB-to-serial driver chip found on previous boards. Instead, it uses an Atmega8U2 that has been coded to act as a USB-to- serial converter. In Italian, "Uno" means "one," and it absolutely was chosen to commemorate the upcoming introduction of Arduino 1.0. Moving forward, the Uno and version 1.0 are going to be the reference versions of Arduino.

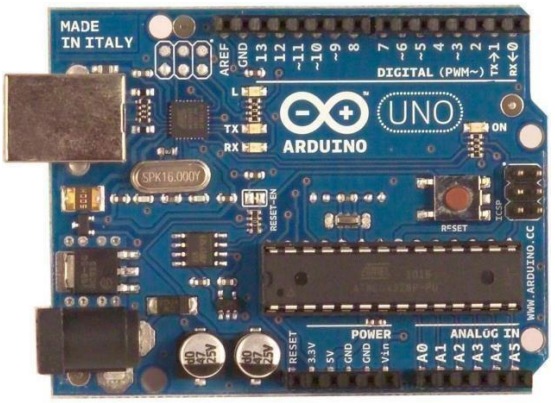

Fig 2: Arduino UNO Board

5.2 HEART RATE SENSOR

Heartbeat sensor is meant to provide digital output of warmth beat when a finger is placed on that. The beat LED flashes in time with each heartbeat when the guts beat detector is working. This digital output is connected to microcontroller on to measure the Beats Per Minute (BPM) rate. It works on the principle of sunshine modulation by blood flow through finger at each pulse.

5.2.1 FEATURES

- Microcontroller based SMD design
- Heat beat indication by LED
- Instant digital signal output for direct microcontroller connection
- Compact Size
- Working Voltage +5V DC

5.3 APPLICATION

- Digital rate monitor
- Patient Monitoring System
- Bio-Feedback control of robotics and applications.

Medical heart sensors are capable of monitoring plant tissue through the tip of the finger or the ear lobe. it's often used for health purposes, especially when monitoring the bodyafter physical training. Heartbeat is sensed by employing a high intensity type LED and LDR. Between the LED and the LDR is a finger.

As Sensor a photograph diode or a photograph transistor will be used. The skin could also be illuminated withvisible (red) using transmitted or reflected light for detection. The minute changes in reflection or transmittance induced by fluctuating blood content in human tissue are nearly imperceptible. Various noise sources may produce disturbance signals with amplitudes equal or maybe more than the amplitude of the heartbeat signal.

As a result, accurate pulse measurement necessitates considerable signal pre-processing. The new signal processing approach presented here combines analog and digital signal processing during a way that both parts is kept simple but together are very effective in suppressing disturbance signals.

Fig 3: Heart-Rate Sensor

A red LED is used for transmitted light illumination, and an LDR is used as a detector in this configuration. With only slight changes within the preamplifier circuit the identical hardware and software may well be used with other illumination and detection concepts. An operational amplifier converts the photo current (AC Part) of the detector to voltage and amplifies it (LM358).

5.4 WET SENSOR

Wet sensor is solely pushed into the water or blood so read directly using the hand-held meter. A tiny low charge is placed on the electrodes and resistivity through the sensor is measured.

Fig 4: Wet Sensor

5.5 FALL DETECTION SENSOR

The A3G4250D can be a low-power 3-axis angular rate sensor ready to provide unprecedented stability at zero rate level and sensitivity over temperature and time. It includes a tool and an IC interface capable of providing the measured angular rate to the external world through a customary SPI digital interface. And I2C- compatible interface is additionally available.

The sensor is manufactured employing an avid micro-machining process developed by STMicroelectronics to produce inertial sensors and actuators on silicon wafers. The IC interface is manufactured employing a CMOS process that allows a high level of integration to style an ardent circuit which is trimmed to raised match the sensor characteristics.

The A3G4250D encompasses a full scale of ±245 dps and is capable of measuring rates with a user- selectable bandwidth. The A3G4250D is out there in a very plastic land grid array (LGA) package and should operate within a temperature range of -40 °C to +85 °C.

Fig 5: Fall detection Sensor

5.6 BODY TEMPERATURE SENSOR

A thermistor can be a form of resistor whose resistance relies on temperature, more than in standard resistors. The word is also a portmanteau of thermal and resistor. Inrush current limiters, temperature sensors (usually NTC type), self-resetting overcurrent protectors, and self-regulating heatingcomponents are all common uses for thermocouples. Thermistors differ from resistance temperature detectors(RTDs) during this the material utilized in a very thermistor isgenerally a ceramic or polymer, while RTDs use pure metals. The temperature response is additionally different; RTDs are useful over larger temperature ranges, while thermistors typically achieve a greater precision within a limited temperature range, typically 90 °C to 130 °C.

Fig 6: Body Temperature Sensor.

5.7 BLUETOOTH

We have all experienced the frustration that comes withattaching peripherals to a computer or connecting other electrical devices, especially when there are a lot of wires to manage. Then we start to think how easy it would be if of those connections were done employing a special way from the physical cables, like infrareds, radio, or microwaves.

The companies of technology and telecommunications needed to develop an opened, low-cost interface to form easier the communication between devices without using cables. This can be often the origin of the technology which key name is "Bluetooth". This could be a fact nowadays, but now another problem arises and is that there are many standards and technologies, incompatible between them. What we did like now's a universal, valid device for the connection of all kinds of peripheral, which works in a very transparent way for the user. This can be often Bluetooth.

In contrast to other existing technologies such as infrared, which is advocated by the IrDA (Infrared Data Association), or DECT, Bluetooth has the backing of the research and telecommunications industries an exceedingly way guarantees the success. Although there is a high number of manufacturers who incorporate the interface IrDA in their telephones, included Ericsson, Motorola and Nokia, the utilization seems to be frustrating for several users who treat without success to download information from their PC or PDAs to their mobile telephones, or contrariwise.

The devices that Bluetooth incorporates are recognized and speak each other within the identical way as a computer does it with the printer. The low price of these products implies that the incorporation in any device supposes a coffee cost for the manufacturer and so the user.

5.8 POWER SUPPLY

Power supply can be a respect to a source of electrical low. A tool or system that supplies electrical orother forms of energy to an output load or group of loads is termed an influence supply unit or PSU. The term is most applied to power supplies, less often to mechanical ones, and sometimes to others. Power supplies for electronic devices areoften broadly divided into linear and switching power supplies. The linear supply could also be a comparatively simple design that becomes increasingly bulky and heavy for top current devices; voltage regulation in an exceedingly linear supply may find yourself in low efficiency. A switched-mode supply of the identical rating as a linear supply are visiting be smaller, is usually more efficient, but are more complex.

5.9 BUZZER

A buzzer, sometimes called a beeper, may be a signaling device. Buzzers want to emit rasping sounds once they were electromechanical devices powered by a stepped-down AC line, hence the name "buzzer." voltage at 50 or 60 cycles. 33 Other sounds commonly accustomed indicate that a button has been pressed are a hoop or a beep. This novel buzzer circuit uses a relay asynchronous with a tiny low audio transformer and speaker. The relay will work via the transformer primary and closed relay contact when the switch is pressed. As soon because the relay operates the normally closed contact will open, removing power from the relay, the contacts close and so the sequence repeats, all very quickly...so fast that the heartbeat of current causes fluctuations within the transformer primary, and hence secondary.

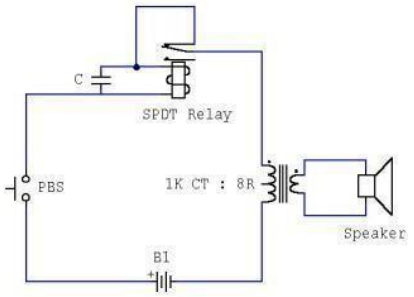

Fig 7: Buzzer Circuit

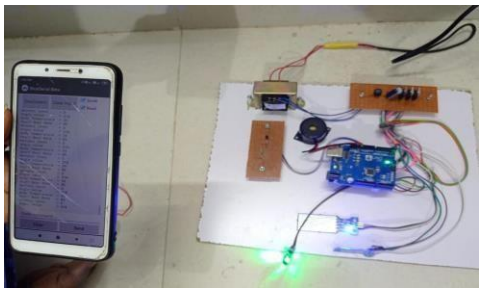

Fig 8: Final Output Projection

Fig 9: Output Values

6. CONCLUSION AND FUTURE SCOPE

For critical conditions, the doctors need to have an all-time update on patients' health-related parameters like their heart pulse and temperature, and wet level. In this way, the Bluetooth Based ICU Patient Monitoring System helps in monitoring ICU Patients without any manual intervention. The output from the sensors circuit is connected to the Arduino. The output from the sensor is fed to Arduino and the counted pulse rate, and temperature are successfully sent via the Bluetooth module.

In the future, we can implement this system through IOT. So that the data can be shared over a long distance. So that we can store all the information and use them when we need it.

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