

Smart Pulse Oximeter

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Abstract

A pulse oximeter is a medical instrument that measures the saturation oxygen level of a blood and pulse rate. The saturation point oxygen level is very important to monitor while a patient is at risk for further process of medication. The method of measuring heart rate and oxygen level conventionally is laborious, prone to errors, and requires the presence of a physician. In this project, we use IOT based smart pulse oximeter to measure oxygen level and heart rate, the values would be stored in an application. By using remote patient monitoring system, individuals can access the data which is stored in an IOT platform. Based on the data received, disease can be detected by the doctors remotely. In this project we use an application to store the data, where it can be viewed through mobile phones.

Keywords: Internet of things, oxygen level, pulse rate, Arduino, Ubidots, Oxygen sensor, Pulse rate sensor.

1. INTRODUCTION

Advancing in terms of health technologies helps to control the major disaster like corona virus. Health is always a major concern in every growth. The good idea to monitor patient's health is by using remote health monitoring system. The solution for this is to use an IOT platform for health monitoring. For the wellbeing of a human being the factors like temperature and pulse will play a major role. Smart pulse oximeter will be very useful for people to see the blood oxygen level and pulse rate. We use oxygen sensor and pulse rate sensor to detect the values. The sensors are connected to a microcontroller and LCD display is also interfaced with microcontroller. The human health is very important. When a person is in a critical situation, person should go to the hospital, which results in unnecessary waste of earning. Especially when an epidemic spreads in an area that is inaccessible to doctors, it takes this into consideration. Smart sensors can be used to prevent the spread of disease and this is the practical solution to save many lives.

2. LITERATURE SURVEY:

IOT based health monitoring systems

Naina Gupta et al. put forward a structure which aims to resolve the issue of time wastage during the ambulatory services and in hospitals, they forces to send the data via GSM module connect through the Bluetooth technology. Routine health check and monitoring the different body parameters with the help of the different sensors attached to the body is the main focus. They focused on developing a small size wearable system that can transfer the data through GPRS to custom networks.

A Smart Health System Monitoring Comatose Patient's Physiological Conditions Remotely

Tati Erlina et al. made a system which is focused to solve the issue of monitoring comatose patient's physiological condition by monitoring heart-beat, respiratory rate & eyelids status. This total system is made to send the data to Android App on the mobile phone on which application is made to show different readings measured. But the solution is failed to hold the security of the system and put the important data on risk.

IoT Based Health Monitoring System using Raspberry Pi

Ashwini Gatte et.al. Proposed an IoT based fitness tracking system of aged persons in which he used different parameters of Body glucose, Blood Pressure, Heart Beat Rate as well activity monitoring etc., with the approach of Raspberry Pi. Gatte also used ECG (Electrocardiogram) sensor for heartbeat and other diseases. He also proposed different IoT based protocols which can be used in this type of system.

3. PROPOSED SYSTEM

People with low oxygen level are clueless about their condition. Majority of the patients don't have time and resource to visit the doctors for medical check-ups. Going to the hospital for these check-up are hassle for older patients who are wheelchair bounded or immobile. This proposed system enables the patients to detect their blood oxygen level at home to ensure the heart rate is normal at different conditions.

The components of our projects are micro-controller, oxygen sensor, heartbeat sensor, Wi-Fi module, LCD display. The sensor contains LED lights to detect the oxygen level of the blood and heart rate. The programmed micro-controller will initiate the sensors and interface with LCD display. The device consists of two LEDs, one will emit red light and the other will emit infrared light. Infrared light is needed to measure heart rate of a human body. The oxygen level in the blood can be measured by using red light and infrared light. The oxygenated blood will rapidly increase when the heart pumps the blood. When the heart relaxes the oxygenated blood will also decrease. Pulse rate can be determined by seeing the time difference between the increasing and decreasing of oxygenated blood. Finally when the fingertip is placed on the sensors the heart rate and oxygen level and heart rate is measured through the transmitting and receiving wavelength of the light. In this project we use an application to see and store a data.

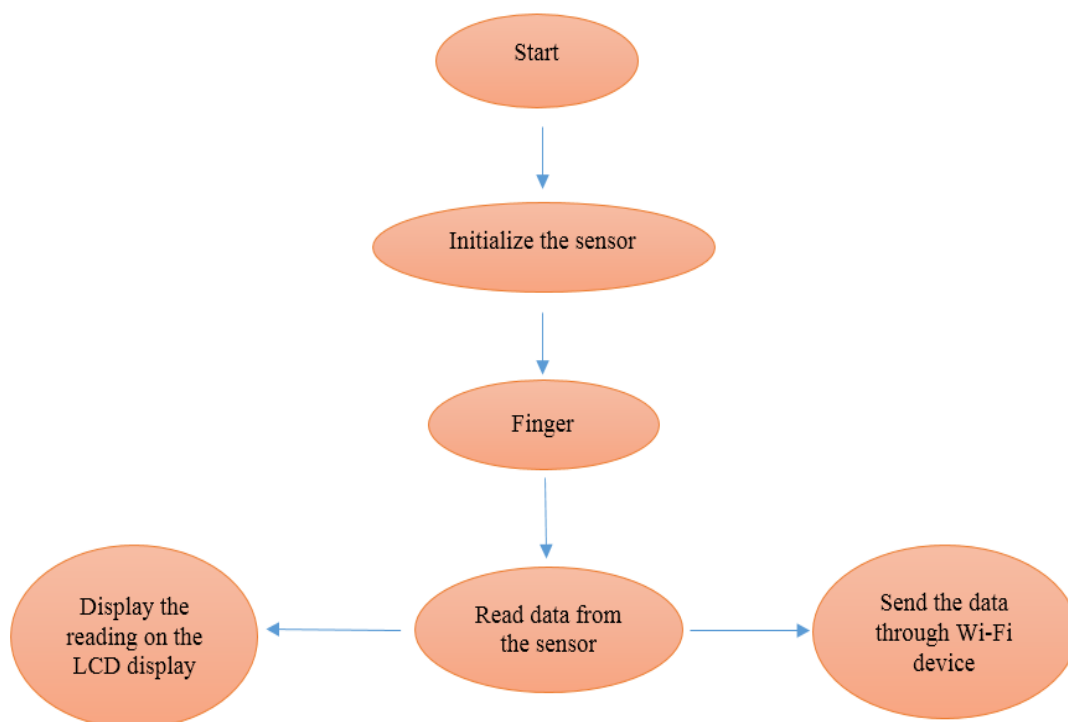


Fig 1. Flowchart of the system

4. BLOCK DIAGRAM

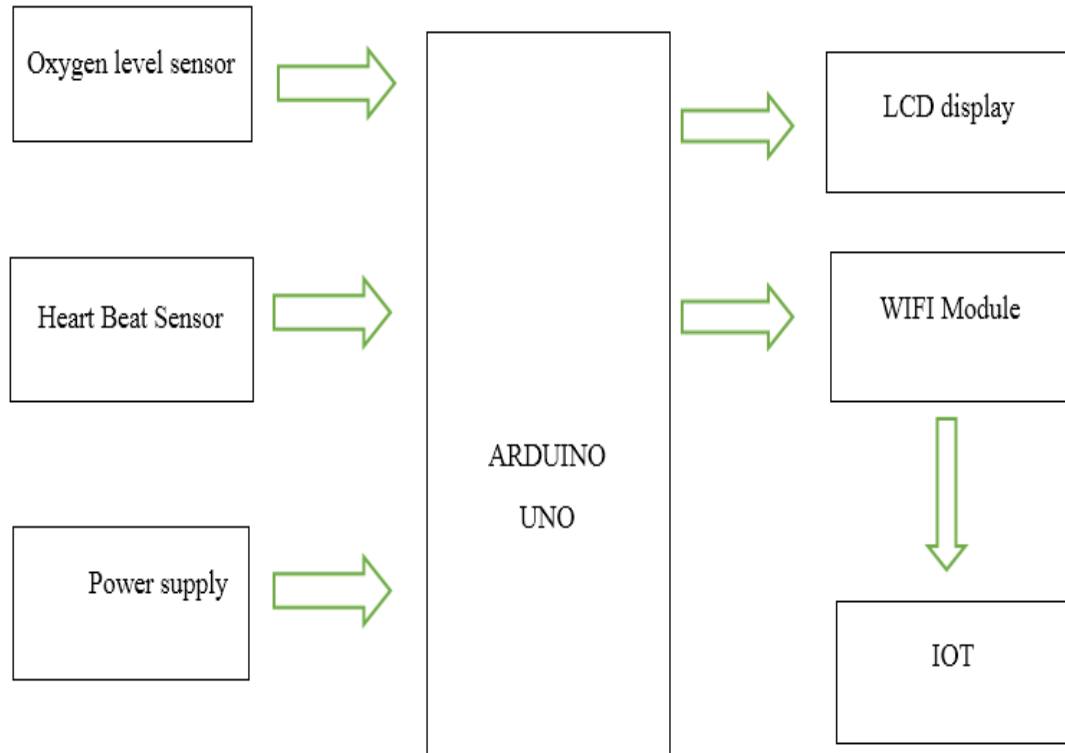


Fig 2. Block diagram of the system

5. WORKING AND RESULT

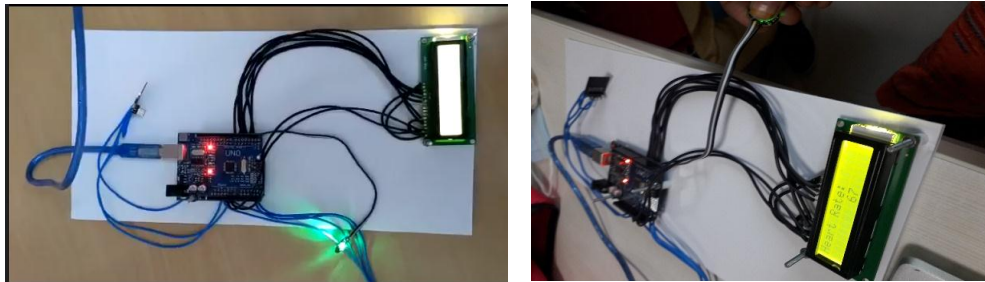
5.1 WORKING:

First we need to upload the code in the arduino board. There are two code one is for Arduino and another one is for Wi-Fi module. The power supply is given to the arduino UNO board. The heart rate sensor and oxygen sensor is connection to the arduino board's analog pin. In this analog pin is acting as input pin. Arduino board has 6 analog pin. When the finger is placed the sensors read the values. The values will be displayed in LCD display. The Wi-Fi module (ESP8266 MODULE) is used here to transfer the data to the server.

5.2 RESULT:

In this project we analyse the values of oxygen level and pulse rate using Arduino. By smart pulse oximeter we can also see and store a data in an application. By this application doctors can detect the patient's heart related problems. The Wi-Fi module is used to transfer the data to the server. The power supply is given to the arduino UNO board. The heart rate sensor and oxygen sensor is connection to the arduino board's

analog pin. In this analog pin is acting as input pin. Arduino board has 6 analog pin. When the finger is placed the sensors read the values. The values will be displayed in LCD display. The Wi-Fi module (ESP8266 MODULE) is used here to transfer the data to the server.



6. FUTURE SCOPE

Blood pressure, blood glucose, respiratory rate are the health parameters which can also be monitored. Machine learning help doctors to detect the disease faster and more accurate. Machine learning is much better than the conventional method and in future it will be one of the greatest support for the doctors in health monitoring system. Furthermore, in case of urgent, when there is an abnormal signal produced from the patient's body, there are some approaches can be added to this project to handle this need. By using SIM800L GSM module, phone calls and SMS can be sent to doctors, patients and ambulance center. Person life can also be saved by Email. By using NodeMCU Email are automatically sent to person's Email account. A wearable DC defibrillator can be attached to the patient body to apply DC shocks automatically when sudden VF (Ventricular Fibrillation) is happening. In future we can also add two or more factors and can do health monitoring kit. In case of emergency patients will get notification through mobile phones and locations will also be sent to the nearby hospital through google maps.

7. CONCLUSION

Nowadays, the Internet of Things is the most suitable solutions for tracking the value in the field of health monitoring. By using the smart pulse oximeter individual parameters like oxygen level and heart rate data is stored in the cloud and doctors can monitor the patient's state remotely. In this project, an IoT based health monitoring system was developed. Smart pulse oximeter check the body's pulse rate and oxygen level and also the values are displayed in the LCD display. The detected values are transmitted to a medical server using wireless communication. The values are received in the smart phone, which help doctor to detect or diagnose the patient's health status. The values can also be stored in an application for further use, it will be very useful for the doctors to say the status of the patient.

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