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Wireless health monitoring and hospital accessing system

Arya A. V.
aryavikraman95@gmail.com
Marian Engineering College, Trivandrum, Kerala

Sneha S. Christopher
snehaschristopher@gmail.com
Marian Engineering College, Trivandrum, Kerala

Ashik Muhammed
ashikmohammedmax@gmail.com
Marian Engineering College, Trivandrum, Kerala

Elza Elezabeth Joseph
josephelzaelezabeth@gmail.com
Marian Engineering College, Trivandrum, Kerala

Nurul Hidaya
nurulsathic@gmail.com
Marian Engineering College, Trivandrum, Kerala

ABSTRACT

The COVID-19 epidemiological situation and death counts are breaking daily records. New cases are reporting everywhere and hence a situation of examining health of an affected emerges. But most of the people (especially elders) are afraid of being affected if they are approaching a health center (or hospitals) and so back up with the decision. In addition to this, those who are suffering with severe respiratory issues are to be monitored continuously. In this project, a prototype of wireless health monitoring system capable of sending information related to the health status of the patient is developed. The project can be divided into two stages of data acquisition & processing, and Communication stages. Data acquisition & processing stage consists of sensors and microcontroller. Sensors monitor temperature, BP, SPO2 etc. of the patient. The output of sensors is converted to digital form and processed by the microcontroller. The details are viewed by the patient on the display and at the same time by the software user who is linked with the microcontroller Wi-Fi. Critical value of the measured data can be set. When they exceed threshold, it will alert the whole system. Once abnormalities are detected, the system transmits the information to the hospital database.

Keywords: *COVID -19, Spo2, Wi-Fi, Health Monitoring System*

1. INTRODUCTION

Wireless health monitoring system involves monitoring of patient's vitals remotely by means of devices that transfers patient data to remote locations wirelessly. We had heard about patient monitoring system. Monitoring is the observation of a disease, condition or one/several medical parameters over time of patient. It can be performed by continuously measuring certain parameters by using a monitor, by repeatedly performing medical test. Covid-19 pandemic was an unexpected guest of 2020.in this pandemic condition, the need for patient monitoring system and its importance in health field are mandatory. Our project with the title wireless health monitoring and hospital accessing system is a type of patient monitoring system. As the name suggest, it is wirelessly health monitoring and access to hospital. According to local survey conducted by us, these are some problems we face now a days (in heath field) regarding Covid conditions.

2. OBJECTIVE

The objective of our project is to provide great support for COVID-19 affected persons who are afraid of being affected if they approach hospitals. Our main aim is to overcome this problem by taking decisions using a microcontroller and access the patient to hospital. The main objective behind this project work is:

- To give physical distancing and the status of the patient to be monitored remotely.
- To eliminate unnecessary hospital rushes and provides service for the needy.
- To make us synchronous sharing of symptoms, medication adherence, and relevant health parameters between the patient and provider

3. HARDWARE REQUIRMENTS

3.1 Temperature sensor

MAX30205 temperature sensor accurately measures temperature and provides an over temperature alarm/interrupt/shutdown output. It converts the temperature measurements to digital form using an analog-to-digital converter. Communication is through

an I²C-compatible, 2-wire serial interface. This temperature sensor evaluation kit (MAX30205EVSYS#) allows designers a convenient way to evaluate the MAX30205 human body temperature sensor.

3.1.1 Board Features

- Quick evaluation of the MAX30205
- USB powered
- Fully assembled and tested
- Windows® 7, 8, and 10 compatible software

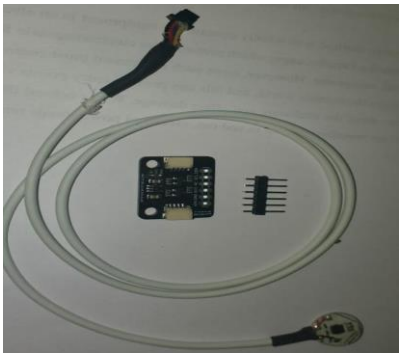

Fig. 1: MAX30205

3.2 Pulse oximeter

A pulse oximeter noninvasively measures the oxygen saturation of a patient's blood. This device consists of a red and an infrared light source, photo detectors, and a probe to transmit light through a translucent, pulsating arterial bed, typically a fingertip or earlobe. In this pulse oximeter oxygenated hemoglobin (O2Hb) and deoxygenated hemoglobin (HHb) absorb red and infrared light differently. The percentage of saturation of hemoglobin in arterial blood can be calculated by measuring light absorption changes caused by arterial blood flow pulsations.

3.2.1 Board Features

- Integrated biometric sensor hub (MAX32664)
- Easy-to-use I2C interface to connect to any host microcontroller.
- Ultra-Low Power
- Algorithms Measure:
- Pulse Heart Rate
- Pulse Blood Oxygen Saturation (SpO2)
- Estimated Blood Pressure
- Dimensions: 35 mm x 17 mm

3.3 Blood pressure sensor:

The MAX32664 is a sensor with embedded firmware and world-class algorithms for wearables. It smoothly enables customer-oriented sensor functionality, including imparting with Maxim's optical sensor solutions and providing raw data to the outside world. The device family interfaces to a microcontroller host via an I2C interface for access to processed sensor data as well as field updates. A firmware bootloader is also provided.

3.3.1 Board Features

- Biometric Sensor Hub Enables Faster Time to Market
- Version A Algorithms Measure Pulse Heart Rate and Pulse Blood Oxygen Saturation (SpO2)
- Version B Algorithm Measures Pulse Heart Rate
- Version C Algorithms Measure Pulse Heart Rate

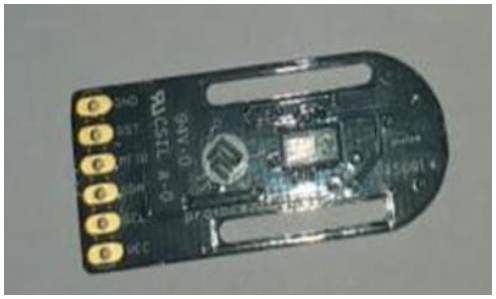

Fig. 2. MAX32664

3.4 Microcontroller

The ESP8266 NodeMCU CP2102 board has ESP8266 which is a highly integrated chip designed for the needs of a new connected world. It offers a complete and self-contained Wi-Fi networking solution, allowing it to either host the application or to offload all Wi-Fi networking functions from another application processor.

3.4.1 Features

- 11 b/g/n Wi-Fi Direct (P2P), soft-AP
- Integrated TCP/IP protocol stack
- Use CH340G to replace the CP2102.
- Open-source, Interactive, Programmable, Low cost, Simple, Smart, WI-FI enabled
- Arduino-like hardware IO
- Integrated low power 32-bit CPU
- Code like Arduino, but interactively in Lua script.

Fig. 3. ESP8266 NodeMCU

3.5 Lcd display

16×2 LCD is named so because; it has 16 Columns and 2 Rows. There are a lot of combinations available like, 8×1, 8×2, 10×2, 16×1, etc. but the most used one is the 16×2 LCD. So, it will have (16×2=32) 32 characters in total and each character will be made of 5×8 Pixel Dots.

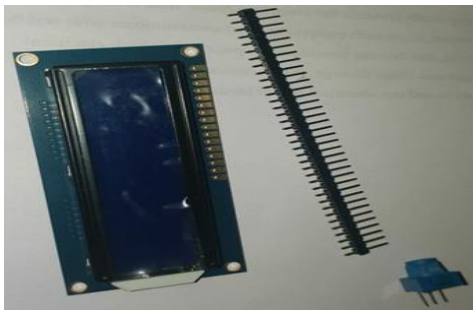

Fig. 4. LCD display

3.6 Battery

Li-ion batteries can use a number of different materials as electrodes. The most common combination is that of lithium cobalt oxide (cathode) and graphite (anode), which is most commonly found in portable electronic devices such as cellphones and laptops. Other cathode materials include lithium manganese oxide (used in hybrid electric and electric automobiles) and lithium iron phosphate. Li-ion batteries typically use ether (a class of organic compounds) as an electrolyte.

4. HARDWARE

- Data acquisition & processing
- MAX30205 collects body temperature, MAX32664 gathers BP & oxygen level
- Node MCU ESP8266 Microcontroller process the data
- Displayed by the device

5. SOFTWARE

Parameters are viewed in a mobile application via Wi-Fi.

6. METHODOLOGY

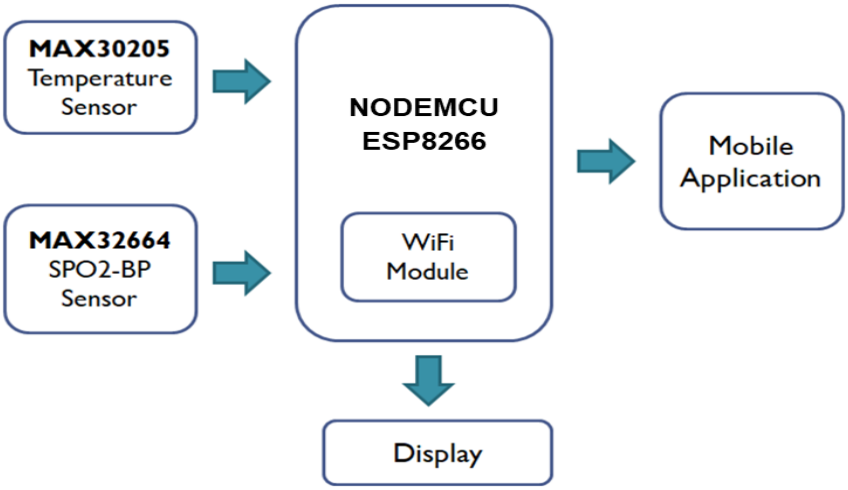

Fig. 5. Block diagram of the system

In this project, we have two sections. One is the Data acquisition and processing stage and other is the communication stage which is handled by a user. Three types of health parameters are measured using various sensors. Temperature is measured using MAX30205; both SPO2 & BP are measured using a single sensor MAX32664.

The output is given to NodeMCU ESP8266 microcontroller for integrating and analyzing the data. The ADC in the MCU converts all the analog outputs to digital form. After processing, the values can be viewed in an external display device as well as on a mobile application via Wi-Fi module within the Microcontroller. If the patient is in unhealthy condition or he/she exceeds the threshold level already set up in the program, the device will generate alarm and at the same time the mobile user gets notified. In addition to this, we need Backup system which includes additional sensors and Power backup facility to overcome failures during operation. When one fails, it will produce alarms and then works on the other.

7. CONCLUSION

In this project we attempt to design a Wireless Health Monitoring System for COVID-19 which measure the parameter of the body & help the patient to access hospital. During the COVID-19 pandemic, the IOT technology has shown very encouraging results dealing with this disease. So it would be successful and useful the society. So in this project we attempt to design a new system, Wireless Health Monitoring & Hospital Accessing System which measure the parameter of the body & help the patient to access hospital. During the COVID-19 pandemic, this technology has shown very encouraging results dealing with this disease. So, it would be successful and useful the society.

8. REFERENCES

[1] School of Science and Engineering, University of Sunshine Coast, Sunshine Coast, Sippy Downs, QLD 4556, Australia; uizhar@usc.edu.au * Correspondence: abashir@usc.edu.au † Presented at the 7th International Electronic Conference on Sensors and Applications, 15–30 November 2020; Available online: https://ecsa-7.sciforum.net/. Published: 14 November 2020

[2] Gibson HM. Managing your wireless spectrum... Making wireless technology work in your hospital. Biomed Instrum Technol. 2006 Suppl:30–36. [PubMed]

[3] Getting the message: results of our survey on cell phone/smartphone policies. Health Devices. 2013;42(4):126–132. [PubMed]

[4] Kapa S, Pierce T, Hayes DL, Holmes DR Jr, Asirvatham SJ. Electromagnetic interference of magnetic field based auto identification technologies in healthcare settings. Int J Med Inform. 2011 Apr;80(4):239–250. [PubMed]

[5] Judgment call. Health Devices. 2012;4110:314–329. [PubMed]

