

# IOT Based Temperature and ECG Monitoring System For Physically Challenged

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**Abstract-** Assisting a physically challenged individual on a daily basis has now become an issue for the present generation. It is not an easy task for a physically challenged individual to visit the doctor for their routine checkup. Hence the main goal is to develop a reliable health monitoring system so that the healthcare professionals can monitor the patients, executing their routine activities. This system provides a wearable device which will continuously monitor the vital parameters such as ECG and temperature. This data is continuously uploaded into the server using the WIFI which is in-built in CC3200. It will collect and transfer the information to the doctor at the earliest because of IoT. IoT ensures the effective and efficient care of the patient in any environment. The usage of these advanced technologies eradicates all complications faced by the physically challenged individual.

**Keywords-** CC3200, ECG module (AD8232), IOT, Temperature Module.

## I. INTRODUCTION

Currently, there is need for a modernized approach. In the traditional approach the healthcare professionals play the major role. There are two basic problems associated with this approach. First is that the healthcare professionals must be present on site of the patient all and second, the patient should be admitted in a hospital, near biomedical instruments, for a period of time. In order to solve these two problems, a reliable and readily available health monitoring system is required. In order to improve the above condition, the technology is used in a smarter way. In recent years, health care modules along with CC3200 play a vital role. Wearable health care modules such as ECG module, temperature module, which remain in contact with the human body enable easy monitoring of the patient

The CC3200 which is a flexible and programmable board provides an easy access to the network. In this system the patient's body parameters (ECG, temperature) are measured with different available modules. These module collected data i.e. biometric information is given to CC3200 and then it is transferred to server.

## II. SYSTEM COMPONENTS

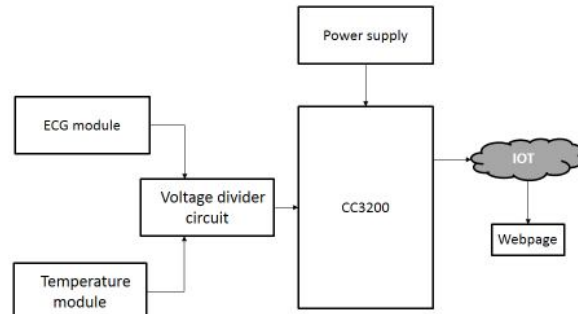
### A. Hardware Devices

- Microcontroller – CC3200
- ECG Module
- Temperature Module
- WIFI in-built in CC3200
- Voltage Divider Circuit

### B. Software Tools

- Energia Software

## III. SYSTEM DESIGN AND FUNCTIONING



In this system some of the vital parameters such as ECG and temperature of a physically challenged person is monitored. ECG module and temperature module is used for the accurate measurements. The microcontroller-CC3200 can accept a voltage of 1.1v but the output from the module is above the threshold value so a voltage divider circuit is used. The output obtained from the modules is given to voltage divider circuit and then to CC3200. The inbuilt WIFI module uploads the processed data into the cloud. So the doctor can monitor the physical condition of patient being away from them. This in turn reduces the risk in travelling to the hospital by the patient. The doctor can continuously monitor and provide instant remedy if any abnormality is detected in the patient.

#### IV. ECGMODULE

This sensor is a cost-effective board used to measure the electrical activity of the heart. This electrical activity can be charted as an ECG or Electrocardiogram and output as an analog reading. The AD8232 is an integrated signal conditioning block for ECG and other bio potential measurement applications. It is designed to extract, amplify, and filter small bio potential signals in the presence of noisy conditions, such as those created by motion or remote electrode placement. The AD8232 module breaks out nine connections from the IC that you can solder pins, wires, or other connectors to. SDN, LO+, LO-, OUTPUT, 3.3V, GND provide essential pins for operating this monitor with a CC3200 or other development board. Also provided on this board are RA (Right Arm), LA (Left Arm), and RL (Right Leg) pins to attach and use your own custom sensors. Additionally, there is an LED indicator light that will pulsate to the rhythm of a heart beat.

#### V. MICROCONTROLLER- CC3200

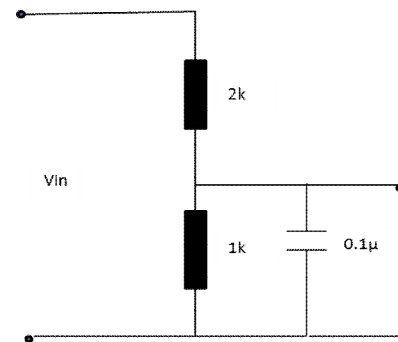
- CC3200 SimpleLink Wi-Fi—Consists of Applications Microcontroller, Wi-Fi Network Processor, and Power-Management Subsystems
- Wi-Fi CERTIFIED™ Chip
- Applications Microcontroller Subsystem
- Embedded Memory
- RAM (Up to 256KB)
- External Serial Flash Bootloader, and Peripheral Drivers in ROM
- 32-Channel Direct Memory Access (μDMA)
- 2 Universal Asynchronous Receivers and Transmitters (UARTs)
- 1 Serial Peripheral Interface (SPI)
- 4-Channel 12-Bit Analog-to-Digital Converters (ADCs)
- Up to 27 Individually Programmable, Multiplexed GPIO Pins
- Wi-Fi Network Processor Subsystem
- Featuring Wi-Fi Internet-On-a-Chip™

#### VI. TEMPERATURE SENSOR

The MAX30205 temperature sensor accurately measures temperature and provide an over temperature alarm/interrupt/shutdown output. This device converts the temperature measurements to digital form using a high resolution, sigma-delta, analog-to-digital converter (ADC). Accuracy meets clinical thermometry specification of the ASTM E1112 when soldered on the final PCB.

Communication is through an I2C-compatible, 2-wire serial interface

#### VI. VOLTAGE DIVIDER CIRCUIT



#### VII. LITERATURE SURVEY

##### A. IOT Based Wearable Health Monitoring System for Pregnant Ladies Using CC3200

This paper presents a health care solution for pregnant ladies by monitoring their health conditions. The doctors staying at distance can monitor the pregnant ladies health condition so that he can save the life of the patient as well as the infant. IOT is used in order to monitor the patient condition easily from anywhere. This is done with the help of CC3200 which enables the uploading the data into the cloud using the inbuilt WIFI module. This paper incorporates the working model to measure body parameters like temperature, heart rate so that the patient condition can be monitored timely and if any critical situation arises then immediate first aid could be given.

##### B. A Tele-medicine System for Measuring Heart Rate, Blood pressure, And Drug Level Detection

This paper presents a current invention for monitoring the patient health by continuous observation. The Patient monitoring system is also a new step in the automation of supervision for doctors. The basic idea behind this system is, it implies that whether a person is at home, on a trip, or at his work place, he/she can stay connected with the doctor and he can take immediate action if necessary. The Telemedicine system for doctors provides solution for this. It continuously provides following information to doctors. Heart pulse rate, Blood Pressure and Drug Level detection. As used in hospital the same system can be used for a person who is not under the continuous observation of doctor, can check his/her vital signs using the sensors in this system if sensors output starts

fluctuating above normal rate hence through GSM network sends an indication to doctor's mobile immediately

### C. Developing Patient Monitoring System Using Android Technology

In this paper the rapid development of telemedicine is applied for the clinical medicine where the information is to be shared from longer distance. Telemedicine can be effectively applied in the field of cardiology and used to develop patient monitoring system using Android Technology. In this system the patients vital signs such as heart beat rate, breathing rate, temperature, SpO2 were monitored. These parameters were uploaded into the web based server and sent to the doctor's phone through ANDROID technology. The doctor can also be able to send the information immediately to the nurse station. In order to achieve better quality of service in health, the advancing technologies provide a lot of ways to monitor the patient continuously. The parameters are initially measured from bed side monitor and interfaced with web based server. Then the information is sent to the doctor's mobile.

### D. Wireless Telemedicine Systems

This paper provides the applications of wireless telemedicine system. The telemedicine provides the sharing of medical information over long distances. It is about providing an expert based medical service to many places. It is said that this system was invented before 30 years at the time of telephone and fax machines were first used as the means of telecommunication. This paper also described about case studies regarding Emergency telemedicine: the ambulance and Emergency, Diagnostic accuracy of an ECG telecardiology service, Electronic patient record: Mobile Medical Data (MOMED).

## VIII. APPLICATIONS

- Hospital
- Patients in rural location

## IX. ADVANTAGES

- Reliable
- Wearable
- IOT based system and hence avoids time wastage

## X. CONCLUSIONS

As health care services for a physically challenged person are important part of in the society, automating these

services reduce the burden on humans and eases the measuring process. Also the transparency of this system helps patients to trust it. When threshold value is reached, the doctors can act more quickly. The objective of developing monitoring systems is to reduce health care costs for the physically challenged by reducing physician office visits, hospitalizations, and diagnostic testing procedure.

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