Review Paper on

PATIENT HEALTH MONITORING SYSTEM USING CAN PROTOCOL

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Abstract: - *In this paper we are dealing with the heart rate monitoring system using CAN protocol which is used to measure the heart rate of one or more patient at a time. The heart rate which is number of times your heart beats per minute (bpm) and send its measured data on CAN bus and it shown on a display. It's a real time monitoring system. In addition we added temperature sensor to measure the body temperature of patient. Control Area Network (CAN bus) is a serial communication protocol which allows microcontroller and devices to communicate with each other through serial communication. The requirement of host computers is eliminated completely by using CAN bus protocol. CAN protocol helps to send data on one system to see all patients measured heart rate as well as body temperature at a time on single monitor by using serial communication using UART.*

Key-Words: Heart rate monitoring, Control Area Control, Serial Communication

1. Introduction:-

We all know how precious human life is and how doctor play crucial role in saving human life. Presently heart diseases are the leading cause of death in the world. When it comes to saving a human life, human vital plays an important role. In this the two main vitals are body heart rate and temperature so if we can measure and monitor vitals of human we can give the doctors some crucial time to save life of human being. Hence new strategies are needed to reduce time before treatment. Monitoring of patient is one of the possible solutions. The main objective of this project is to reduce the time & increase the flexibility. As it can measure the heart rate of more than one person at same time, so it will help doctors to monitor the heart rate of each person from one place. It is portable system.

2. LITERATURE REVIEW

Presently heart diseases are the leading cause of death in the world. Monitoring of patient consistently is difficult for doctors during total working hours. Hence, it is really important to diagnose and monitor accurate heart rate of patient continuously.

Your pulse is usually called your heart rate which is number of times your heart beats per minute (bpm). The heart rate of adult person is around 72beats per minute (bpm) and babies at around 120bpm and older children have heart rate at around 90bpm. Heart rate is measured by placing finger over the person's arterial pulsation, and timing and counting in a 30seconds. The heart rate is calculated by multiplying the obtained no by 2. This method is simple and it is not correct, it may give error

There are two traditional methods to measure the heart rate one is place your fingers on your wrist (Radial artery) and second is on your neck (carotid artery). The sophisticated method to measured heart rate is by ECG (Electrocardiogram) and EEG (Electroencephalogram).

M.K.Islam [3] proposed the study and analysis of ECG signal processing by means of MATLAB tool in 2012. Study of ECG signals includes generation & simulation of ECG signal, acquisition of real time ECG data, ECG signal and processing, feature extraction, comparison between different ECG signal analysis algorithms.

J.S. Prasath [2] proposed wireless monitoring of a heart rate based on microcontroller in 2013. We can record the ECG signals and heart beats of all patient's is display on single computer. Real time analysis of ECG signal and simulation of these signals is done in MATLAB. We can monitor the patient's ECG signal by using Bluetooth transmission and reception in central place. The MATLAB software is used to simulate the ECG waveform.

Larissa Carvalho et al. [4] proposed a non-invasive heart rate monitoring system in 2014, to monitor heart rate of different age groups using Digital Image Processing. The main feature of research is Image processing and computer vision.

R. Archana [6] proposed the measuring the pulse rate by using webcam in 2014. This system measures the physiological parameters of face of different subject's using basic logistic webcam. The pulse waves were

extracted from imaging PPG system. This provides the heart rate by means of non-contact physiological assessment with lab view software.

Aniket Kale [5] proposed the GSM based heart rate monitoring system in 2015. In this system, heart rate and temperature of patient is measured and sends message through GSM module to medical advisory. The drawback of this system, it required a post-paid SIM Card.

Komkrit Chooruang [7] was developed wireless heart rate monitoring system using MQTT. It presents heart rate monitoring system using Wi-Fi module on Arduino microcontroller and Message Queuing Telemetry Transport (MQTT) for messaging protocol, It Is real time system which can remotely monitor the heart rate.

JULIO CESAR BALLESTEROS BORRERO et al. [8] describes the PPG signals measured from wrist which is subjected to distortion and noise in 2016. Signal processing techniques tackle these issues were investigated and implemented. The result of it shows the PPGb as heart rate monitoring on wearable devices.

Varun Goel [1] proposed heart rate monitoring system using fingertip through IOT in 2018.It describes a technique of

Measuring the heart rate through a fingertip and show measured heart beat on LCD display and results over the net using local server as well as global server. This method is simple, is not accurate and can give

Errors when the rate is high.

3. THE PROPOSED SYSTEM

In hospital, it is very difficult to monitor heart rate

of every patient at a time in order to avoid the leading cause of death. This system proposed to monitor the heart rate and body temperature of more than one patient at a time on a single computer. This can be achieved by using CAN protocol as well as serial communication protocol. The microcontroller PIC18F458 is used with heart rate sensor module and temperature sensor LM35 to measure the heart rate. The measured heart rate and temperature is shows on LCD display as well as it is transfer to receiver node through CAN communication. This received data is transferred serially to display it on computer.

Fig: - 1. The Proposed System

The heart rate sensor gives the output in digital output of heart beat when a finger placed on it. To measure the Beats per Minute (BPM) rate heart rate sensor output is directly connected to microcontroller. The working principle of heart rate sensor is light modulation by blood flow through finger at each pulse. The temperature sensor LM35 is used to measure the body temperature. LM35 gives output in centigrade temperature later we will convert it into Fahrenheit.

The Control Area Network protocol is invented by Robert BOSCH to reduce cost of the wiring harness in vehicle. It is used in automotive and industrial control application.

This system consists of two nodes, one is transmitting node and another one is receiving node. The heart rate sensor and temperature sensor is connected to transmitting node. The second node is receiving node to which MCP2551 for CAN data reception and MAX232 is connected for serial transmission of measured data.

The heart rate of person is measured using heart rate sensor which gives digital output pulse. The temperature of patient is measured by LM35 sensor, which output is in centigrade later we convert it into Fahrenheit. This measured data is displayed on LCD with real time and also it is transmitted to another node via CAN communication.

The second node will receive this measured data and transferred it serially to the PC via serial communication.

On single monitor we are able to track the heart rate and temperature of more than one patient at a time..

This project focuses on the design of the heartbeat monitor which is able to monitor the heart beat rate of patient continuously. In this way, it will be easy to monitor the heart rate of patient at the same time which helps doctors a lot.

Objectives of the Proposed work

The objectives of the work would be:

(i) To reduce the time and to increase flexibility. As it can measure heart rate of more than one person at the same time, so it will help doctors to monitor heart rate of each patient from one place.

(ii) To measure accurate heart rate and body temperature of person in real-time

FUTURE SCOPE

- By setting threshold value (proper heart rate according to person's age) for heart rate, we can display message on LCD whether measured heart rate is proper for person's health or not.
- By using wireless communication as Bluetooth, Zigbee, GSM module we can send the person's data to doctor or to the caretaker on their communication modules.

- In future, we can measure blood pressure, sugar level, etc. by interfacing with required sensors.
- We can interface more nodes with more sensors.

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