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HumanTemperature,PulseRateandOxygenMonitoringSystem

PritiUddhavraoBhagat

M.E.studentCSMSS,Aurangabad,Maharashtra.

Abstract: *Now-a-days the whole world is witnessing significant changes in healthcare facilities.Its roleisextending fromtreatmentto prevention andremote patient monitoring.As we know that "Prevention is always better than Cure" it is the need to monitor the health of an individual staying at home so that a person is prevented from the danger of fatal diseases. Now a day corona virus is a dangerous virus spreads all over the world, having visible symptoms of high temperature, breathing problem, low oxygen level. If a person has a mild case of COVID-19 and is self-treating at home, than this device can be a helpful for checking oxygen levels and temperature. So that low oxygen levels and high temperature can be check regularly. Not only for covid-19 patients but it can be also useful for other heart patients to help in reducing the frequent visits to the clinic and also help in early diagnosis of dangerous diseases.*

Keywords:Oxygenlevel,bodytemperature,heartrate.

1. Introduction

Heart disease is the number one cause of death in the world. The heart functions to pump bloodflowingthroughtheveinsorarteriestoall partsofthe body.In the bloodcontainsmany levels of molecules or constituents, such as oxygen in blood HbO2 (oxyhemoglobin). This study aims to design a system used to measure changes in voltage fluctuations to the transducer (photoplethysmography), oxygen saturation and changes in body heat. Firstly we will see the parameters to be check on this system

1.1. Temperature

Normal human body temperatureisaconceptthat depends uponthe placeinthebody at which the measurement is made, and the time of day and level of activity of the person. Thereis nosinglenumberthatrepresentsa normal orhealthytemperaturefor allpeople under all circumstances using any place of measurement. . The commonly accepted average core body temperature (taken internally) is 37.0 °C (98.6 °F). The typical oral (under the tongue) measurement is 36.8±0.7 °C, or 98.2±1.3 °F. From the home to the hospital and everywherein between large number of people rely on digital thermometers to take fast, accurate reading of a patient's body temperature.

1.2. Oxygensaturation

Oxygen saturation is defined as the ratio of oxhemoglobin to the total concentrationof hemoglobin present in the blood. A hemoglobin molecule can carry a maximum of four oxygen molecules. 2000 hemoglobin molecules can carry a maximum of 8000 oxygen molecules; if they together were carrying 7200 oxygen molecules, then the oxygen saturation level would be 90%. An instrument measures the oxygen saturation level of a patient's body.

1.3. Heartrate

For an adult, a normal resting heart rate ranges from60 to 100 beats per minute (bpm). For a well-trained athlete, a normal resting heart rate may be as low as 40 to 60 bpm.In healthy adults, a lower heart rate at rest generally implies more efficient heart function and bettercardiovascularfitness.Tomeasureyourheartrateathome,simplycheck yourpulse. Placetwofingersonthethumbandthird

finger on your neck to the side of your windpipe. When you feel your pulse, look at your watch and count the number of beats in 15 seconds. Multiply this number by 4 to get your heart rate per minute.

2. Literaturesurvey

Care of critically ill patient, requires spontaneous & accurate decisions so that life-protecting & lifesaving therapy can be properly applied. Statistics reveal that every minute a human is losing his/her life across the globe. More close in India, everyday many lives are affected by heart attacks and more importantly because the patients did not get timely and proper help .now a day's corona virus is spread all over the world This paper is based on monitoring earlier symptoms of covid 19 which are high temperature, high pulse rate. In the field of health monitoring the current most importantuser groups are those aged40 and more. The group of 40+ users shows more diversity in their health conditions than younger people. There are ring-type pulses monitoring sensor available in the market in which the measured data are displayed in the LCD. Thus, it is not possible to monitor the vital parameters such as temperature, pressure and pulse. In a hospital either the nurse or the doctor has to move physically from one person to another for health check, which may not be possible to monitor their conditions continuously. Thus any critical situations cannot be found easily unless the nurseordoctorchecksttheperson'shealthatthatmoment.Thismaybeastrainforthedoctors who have to take care of a lot number of people in the hospital. In order to make self monitoring the system can be used to monitor physiological parameters, such as temperature and heart rate, of a human subject. The system consists of an electronic device having several sensors to measure different vital signs; the person is monitored within his own home. This device senses the person's temperature and heart rate and displays it. So it is easy to take the readings. Currently there are number of health monitoring systems available for the patients. The available systems are huge in size. To visit to the hospital Regular for a patient is not possible once he/she is discharged from hospitals, or he/she is more aged or because of spreading virus. These systems cannot be used at home. So to overcome limitationsof systems I have proposed a new system. This system is able to check the parameters of patient and if the condition is critical than only go to the hospital, and if the readings are normal then they not to worry

3. Proposedsystemdesign

The system can monitor the human temperature, oxygen and heart rate. It uses alcd display the data. The structural frame of the system is shown in Figure l.A cortex m3 processor is used for processing the data. The system having two inputs one is temperature sensorand pulse oxymeter.in temperature sensor a black thermister is used to sense thehuman body temperature. By a touch it senses the tempeture and display it on lcd.pulseoxymeter measure heart rate and oxygen level of the person and display on thelcd ,a16by 2 lcd display is used to show the data.

3.1. Hardwaredesign

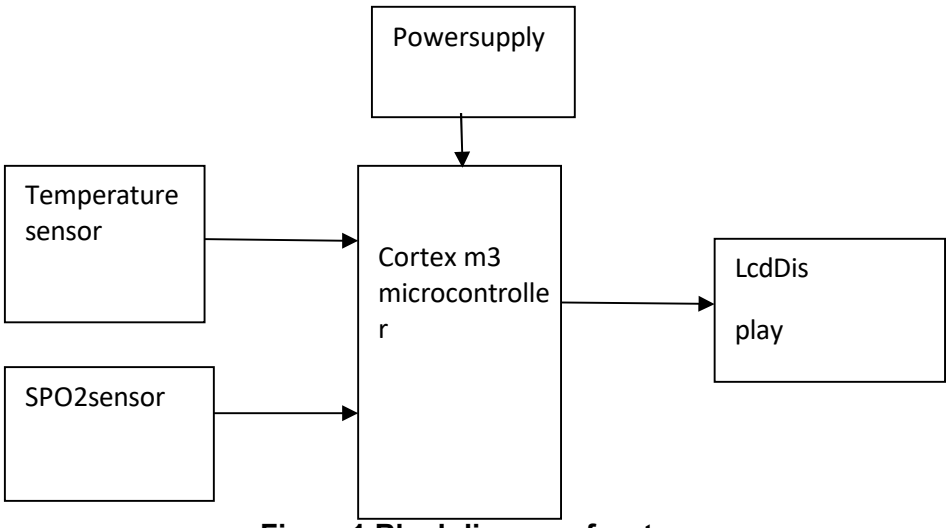

Figure1.Blockdiagramofsystem

3.1.1. ARMCortex-M3RISCprocessor

Atmel'sSAM3X/Aseries is a member of a family of Flashmicrocontrollers based on the high-performance 32-bit ARM Cortex-M3 RISC processor. It operates at a maximum speed of84 MHz and features up to 512 Kbytes of Flash and up to 100 Kbytes of SRAM. The peripheral set includes a High Speed USB Host and Device port with embedded transceiver, an Ethernet MAC, 2x CANs, a High Speed MCI for SDIO/SD/MMC, an External Bus Interface with NAND Flash controller, 5x UARTs, 2x TWIs, 4x SPIs, as well as 1 PWM timer, 9x general-purpose 32-bit timers, an RTC, a 12-bit ADC and a 12-bit DAC.

3.1.2 Temperaturesensor

This is a Negative Temperature Coefficient Resistor Whose resistance changes with ambient temperature changes. Thermistor comprises 2 or 4 kinds of metal oxides of iron, nickel,cobalt,manganeseand copper, being shapedand Sinteredat hightemperature(1200℃ to 1500℃). in this system the temperature sensor get analog output. Whenever a person touchesthesensoritit willchangestheresistanceofthesensorasperthebodytemperatureof the person in normally human body temperature is 36.5 to 37 degree c.So as temperature changes resistance changes. This resistance will be converted into voltage and then calibrated into degree temperature. Thus we get a digital reading of temperature in degree Celsius on

display.Soapersoncaneasilygethis/hertemperature.

3.1.3 Pulseoxymeter

To measure pulse rate and oxygen level of the person an integrated pulse oximetry and heart rate monitor sensor is used. It combines two LEDs, a photodetector, optimized optics, and low-noise analog signal processing to detect pulse oximetry and heart-rate signals. It operates from 1.8V and 3.3V power supplies and can be powered down through software with negligible standby current, permitting the power supply to remain connected at all times. Whenever a person touchesthe sensoritmeasure the heart beats as well as the level of pick .a normal human heart rate is 70 to 80 and oxygen level is 95 to100.after getting all these data thesystemwill displaythisinformationonlcddisplay.Ageneralblockdiagramofthesystem is as shown below.

4. Flowchartofsystem

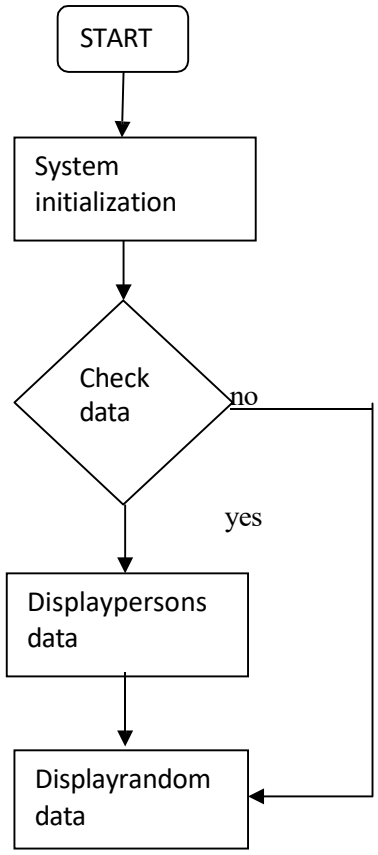

Figure2.Flowchartofthesystem

Above figure shows the flow chart of the system. When a person touches the sensors it will display the data on lcd display.

5. Result

The final result of the system is we get a person's heart rate, body temperature and oxygen level on the display. A sixteen by two display is used to show the data, on that digital reading are displayed so anyone can easily detect and read the parameters. By checking the readings of parameters one can detect patients health But, if the readings are not in normal range then a person can immediately visit to the doctor. As shown in picture 1 three parameters are displayed where T is temperature, HR is heart rate and SPO2 is the oxygen level.

Picture1.Displayofdata

4.Summary

This system achieves the monitoring of multiple physiological signals and completes the real-time display of data. The system created in this study has been able to work in accordance with the planning, which can measure heart rate, oxygen saturation in blood and body temperature. The sensor response time is average when the tool is turned on for approximately 10 seconds.

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