SMART CHAIR FOR THE DETECTION OF THE BODY VITAL PARAMETER

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Abstract: Design and implementation on chair to measure vital body parameter or display the output with help of sensor. Variable device can be monitor and record real time information about one's physiological condition and motion activates. The invention relates to an apparatus for measuring the vital function of subject used chair on a corresponding means suitable for sitting in on the chair and measuring one or more data using sensor are placed in the chair and give the final output and it's also used for non-medical means home service. A smart chair design a diagnose chair that can measure non-intrusive of biology signal Like, Temperature, Pulse rate, Respiration rate, and Heart rate. Where different type of sensor are used for different parameter temperature measured by LM 35. Respiration rate measured by Mask sensor. For reduce the cost we make mask sensor with the help of IR sensor.Heart rate & SpO2 measured by Max30100 sensor after placed the sensor on subject body and give the output from LCD display.

Index Terms - Health care, Physiological body parameters, sensors, Controller..

I. INTRODUCTION

An undertaking is a keen seat to gauge essential body parameter and show the yield with assistance of sensor with composed structures for checking of a couple of critical parameters, including circulatory strain and heartbeat. [2, 3]There are four fundamental crucial sign body temperature beat, beat (pulse), and breathing rate (respiratory rate), oftentimes documented as BT, HR, and RR. Normally to just vitals are a get-together of the 4 to 6 most basic signs that demonstrate the status of the body's basic (life-supporting) limits. These estimations are taken to help assess the general physical soundness of a man, offer snippets of data to possible afflictions, and show advance toward recovery. The typical goes after a man's basic signs move with age, weight, sexual introduction, and as a rule prosperity. In any case, dependent upon the clinical setting. The rigging required is a thermometer, a sphygmomanometer, and a watch. Regardless of the way that a heartbeat can be gotten a handle on by hand, a stethoscope may be required for a patient with an amazingly weak heartbeat that various sensor and anode is utilized for getting physiological signs like as SPO2 finger sensor (IR sensor), circulatory strain sleeve and temperature test to gauge the physiological signal. [4–6].



Figure: 1 Basic Proposed-Diagram

It is exceptionally essential to nonstop screen the fundamental physiological indications of the individual and quiet or that framework has dependably been involving a critical position in that field of therapeutic device.in the past predominant items fabricate by medicinal gadget are basically those for single parameter measure now day multi-parameter are estimated. [4, 10]. Most ailments of the heart and the circulatory framework. Alluded to as cardiovascular illnesses, strike all of a sudden and brief treatment is required if passing is to be maintained a strategic distance from .such treatment is best given in a specific territory of emergency clinic alluded to as "intensive care unit". These specific medical clinic, homecare units or rec center give perception of the subject. The subject physiological condition and give quick crisis treatment at whatever point it is required. treatment of sicknesses of the circulatory framework, for example, stroke.

Pulmonary serious consideration units are utilized for treatment of respiratory ailments. Multi connector link interfaces the yield from four subject observing locales. Some focal station copy indictor for relative respiratory action and body temperature. In this, sensors embed on seat that measure fundamental parameters like temperature, breath, pulse, Spo2 respectively sensor is LM35, veil sensor and Max30100. The ordinary body temperature rate is 36 to 37.5C and breath rate is 12 to 20 breath for each moment, heart beat 60-100 and Spo2 is 94%to100% when this rate underneath point of confinement or more utmost the ringer will be enacted and give demonstrate the some irregularity that perusing will be show on LCD. And furthermore these parameters are show on the LCD screen. [17].

II. STUDY AND MEASURES OF VITAL SIGNS PARAMETERS

A. Temperature

Temperature recording offers an indication of center temperature that is generally firmly controlled (thermoregulation) because it influences the speed of concoction responses. Temperature is preserved through associate degree effort of the heat created by the body and also the warmth lost from the body. Temperature is recorded keeping in mind the tip goal to line up a pattern for the person's traditional temperature for the positioning and estimating conditions. The principle purpose behind checking temperature is to request any indications of basic malady or irritation inside the sight of a fever (temp > thirty seven.5 $^{\circ}C/101.3$ $^{\circ}$ F or managed worker > three8 $^{\circ}$ C/100.4 $^{\circ}$ F), or hoisted altogether over the person's traditional temperature. Completely different reasons for raised temperature incorporate hyperthermia. Temperature discouragement (hypothermia) likewise ought to be assessed. it's likewise noteworthy to audit the pattern of the patient's temperature. A fever of thirty eight °C isn't very showing associate degree ominous sign if the patient's past temperature has been higher. Temperature discouragement (hypothermia) likewise ought to be assessed. it's likewise noteworthy to audit the pattern of the patient's temperature. A fever of thirty eight °C isn't very showing associate degree ominous sign if the patient's past temperature has been higher. A temperature detector could be a contrivance, ordinarily, a thermocouple junction or RTD, that accommodates temperature estimation through associate degree electrical flag. A thermocouple junction (T/C) is made victimization 2 completely different metals that make electrical voltage in direct extent to changes in temperature.

B. Respiratory rate

Fluctuates with age, but the traditional reference choose a grown-up is 16–20 for each moment. The estimation of rate of respiration as a marker of potential metabolism brokenness has been researched nonetheless discoveries propose it's of restricted esteem. rate of respiration could be a affordable pointer of pathology states, because the principle capability of breath is evacuation of carbon dioxide departure hydrogen carbonate base offered to be used.

C. SpO2rate

SpO2 stands for peripheral capillary gas saturation, associate estimate of the quantity of gas within the blood. a lot of specifically, it's the share of ventilated haemoglobin containing oxygen compared to the overall quantity of haemoglobin within the blood (oxygenated and non-oxygenated haemoglobin). SpO2 is associate estimate of blood vessel gas saturation, or SaO2, that refers to the quantity of ventilated haemo protein within the blood. Haemo protein could be a protein that carries gas within the blood. it's found within red blood cells and provides them their red color.SpO2 are often measured by pulse oximetry, associate indirect, non-invasive methodology (meaning it doesn't involve the introduction of instruments into the body). It works by emitting so gripping a light-weight wave passing through blood vessels (or capillaries) within the tip. A variation of the sunshine wave passing through the finger can offer the worth of the SpO2 measuring as a result of the degree of gas saturation causes variations within the blood's colour. This price is diagrammatic by a proportion. If your Witlings Pulse Ox[™] says ninety eight, this suggests that every red corpuscle is formed from ninety eight ventilated and a pair of non-oxygenated haemo protein. Traditional SpO2 values vary between ninety five and a thousandth.

D. Heart rate

Heart rate is the speed of the heart beat measured by the no. of contraction and relaxation of heart per minute (bpm). The normal value of heart rate is 60 to 100 bpm. If any changes in normal heart activity it is consider as abnormality related to the heart and it will lead to cause some life threating heart diseases like ventricular fibrillation, tachycardia (Fast heart beat) and bradycardia (low heart beat).

III. LITERATURE SURVEY ON EXISTING SYSTEM

Most of the system have different different sensors and placed on body. Like for temperature there is thermometer for heart rate there is heartbeat counter for SpO₂ different fingertip sensor or probe. So that system is bulky and time consuming that system is also costly. And the multi para monitor which have sensors combined in one system but it's size increase and costly.

If in emergency case they connect all these things and then check up so may the patient lose their life. And in emergency different sensors attached with patient is irritating for patient so that we decide to make a chair like this to measure vital body parameters.

IV. PROPOSED SYSTEM

In that project the most purpose is mensuration completely different important body parameter Like vital sign, pulse rate, heart rate, or respiration rate the construct that system is comprised or anyplace either any time may be measured.



Basic Block-diagram of scmvp

LM35 (Temperature sensor)

For body temperature measurement we use LM 35 sensor. we put the sensor on rest arm finger is placed on the sensor so it gives the readings of body temperature on LCD display. It is Calibrated Directly in Celsius so we can take output directly in Centigrade. Low-Cost Due to Wafer-Level Trimming and it is Operates From 4 V to 30 V.



Max30100 sensor for SpO2 and Heart rate

This device is used to measure SpO₂ and Heart rate. The device has 2 LEDs, one emitting a red light-weight, another emitting infrared emission. For SpO₂ rate, solely the infrared emission is required. each the red light and infrared emission is employed to live O levels within the blood. Once the center pumps blood, there's a rise in aerated blood as a results of having additional blood. Because the heart relaxes, the quantity of aerated blood conjointly decreases. By knowing the time between the rise and reduce of aerated blood, the heart beat rate is decided. It seems, aerated blood absorbs additional infrared emission and passes more red light whereas deoxygenated blood absorbs red light and passes more infrared light. this can be the most perform of the MAX30100.



Mask Sensor for Respiration Rate

For respiration we are going to create mask device with the assistance of IR sensor and one plastic pipe. we tend to place plastic pipe and during this thermo Cole ball. Once someone takes breath the ball will move one aspect to a different side therefore the transmitter and receiver can discover that movement and thru that we are able to count the breaths per min. associate infrared device is an device. That emits so as to sense some aspects of the environment. associate IR device will live the warmth of an object still as detects the motion. These sorts of sensors measures solely infrared emission, instead of emitting it that's known as a passive IR device. typically within the spectrum, all the objects radiate some style of thermal radiations.



These kinds of radiations are invisible to our eyes which will be detected by an infrared detector. The electrode is solely associate IR crystal rectifier (Light Emitting Diode) and also the detector is simply an IR photodiode that is sensitive to IR lightweight of the identical wavelength as that emitted by the IR LED. once IR lightweight falls on the photodiode, The resistances and these output voltages, amendment in proportion to the magnitude of the IR lightweight received

• ADVANTAGES:

- > This device provides real time analysis of the patient health parameters.
- ▶ If we use smart chair so no need to connect different types of sensors.
- ➢ It is very easy to use and save the time.
- In emergency condition no need to check parameters one by one only seating on a chair and their parameters are checked.
- > If any patient's parameters will high or low then the alarm alter system can activate so that observe can identify.

APPLICATION

Hospital:

In hospital if any emergency is occur and the nurses or Doctors are not available so at that time patient just sit on chair and wear a mask so the parameters will check. After that if any abnormality is diagnose so buzzer will active and doctor know that any critically ill patient is there.

Home:

If any paralyzed patient or any disable patient who can't go to the hospital they also easily check their parameters with the help of this project.

Gym:

In Gym or any fitness center after doing exercise they should have to check temperature, heartbeat, respiration etc.

• **RESULT ANALYSIS**

The smart chair is kind of project were body's different parameter are displayed on LCD screen and impotent parameter are body are body temperature, heart rate, reparation rate and spo2.that is suitable for any patient who has come for checkup as this above mentioned parameter are so useful to measure this chair not only useful hospital but also used for home, gym, fitness centre, etc.



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As a person or patient seat on chair than he/or she wear mask that measure reparation rate that result given in Breath's per min approximately in adults 12 to 20 Bpm and in children 20 to 30. Then the one hand on chair that measure body temperature that show result is 36.5 to 37.5 Celsius(97.8 to 99 Fahrenheit) for healthy adult. And other hand measuring heart rate and spo2 that will be show normal rate is 72 beats per minute(BPM) or spo2 is show in percentage should be 94 to 100 % that is indicates a healthy level of hemoglobin carrying oxygen through the blood.

