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IOT SMART HEART MONITORING SYSTEM

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***Abstract* - The project is named" IOT SMART HEART MONITORING SYSTEM ". With the development of technology, we can digitally sense body temperature and heart rate using Arduino in this project. Mainly Arduino is used because it can sense the environment by receiving input from a variety of sensors and can affect its surroundings by controlling lights, motors, and other actuators. The microcontroller on the board is programmed using the Arduino programming language. LM35 is used for the sense of body temperature. Body temperature is a basic parameter for monitoring and diagnosing human health. A heartbeat sensor was used for sensing heart rate. This device will allow one to measure their mean arterial pressure (MAP) in about one minute and the accurate body temperature will be displayed on the Android. The system can be used to measure physiological parameters, such as Heart rate (Systolic and Diastolic), Pulse rate.**

Keywords:--- ***Arduino; Heart rate; blood heat.***

I. INTRODUCTION

According to the constitutions of the World Health Organization (WHO), the highest attainable standard of health is a fundamental right for an individual. As we are truly inspired by this, we attempt to propose an innovative system that puts forward a smart patient health tracking system that uses sensors to track patient vital parameters and uses the internet to update the doctors so that they can help in case of any issues at the earliest preventing death rates. Patient Health monitoring using loT is a technology to enable monitoring of patients outside of conventional clinical settings (e.g. in the home), which may increase access to care and decrease healthcare delivery costs. This can significantly improve an individual's quality of life. It allows patients to maintain independence, prevent complications, minimize personal costs. This system This system facilitates these goals by delivering care right to the home. In addition, patients and their family members feel comfort knowing that they are being monitored and will be supported if a problem arises.

The area of work of this undertaking depends on Gadgets Correspondence and Software engineering. This venture is essentially finished by Ardunio. Since Arduino can detect the climate by getting input from an assortment of sensors and can influence its environmental elements by controlling lights, engines, and different actuators so Arduino is a principal part of this venture. Arduino coding is required for detecting pulse and internal heat levels by utilizing Arduino programming. Through this project, I‟m presenting Programming and equipment execution.

II. LITERATURE REVIEW

- K. S. Shin and M. J. Mao Kaiser studied a cell phone-based health monitoring system with self-analysis which incorporates loT a new paradigm that uses smart objects which are not only capable of collecting information from the environment and interacting with the physical world but also to be interconnected with each other through internet to exchange data as well as information.

- Loren Schwiebert, Sandeep K.S. Gupta and Jennifer Weinmann studied the strength of smart sensors which are developed from the combination of sensing materials along with combined circuitry for other biomedical applications.

- JL. Kalju developed a system, which is capable of measuring different physiological parameters and are used to design a system for heart rate reconstruction for rate-adaptive pacing.

- Cristina Elena Turcus studied Health care applications a solution based on the Internet of Things survey that aims to present detailed information about how radio frequency identification, multi-agent and Internet of Things technologies can be used to develop and improve people's access to quality and health care services and to optimize the health care process.

- Gennaro tartaric and Tabilo Paniclo had studied Maintaining sensing coverage and connectivity in large sensor networks mainly including the information about how to build or develop a new computational technology based on clinical decision support systems, information processing, wireless communication and also data mining kept in new premises in the field of personal health care.

III. METHODOLOGY

Arduino ATMEGA2560: Arduino will sense the atmosphere by receiving input from a spread of sensors and might affect its surroundings by dominant lights, motors, and different actuators.

Jumper Wire: wire is the part accustomed to connecting the complete part through the breadboard. Wires square measure should for the affiliation within the breadboard.

Breadboard: This part is employed as a result of it'll be the bottom of our device all the connections square measure being connected by this base.

LM35 temperature sensor: This part is chosen as a result of this can be the sole sensor that is employed to live the blood heat accurately.

Heartbeat sensor: The sensor is an accustomed sense the guts rate every second.

Heartbeat sensing mechanism

Heartbeat is sensed by the guts beat pulse sensing element within which we can live the guts rate per minute.

Fig. 1. Heartbeat sensor

We wire the pulse sensor to the Arduino as following: S of pulse sensor -> A0 of Arduino „-„of pulse sensor - >GND of Arduino „+‟ of pulse sensor -> +5V of Arduino device has an advantage over linear temperature sensors calibrated in degrees Kelvin because the user is not required to subtract a large constant voltage from its output to obtain convenient Fahrenheit scaling.

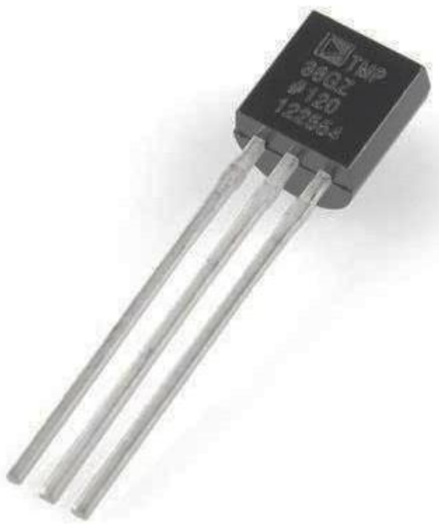

Fig.2. LM35 temperature sensing element

ARDUNIOmega2560

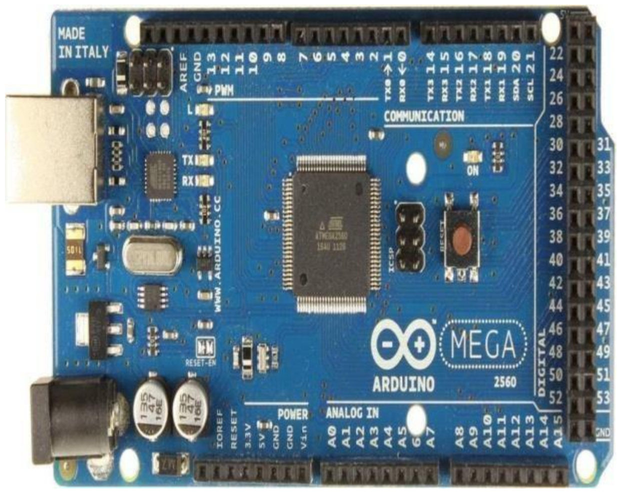

Fig. 3. Arduinomega2560

The Arduino Mega is a microcontroller board based on the ATmega 1280 (datasheet). It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 analogue inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

PROCESSING DATA

Heart Rate Calculation:

$$sum = \sum_{i=1}^{30} FreqMeasure.read()$$
$$frequency = F\_CPU / (sum / 30)$$
$$BPM = frequency * 60$$

Body Temperature Calculation

Voltage to Temperature conversion: Temperature in degree Celsius,
Temp = Output voltage * 0.48828125

Celsius degree to Fahrenheit degree conversion: Temp= (Temp*1.8) +32.

IV. RESULT AND ANALYSIS

Pulse is estimated by utilizing two numbers. The main number is called systolic pulse which estimatesthestraininourveins wheoururheartbeatss. The subsequent number is called diastolic pulse which estimates the tension in your veins when your heart rests between pulsates. Assuming the estimation peruses 120 systolic and 80 diastolic, you would agree "120/80 mmHg."A pulse under 120/80 mmHg is ordinary. A pulse of 140/90 mmHg or more is excessively high. Individuals with levels in the middle of 120/80 and 140/90 have a prehypertension condition, which implies they are at a high gamble for r high pulse.

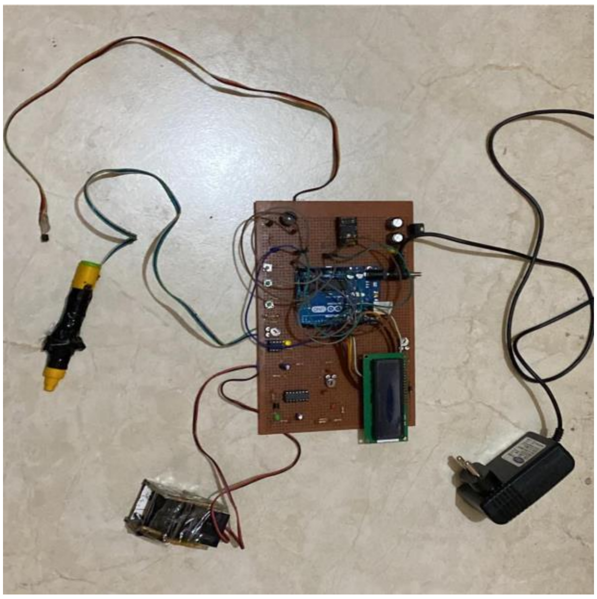

Fig. 4. Operating of project

Body Temperature

Body temperature	
Normal:	The average normal temperature is 98.6°F (37°C). But "normal" varies from person to person.
Abnormal:	Oral, temporal artery temperature Fever: 100.4°F (38°C) to 103.9°F (39.9°C) High fever: 104°F (40°C) and higher
	Armpit (auxiliary) temperature Fever: 99.4°F (37.4°C) to 102.9°F (39.4°C) High fever: 103°F (39.5°C) and higher
	A rectal or ear temperature of less than 97°F (36.1°C) means a low body

Table.1

Heart rate

Normal	Systolic rate is lesser than 120 mmHg and diastolic rate is lesser than 80mmHg
At risk (prehypertension)	Systolic rate is higher than 120–139 mmHg and diastolic rate is higher than 80–89 mmHg
High	Systolic rate is 140 mmHg or higher diastolic rate is 90 mmHg or higher

Table.2.

WORKING

If we tend to connect it to the Arduino we can live the guts rate and blood heat like this.

FOR TEMPERATURE SENSOR:

The output of the measure of the blood heat in Fahrenhethe is scale. It will show the correct results of the temperature of the body. Blood heat may be a

Live of the body's ability to get and acquire eliminate heat.

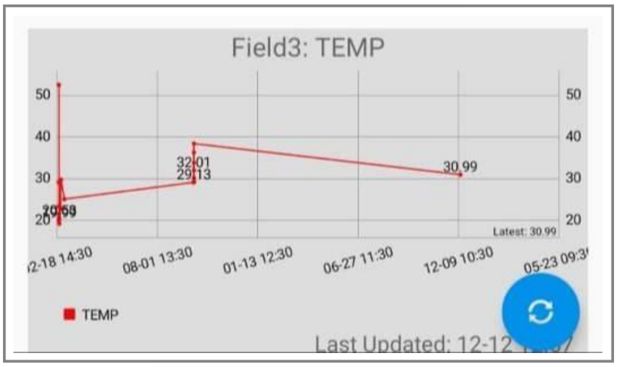

Fig. 5. Temperature sensoring monitoring

FOR PULSE SENSOR:

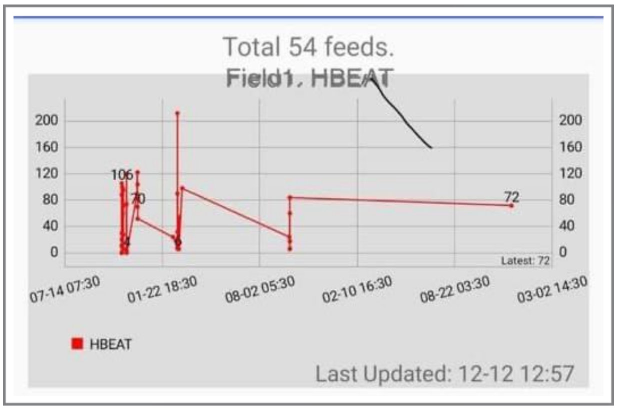

Fig. 6. Pulse sensoring monitoring

The output of the guts beats sensing by memory beat sensing element measured in beats per minute (BPM). It will live heartbeat beat in each minute and displayed it on the mechanical man.

VI. FUTURE SCOPE

- Heart rate indicates the soundness of our heart.
- Heart rate assessing the condition of the cardiovascular system doctor can't observe serve a
  patient‟s heart rate per minute and body temperature all the time.
- Again a doctor far away from the patient needs to know heneedsrate and body temperature for initial treatment.
- An embedded system that can measthathe heart rate and body temperature and stores the data for the doctor to know the condition of the patient can help for this purpose.

VII. CONCLUSION

Carefully sensing internal sensing level and pulse utilizing gardenia can show the exact outcomes that will be shown on the LCD monitor. This gadget will permit to gauge persistently the mean blood vessel pressure (Guide) in around one moment and the precise internal heat level will be shown on the LCD screen. Presently I‟m remembering to make an android application for sending the cautions and showing the aftereffects of internal heat level and circulatory strain persistently at a specific time frame.

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