FINAL YEAR PROJECT REPORT

TITLE

HEARTBEAT AND TEMPERATURE SENSOR MONITOR VIA MOBILE PHONE

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PROJECT TITLE:	**Heartbeat and Temperature Sensor using Arduino (Heart Rate Monitor)** & INTERNET OF THING(IOT)

CONFIRMATION OF THE PROJECT

This project titled " HEARTBEAT AND TEMPERATURE SENSOR MONITOR VIA MOBILE PHONE" has been submitted, reviewed and verified to meet the requirements and requirements of the Project Writing as specified.

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STUDENT DECLARATION

"We acknowledge that this work is our own work except for

the excerpts from which we have explained its source."

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Thank you.

ABSTRACT

This study is to introduce developing a new system that monitors heartbeat rate and also body temperature at the same time via mobile phone. The heartbeat sensor was initially designed to measure internal temperature and heartbeat rate of human body which is highly related to heat stroke and heart attack access. The cognition behind this current study is to determine the impact for the implementation of this monitoring device towards the children body temperature state .Heat stroke condition can caused by body overheating where usually as a result of prolonged exposure to or physical exertion in high temperature. This is the most serious form of heat injury, heatstroke and it can occur if body temperature rises to 104 F (40 C) or higher .The results obtained undeniably implicit that the body temperature increased significantly when children too expose to the environment and heart attack cases cause the persons heart to beat in the dangerous rate at the wrong moment. Thus,the importance of this device evaluated through lecturers,parents and students perspectives was 90% respectively.

<u>**CONTENTS**</u>

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List of Symbols and Abbreaviations

1.	Arduino	Arduino nano
2.	LCD	Liquid crystal display
3.	HS	Heartbeat Sensor
4.	TS	Temperature Sensor
5.	WM	Wifi-Modulator

CHAPTER 1 : INTRODUCTION

Introduction

Heatstroke is a condition caused by your body overheating, usually as a result of prolonged exposure to or physical exertion in high temperatures. This most serious form of heat injury, heatstroke, can occur if your body temperature rises to 104 F (40 C) or higher. The condition is most common in the summer months.Heatstroke requires emergency treatment. Untreated heatstroke can quickly damage your brain, heart, kidneys and muscles. The damage worsens the longer treatment is delayed, increasing your risk of serious complications or death.Heat stroke symptoms are high body temperature,altered mental state or behavior.Confusion, agitation, slurred speech, irritability, delirium, seizures and coma can all result from heatstroke.Alteration in sweating. In heatstroke brought on by hot weather, skin will feel hot and dry to the touch. However, in heatstroke brought on by strenuous exercise, skin may feel dry or slightly moist.Nausea and vomiting also one of the symptoms. That person may feel sick to stomach.Heart rate and breating rate also increases.Cases of heat stroke spike at the end of June into July each year and continue through August. Troy Smurawa, M.D., Director of Pediatric Sports Medicine at the Children's Health Andrews Institute for Orthopaedics and Sports Medicine, says that heat stroke in children can be extremely serious.The Health Ministry recorded 14 heat-related illnesses from March 1 until today due to the recent heat wave phenomenon.Health Minister Datuk Seri Dr S. Subramaniam said the cases comprised 11 heat exhaustion and 3 heat stroke cases.The medical records of three children who were entrapped inside vehicles are reviewed and their outcome following the incidents were assessed in this report. The children developed heat stroke following the incidents and survived after several days in coma but with severe cognitive functions impairment. Two of the children were left with hyperactivity and attention deficit, while the third had active epilepsy.Vehicular entrapment heat stroke is one of the preventable brain injuries in children. Several children get entrapped in cars or other vehicles yearly and survivors are left with significant brain damage.

Now-a-days health problems like cardiac failure, lung failures & heart related diseases are arising day by day at a very high rate. Due to these problems time to time health monitoring is very essential. A modern concept is health monitoring of a patient wirelessly. It is a major development in medical arena. Health professionals have developed a brilliant and inexpensive health monitoring system or providing more comfortable living to the people suffering from various diseases using leading technologies like wireless communications, wearable and portable remote health monitoring device. As visits of doctors to the patients constantly are decreased as the information regarding patient's health directly reaches to doctor's monitor screen from anywhere the patient resides[1]. Also, based on this doctors can save many lives by imparting them a quick & valuable service.

According to the recent statistics, nearly two million people suffer from heart attack every year and one person dies every 33 seconds in India. World Health Organization (WHO) reports that heart disease rate might increase to 23.3% worldwide by the year 2030. The treatment of such chronic disease requires

continuous and long term monitoring to have proper control on it. IoT helps to move from manual heart rate monitoring systems to remote heart rate monitoring systems A doctor may not be present all the time to provide medication or treatment to the patients or a guardian may not be present all the time to take the patient to the hospital. Hence, our proposed system is the right solution for this problem. The remote heart rate monitoring system is used to monitor physical parameter like heart beat and send the measured heart rate directly to a doctor through Email or SMS.

In today's era, health problems are increasing day-by-day at a a high pace. The death rate of 55.3 million people dying each year or 151,600 people dying each day or 6316 people dying each hour is a big issue for all over the world. Hence it is the need of hour to overcome such problems. We, therefore, proposing a change in wireless sensors technology by   designing a system which included different wireless sensors to receive information with respective human body temperature, blood pressure, saline level, heart rate etc. that will be undoubtedly further transmitted on an IoT platform which is accessible by the user via internet. An accessible database is created about patient's health history which can be further monitored & analyzed by the doctor if necessary. This paper proposes a health monitoring system which is capable of detecting multiple parameters of our body such as blood pressure, temperature, heart rate. A continuous record of body health parameters can be used o detect the disease in a more efficient manner. Now-a-days, people pay more attention towards prevention & early recognition of disease. In addition to it, new generation mobile phones technologies.

Proposed system consists of a pulse rate sensor, Arduino Nano and Raspberry Pi 3. This system is able to measure heart rate of an infant to an elderly person. The low cost of the device helps to provide appropriate portable remote based effective heart rate monitoring system. The system is based on advanced wireless and wearable sensor technology. The rapid growth in technology has remarkably enhanced the scope of remote health monitoring systems. Thus in such environment proposed system serves to be of effective cost with ease of application.

1.2 PROBLEM STATEMENT

I. Community will have trouble keep track of their heartbeat rate in their daily life.
II. Community will be worried that their heartbeat rate is not normal but can't check immediately.
III. If community needs to check heartbeat rate they have to go to nearby clinic or hospital which is not convenient at all.

1.3 OBJECTIVE OF RESEARCH

I. Individual can check their heartbeat rate by just using our device and their very own mobile phone.
II. Those who constantly needs to keep track of their heartbeat rate can just use the device and their mobile phone where it shows the increase and decrease of the heartbeat rate.
III. Avoid travelling to clinic and hospital saves the hassle.

1.4 ISSUES REVOLVED

I. The sensor must be capable for sensing the heartbeat rate effectively. So that easy to detect the changes in the person's heart rate.
II. The WiFi connectivity of the device to the mobile phone must be strong so that the information of the heartbeat rate can be transferred instantly to the mobile phone so that the user can view it with their synchronize heartbeat rate.
III. The materials used to make device must be long lasting, so that users can carry it around confidential instead of being uptight.

1.5 SCOPE OF THE PROJECT

The scope were defined into the customers who are mostly patient or are in need to keep track of their daily heartbeat rate. The limitations were referred to its software programming where it only senses the heartbeat rate. The sensing elements made of eco-friendly substances and materials.

1.6   IMPORTANCE OF RESEARCH

I. Alerts the customers and educate them with a basic knowledge of the importance of monitoring their heartbeat rate.
II. Prevents users from getting into any sored of serious health issues due to the lack of heart rate monitoring.
III. Implementation of internet off things (IOT) in heath science sectors.

1.7 OPERATION OF PROJECT

Upload the code to Arduino UNO and Power on the system. The Arduino asks us to place our finger in the sensor and press the switch. Place any finger (except the Thumb) in the sensor clip and push the switch (button). Based on the data from the sensor, Arduino calculates the heart rate and displays the heartbeat on the mobile phone by using the IOT. While the sensor is collecting the data, sit down and relax and do not shake the wire as it might result in a faulty values. After the result is displayed on your mobile phone, if you want to perform another test, just push the rest button on the Arduino and start the procedure once again.

SUMMARY

The change of heartbeat rate can be monitored instantly as it increase and decrease. It is very effective and very useful for patient who needs their heartbeat rate to be monitored.

CHAPTER 2: LITERATURE RESEARCH

2.1 INTRODUCTION

First of all, monitoring heart rate is very important for athletes, patients as it determines the condition of the heart (just heart rate). There are many ways to measure heart rate and the most precise one is using an Electrocardiography but the more easy way to monitor the heart rate is to use a Heartbeat Sensor. It comes in different shapes and sizes and allows an instant way to measure the heartbeat. Heartbeat Sensors are available in Wrist Watches (Smart Watches), Smart Phones, chest straps, etc. The heartbeat is measured in beats per minute or bpm, which indicates the number of times the heart is contracting or expanding in a minute.

2.2 CONCEPT OF THEORY

The principle behind the working of the Heartbeat Sensor is Photoplethysmograph. According to this principle, the changes in the volume of blood in an organ is measured by the changes in the intensity of the light passing through that organ. Usually, the source of light in a heartbeat sensor would be an IR LED and the detector would be any Photo Detector like a Photo Diode, an LDR (Light Dependent Resistor) or a Photo Transistor. With these two i.e. a light source and a detector, we can arrange them in two ways: A Transmissive Sensor and a Reflective Sensor. In a Transmissive Sensor, the light source and the detector are place facing each other and the finger of the person must be placed in between the transmitter and receiver. Reflective Sensor, on the other hand, has the light source and the detector adjacent to each other and the finger of the person must be placed in front of the sensor.

2.3 LITERATURE REVIEW

The circuit design of Arduino based Heart rate monitor system using Heart beat Sensor is very simple. First, in order to display the heartbeat readings in bpm, we have to connect a 16×2 LCD Display to the Arduino UNO.The 4 data pins of the LCD Module (D4, D5, D6 and D7) are connected to Pins 1, 1, 1 and 1 of the Arduino UNO. Also, a 10KΩ Potentiometer is connected to Pin 3 of LCD (contrast adjust pin). The RS and E (Pins 3 and 5) of the LCD are connected to Pins 1 and 1 of the Arduino UNO.

Karan kansara (2015) proposed an automated watering system where the humidityand temperature sensors are used to sense the soil conditions and based on that microcontroller will control the water flow. Farmer will be intimated through GSM. This system doesn't

intimated through GSM. This system doesn't monitor the nutrient content in the soil [5].

2.4 TOPIC SUMMARY

The working operation of the heartbeat and temperature sensor was illustrated in form of basic flow chart and block diagram. Those mechanisms were described as well as it's theoretical statements. The previous research or inventions found on market were shown as an example for reference purpose.

CHAPTER 3 : METHODOLOGY OF RESEARCH

1.1   INTRODUCTION

Heartbeat and Temperature sensor will help reduce disease in the community .The date research collected by many highly know doctors were used as our data of

programming. The users will be able to monitor their heartrate so that they can keep track of any unexpected disease that might hit or get to them.

HARDWARE

Nowadays, people facing problem to measure temperature and heart beat frequently. People need to used thermometer for measure temperature which takes time and for heart beat we have to go to the clinic or hospital. If got once device to measure the temperature and heart rate in frequently, it will be easier to keep the body hydrated and stable. Thus, this is one key to prevent heatstroke and know about heart rate easily.

INTERFACE

Nowadays people are facing problems to monitor body temperature and heart rate frequently.Most of the people are now are busy with their work.As proven by articles in newspaper,states that most of the parents are not concern about their children body temperature and heart rate.Furthermore,it also very hard for them to monitor their body temperature and heart beat when they are at workplace and their children at school.So,people need a device that can monitor and record body temperature and heart beat at a distance.This will reduce time and cost.Internet of Things (IoT) system will help the community by providing a lot of advantages.

SOFTWARE

Nowadays,people facing problem to measure heartrate and temperature frequently .People need to go nearby clinic for measure of heartrate and temperature which takes time. Thus,hydration is one of key to prevent heat stroke . Everyone need to monitor their body temperature and heartrate time to time so that, can prevent them from heat stroke. If got one device to measure the temperature and heartrate time to time it will be easier to keep their body hydrated from anywhere based in Internet of Thing (IoT).

Objectives

HARDWARE

  Fabrication of the heat stroke prevention wearable based in IOT

Aim of this project is to conserve energy through the use of green technology.it can be used to store energy. which can be used later when sun is not available on a wet or cloudy day. Furthermore, to make a person life easier by monitoring the temperature and heart beat by just looking at it will saves time, cost.

<u>INTERFACE</u>

IoT system for thermoregulatory homeostasis in human body.

Enhancing productivity, reducing costs and the automation of internal processes dominate are also the aim of this project.This technology could replace humans who are in charge of monitoring and maintaining supplies.Moreover,the smart phone keep a track both on the quality and the viability of things.It will reduce the number of heat stroke and cardiovascular diseases related patients.

<u>SOFTWARE</u>

Alert system for heat stroke based in IoT

The objective is to prevent anyone from heat stroke from their smart phone. Beside that, it is portable and we no need to worry about the power source. However, it is also no limit energy. Moreover, the connection between smart phone and user to monitor their body temperature is based in Internet of Thing(IoT) which is known as interface connection. There is no any body temperature wearable based in IoT in our country yet.

<u>Scope</u>

The scope of this project is to build a device for individuals from all age.This is to show our project and ensure it is achievable with the restricted time and resources available. This device the most important feature of this device is that it must be easy to use.

<u>Importance of Research</u>

<u>Children</u>

The result will reduce dehydration among children throughout the days.It will give realization to students that keep the self hydrated is important and will also keep track on their heart beat readings.On the other hand,it also reduce student from expose under the sunlight

<u>Adults</u>

Parents will understand the hydration level of them.Thus, parents can keep monitoring their body temperature and heart beat readings .This would help them to formulate some preventive measures to help them from to getting heat stroke or cardiovascular diseases.

CHAPTER 2 : LITERATURE REVIEW

Heat stroke

Heat stroke is a medical emergency symbolize by a high body temperature, altered mental status and ,in classical heat stroke ,hot , dry flushes skin[1] heat stroke could start to multi-organ damage with haemorrhage and necrosis in the lungs, heart ,liver, kidney, brain and gut.[1] heat stoke occurs when the core body temperature hike against a falling thermoregulatory system.[1]

Cardiovascular Diseases

Diseases generally refers to conditions that involve narrowed or blocked vessels that can lead to a heart attack,chest pain(angina) or stroke

Effects of heat stroke

The result of these effects is that the body surface temperature rises. When this situation continues for a long time, the dehydration caused by sweating progresses and, when combined with blood being retained at the dilated peripheral blood vessels, blood volume decreases[4]. The result of these effects is that the body surface temperature rises. When this situation continues for a long time, the dehydration caused by sweating progresses and, when combined with blood being retained at the dilated peripheral blood vessels, blood volume decreases.

Effect of cardiovascular Diseases

The term "heart disease" is often used interchangeably with the term "cardiovascular disease." Cardiovascular disease generally refers to conditions that involve narrowed or blocked blood vessels that can lead to a heart attack, chest pain (angina) or stroke. Other heart conditions, such as those that affect your heart's muscle, valves or rhythm, also are considered forms of heart disease.

Many forms of heart disease can be prevented or treated with healthy lifestyle Cardiovascular disease symptoms may be different for men and women. For instance, men are more likely to have chest pain; women are more likely to have other symptoms along with chest discomfort, such as shortness of breath, nausea and extreme fatigue.

Symptoms can include:
- Chest pain, chest tightness, chest pressure and chest discomfort (angina)
- Shortness of breath
- Pain, numbness, weakness or coldness in your legs or arms if the blood vessels in those parts of your body are narrowed
- Pain in the neck, jaw, throat, upper abdomen or back choices.

		Air temperature
Overheated >180 breaths / min	• Dramatic rise in body temperature • High gut permeability • Increased passage of endotoxins & pathogens	**Death** 34°C
Hot 50-180 breaths / min	• Spread out • Lower feed intake • Increased floor contact • Increased body temperature • Increased splashing, fouling	30°C 27°C
Comfortable 20-30 breaths / min	• Normal behavior	23°C 18°C

Factors of heat stroke

Risk factors may be present but are not requisite. The onset of heat stroke is rapid, and patients may have a prodrome of weakness, headache, chills, ataxia, and nausea. Chest pain may be present, as well as shortness of breath and abdominal pain. Thirst is not a reliable indicator of impending heat stroke. The body temperature rises rapidly, sweating ceases, and multiple system failure ensues (usually heralded by neurological problems). An acute phase inflammatory reaction appears to be involved in the progression from heat exhaustion to heat stroke. During heat stroke fever is 104°F (40°C) or greater. Sweating usually ceases and the skin becomes hot and dry[5]. Confusion, delirium, and ataxia are followed by loss of consciousness. Some patients will have seizures that usually occur during cooling. Tachycardia and hyperventilation are common vital sign changes. Laboratory examination reveals an elevated hematocrit (secondary to hemoconcentration), electrolyte and acid-base disturbances (typically hyponatremia, metabolic acidosis, and hypokalemia), and evidence of muscle, renal, and hepatic damage. The electrocardiogram and cardiac enzymes may

indicate myocardial injury. Thrombocytopenia can be profound if disseminated intravascular coagulation has occurred.

Factors of Cardiovascular
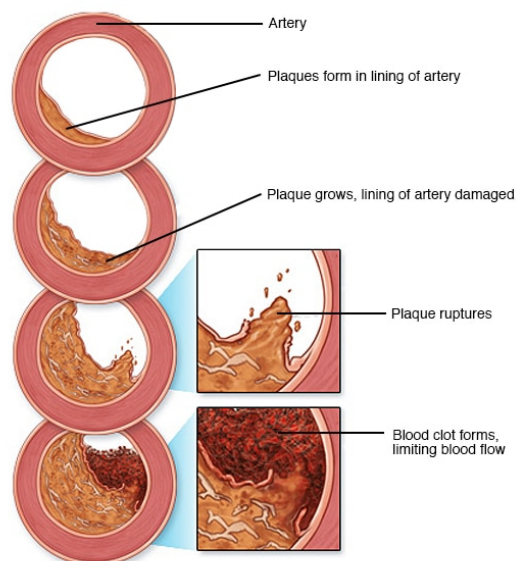
Development of atherosclerosis

While cardiovascular disease can refer to different heart or blood vessel problems, the term is often used to mean damage to your heart or blood vessels by atherosclerosis (ath-ur-o-skluh-ROE-sis), a buildup of fatty plaques in your arteries. Plaque buildup thickens and stiffens artery walls, which can inhibit blood flow through your arteries to your organs and tissues.

Atherosclerosis is also the most common cause of cardiovascular disease. It can be caused by correctable problems, such as an unhealthy diet, lack of exercise, being overweight and smoking.
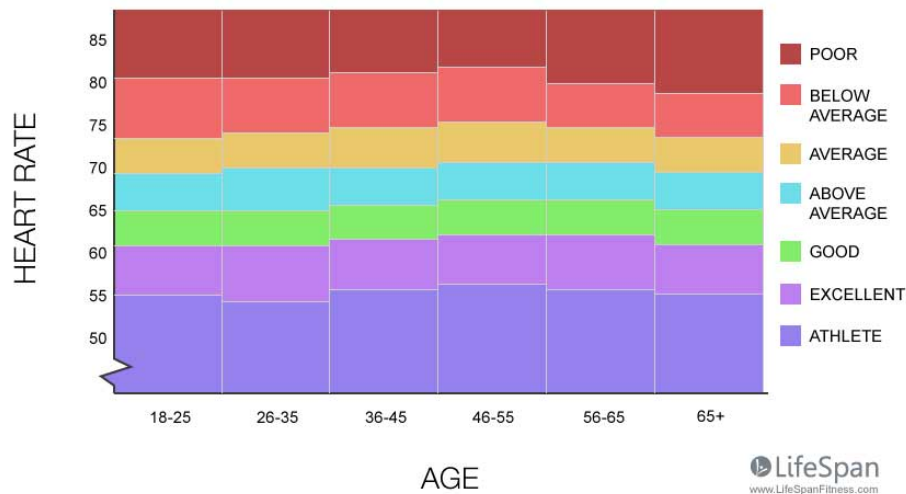
Heat stroke and Cardiovascular diseases occurs in two forms, classic and exertional

Classic heat stroke occurs as a result of excessive environmental temperatures, and mainly affects members of vulnerable populations, such as children or the elderly, those already in poor health, or those who do not have access to air conditioning.   Classic heat stroke is characterized by little or no sweating as a result of excessive dehydration.

Exertional heat stroke is caused by the production of excess heat in the body, and is more common among generally healthy individuals such as athletes and others who do strenuous activity out of doors.The ability to sweat may not be impaired, but the individual is unable to cool down quickly enough after ceasing activity. This variant of heat-related illness can come on quickly relatively moderate temperatures during heavy activity. According to the recent statistics, nearly two million people suffer from heart attack every year and one person dies every 33 seconds in the world. World Health Organization (WHO) reports that heart disease rate might increase to 23.3% worldwide by the year 2030. The treatment of such chronic disease requires continuous and long term monitoring to have proper control on it. IoT helps to move from manual heart rate monitoring systems to remote heart rate monitoring systems A doctor may not be present all the time to provide medication or treatment to the patients or a guardian may not be present all the time to take the patient to the hospital.

Benefits of temperature and heart beat sensor

- The increase of temperature on earth's surface in recent years has significantly affected the health of humans, where the concept of heat stroke has become a disturbing situation, especially if we consider the increase in deaths caused by this condition. The effects caused by problems related to high temperatures have been of interest for studies where the technology can have an important role for the solution of the same ones. The present work shows the design of a system employing temperature sensors using IoT concept for detection heat stroke early in everyone. The results show that the system proposed is efficient and practically usable in life real. You can find the Principle of Heartbeat Sensor, working of the Heartbeat & Tempearture Sensor and Arduino based Heart Rate Monitoring System B using a practical heartbeat Sensor. Monitoring heart rate is very important for athletes, patients as it determines the condition of the heart (just heart rate). There are many ways to measure heart rate and the most precise one is using an Electrocardiography. But the more easy way to monitor the heart rate is to use a Heartbeat Sensor. It comes in different shapes and sizes and allows an instant way to measure the heartbeat. The heartbeat is measured in beats per minute or bpm, which indicates the number of times the heart is contracting or expanding in a minute.

Concept of Internet of Things

A recent study reported that Internet of Things links people, device and services[8].Furthermore,Internet of Things more likely to describe as a system or framework.Internet of Things known as connection between network of things or objects and Internet[5] .Internet of Things consist of two words.That are Internet and Things.Internet depicts network that are linked world widely via some standard protocols. Moreover, The Things shows that any physical objects which has connectivity[5].Based on Cisco statistics nearly 50 billion devices will be communicated to the Internet by 2020[2].This turns IoT to become reality[2].The Internet of Things is gathering in importance with rising access to the Internet [1].
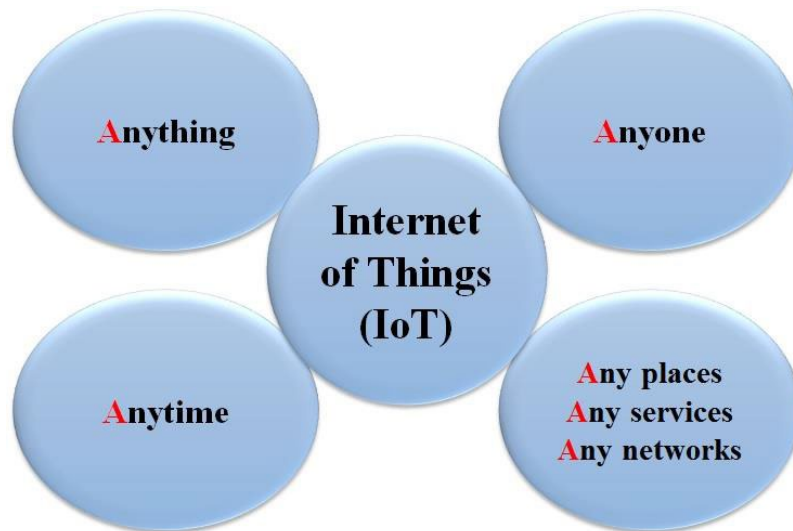
Impact of Internet of Things

Internet of Things has a higher effect on certain sectors.That are education, business ,science ,communication ,humanity and government [10].It also proven that this service helps the community by reducing costs , increasing efficiency and enhancing the usability of existing systems [8].Some evidence proves that by using Internet of Things objects identify themselves and gain intelligence behavior by allowing related decisions thinks to fact that they can communicate information about themselves [10].Market Analyst determined that IoT devices would reach 25 billion by 2020[5].Corresponding to the report by marketresearch.com, market of Internet of Things in health care was estimated to reach 117 billion by 2020[5]. IoT devices will collecting a very big amount of data on the way people communicate between each other[2].

Internet of Things Standardizations and Protocols

It was estimated that by 2020 around 50 to 100 billion things will be connected electronically to Internet [10].The victory of IoT based on standardization, which provides interoperability, compatibility, reliability, and effective operations on a global scale whereas today more than 60 companies for leading technology, in communications and energy, working with standards, such as IETF, IEEE and ITU to specify new IP based technologies for the Internet of Things[10].
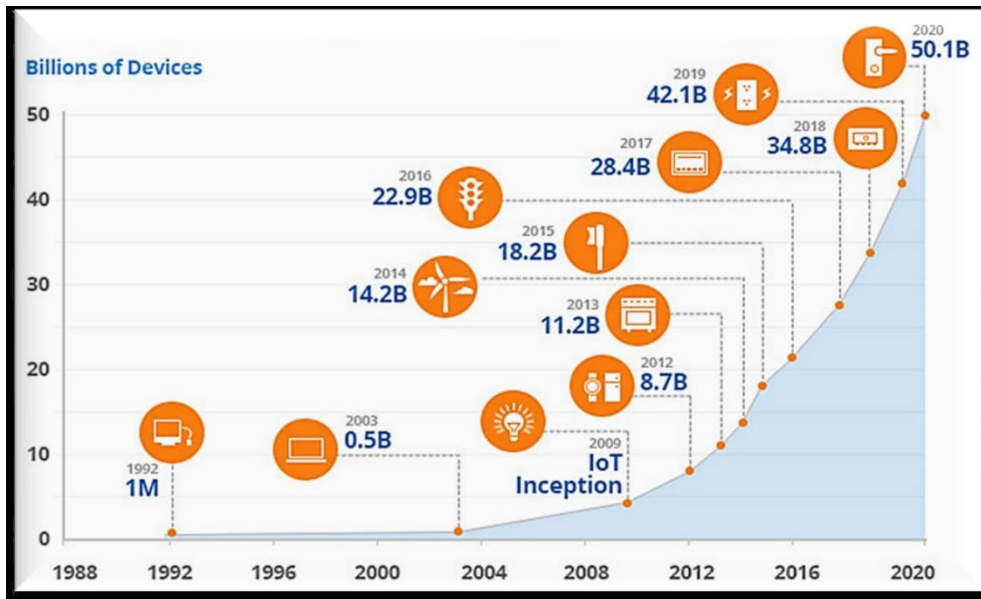
IoT and Health care Monitoring

According to Forbes magazine IoT market will be more than 117 billion by 2020 [5].Health care one of the biggest sector in Internet of Things technology.IoT wearable device monitor patient health related blood pressure and body temperature[5].Health care sector uses smart health sensors to analyze and collect data using gateways and analyze through cloud and stores in clouds[10].

Cloud Computing

It was certify that cloud computing can analyze and stores data effectively[7].Cloud is the most convenient and cost effective solution to deal with data produced by IoT and, in this respect, it generates new opportunities for data aggregation, integration, and sharing with third parties [10].Based on findings,Internet of Things platform need to be contribute by a powerful computing sources.Therefore,cloud computing is suitable for the development for Internet of Things platform[6].

Benefits of Using Internet of Things in Health Care System

Reduction in Human Error

Data can be collected very accurately and precisely.This was because of usage of sensors[5].

Early Detection of Chronic Disease

Using Big data analytics it is possible to predict chronic disorder in early stage and treatment can be done within short period[5].

Concept of Alert System

According to R. Wipfli and C. Lovis about Alert System [11]. As already introduced, an alert can also be viewed as an interaction between user and the system. In fact, an alerting system can be reduced to the physician's interaction with the display, keyboard and mouse. In order to find a way to reduce errors on this cognitive level,

we would like to refer to Rasmussen's model of decision making [14]. According to his model, human decision making can be modeled as bottom-up problem identification and a top-down process of problem solving. In the context of this work we would like to limit to the problem identification. From a users perspective the first step is to be alerted of the occurrence of an abnormal situation. This level of decision making addresses the skill-based level of decision making, as it concerns automated processes.

Obstacles without Alert System for Heat stroke and Heart rate

The impacts from work stress relate dare one of the reason why most of people tend to forgot [12]. This clarifies that individual's day by day life could influence their conduct and contribute to one's decision because of distressing and work load.

Visual Alert

Based on International Journal of Engineering and Computer Science in visual alert[4]. ODAS provides visual alert to the user by means blinking LED lights and buzzer. Similar to audible alert, the frequency of blinking depends upon vehicle speed above threshold limit. But in our project research we are using Blynk Software which is an Android app for monitoring sensors or control electrical devices via Bluetooth, local WIFI or Internet.

Android Application Based Internet of Things (IOT)

There are separate login credentials for doctors and patients[13]. Here the Doctors can monitor health status of all the patients assigned to them while patients can only view their own health status by logging in using their respective login credentials while humidity status is accessible to both doctors as well as patients via their Android app based on IoT in smart phones.

Blynk Platform

Blynk is not an app that works only with a particular shield. Instead, it's been designed to support the boards and shields you are already using. And it works on iOs and

Android. UPD: Blynk also works over USB. Blynk Server is an Open-Source Netty based Java server, responsible for forwarding messages between Blynk mobile application and various microcontroller boards and SBCs (i.e. Arduino , Raspberry Pi).
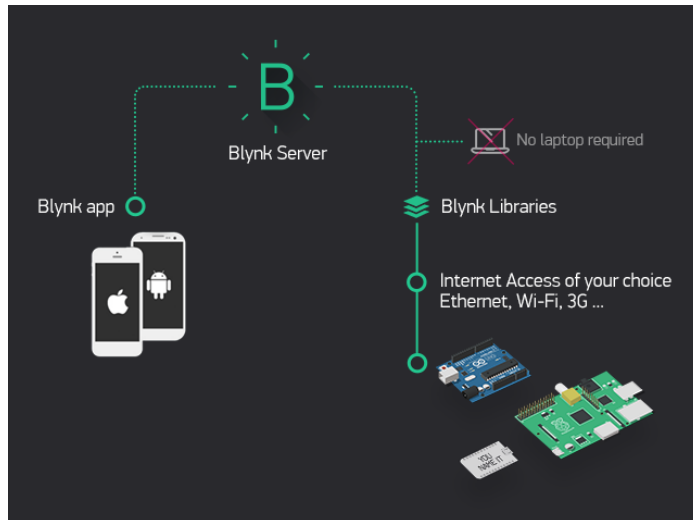

Android App Based on IoT

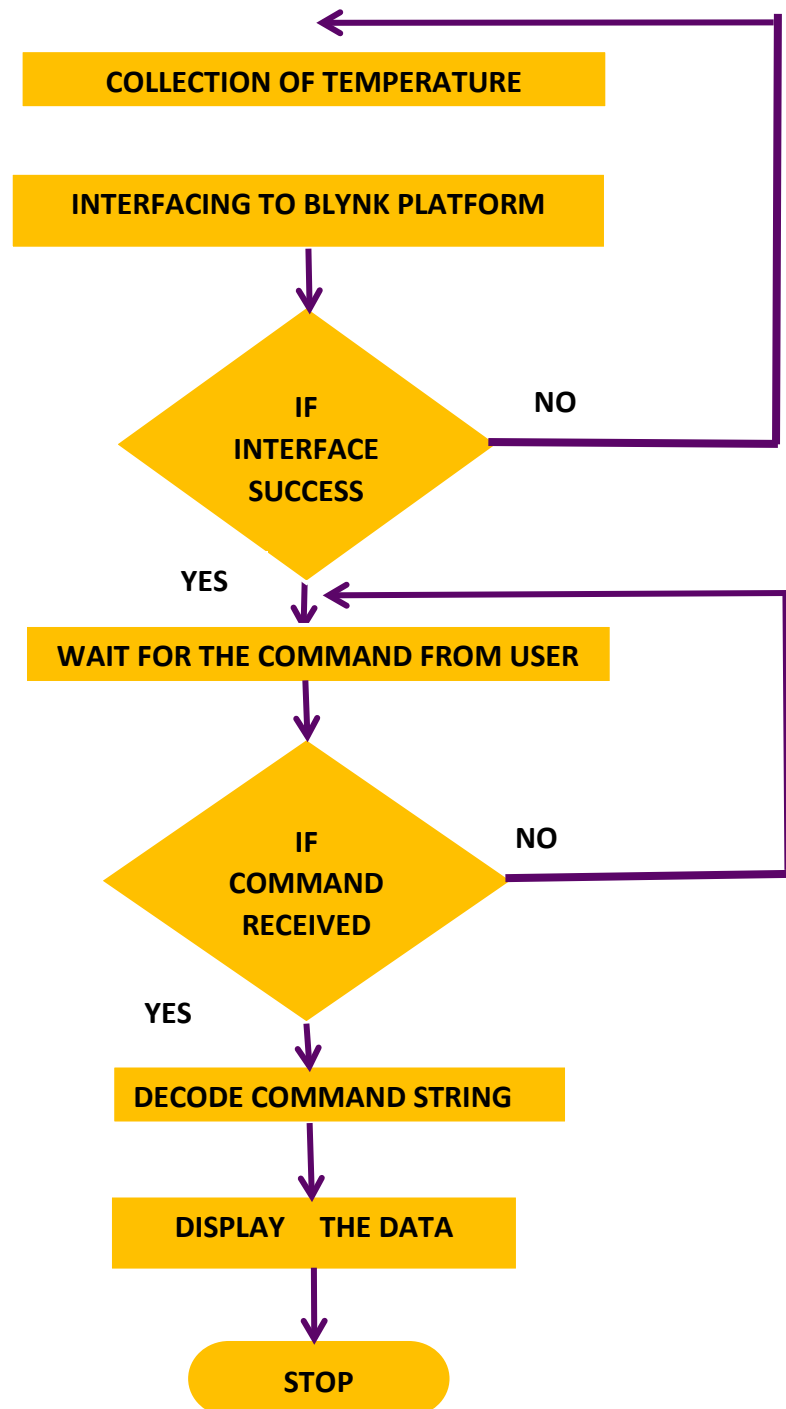There are separate login credentials for doctors and patients[13]. Here the Doctors can monitor health status of all the patients assigned to them while patients can only view their own health status by logging in using their respective login credentials while humidity status is accessible to both doctors as well as patients via their Android app based on IoT in smart phones.

INTERFACE

START

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        │     COLLECTION OF TEMPERATURE       │                │
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        │    INTERFACING TO BLYNK PLATFORM     │                │
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The methodology adopted for this sub project is by using IOT system.These devices, or things, connect to the network to provide information they gather from the

environment through sensors, or to allow other systems to reach out and act on the world through actuators.A gateway enables devices that are not directly connected to the Internet to reach cloud services.Although the term gateway has a specific function in networking, it is also used to describe a class of device that processes data on behalf of a group or cluster of devices. The data from each device is sent to Cloud Platform, where it is processed and combined with data from other devices.A gateway manages traffic between networks that use different protocols. A gateway is responsible for protocol translation and other inter operabilty tasks. An IOT gateway device is sometimes employed to provide the connection and translation between devices and the cloud. Because some devices don't contain the network stack required for Internet connectivity, a gateway device acts as a proxy, receiving data from devices and packaging it for transmission over TCP/IP.

According to its developers, Blynk is an open source Internet of Things (IoT) application and API to store and retrieve data from things using the HTTP protocol over the Internet or via a Local Area Network. Blynk enables the creation of sensor logging applications, location tracking applications, and a social network of things with status updates.Blynk is an Internet of Things (IoT) platform that lets you collect and store sensor data in the cloud and develop IoT applications. The Blynk™ IoT platform provides apps that let you analyze and visualize your data in MATLAB, and then act on the data. Sensor data can be sent to Blynk from ArduinoFrom the software perspective, the application code running on the device maintains the source of truth.

BLYNK

Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, vizualize it and do many other cool things
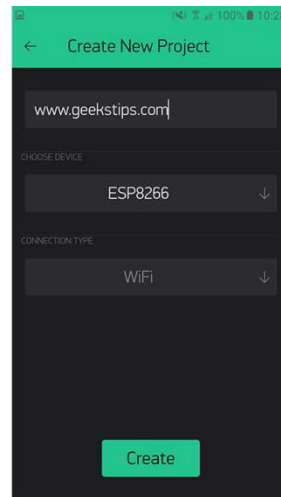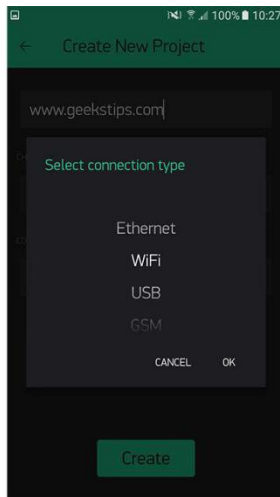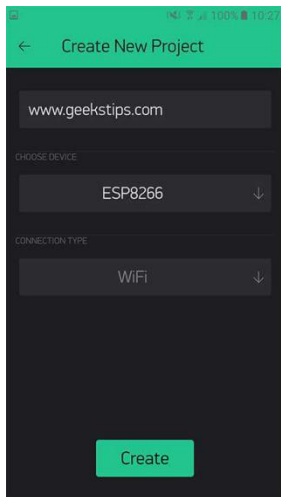
Coding

```
#include <LiquidCrystal_I2C.h>
#include <SoftwareSerial.h>
//SoftwareSerial EspSerial(2, 3); // RX, TX
//#define BLYNK_PRINT Serial
//#include <ESP8266_Lib.h>
//#include <BlynkSimpleShieldEsp8266.h>
//#include <SimpleTimer.h>


//#define ESP8266_BAUD 9600
//ESP8266 wifi(&EspSerial);

int x=0;
int LastTime=0;
bool BPMTiming=false;
bool BeatComplete=false;
int BPM=0;

#define UpperThreshold 518
#define LowerThreshold 490

int bz=5;

/*
char auth[] = "67e3c31c2cc048d786dfcf078d4a9169";
char ssid[] = "Heartbeat1";
char pass[] = "HBT12345";
*/

LiquidCrystal_I2C lcd(0x3F,16,2);

void setup() {

  Serial.begin (9600);
  //EspSerial.begin(ESP8266_BAUD);
  delay(10);
```

```
pinMode(bz,OUTPUT);

lcd.init(); //initialize the lcd
lcd.begin(16,2);   // iInit the LCD for 16 chars 2 lines
lcd.backlight();
lcd.setCursor(0,0); //First line
lcd.print(" Heart Beat ");
lcd.setCursor(0,1); //Second line
lcd.print(" Monitoring ");
delay(2000);
lcd.clear();
lcd.setCursor(0,0); //First line
lcd.print("   STATUS   ");

//Blynk.begin(auth, wifi, ssid, pass); //95d84ace1c9e4cf4b56465edaa2b7f33

}

void loop() {
// Blynk.run();
 delay(10);
 TEMP();
  if(x>127)
  {
 digitalWrite(bz,HIGH);
 delay(50);
 digitalWrite(bz,LOW);
 delay(50);
 digitalWrite(bz,HIGH);
 delay(50);
 digitalWrite(bz,LOW);
 delay(50);
```

```
  lcd.print("BPM");
  delay(2000);
  x=0;


  }
   if(x<127)
   {

  digitalWrite(bz,LOW);
  lcd.setCursor(0,1);
  lcd.print("BPM");


  }

  int value=analogRead(A0);


  if(value>UpperThreshold)
  {
    if(BeatComplete)
    {
      BPM=millis()-LastTime;
      BPM=int(60/(float(BPM)/1000));
      BPMTiming=false;
      BeatComplete=false;
    }
    if(BPMTiming==false)
    {
      LastTime=millis();
      BPMTiming=true;
    }
  }
  if((value<LowerThreshold)&(BPMTiming))
    BeatComplete=true;
    // display bpm
```

```
  lcd.setCursor(0,1);
  lcd.print("BPM=");
  lcd.setCursor(4,1);
  lcd.print(BPM);
  lcd.print("  ");
  x++;
  //Blynk.virtualWrite(V0, BPM);



}


void TEMP() {
  int dataadc = analogRead(A1);


  float volt = dataadc * (5.0 / 1023.0 );
  float suhu = volt *100;


  lcd.setCursor(8, 1);
  lcd.print("SUHU=");
  lcd.print(suhu);
  lcd.print(" c");
  // Blynk.virtualWrite(V1, suhu);

}
```
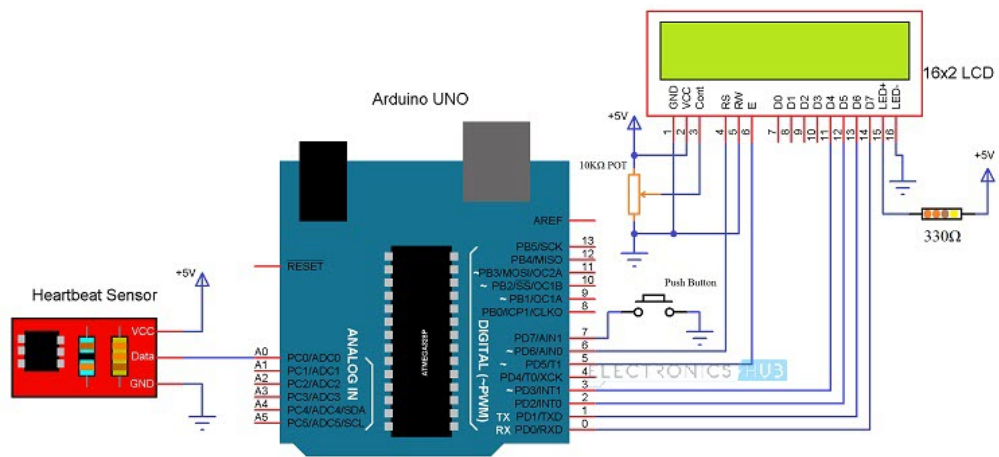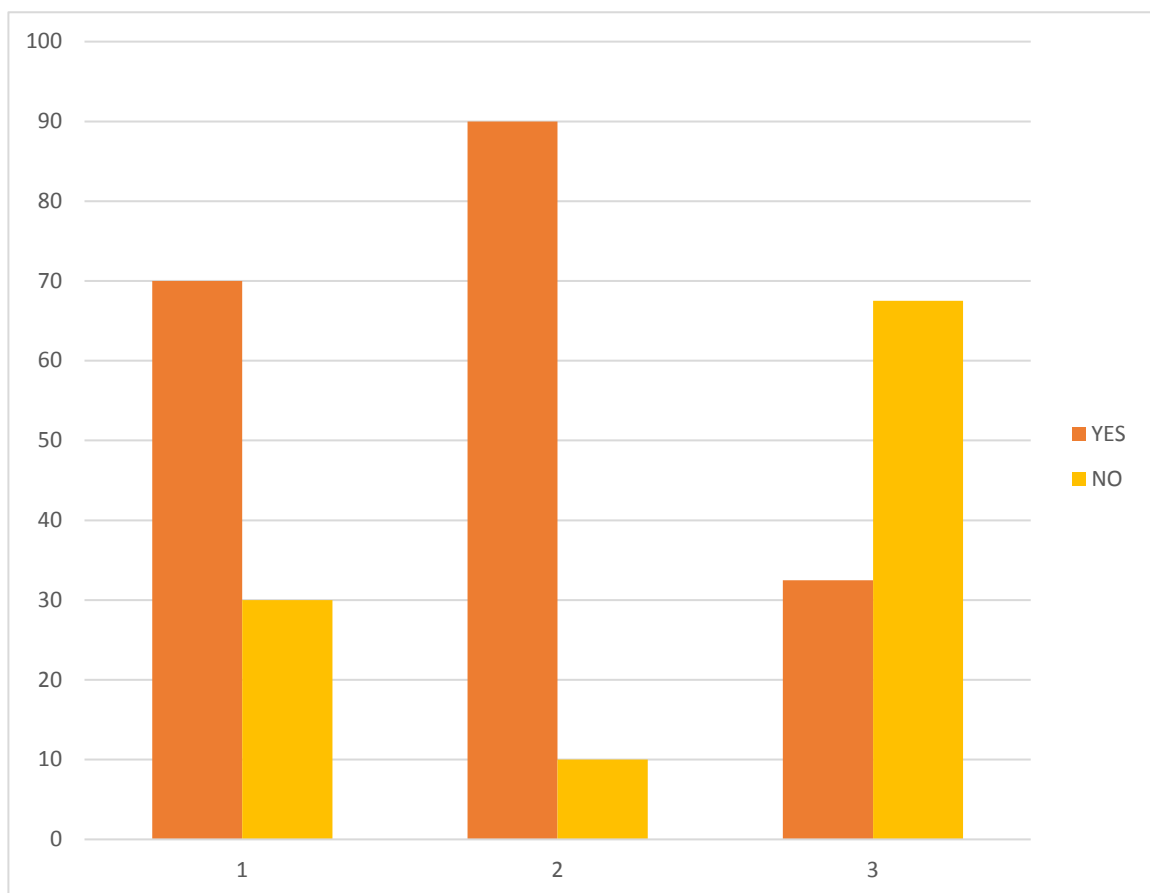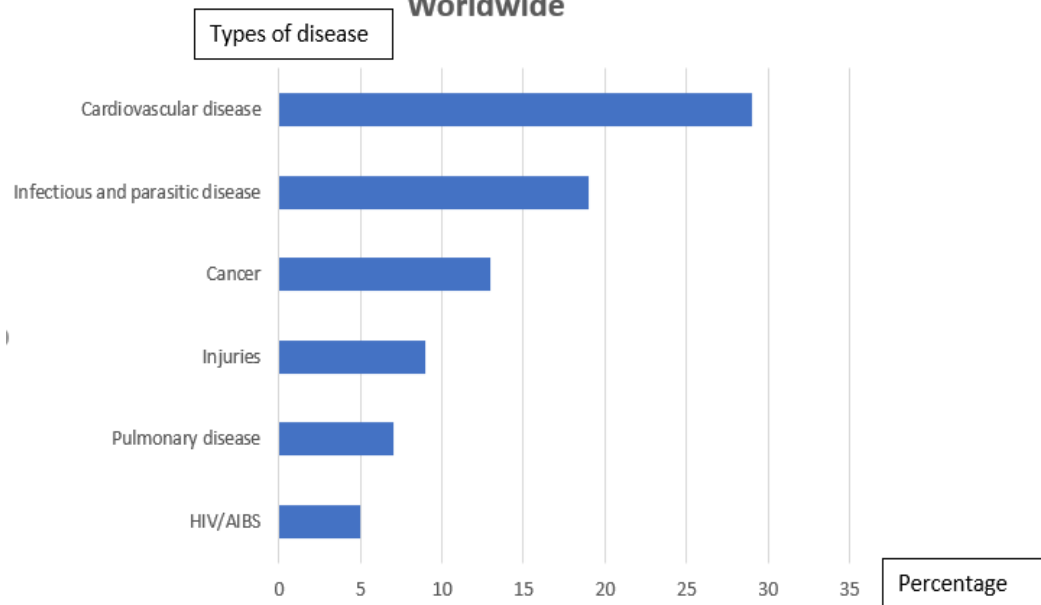
Pinout Diagram

The following image shows the circuit diagram of the Arduino based Heart Rate Monitor using Heartbeat Sensor. The sensor has a clip to insert the finger and has three pins coming out of it for connecting VCC, GND and the Data.
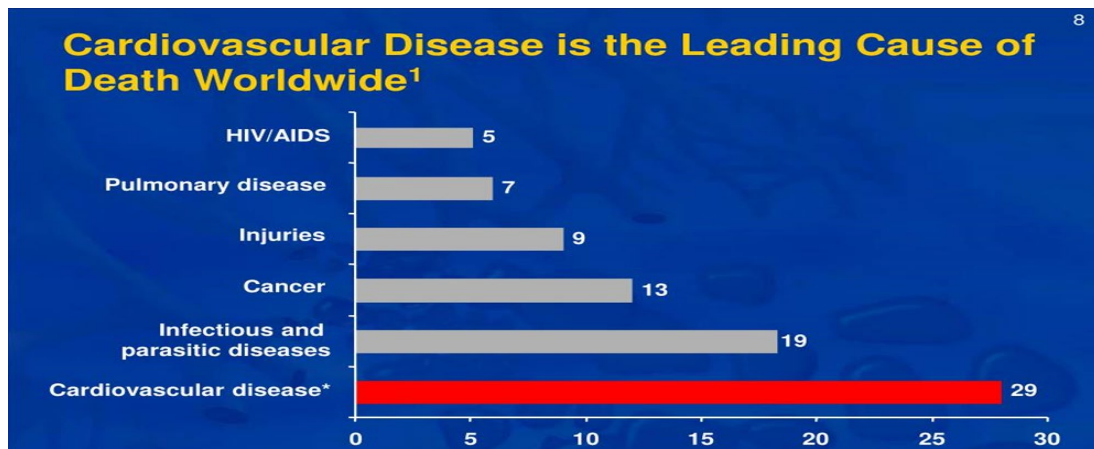
CHAPTER 4 : ANALYSIS AND DISCUSSION

Cardiovascular disease is the leading cause of Death Worldwide

Types of disease

Percentage

- Cardiovascular disease — 29
- Infectious and parasitic disease — 19
- Cancer — 13
- Injuries — 9
- Pulmonary disease — 7
- HIV/AIBS — 5

(Chart axis: 0, 5, 10, 15, 20, 25, 30, 35)

(Bar chart — YES (orange) / NO (yellow))

	1	2	3
YES	70	90	32
NO	30	10	67

1) Do you think heat stroke is on going problem among the people?

2) Do you think we need to create a device to alert the people about healthy heart beat and internal temperature?

3) Is there any IoT device that can monitor heat stroke and heart rate sensor in the market?

Cardiovascular Disease is the Leading Cause of Death Worldwide[1]

HIV/AIDS	5
Pulmonary disease	7
Injuries	9
Cancer	13
Infectious and parasitic diseases	19
Cardiovascular disease*	29

CHAPTER 4: RESULTS AND DISCUSSION

4.1 INTRODUCTION

In preparing the final project, analysis and discussion are carried out to ensure the project results are in the desired state without causing any problems. Project analysis is performed to determine, select and produce an optimal design in terms of material usage, cost and perfect manufacturing methods.

The analysis is more focused on project characteristics, problems encountered and the cost of materials used such as the price of raw materials used and experiments conducted and other items involved.

4.2 RESULT AND ANALYSIS

1. Sensor work and detect the heartrate of user.

2. Wifi modulator able to connect with phone via BLYNK

3. temperature sensor working

4. Arduino has a good performance.

5. LCD can display the reading very well.

6. Reading was detected every 60sec.

<u>4.3 SUMMARY</u>

Through this methodological research we were able to understand the demand or the hype for the system and the potential of the heartbeat and temperature sensor among todays society

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CHAPTER 5 : CONCLUSION

From this project, it got to encourage the self-expression of thoughts and and feelings related with illness/hospitalization. And also, help patient process and work through traumatic experiences associated with hospitalization. Next to facility positive self-esteem and positive body image, and promote a sense of independence and feelings of control. Encourage the development of healthy strategies for coping with hospitalization. The main result of this project is to help to measure the temperature to prevent heatstroke among the people. Most of the rehab process is depends on feeling of patient and judgement by doctor. Sometimes the judgement could be wrong. With this project it got to resolve this problem and give an accurate rehab level things to patient. The resulting system was also low in power and cost, non - invasive, and provided real time monitoring. It is also easy to use and provides accurate measurements.

## CHAPTER 3 : METHODOLOGY

<u>HARDWARE</u>

The methodology adopted for this subproject is when the watch is switch on, the temperature is then been monitored continuously and the reading is displayed onto the LCD display. If the temperature is exceeds 40 degree Celsius,a message will be send to android application through IoT. Once the message is received and the 'ok' button is pressed on the phone, the vibration on the watch stops and continuous to monitor the temperature. If the temperature does not exceeds 40 degree Celsius, it continues to monitor temperature of the body. Before starting of project, we form a group of three and choose the best idea for major project.Our chosen and agreed by lecturers to conduct the project. The first step was taken is study on heatstroke and find problem statement. By researching to collect information's. Next is identifying block diagram, understand the function of each block diagram and design the schematic diagram as initial work before working on upgrade progression. After done design schematic diagram, construct the block diagram to determine the function of the circuit step by step. And then we start making circuit assembly for the project to get all the components used in the circuit and test each block diagram. If testing fail, troubleshooting step will be taken and repeat the circuit assembly process. If successful, proceed with fabrication product. Else, if the circuit testing is functionally well, we can finish the prototype and upgrade it and make a trial run for end user.
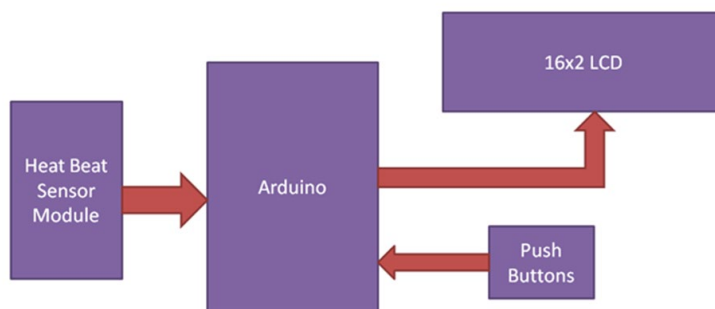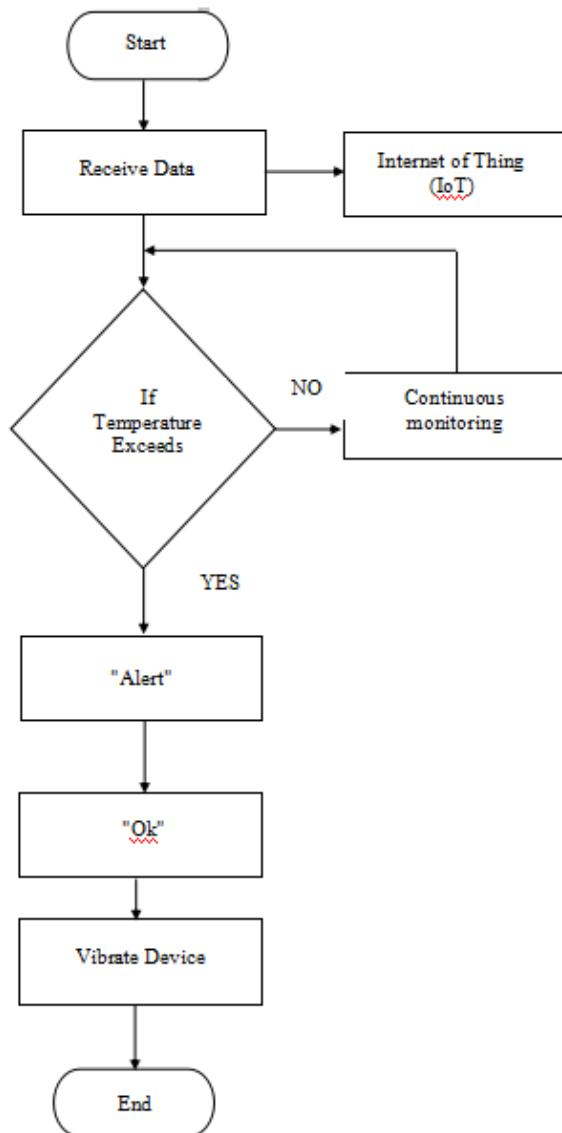
CIRCUIT :

The circuit that we used is to measure the temperature using arduino nano.

SCHEMATIC DIAGRAM
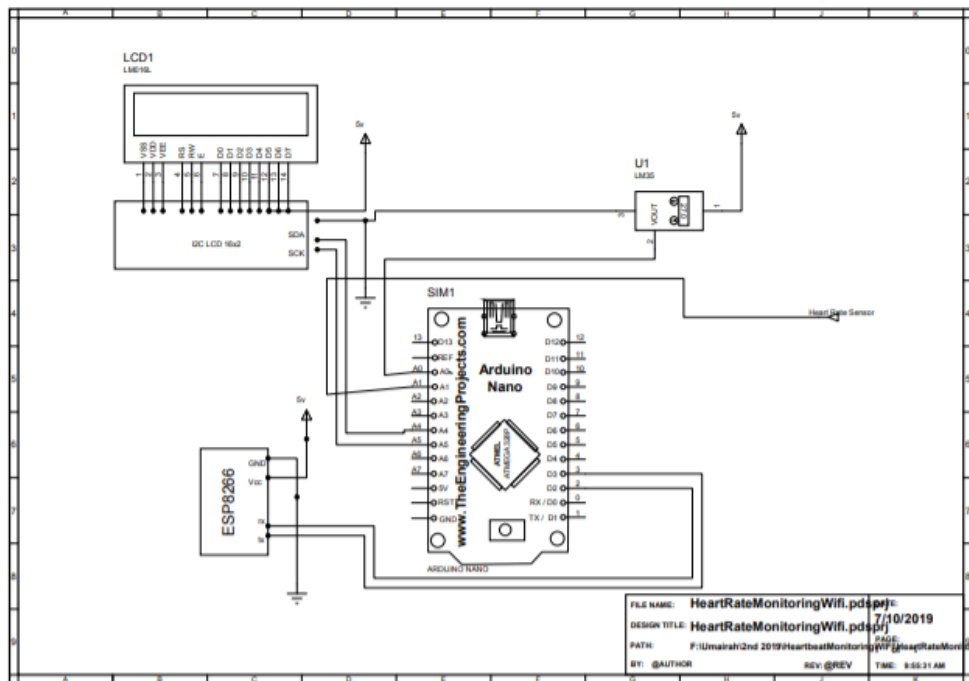
BLOCK DIAGRAM

The methodology adopted for this subproject is by using smart phone and Apps .The app is based on IoT software. This software is going to be a connection between the wearable device and the application in smart phone. When the switch is ON, sensor will start measuring temperature in human body. If the voltage increases, then the temperature rises and there is a voltage drop between the transistor terminals of base & emitter, they are recorded by the sensor. If the temperature maintain on normal level,it will continue monitor the temperature.Once the temperature exceeds the normal range,the message will be send to the parents smart phone using IoT. Once the parent press the alert button in the application, the acknowledgment to consume water will be send to the user(children) .The reading of temperature will be shown on LCD display which help the user to read. If there is no changes in the temperature level,it will keep vibrating until action is taken.Once the temperature level decreases the same process will be repeated.

PRODUCTS AND SPECIFICATIONS

1. **Title :   Heartbeat sensor**

Description : System includes the capability to detect and give a

digital output of heat beat when finger is placed on it

2. **Title** : Arduino Nano

Description : System includes the microcontroller which usually

comes with Arduino Uno.This microcontroller reads the

reading from the sensor and controls the overall

system.

Version : Version 1.0

3. **Title** : Hitachi LCD 16x2

Description : System includes the LCD interface for the user, which

displays the reading taken by the different sensors in

the system.

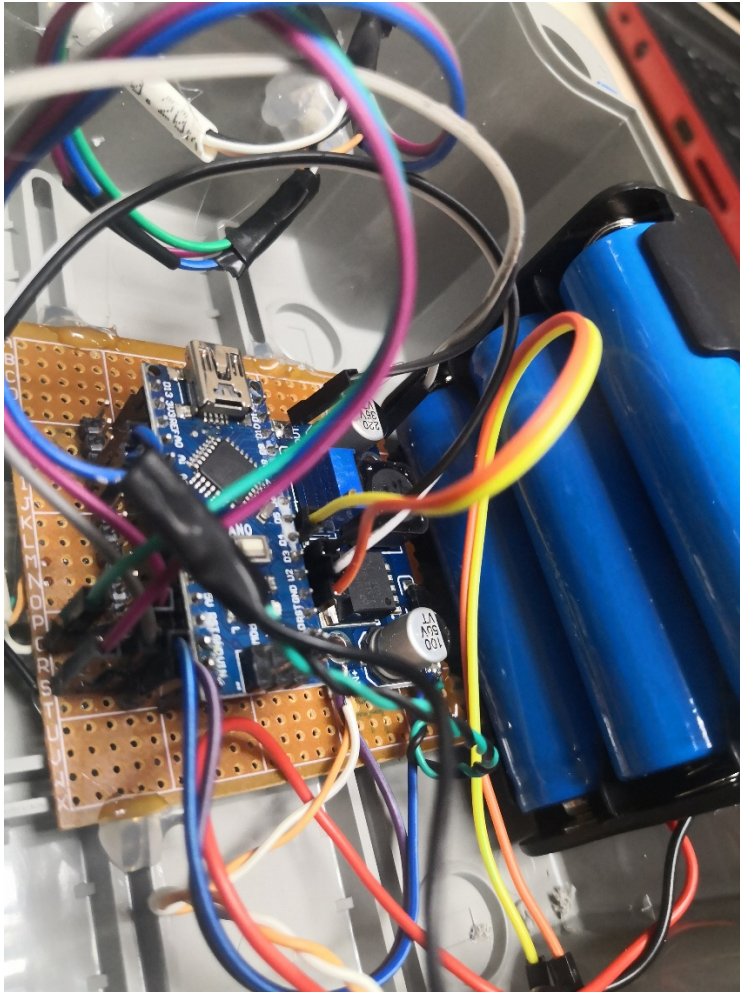**Version** : Version 1.0

4. **Title** : Temperature Sensor

Description : System includes the thermocouple that provides temperature measurement through an electric signal.

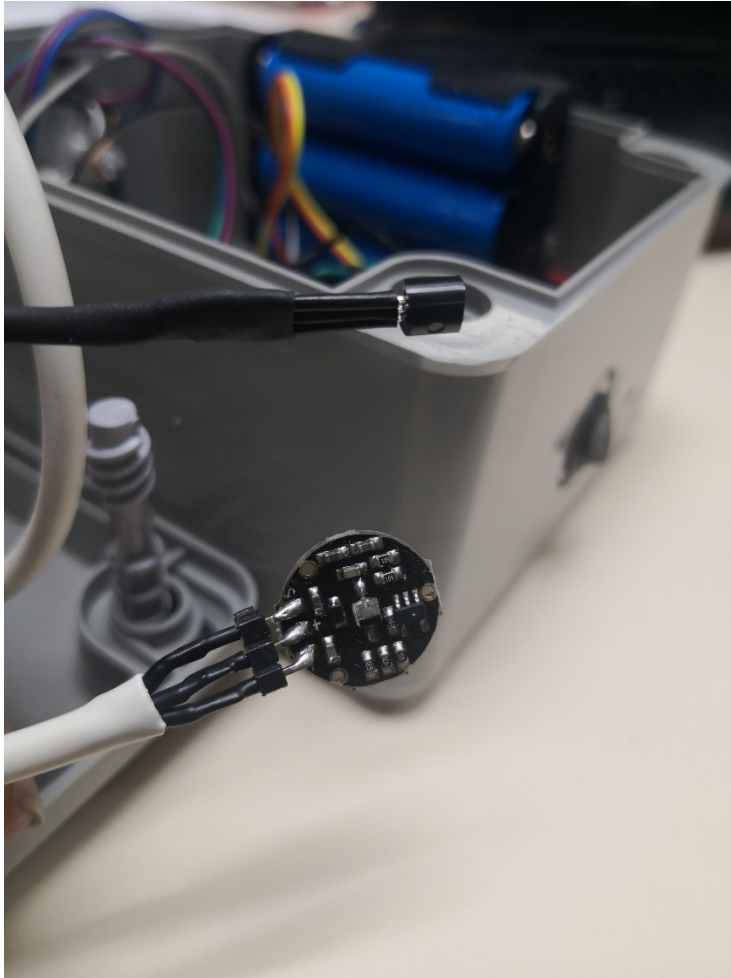**Version** : Version 1.0

SOFTWARE DESIGN

Implementation of the software design

- use 12volt battery to operate the entire heartbeat and temperature sensor.

Connecting LCD to Arduino

I.   Connect LCD GND to GND.

II.   Connect LCD SCL to Arduino A5.

III. Connect LCD SDA to Arduino A4.

IV.   LCD VCC to Arduino 5V

- **Connecting heartbeat and temperature sensor to the arduino**

I.   Connect the two pins from the Sensor to the two pins on the Amplifier circuit via hook up wires.

II.   Connect the Vcc from the Amplifier to the 3.3V pin on the Arduino and the Gnd pin to the Gnd pin on the Arduino.

III. Now connect the Analog Data Pin to the A0 pin on the Arduino

List of component

There are several components that were used in this project. The main component is the

- Arduino nano
- LM35
- Wifi-Modulator
- Heart beat sensor
- Temperature sensor

The basic components such as :

ARDUINO NANO The Arduino Nano is a microchip that is a small, complete, and breadboard-friendly board based on the ATmega328P. This particular microprocessor incorporates all of the functions necessary to meet our specifications. It offers the same connectivity and specs of the UNO board in a smaller form factor. The Arduino Nano is programmed using the Arduino Software (IDE), Integrated Development Environment common to all our boards and running both online and offline.
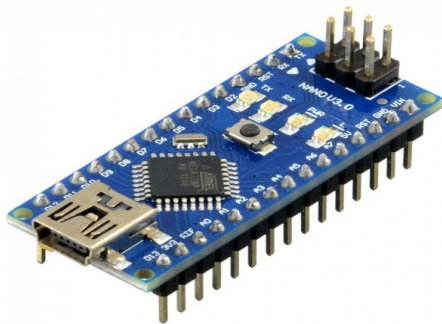
Wifi-Modulator
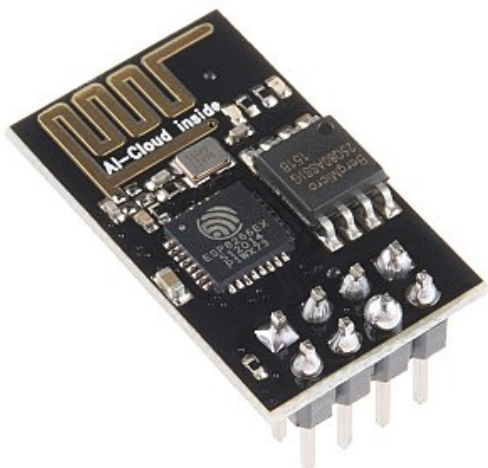
ESP8266 is a 3V WiFi module very popular for its Internet of Things applications. ESP 8266 maximum working Voltage is 3.6V and its very important to note. You must know how to power it, how to serial-connect it with Arduino safely, how to ping and many other things. You should use software like Circuito.io, Tinkercad, Fritzing to simulate and work with the board safely. You should also use Logic Level Controller to use with ESP8266 module

WIRES

The purpose of the **wires** in a series circuit is to allow the electricity to flow from one device to the next. **Wire** is used to carry the flow of electrons. Metal **wire** is a very good conductor.
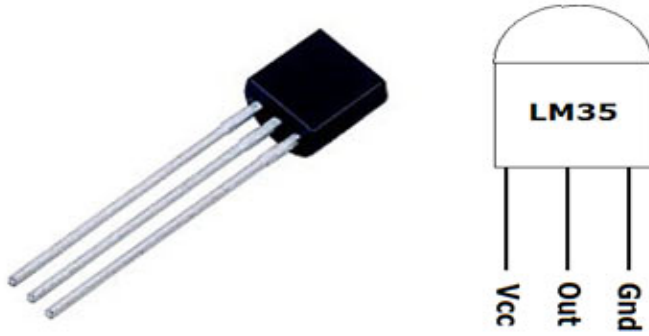

LED

A light-emitting diode (a semiconductor diode which glows when a voltage Is applied)."light sources can be fluorescent tubes, optical fibres, or LEDs".

LM35

LM35 is a basic temperature sensor that can be used for experimental purpose.It give the readings in centigrade(degree Celsius)since its output voltage is linearly proportional to temperature.
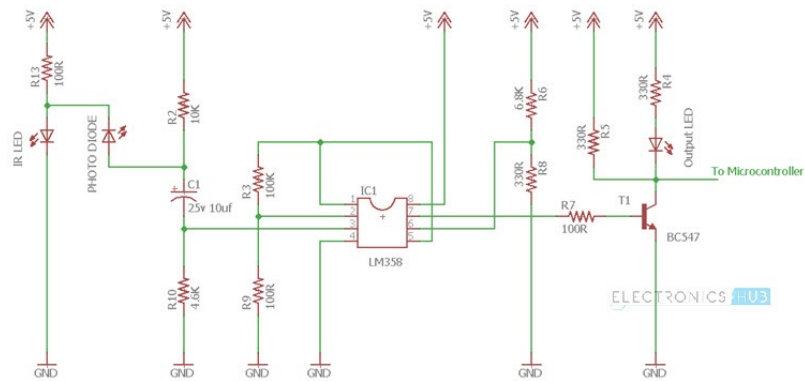

Working of Heartbeat Sensor

A simple Heartbeat Sensor consists of a sensor and a control circuit. The sensor part of the Heartbeat Sensor consists of an IR LED and a Photo Diode placed in a clip.

The Control Circuit consists of an Op-Amp IC and few other components that help in connecting the signal to a Microcontroller. The working of the Heartbeat Sensor can be understood better if we take a look at its circuit diagram.

The above circuit shows the finger type heartbeat sensor, which works by detecting the pulses. Every heartbeat will alter the amount of blood in the finger and the light from the IR LED passing through the finger and thus detected by the Photo Diode will also vary.

The output of the photo diode is given to the non – inverting input of the first op – amp through a capacitor, which blocks the DC Components of the signal. The first op – amp cats as a non – inverting amplifier with an amplification factor of 1001.

The output of the first op – amp is given as one of the inputs to the second op – amp, which acts as a comparator. The output of the second op – amp triggers a transistor, from which, the signal is given to a Microcontroller like Arduino.

The Op – amp used in this circuit is LM358. It has two op – amps on the same chip. Also, the transistor used is a BC547. An LED, which is connected to transistor, will blink when the pulse is detected.

COST

Tools and cost required for project

NAME	QUANTITY	PRICE (RM)
Wifi module esp8266	1	RM 11.00
Arduino Nano	1	RM 50
Hitachi 16×2 LCD	1	RM 10.50
Heartbeat Sensor	1	RM 20.00
Battery 12V	1	RM 22.00
Temperature sensor	1	RM 10.00

NAME	QUANTITY	PRICE (RM)
Screwdriver	1	(Rm 7.20)
Cutter	1	(Rm 7.00)
Plier	1	(Rm 6.00)
Wire stripper	1	(Rm 7.90)
Soldering iron	1	(Rm 18.00)
Tray	1	(Rm 18.00)
Saw	1	(Rm 4.00)
Scissors	1	(Rm 3.00)
Nylon cable tie	1 packet	(Rm 12.00)
Dupont wires		(Rm 5.00)
Hot glue	1	(Rm 15.00)

SAFETY PRECAUTIONS

- During the project, we make sure that all the wires are connected tightly.

- When testing the heartbeat and temperature sensor we made sure the finger was placed properly in order to get the right reading.

- We ensure that the circuit diagram is keep away from water to avoid any errors.

- We make sure that the casing was closed properly so it is user friendly.

THE END

THANK YOU