MOUNTAIN CLIMBER HEALTH, ENVIRONMENT AND GPS TRACKER USING IOT

Submitted in partial fulfilment of the requirements for the award of Bachelor of Engineering Degree in Electronics and Instrumentation Engineering

by

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SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY (DEEMED TO BE UNIVERSITY)

Accredited with Grade "A" by NAAC

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MAY 2022

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DEPARTMENT OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of E. VENDA (38180008) and IDAMAKANTI BHANU SRI (38180702) who carried out the project entitled **"MOUNTAIN CLIMBER HEALTH, ENVIRONMENT AND GPS TRACKER USING IOT"** under our supervision from September 2021 to May 2022.

Internal Guide

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Submitted for Viva voce examination held_____

Internal Examiner **External Examiner**

DECLARATION

We, and **E. VENDA (38180008) and IDAMAKANTI BHANU SRI (38180702)** hereby declare that the Project Report entitled **"MOUNTAIN CLIMBER HEALTH, ENVIRONMENT AND GPS TRACKER USING IOT"** done by us under the guidance of **Dr.D. MARSHIANA, M.E., Ph.D.** is submitted in partial fulfilment of the requirements for the award of Bachelor of Engineering degree in Electronics and Communication Engineering.

1)

2)

DATE:

PLACE:

SIGNATURE OF THE CANDIDATES

ACKNOWLEDGEMENT

We are pleased to acknowledge our sincere thanks to Board of Management of **SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. We are grateful to them.

We convey our thanks to **Dr.N. M. NANDHITHA, M.E., Ph.D. Dean, School of Electrical and Electronics Engineering** and **Dr. S. LALITHA KUMARI, M.E., Ph.D. Head of the Department, Department of Electronics and Instrumentation Engineering** for providing us necessary support and details at the right time during the progressive reviews.

We would like to express our sincere and deep sense of gratitude to our Project Guide **Dr.D.MARSHIANA, M.E., Ph.D. Associate Professor, Department of Electronics and Instrumentation Engineering** for his valuable guidance, suggestions and constant encouragement paved way for the successful completion of the project work.

We wish to express our thanks to all teaching and non-teaching staff members of the **Department of Electronics and Instrumentation Engineering** who were helpful in many ways for the completion of the project.

We express our gratitude to our parents for their constant encouragement and support for the completion of the project.

ABSTRACT

Mountaineering has always been a very adventurist & enthusiastic activity. But with adventure comes risk. Mountain climbers are always under risk of accidents. When any such accident occurs at high altitudes or remote locations, search and rescue operations are not always successful. Because the news of accident takes hours or even days of reach search & rescue team. Search and rescue team doesn't know the location of the accident. Search & rescue team doesn't know if the person is alive or not, and if alive what is his condition. The smart mountain climber allows for teams to track vitals of climbers in real time as well as monitor their location over IOT.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

This project presents a prototype machine-to-device (M2M) healthcare answer that combines cellular and IPv6 techniques in a wireless sensor network to display the fitness circumstance of person and provide an extensive range of effective, complete, and convenient healthcare offerings. A low-strength embedded wearable sensor measures the fitness parameters dynamically, and is attached, consistent with the concept of IPv6 over low-power wireless non-public area community, to the M2M node for wireless transmission through the internet or external IP enabled networks thru the M2M gateway. A visualization module of the server application graphically shows the recorded biomedical indicators on Android cellular gadgets utilized by sufferers on the quit of the networks in actual-time. Our method for a international M2M healthcare solution is controlled to technique the huge amount of biomedical indicators thru the prolonged community combining IPv6 method and cellular technology for each day lifestyle to customers appropriately. This paper provides a operating version which includes sensors to degree these kinds of parameters like body temperature and Heart Beat fee and transfer it to the ARM 11 SMARTPHONE, so that the patient condition can be analysed to by means of doctors in any part of the sanatorium wherever they're. Thus, it reduces docs work load and additionally offers extra accurate outcomes, anyplace there may be an abnormality felt by using the affected person, we've got also integrated saline tracking device which gives an alarm when the saline bottle about to empty. The experimental setup can be operated for tracking from anywhere included by way of the Cellular (GSM) service through changing SMS messages with the remote mobile device. At the consultation unit, a devoted application software is needed to control the comply with of SMS messages from the mobile and show the temperature and heartbeat of the affected person. ISSN: 2278 – 7798 International Journal of Science, Engineering It is the duty of a kingdom to offer food, training and hospital treatment to its residents. Fulfilling this could promise powerful efforts with the aid of human resource for the nation’s development. Efforts should begin proper from providing timely and quality health

help to pregnant girls with a view to lead to the delivery of healthful youngsters. Here comes the need of technology which facilitates to attend to them. People in rural regions aren't aware about right medications and technological improvements to alleviate complications at some point of pregnancy period. For instance, pregnant ladies must carry out Ultra sound scans as a minimum 2 times at some stage in being pregnant period to recognise extra about fetal increase. Moreover, right and timely take a look at-united states of America can ensure secure delivery. Women in rural areas lack knowledge approximately importance of proper medicine. Medical Expenses also are unaffordable to them. Therefore, on this machine, some essential parameters like heartbeat, temperature and Kicking is measured. Sensors are connected in this system as a consequence it helps to take reading and show on your cellular. II. LITERATURE SURVEY II.1Health Monitoring Laboratories by using Interfacing Physiological Sensors to Mobile Android Devices: SuhasRanganath-Mahesh.K, this paper describes, Android Java-DSP (AJDSP) as a mobile software that interfaces with sensors and permits simulation. This also helped in visualization of sign processing. In this system first off there is advent of interface between both external sensors and on-board device sensors for tracking the physiological parameter of man or women. This paper additionally explored the trend of mobile sensing and tailored it closer to enhancing virtual signal processing (DSP), by constructing interfaces to scientific sensor and outside sensors. In this paper there's use of SHIMMER. It is a small wireless low energy sensor International Journal of Advance Foundation and Research in Computer platform which could report and transmit physiological (Health related like ECG) and kinematic facts in real-time. The downside of this system is that it only video display units the patient that is admitted within the health centre. In this low power sensor are used. According to give scenario, people favour to consume junk meals because of work stress that's unhealthy and it results in weight problems. Due to technological improvement and environmental elements humans suffer due to stress with a view to in particular affect the pregnant girls. Hence it's miles our obligation to solve the health difficulty of pregnant ladies. This paper affords a healthcare answer that combines internet app and CC3200 techniques in a wireless sensor community to screen the health condition of patient and offer a

huge variety of powerful, comprehensive, and handy healthcare services. The specialist staying at a distance can

Monitor the pregnant women fitness situation so that he can keep the lifestyles of the affected person and additionally the little one. IOT era is used so that we are able to screen the affected person circumstance without problems from everywhere. Measures the health parameters dynamically and is hooked up to cloud using IOT, in line with the idea of CC3200. This paper provides a working model which includes sensors to measure most of these parameters like body temperature, pressure and pulse charge that is transferred to the microcontroller CC3200, in order that the patient condition can be analysed by using docs in any part of the health centre anywhere they live. When patient reaches strange situation, an alarm might be surpassed to both the medical doctor and to the relation of the affected person

This paper considers or takes into consideration sure statistics, which might be heart assault and stroke as they're the essential motive of hospitalization of the elder humans. There is more probabilities of survival if the older humans receives the treatment within an hour. It had additionally been advanced. An android smart phone with accelerometer is used to come across a fall of the service, and this android tool is known as healthcare tool. The android telephone is then linked to the monitoring machine by means of the use of the TCP/IP protocol via Wi-Fi. Because of this device, elderly and chronically unwell patients can live independently of their own domestic and comfy within the knowledge that they're being monitored. The disadvantage of this gadget is that it only considers elder humans as there's greater possibilities of surprising (emergency state of affairs) outbreak in them like coronary heart attack and stroke.

This gadget describes the layout and implementation part of wearable ECG with the smart smartphone for the real time tracking of fitness. In this machine clever blouse are advanced with ECG sensors and can be worn with the aid of any type of patient for tracking his or her fitness in actual time and get required treatment or prescription. These systems are particularly evolved thinking about elder people in thoughts as they stay alone in their houses. Therefore, this machine basically

monitors the elderly human beings for self-diagnosis cause. The result of this machine was the device could display and diagnose patients' coronary heart conditions in actual time, when they put on a sports-blouse with a ECG sensor in it. In addition to this, the device also provides graphical data with history management tools and an automated emergency call device to the affected person to get the specified treatment in time. The downside of the machine is that it only Concentrates on elder human beings and it consists of shirt (ECG sensor) for wearing which cost loads

This paper provides the photograph-based totally device which acquires the ECG sign via virtual camera; this statistic is finished at the tool like MATLAB and information sending through the net network and stored in database. Then the authentic photo is then availed to the medical doctor thru Android mobiles. The purpose of this machine is the crucial symptoms and parameters from the ICU tracking machine and makes this information to be to be had to the health practitioner who may not be in the health facility and inside the country. In case of any abnormality, the physician is alerted with the aid of sending a notification from C2DM server to his cellular. The disadvantage of this paper is that, due to the gradual internet connection the statistics will no longer be ship to the doctor which is positioned remotely. The image is captured via the digital camera, which have to be HD which fee loads. The contemporary high cost of healthcare and the tendencies of increasing prices because of the getting older society are crucial troubles inside the international. Thus, the implementation of measures for fee reduction is one of the most extensive modern traits in healthcare. One manner through which the price discount can be achieved through growing the efficiency inside healthcare businesses, for e.g., by reducing of the quantity of "days of stay in a health facility", discount of high-priced remedy programmes, and the variety of face-to-face consultations. Another manner is prevention by detecting human beings at threat in an early stage and imparting steering to save you luxurious hospitalization. It is also important to inspire humans to maintain a healthful lifestyle.

CHAPTER - 2

LITERATURE REVIEW

2.1 LITERATURE SURVEY

Title: IOT Based Soldier Navigation and Health Monitoring System

Author: Krutika Patil, Omkar Kumbhar, Sakshi Basangar, Priyanka Bagul

Content: In current world scenario the security of a nation is the uttermost important factor and hence enemy warfare plays an important role. The security of any nation depends on the military, army, air-force and navy of the country and the backbone of all these forces are our soldiers. Without the soldier it would be nearly impossible to protect a nation. But there are many concerns revolving around the security of these soldiers, especially the army soldiers. Even today when the world is at its prime for technology development, the army is still using rudimentary techniques especially when navigation technology is taken into consideration.

Title: GPS And IoT Based Tracking & Health Indication System

Author: Jasvinder Singh Chhabra, Akshay Chhajed, Shamlee Pandita, Suchita Wagh

Content: In today's world the security of the nation is depends up on the enemies' warfare and so the safety of the soldiers is considered as vital role in it. Concerning the soldier's safety there are many instruments to view their health status as well as ammunitions on the soldiers. In soldiers' security, bio-sensors systems give different types of small

physiological sensors, Biomedical sensor, transmission modules and processing capabilities, and can thus facilitate low-cost wearable unobtrusive solutions for health monitoring.

Title: Health Monitoring and Tracking System For Soldiers Using Internet of Things(IoT)

Author: Niket Patil, student member

Content: The paper reports an Internet of Thing (IoT) based health monitoring and tracking system for soldiers. The proposed system can be mounted on the soldier's body to track their health status and current location using GPS. This information will be transmitted to the control room through IoT. The proposed system comprises of tiny wearable physiological equipment's, sensors, transmission modules. Hence, with the use of the proposed equipment, it is possible to implement a low-cost mechanism to protect the valuable human life on the battlefield.

Title: IOT Based Soldier Navigation & Health Indication System

Author: Ms. Sakshi S. Budhlani, Ms. Simran S. Budhlani, Ms. Monika V. Bhivarkar, Ms. Anuja G. Asole.

Content: The soldiers are the backbone of any Armed Force, usually many of them lose their lives due to lack of medical help when in emergency. So, the safety of the soldiers plays an important role in nation's safety as well as security. It is important to make a system which will help them in such panic situation. Even today when the world is at its prime for technology development, the army is still using rudimentary techniques especially when navigation technology is taken into consideration. This proposed work gives the ability to track the real

time position of soldier during warfare using GPS and will monitor the health status of the soldier whenever required.

Title: A Real Time Autonomous Soldier Health Monitoring and Reporting System Using COTS Available Entitie

Author: Surbhi Sharma, Sudhakar Kumar, Ankita Keshari

Content: Perturbed by the numerous instances of soldiers going untraced in action or killed in action, this paper suggests a qualitative approach to render an aid to the defence services by ensuring the safety, whereabouts and dignity of army personnel. The proposed system enables to detect the pulse (heartbeat rate) and position of the army personnel whenever required, thus vouching that timely support is provided to the needy ones. The transmitter equipped with pulse sensor and GPS Module is programmed with certain conditions to examine the healthiness of the soldier and accordingly to communicate with the receiver at some remote location.

2.2OBJECTIVE:

- To Analyze MOUNTAIN CLIMBER HEALTH, ENVIRONMENT AND GPS TRACKER USING IOT.
- For measuring fitness we're the use of Pulse Sensor, Temperature.
- For measuring surroundings we're using Humidity Sensor (DHT11), Pressure Sensor.
- For Tracking we're the use of Node MCU chip to provide the facts to the controller.
- To Life the man or woman on tracking.

CHAPTER 3

AIM AND SCOPE OF THE PRESENT INVESTIGATION

3.1. Existing system:

In the existing system they won't monitor the soldier' when they are in border. If they injured by something means, it cannot be identified and cannot give any treatment to the soldier. In that case some peoples also die due to loss of treatment.

In an existing system they send the data through Zigbee.

The transmits the data around 3.1 kms only.

3.2. Proposed system:

In the proposed project we are going to monitor the mountain climber using IOT.

The body temperature sensor is used to measure the temperature of the soldier.

The heart beat sensor is used to measure the heartbeat. When it is gone high, it automatically sends message to the authenticated person.

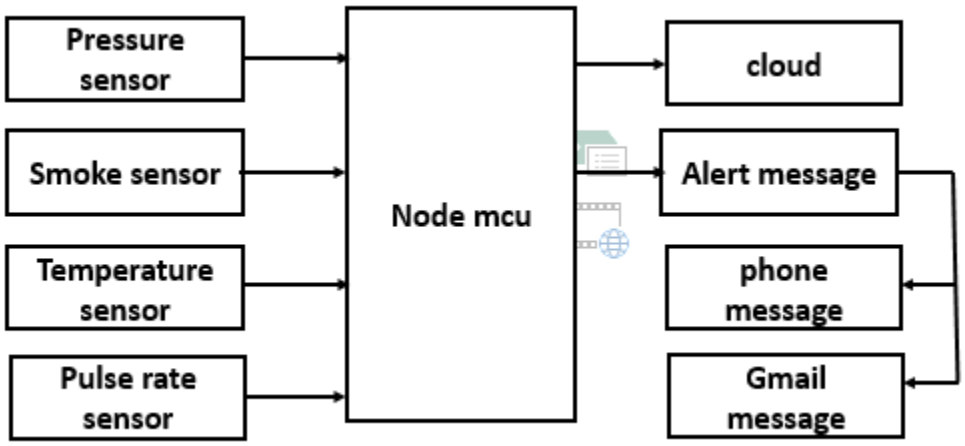
Pressure sensor is used to identify the pressure of the place

Gas sensor is also used to identify the poisonous gas.

The gps is used to identify the person when they are injured

The data is saved in cloud in real time

3.3. Block Diagram



CHAPTER 4

MATERIALS AND METHODS USED

4.1. DESIGN OF EMBEDDED SYSTEMS

4.1.1. overview of embedded systems

An embedded system is a unique-reason computer system designed to perform one or a few dedicated features, often with real-time computing constraints. It is generally embedded as a part of a complete tool which include hardware and mechanical elements. In comparison, a well-known cause computer, such as a non-public computer, can do many specific responsibilities depending on programming. Embedded structures have come to be very important these days as they manage some of the common devices we use.

Since the embedded gadget is dedicated to unique responsibilities, layout engineers can optimize it, lowering the dimensions and price of the product, or growing the reliability and overall performance. Some embedded structures are industrially produced, profiting from economies of scale.

Physically, embedded structures range from portable devices consisting of virtual watches and MP3 gamers, to huge stationary installations like traffic lighting, factory controllers, or the structures controlling nuclear power plants. Complexity varies from low, with a single microcontroller chip, to very high with a couple of units, peripherals and networks hooked up inner a large chassis or enclosure.

In standard, "embedded gadget" isn't always a precisely defined term, as many systems have some detail of programmability. For example, Handheld computers percentage a few elements with embedded systems — which includes the running systems and microprocessors which power them — but are not truly embedded

structures, because they permit specific packages to be loaded and peripherals to be related.

Embedded structures provide numerous features

• Monitor the environment; embedded structures read records from input sensors. This record is then processed and the results displayed in some format to a person or customers

• Control the surroundings; embedded systems generate and transmit instructions for actuators.

• Transform the information; embedded structures transform the statistics collected in some significant way, including facts compression/decompression

Although interaction with the outside international via sensors and actuators is an crucial issue of embedded structures, these structures also provide functionality precise to their applications. Embedded structures normally execute packages such as manage laws, finite country machines, and sign processing algorithms. These systems should also come across and react to faults in each the inner computing environment as well as the surrounding electromechanical structures.

There are many categories of embedded systems, from conversation gadgets to domestic home equipment to manipulate structures. Examples encompass;

• Communication gadgets

e.g.: modems, mobile phones

• Home Appliances

e.g.: CD participant, VCR, microwave oven

- Control Systems

e.g.: Automobile anti-lock braking systems, robotics, satellite control

4.2. Block diagram of an embedded system:

An embedded machine usually consists of an embedded processor. Many appliances which have a virtual interface -- microwaves, VCRs, vehicles -- utilize embedded systems. Some embedded systems include an operating system. Others are very specialized resulting in the entire logic being carried out as an unmarried software. These structures are embedded into a few tools for a few particular causes apart from to provide fashionable motive computing. A common embedded gadget is shown in Fig 1.1

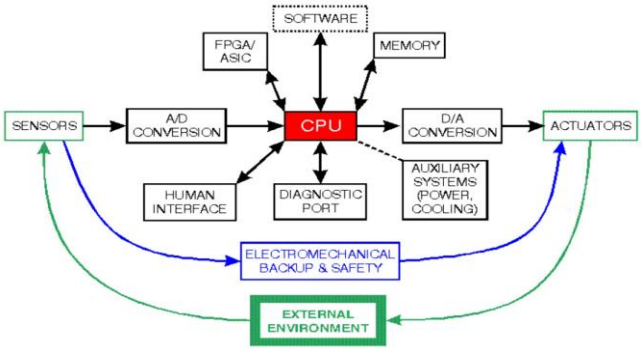


Fig 4.1 Block diagram of a typical embedded system

4.2.1. Characteristics of embedded systems

Embedded structures are characterized by a completely unique set of traits. Each of those traits imposed a selected set of design constraints on embedded structures designers. The task to designing embedded systems is to comply to the precise set of constraints for the application.

4.3. Application Specific Systems:

Embedded systems are not well known-cause computer systems. Embedded system designs are optimized for a selected application. Many of the job characteristics are recognised earlier than the hardware is designed. This allows the fashion designer to recognition on the precise design constraints of a properly-described application. As such, there's constrained user reprogram ability. Some embedded structures, but require the ability of reprogram capacity. Programmable DSPs are common for such programs.

4.3.1. Reactive Systems

As noted in advance, a typical embedded systems version responds to the environment through sensors and control the surroundings the usage of actuators. This requires embedded systems to run at the velocity of the environment. This function of embedded machine is referred to as “reactive”. Reactive computation way that the system (mostly the software factor) executes in response to outside events. External occasions can be both periodic or aperiodic. Periodic occasions make it less complicated to time table processing to assure overall performance. Aperiodic events are harder to time table. The most event arrival rate must be anticipated to be able to accommodate worst case conditions. Most embedded systems have a substantial reactive element. One of the largest demanding situations for embedded machine designers is acting an correct worst case design evaluation on systems with statistical performance traits (e.G., cache memory on a DSP or different embedded processor). Real time device operation way that the correctness of a computation depends, in part, on the time at which it's far introduced. Systems with this requirement must frequently layout to worst case performance. But as it should be predicting the worst case may be hard on complex architectures. This often leads to overly pessimistic estimates erring at the facet of warning. Many embedded structures have a significant requirement for real time operation so that it will meet external I/O and manipulate stability requirements. Many real-time structures are also reactive structures.

4.3.2. Distributed Systems

A not unusual function of an embedded device is one that includes speaking procedures executing on several CPUs or ASICs that are related by using verbal exchange links. The purpose for that is economic system. Economical 4 eight-bit microcontrollers can be cheaper than 32-bit processors. Even after adding the price of the communication links, this technique may be top-rated. In this method, multiple processors are generally required to deal with a couple of time-important responsibilities. Devices under manage of embedded structures can also be physically distributed.

4.3.3. Heterogeneous Architectures

Embedded structures often are composed of heterogeneous architectures (Fig 1.2). They may additionally include one-of-a-kind processors in the same machine solution. They can also be combined sign systems. The combination of I/O interfaces, local and remote recollections, and sensors and actuators makes embedded device layout without a doubt particular. Embedded structures also have tight layout constraints, and heterogeneity offers better layout flexibility.

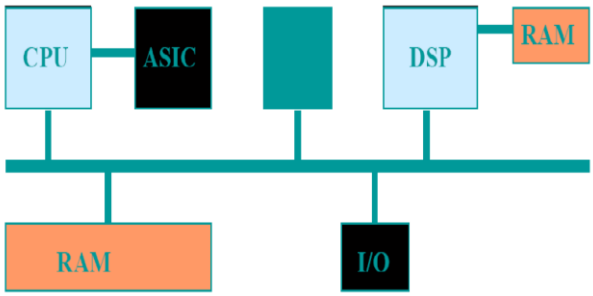


Fig 4.2 Embedded Systems having Heterogeneous Architectures

Harsh environment

Many embedded systems do not perform in controlled surroundings. Excessive warmth is mostly a hassle, specifically in programs regarding combustion (e.g., many transportation applications). Additional troubles can be prompted for embedded computing by a want for protection from vibration, shock, lightning, electricity supply fluctuations, water, corrosion, fireplace, and widespread bodily abuse.

4.3.4. System safety and reliability

As embedded machine complexity and computing electricity continue to grow, they're starting to manipulate increasingly of the protection factors of the overall system. These protection measures can be inside the shape of software program as well as hardware manipulate. Mechanical safety backups are usually activated while the laptop system loses manage to be able to correctly close down system operation. Software protection and reliability is a bigger problem. Software does not generally "wreck" inside the feel of hardware. However, software may be so complex that a hard and fast of unexpected occasions can reason software failures leading to dangerous situations. Discussion of this subject matter is out of doors the scope of this book, however the challenges for embedded designers include designing reliable software and building cheap, available systems the use of unreliable components. The main task for embedded device designers is to achieve low-cost reliability with minimum redundancy.

4.3.5. Control of physical systems

One of the primary reasons for embedding a computer is to engage with the surroundings. This is regularly accomplished by way of tracking and controlling outside equipment. Embedded computers rework the analog alerts from sensors into digital shape for processing. Outputs should be converted back to analog sign stages. When controlling bodily device, big contemporary loads may additionally want to be switched in order to perform motors and other actuators. To meet those wishes, embedded systems might also want large pc circuit forums with many non-digital components. Embedded system designers ought to carefully balance gadget trade-offs among analog additives, strength, mechanical, network, and digital hardware with corresponding software program.

Small and low weight

Many embedded computers are physically located within a few larger machine. The form issue for the embedded system may be dictated by way of aesthetics. For instance, the shape component for a missile may additionally must healthy inside the nostril of the missile. One of the challenges for embedded systems designers is to develop non-rectangular geometries for certain answers. Weight also can be a

important constraint. Embedded car manage structures, for example, should be mild weight for fuel financial system. Portable CD players should be light weight for portability functions.

Cost sensitivity

Cost is an problem in maximum structures, however the sensitivity to value adjustments can vary dramatically in embedded structures. This is particularly due to the impact of computer expenses have on profitability and is extra a feature of the share of fee adjustments as compared to the full system price.

Power management

Embedded systems have strict constraints on electricity. Given the portability necessities of many embedded structures, the want to conserve strength is vital to keep battery lifestyles so long as possible. Minimization of warmth production is some other obvious problem for embedded systems.

4.4. POWER SUPPLY

All digital circuits work best in low DC voltage, so we want a power supply unit to offer the appropriate voltage deliver for his or her proper functioning. This unit consists of transformer, rectifier, clear out & regulator. AC voltage of typically 230volts rms is attached to a transformer voltage right down to the level to the preferred ac voltage. A diode rectifier that provides the total wave rectified voltage that is first of all filtered by a easy capacitor filter to provide a dc voltage. This resulting dc voltage normally has a few ripple or ac voltage variant. A regulator circuit can use this dc enter to provide dc voltage that now not best has a whole lot less ripple voltage but additionally remains the same dc price even the dc voltage varies rather, or the load related to the output dc voltages adjustments.

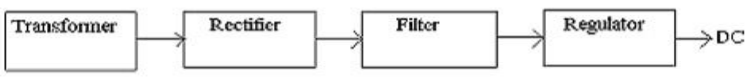


Fig 4.3. General Block of Power Supply Unit

TRANSFORMER:

A transformer is a static piece of which electric power in a single circuit is converted into electric strength of equal frequency in some other circuit. It can enhance or lower the voltage within the circuit, but with a corresponding decrease or increase in cutting-edge. It works with the principle of mutual induction. In our undertaking we are the usage of a step-down transformer to supplying a important supply for the digital circuits. Here we step down a 230volts ac into 12volts ac.

RECTIFIER:

A dc degree acquired from a sinusoidal input can be stepped forward one hundred% the usage of a manner referred to as full wave rectification. Here in our task for full wave rectification we use bridge rectifier. From the primary bridge configuration we see that two diodes (say D2 & D3) are conducting even as the other two diodes (D1 & D4) are in off nation in the course of the duration t = 0 to T/2.Accordingly for the negative cycle of the input the accomplishing diodes are D1 & D4. Thus the polarity throughout the burden is the same.

In the bridge rectifier the diodes can be of variable sorts like 1N4001, 1N4003, 1N4004, 1N4005, IN4007 and many others…. can be used. But right here we use 1N4007, because it may withstand as much as 1000v.

FILTERS:

In order to reap a dc voltage of 0 Hz, we have to use a low bypass filter out. So that a capacitive clear out circuit is used where a capacitor is attached at the rectifier output& a dc is obtained throughout it. The filtered waveform is largely a dc voltage with negligible ripples & it is ultimately fed to the load.

REGISTERS:

The controller IC has two 8 bit registers, an training sign in (IR) and a facts check in (DR). The IR stores the education codes and deal with information for display statistics RAM (DD RAM) and person generator RAM (CG RAM). The IR may be written, however not study through the MPU.

The DR temporally stores data to be written to /study from the DD RAM or CG RAM. The information written to DR by using the MPU, is automatically written to the DD RAM or CG RAM as an inner operation.

When an deal with code is written to IR, the information is routinely transferred from the DD RAM or CG RAM to the DR. Data transfer between the MPU is then finished while the MPU reads the DR. Likewise, for the next MPU read of the DR, information in DD RAM or CG RAM at the address is despatched to the DR robotically. Similarly, for the MPU write of the DR, the following DD RAM or CG RAM address is selected for the write operation.

The dot-matrix liquid crystal display controller and driving force LSI displays alphanumeric, Japanese kana characters, and emblems. It can be configured to power a dot-matrix liquid crystal show underneath the control of a four- or eight-bit microprocessor. Since all the features including show RAM, individual generator, and liquid crystal driver, required for using a dot-matrix liquid crystal display are internally supplied on one chip, a minimum device can be interfaced with this controller/motive force.

REGULATORS:

The output voltage from the capacitor is extra filtered & ultimately regulated. The voltage regulator is a tool, which keeps the output voltage regular regardless of the trade in supply versions, load variations & temperature modifications. Here we use fixed voltage regulator specifically LM7805.The IC LM7805 is a +5v regulator that's used for microcontroller.

4.4.1. FEATURES AND DESCRIPTION OF REGULATORS

- Output Current as much as 1A
- Output Voltages of five, 6, 8, nine, 10, 12, 15, 18, 24V
- Thermal Overload Protection

- Short Circuit Protection
- Output Transistor Safe Operating Area Protection

4.5. ESP8266 Node MCU Wi-Fi Devkit

Fig 4.4. Node MCU chip

Specification:

- Voltage: three.3V.
- Wi-Fi Direct (P2P), soft-AP.
- Current consumption: 10uA~170mA.
- Flash memory attachable: 16MB max (512K everyday).
- Integrated TCP/IP protocol stack.
- Processor: Ten silica L106 32-bit.
- Processor velocity: eighty~160MHz.
- RAM: 32K + 80K.
- GPIOs: 17 (multiplexed with different functions).
- Analog to Digital: 1 input with 1024 step decision. •+19.5dBm output energy in 802.11b mode
- 802.11 aid: b/g/n.

Maximum concurrent TCP connections: 5.

4.6. Pin Definition:

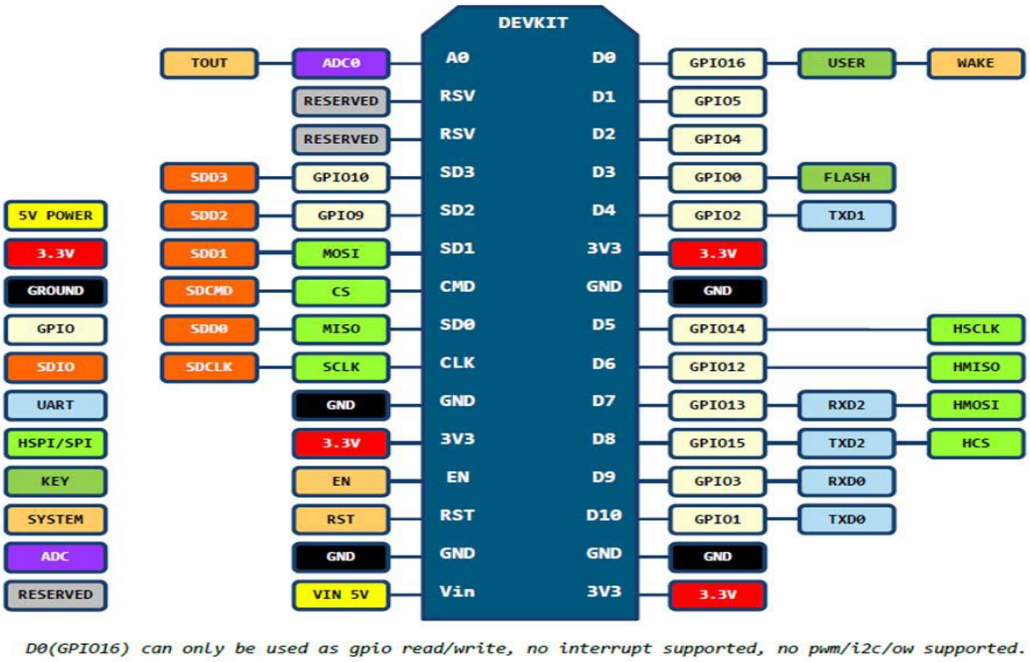


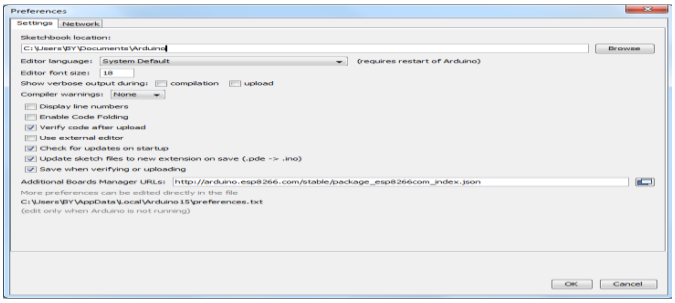
Fig 4.5. Node MCU pin diagram

4.7. Using Arduino IDE

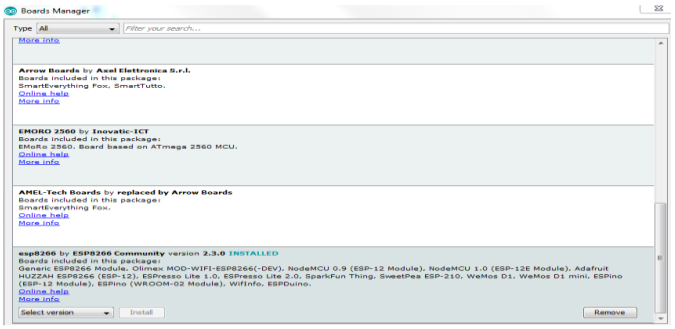
The maximum primary manner to use the ESP8266 module is to apply serial instructions, because the chip is essentially a Wi-Fi/Serial transceiver. However, this isn't always handy. What we propose is the usage of the very cool Arduino ESP8266 assignment, which is a modified model of the Arduino IDE which you want to put in in your laptop. This makes it very convenient to use the ESP8266 chip as we can be the usage of the famous Arduino IDE. Following the underneath step to put in ESP8266 library to work in Arduino IDE environment.

4.8. Install the ESP8266 Board Package

Enter http://arduino.Esp8266.Com/stable/package_esp8266com_index.Json into Additional Board Manager URLs area within the Arduino v1.6.4+ possibilities.



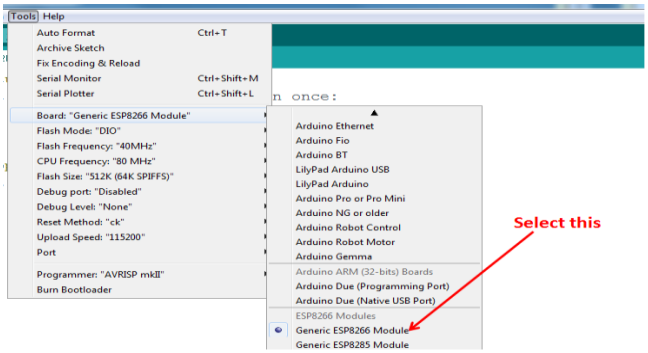
Click ‘File’ -> ‘Preferences’ to access this panel. Next, use the Board supervisor to put in the ESP8266 package deal.



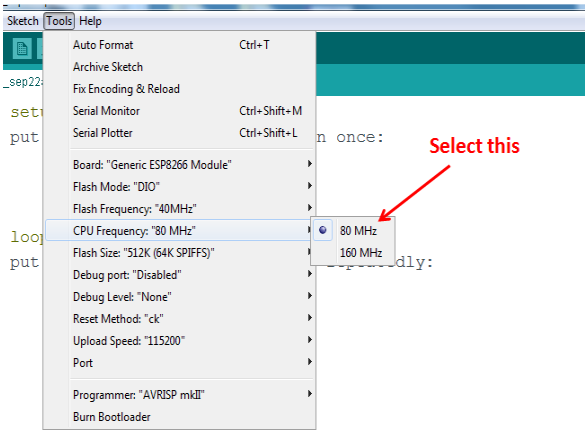
Click ‘Tools’ -> ‘Board:’ -> ‘Board Manager…’ to access this panel. Scroll right down to ‘ esp8266 by way of ESP8266 Community ’ and click “Install” button to install the ESP8266 library package. Once installation finished, close and re-open Arduino IDE for ESP8266 library to take effect.

Setup ESP8266 Support

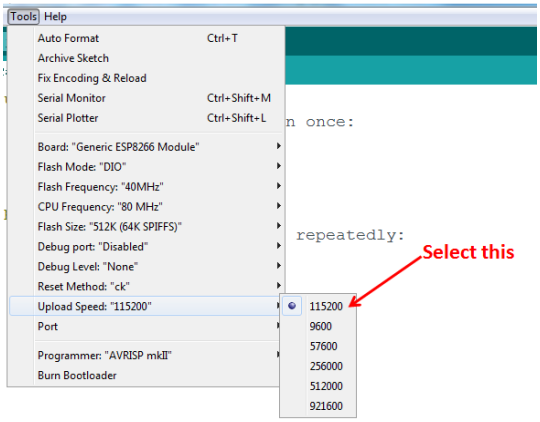
When you've got restarted Arduino IDE, choose ‘Generic ESP8266 Module’ from the ‘Tools’ -> ‘Board:’ dropdown menu.



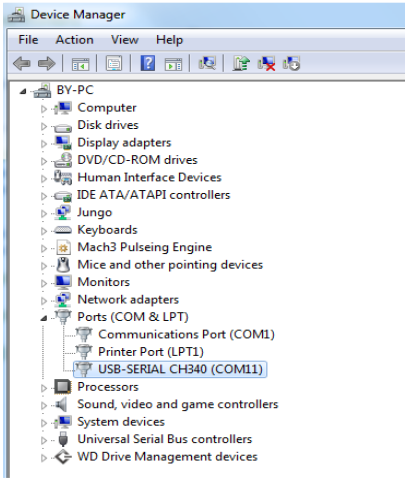
Select 80 MHz because the CPU frequency (you can attempt a hundred and sixty MHz overclock later)

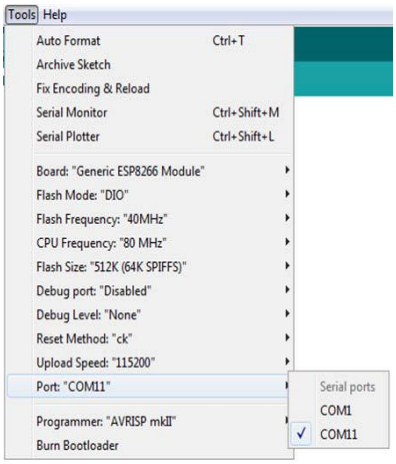


Select ‘115200’ baud add pace is a good vicinity to begin - afterward you could try better speeds however 115200 is a superb secure place to begin.



Go to your Windows ‘Device Manager’ to find out which Com Port ‘USB-Serial CH340’ is assigned to. Select the matching COM/serial port to your CH340 USB-Serial interface.





4.9. Blink Test

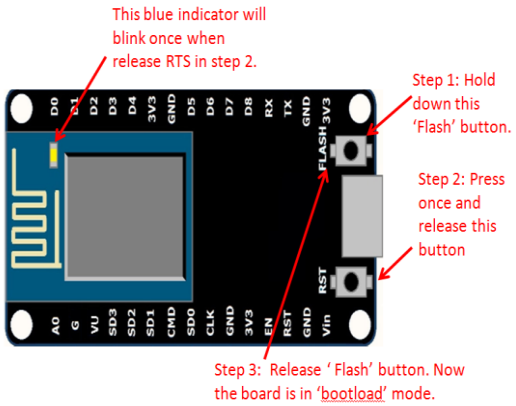
We'll start with the simple blink test. Enter this into the sketch window (and keep due to the fact you will should). Connect a LED as shown in Figure3-1.

Now you will want to place the board into boot load mode. You'll ought to try this before every upload. There is not any timeout for boot load mode, so you do not need to rush!

• Hold down the ‘Flash’ button.

• While preserving down ‘ Flash’, press the ‘RST’ button.

• Release ‘RST’, then release ‘Flash’



Once the ESP board is in boot load mode, add the cartoon through the IDE,

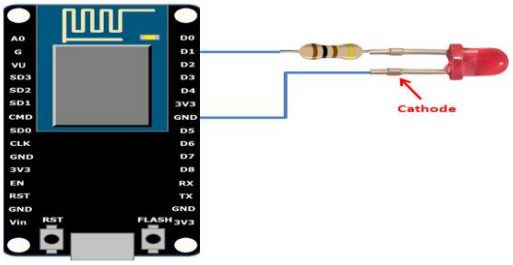
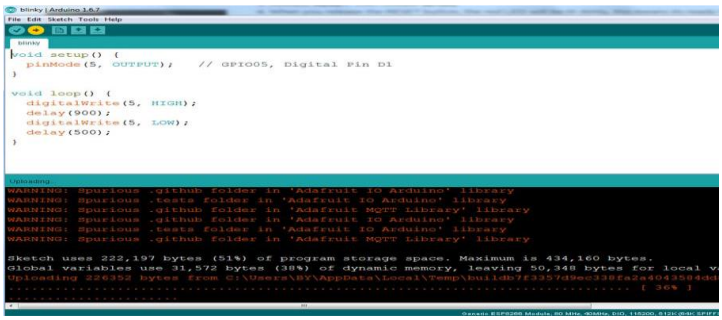


Fig 4.6. Connection diagram for the blinking test

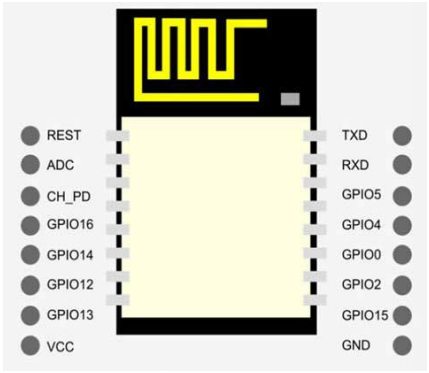


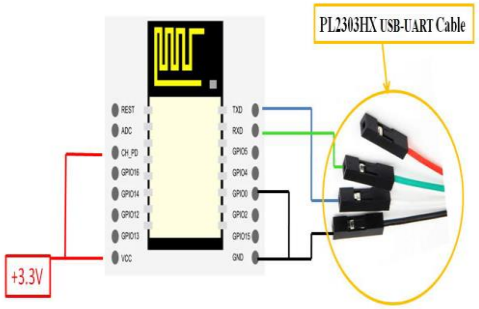
Flashing Node MCU Firmware on the ESP8266 using Windows

Node MCU is a firmware that allows you to software the ESP8266 modules with LUA script. And you'll find it very similar to the way you program your Arduino. With only some strains of code you may establish a Wi-Fi connection, manipulate the ESP8266 GPIOs, turning your ESP8266 into an internet server and plenty more. In this educational we're going to use some other ESP8266 module with pin header adapter board which is breadboard pleasant.

ESP8266 Module Breadboard Friendly with Header Connector

4.10. Pin Assignment:





4.11. Humidity sensor

Measurement and control of temperature and relative humidity unearths programs in sever a region. These days gadgets are to be had that have each temperature and humidity sensors with signal conditioning, ADC, calibration and conversation interface all built inner them. The use of such smart sensors significantly simplify the layout and reduces the general cost. We mentioned in past approximately Humidity and temperature measurements with Sensirion's SHT1x/SHT7x sensors. These sensors are able to measuring both temperature and relative humidity and offer fully calibrated digital outputs. While SHT1x/SHT7x are very correct sensors, they're still costly for hobbyists use. This article discusses the DHT11 sensor which

additionally offers calibrated virtual outputs for temperature and humidity however is rather lot less expensive than the Sensirion sensors. The DHT11 sensor uses a proprietary 1-cord protocol which we can be exploring right here and implementing with the PIC16F628A microcontroller on the way to receive the temperature and humidity values from the sensor and show them on a sixteen×2 person LCD.

4.12. About DHT11 sensor

The DHT11 sensor comes in a unmarried row four-pin bundle and operates from 3. Five to 5.5V strength supply. It can measure temperature from zero-50 °C with an accuracy of ±2°C and relative humidity ranging from 20-ninety-five% with an accuracy of ± five%. The sensor presents fully calibrated digital outputs for the two measurements. It has got its own proprietary 1-twine protocol, and therefore, the communique between the sensor and a microcontroller isn't viable via a direct interface with any of its peripherals. The protocol has to be applied within the firmware of the MCU with unique timing required via the sensor. The following timing diagrams describe the statistics transfer protocol among a MCU and the DHT11 sensor. The MCU initiates information transmission with the aid of issuing a “Start” signal. The MCU pin need to be configured as output for this cause. The MCU first pulls the information line low for at least 18 ms and then pulls it high for next 20-forty? S before it releases it.

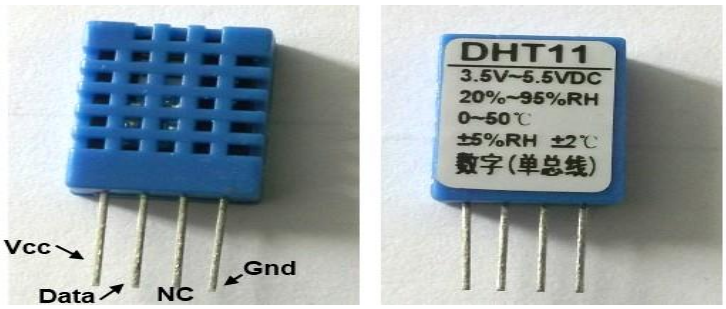
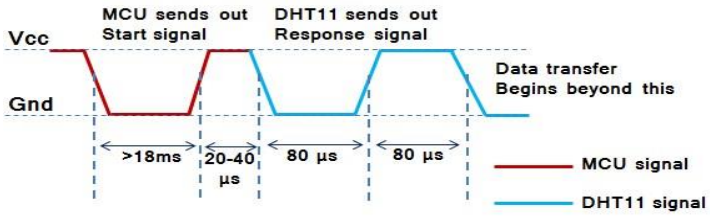


Fig 4.7. DHT11 sensor comes in a single row 4-pin package

Next, the sensor responds to the MCU “Start “signal via pulling the road low for eighty? S followed by means of a good judgment high signal that also lasts for eighty? S. Remember that the MCU pin need to be configured to input after completing the “Start “sign. Once detecting the reaction signal from the sensor, the

MCU need to be prepared to receive data from the sensor. The sensor then sends 40 bits (5 bytes) of information continuously in the statistics line. Note that even as transmitting bytes, the sensor sends the most considerable bit first.



"Start" and "Response" signals

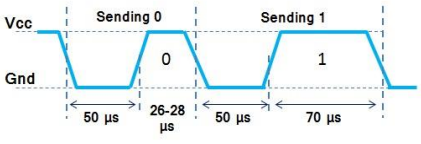
The 40-bit statistics from the sensor has the subsequent shape.

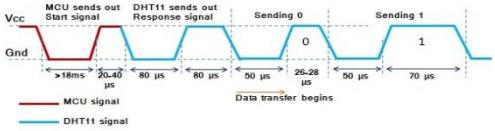
Data (forty-bit) = Integer Byte of RH + Decimal Byte of RH + Integer Byte of Temp. + Decimal Byte of Temp. + Checksum Byte

For DHT11 sensor, the decimal bytes of temperature and humidity measurements are usually zero. Therefore, the primary and third bytes of obtained statistics truly supply the numeric values of the measured relative humidity (%) and temperature (°C). The ultimate byte is the checksum byte that's used to make certain that the statistics transfer has passed off without any errors. If all the 5 bytes are transferred successfully then the checksum byte have to be same to the remaining eight bits of the sum of the first 4 bytes, i.e.,

Checksum = Last eight bits of (Integer Byte of RH + Decimal Byte of RH + Integer Byte of Temp. + Decimal Byte of Temp.)

Now we could speak approximately the maximum crucial factor, that is signalling for transmitting “zero″ and “1″. In order to ship a bit of facts, the sensor first pulls the road low for 50? S. Then it increases the line to excessive for 26-28? S if it has to ship “0″, or for 70? S if the bit to be transmitted is “1″. So, it is the width of the superb pulse that includes information about 1 and 0.





Timing difference for transmitting "1s" and "0s"

Start, Response and Data indicators in sequence

At the cease of the final transmitted bit, the sensor pulls the records line low for 50? S and then releases it. The DHT11 sensor calls for an outside pull-up resistor to be related between its Vcc and the statistics line in order that underneath idle circumstance, the information line is constantly pulled excessive. After finishing the statistics transmission and freeing the records line, the DHT11 sensor goes to the low-strength intake mode till a brand new “Start” sign arrives from the MCU.

4.13. RESPIRATORY SENSOR:

Air and gas flows in addition to line and remedy pressures have to be monitored and controlled in sever a clinical gadget such as breathing devices, aesthetic gadgets, sleep analysis devices, sleep apneas remedy gadgets (CPAP), spirometers and oxygen concentrators. High-excellent sensors in breathing devices measure minute float fees across the zero factor of the respiratory flow and also hit upon float rates of several hundred l/min. Applications in aesthetic gadgets name for sensors with excessive resistance to anaesthetics. In controlled CPAP devices, strain sensors continuously display the remedy pressure, thereby enhancing the comfort and first-class of the treatment. Spirometers utilize unique pneumotach graphs that degree the respiration glide the use of efficient differential strain sensors.

First Sensor develops and manufactures particularly reliable sensors and custom designed sensor structures as a strategic accomplice to clinical product producers within the area of respiratory and breathing. Our entire advisory, improvement, production and service procedures observe the excessive requirements for scientific products in line with EN ISO 13485.

The respiration sensor is constant to a long hook and loop strap this is located around the chest or stomach. For most packages, putting one sensor across the

stomach is necessary. Optionally, you may area a 2d respiration sensor around the chest. Using two sensors is beneficial for belly breathing physical games.

Unravel the strap and fix it across the stomach (or torso) so that the sensor is within the front. Ask the client to breathe out as completely as possible and connect the sensor so there may be minimal anxiety. The match has to be comfortable enough that the strap remains fixed when the concern is secure.

There need to additionally be enough slack within the rubber strap of the sensor so that growth of the stomach reasons this rubber strap to increase without being overextended.

The respiratory sign is a relative measure of stomach expansion.
The Respiration Sensor is a sensitive girth sensor the usage of an easy fitting high sturdiness latex rubber band fixed with self-adhering belt. It detects chest or belly enlargement/contraction and shows the respiration waveform and amplitude. It can be worn over apparel. Respiration can be measured by means of an inductive or resistive breathing belt, but additionally with the aid of measuring the EMG of the diaphragm.

For several medical functions, the respiratory of a patient desire to be measured. Sometimes we need to have an impact approximately the pulmonary characteristic, every so often we just need to stumble on and calculate the quantity of apneas.

We have both inductive and resistive respiratory belts available for the dimension of respiratory. Next to that it is also viable to degree the nasal airflow by way of our differential pressure sensors.
The Future Internet purpose is to offer an infrastructure to have an immediate access to statistics approximately the bodily global and its gadgets. Physical gadgets may be relevant to one-of-a-kind software domains, along with e-fitness, warehouse control, etc. Each application domain may have extraordinary sorts of physical devices. Each physical device will have its personal specifications, that is

required to use so as to engage with it. To gain the future Internet aim, a layered vision is required that could facilitate statistics get entry to. Internet of Things (IoT) is a vision that aims to combine the virtual international of information to the real global of devices thru a layered architecture.

The term „Internet of Things" includes phrases, specifically Internet and Things. Internet refers to the global community infrastructure with scalable, configurable abilities based totally on interoperable and general verbal exchange protocols. Things are physical objects or gadgets, or virtual gadgets, gadgets or facts, that have identities, physical attributes and digital personalities, and use sensible interfaces [1]. For instance, a virtual object can constitute an summary unit of sensor nodes that includes metadata to perceive and find out its corresponding sensor nodes. Therefore, IoT refers back to the things that can provide records from the bodily environment thru the Internet.

Middleware is as an interface among the hardware layer and the software layer, that is chargeable for interacting with devices and records management [2]. The function of a middleware is to present a unified programming version to have interaction with gadgets. A middleware is in fee of masking the heterogeneity and distribution problems that we are facing while interacting with devices [3].

Motivation

IoT-based totally machine is in price of supplying information from an surroundings to an non-expert user. IoT-primarily based machine can be used in extraordinary environments, so it desires as a way to cope with many heterogeneous devices. Thus, a first-rate problem within growing an IoT-based device is the way to deal with the interplay with the heterogeneous devices for non-expert customers. This situation may be addressed by way of a middleware layer among gadgets and non-expert customers. This layer is responsible to hide the variety of gadgets from the consumer angle, and gives get right of entry to transparency to the devices for the end users.

The concept of making abstractions of devices been addressed in the literature. The middleware we found within the literature can provide pride with the aid of facilitating the interplay with gadgets, however they do now not aid low-level tool configuration [4].

4.14. IoT definition

In this phase, we give an explanation for some of the IoT definitions. Also, we give an explanation for the layered architecture for IoT.

Internet of Things (IoT) has increasingly gained interest in enterprise to interact with extraordinary styles of devices. IoT can have an impact on industry and society by means of integrating physical gadgets into statistics networks [8]. IoT impacts can be on exceptional perspectives, particularly for personal and commercial enterprise users. From the angle of a personal person, IoT has effect on each running and personal fields, such as clever homes and places of work, e-fitness and assisted living. From the issue of a commercial enterprise consumer the affects would be in fields together with automation and business production, logistics, business process management, sensible transportation of people and goods [9]

IoT integrates bodily matters into records networks. IoT covers the overall infrastructure, including software, hardware and services, that is used to support these records networks. The included bodily things can trade facts about the bodily residences and information that they experience of their surroundings. To discover devices, we can use identity technology like for instance RFID, which permit each device be uniquely recognized [10].

International Telecommunication Union (ITU)1 defines IoT as “A worldwide infrastructure for the Information Society, allowing superior services by interconnecting (physical and virtual) matters based on, current and evolving, interoperable information and communication technologies” [11]

Internet of Things-Architecture 2 (IoT-A) defines it as “The idea of a globally interconnected continuum of gadgets, items and things in preferred emerged with the RFID technology, and this idea has considerably been extended to the contemporary vision that envisages a plethora of heterogeneous gadgets interacting with the bodily surroundings.”

IoT has a layered architecture designed to answer the needs of numerous industries, establishments and society. Fig. 2.1 shows a generic layered structure for IoT that consist of 5 layers, which can be mentioned, inside the following

- Edge Technology layer

  This is a hardware layer that consists of embedded systems, RFID tags, sensor networks and all of the different sensors in exceptional bureaucracy. This hardware layer can perform several features, which includes collecting facts from a machine or an surroundings, processing information and helping conversation.

- Access Gateway layer

  This layer is worried with statistics coping with, and is answerable for publishing and subscribing the offerings which might be provided by using the Things, message routing, and hovelling the communique among platforms.

- Middleware layer

  This layer has a few vital functionalities, which includes aggregating and filtering the acquired facts from the hardware gadgets, acting facts discovery and providing get admission to manipulate to the devices for programs.

- Application layer

This layer is accountable for handing over numerous utility services. These offerings are supplied thru the middleware layer to exceptional packages and users in IoT-based totally systems. The utility offerings can be used in unique industries along with, logistics, retail, healthcare, and so on.

4.15. HEARTBEAT SENSOR

A character's heartbeat is the sound of the valves in his/her coronary heart contracting or expanding as they pressure blood from one place to every other. The variety of instances the coronary heart beats in step with minute (BPM), is the coronary heart beat price and the beat of the coronary heart that can be felt in any artery that lies close to the pores and skin is the heart beat.

4.15.1. Two Ways to Measure a Heartbeat

Manual Way: Heart beat may be checked manually with the aid of checking one's pulses at locations- wrist (the radial pulse) and the neck (carotid pulse). The manner is to place the two hands (index and centre finger) at the wrist (or neck underneath the windpipe) and count the number of pulses for 30 seconds and then multiplying that range via 2 to get the heart beat rate. However, strain need to be implemented minimum and additionally hands should be moved up and down till the heartbeat is felt.

Using a sensor: Heart Beat may be measured primarily based on optical electricity version as light is scattered or absorbed all through its direction thru the blood as the coronary heart beat modifications.

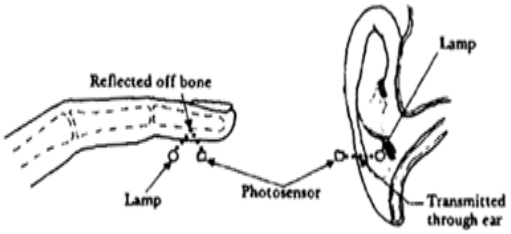
4.15.2. Principle of Heartbeat Sensor

The heartbeat sensor is based at the precept of photo plethysmography. It measures the change in quantity of blood through any organ of the frame which causes a alternate in the light intensity thru that organ (a vascular place). In case of programs where heart pulse fee is to be monitored, the timing of the pulses is extra essential. The drift of blood quantity is decided by means of the fee of coronary heart pulses and considering the fact that mild is absorbed by blood, the signal pulses are equal to the heart beat pulses.

There are two forms of photoplethysmography:

Transmission: Light emitted from the light emitting device is transmitted thru any vascular vicinity of the frame like earlobe and received via the detector.

Reflection: Light emitted from the light emitting tool is reflected by way of the regions.



4.15.3. Working of a Heartbeat Sensor

The simple heartbeat sensor consists of a mild emitting diode and a detector like a mild detecting resistor or a photodiode. The heart beat pulses cause a version in the drift of blood to one-of-a-kind areas of the frame. When a tissue is illuminated with the mild supply, i.E. Mild emitted through the led, it either displays (a finger tissue) or transmits the mild (earlobe). Some of the light is absorbed through the blood and the transmitted or the reflected mild is obtained by the light detector. The quantity of mild absorbed depends at the blood volume in that tissue. The detector output is in form of electrical sign and is proportional to the coronary heart beat rate.

This signal is actually a DC sign regarding the tissues and the blood extent and the AC factor synchronous with the coronary heart beat and due to pulsatile adjustments in arterial blood extent is superimposed on the DC sign. Thus, the foremost requirement is to isolate that AC factor as it's miles of top significance.

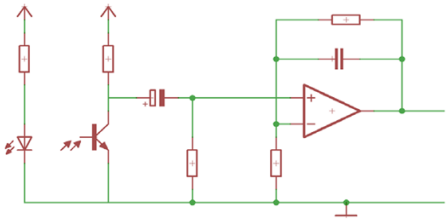


Fig 4.8. schematic diagram of heart beat sensor

To achieve the venture of getting the AC sign, the output from the detector is first filtered the usage of a 2 level HP-LP circuit and is then converted to digital pulses

using a comparator circuit or using easy ADC. The virtual pulses are given to a microcontroller for calculating the heat beat fee,

BPM (Beats per minute) = 60*f

Where f is the pulse frequency

4.15.4. Practical Heartbeat Sensor

Practical heartbeat Sensor examples are Heart Rate Sensor (Product No PC-3147). It includes an infrared led and anldr embedded onto a clip like structure. The clip is attached to the organ (earlobe or the finger) with the detector component at the flesh.

Another instance is TCRT1000, having four pins-

Pin1: To give deliver voltage to the LED

Pin2 and 3 are grounded. Pin four is the output. Pin 1 is likewise the allow pin and pulling it high turns the LED on and the sensor starts operating. It is embedded on a wearable tool which may be worn on the wrist and the output may be sent wirelessly (via Bluetooth) to the pc for processing.

Fig 4.9. heart beat sensor

Application Developing your very own Heartbeat Sensor System

A fundamental Heartbeat Sensor system can also be constructed the usage of basic components like a ldr, comparator IC LM358 and a Microcontroller as given under

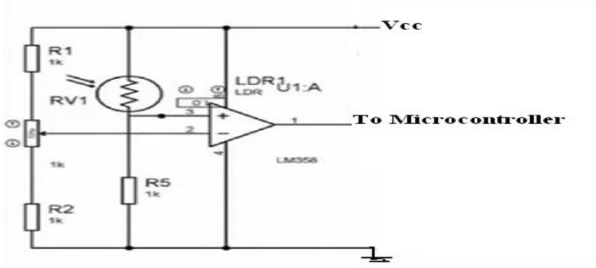


Fig 4.10. *schematic diagram of heart beat*

As described above regarding the precept of coronary heart beat sensor, whilst the finger tissue or the earlobe tissue is illuminated the usage of a light supply, the light is transmitted upon getting modulated i.E. A component getting absorbed through the blood and the rest being transmitted. This modulated mild is obtained by the mild detector.

Here a Light Dependant Resistor (LDR) is used as a mild detector. It works at the precept that once mild falls at the resistor, its resistance modifications. As the mild intensity will increase, the resistance decreases. Thus, the voltage drops throughout the resistor decreases.

Specification:

- On-board passive buzzer
- On-board 8550 triode drive
- Can control with single-chip microcontroller IO directly
- Working voltage: 5V
- Board size: 22 (mm) x12 (mm)

4.16. Pressure sensor

A strain sensor measures stress, commonly of gases or beverages. Pressure is an expression of the force required to stop a fluid from increasing, and is generally stated in terms of force in keeping with unit area. A strain sensor generally acts as a transducer; it generates a signal as a function of the pressure imposed. For the functions of this text, one of these signs is electrical.

Pressure sensors are used for control and tracking in hundreds of normal packages. Pressure sensors can also be used to in a roundabout way degree different variables along with fluid/gas drift, pace, water stage, and altitude. Pressure sensors can as a substitute be referred to as stress transducers, pressure transmitters, pressure senders, strain signs, piezometers and manometers, among different names.

Pressure sensors can vary drastically in technology, layout, performance, application suitability and value. A conservative estimate could be that there can be over 50 technology and as a minimum 300 agencies making pressure sensors worldwide.

There is likewise a class of stress sensors which might be designed to measure in a dynamic mode for shooting very excessive pace adjustments in pressure. Example packages for this sort of sensor could be inside the measuring of combustion pressure in an engine cylinder or in a gas turbine. These sensors are commonly manufactured out of piezoelectric materials inclusive of quartz.

Some stress sensors, together with the ones located in a few visitors' enforcement cameras, feature in a binary (off/on) manner, i.E., whilst pressure is carried out to a pressure sensor, the sensor acts to complete or wreck an electrical circuit. These sorts of sensors are also referred to as a pressure transfer.

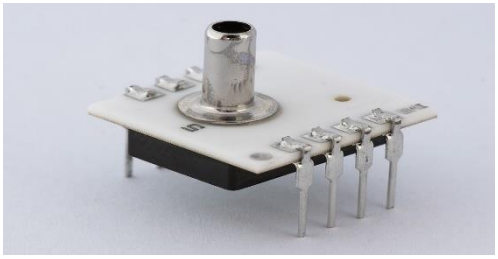


Fig 4.11. pressure sensor

4.17. Software requirements:

- Arduino ide
- Arduino c

4.18. ARDUINO UNO AND ITS PROGRAMMING

Arduino is a device for making computer systems that may sense and manage extra of the physical global than your laptop computer. It's an open-supply physical computing platform based totally on a easy microcontroller board, and a development environment for writing software for the board.

Arduino can be used to develop interactive items, taking inputs from a selection of switches or sensors, and controlling a selection of lights, automobiles, and other bodily outputs. Arduino projects may be stand-by myself, or they can speak with software program jogging to your computer. The boards may be assembled with the aid of hand or bought preassembled; the open-source IDE can be downloaded at no cost.

The Arduino programming language is an implementation of Wiring, a similar bodily computing platform, that is based totally on the Processing multimedia programming environment.

Arduino ide:

4.18.1. Overview

The Arduino microcontroller is an easy to apply yet powerful unmarried board computer that has gained widespread traction inside the interest and expert marketplace. The Arduino is open-source, because of this hardware is reasonably priced and improvement software program is free. This guide is for college students in ME 2011, or students everywhere who're confronting the Arduino for the first time. For superior Arduino users, prowl the internet; there are plenty of resources.

4.18.2. Communication

Microcontrollers depend on a bunch computer for growing and compiling applications. The software used at the host laptop is referred to as an integrated improvement environment, or IDE. For the Arduino, the improvement surroundings is based at the open supply Processing

Platform (www.Processing.Org) that's described by way of its creators as a “programming language and surroundings for folks that need to application pics, animation, and interactions. “The Arduino programming language leverages an open supply challenge referred to as Wiring (wiring. Org.Co). The Arduino language is

based on true antique- usual C. If you are unusual with this language, don’t worry; it’s no longer tough to examine, and the Arduino IDE offers some feedback while you make errors on your applications.

The Arduino Uno has some of centres for speaking with a computer, another Arduino, or different microcontrollers. The ATmega328 gives UART TTL (5V) serial conversation, that's to be had on digital pins zero (RX) and 1 (TX). An ATmega16U2 on the board channels this serial communication over USB and appears as a virtual com port to software at the pc. The '16U2 firmware uses the usual USB COM drivers, and no outside driver is needed. However, on Windows, a inf report is needed. The Arduino software program includes a serial monitor which allows simple textual records to be despatched to and from the Arduino board. The RX and TX LEDs on the board will flash while records is being transmitted thru the USB-to-serial chip and USB connection to the computer (but now not for serial communique on pins zero and 1).

A Software Serial library allows for serial conversation on any of the Uno's digital pins. The ATmega328 additionally helps I2C (TWI) and SPI conversation. The Arduino software program includes a Wire library to simplify use of the I2C bus; see the documentation for info. For SPI conversation, use the SPI library.

As you undergo the list of programming statements to be had within the Arduino IDE (pick out Help->Reference), you might suppose there isn’t a whole lot electricity for doing things like walking servos, running stepper automobiles, analyzing potentiometers, or showing textual content on an LCD. Like maximum any language based totally on C, the Arduino helps the notion of “libraries” code

Repositories that expand middle programming capability. Libraries will let you re- use code without having to bodily replica and paste it into all of your packages. The fashionable Arduino software set up comes with numerous libraries you can use, and you may down load others from the Arduino guide pages and from 1/3-celebration websites that put up Arduino library code. A desirable example of a library you'll use with the Robot and in all likelihood many other robotic tasks is servo. This library allows you to connect one or more interest R/C servos to the Arduino's virtual I/O pins. The Servo library comes with the usual Arduino installation package Library->Servo. This provides the road

#Consist of <Servo.H>

Which tells the Arduino IDE which you wish to encompass the Servo library for your caricature. With the capability of the library now available to you, you could use its diverse capabilities to govern one or greater servos. For instance, you may use the write function to rotate a servo to a selected role, from zero to a hundred and eighty levels. The following code

myServo.Write(90);

Moves a servo to its midpoint, or ninety diploma function. Structurally, Arduino sketches are very trustworthy and are quite easy to study and recognize. The Arduino application incorporates two most important elements: setup () and loop (). These are programming features that do what their names endorse: setup () units up the Arduino hardware, consisting of specifying which I/O strains you intend to apply, and whether

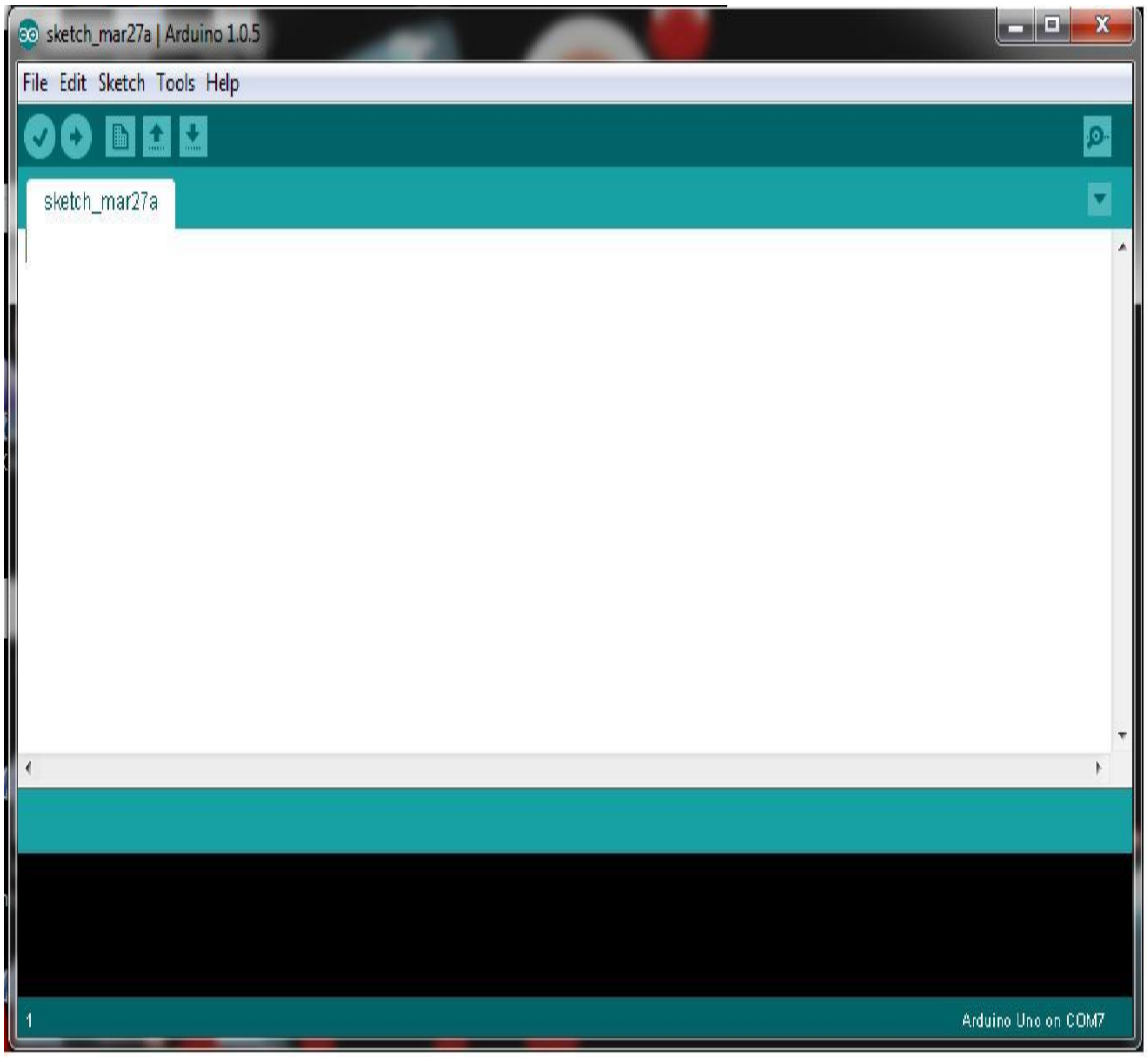
They are inputs or outputs. The loop () feature is repeated ad infinitum while the Arduino is working.

Arduino IDE (Integrated improvement environment) is used to put in writing this

4.19. ARDUINO SOFTWARE:

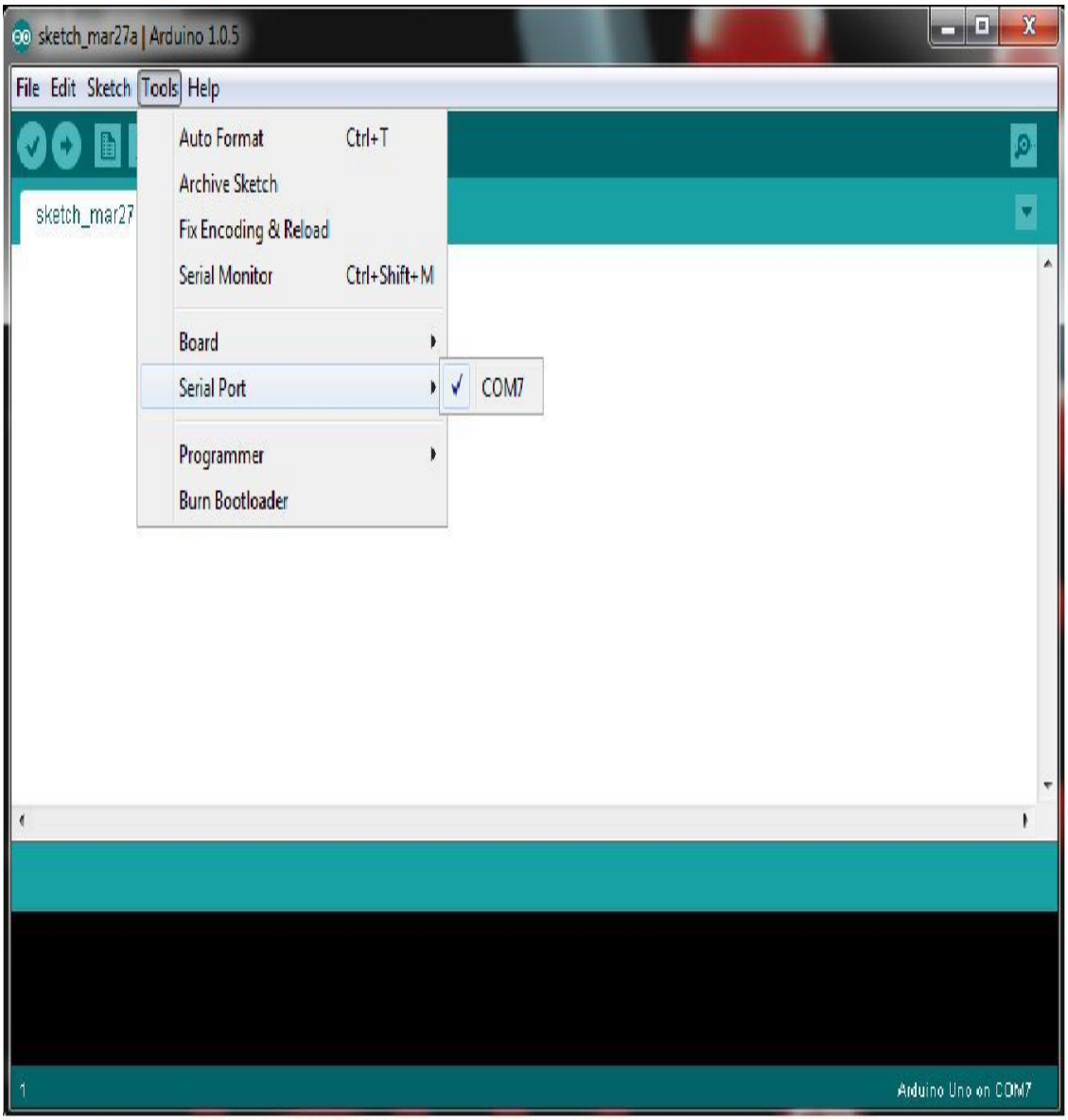
1. Open Arduino IDE as shown below

   Open Arduino IDE



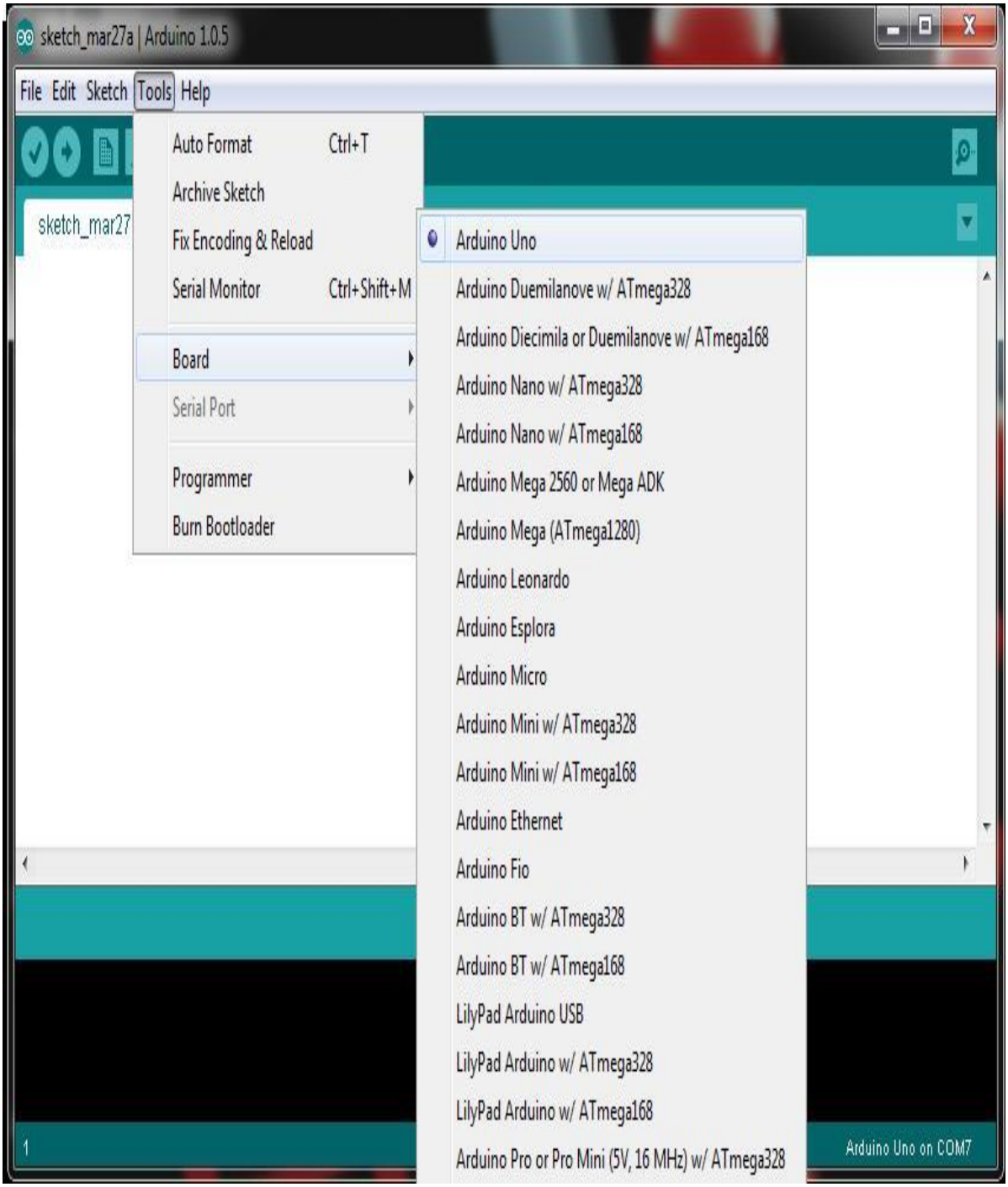
2. Select the COM Port from tool

Select the COM Port



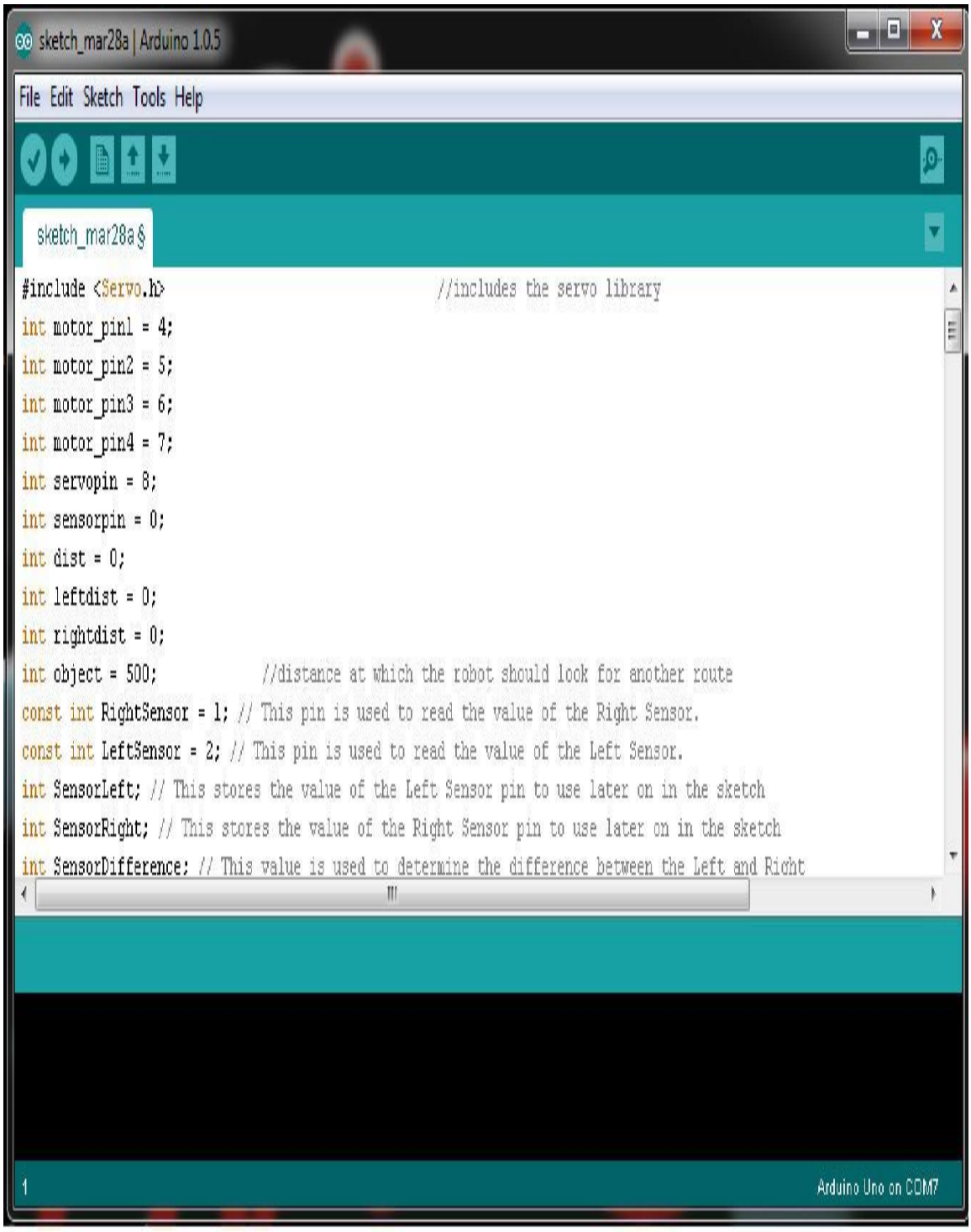
3. Select the required Arduino board from Tools as shown below

Select the required Arduino board

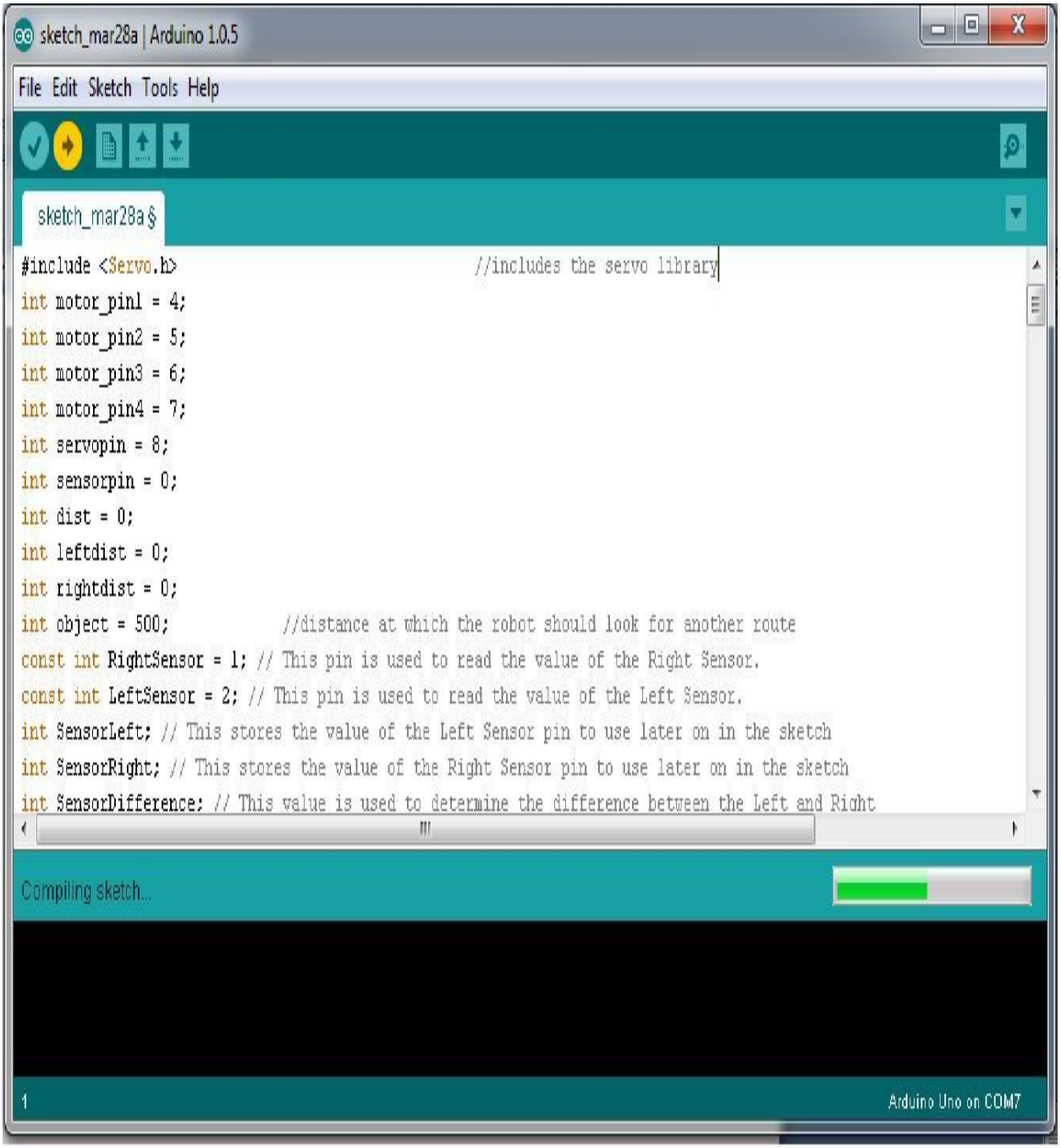


4. Write the sketch in Arduino IDE

Sketch in Arduino IDE



5. Compile and upload the Sketch to Arduino board upload the Sketch to Arduino board



4.20. ALGORITHM:

1) Start the program.

2) Install the Adafruit library as header file.

3) Adafruit header files have inbuild sensors data.

4) Create DHT11.h header file to sense the temperature.

5) Create DHT pin D5 for input purpose.

6) To use Ubidots software create Ubidots token characters.

7) To use software, create WIFI and password character to use WIFI SSID, and WIFI Password.

8) Use D0 as input data.

9) Use else loop concepts for sensing the data.

10) Use loop concepts to detect the temperature, humidity, pressure, altitude, gas data.

11) After data detection it sends to the device which matches the token id.

12) After receiving the data, it shows value on the screen of Ubidots.

13) Use delay as 2000.

14) End the program.

Chapter-5

CONCLUSION AND RESULT

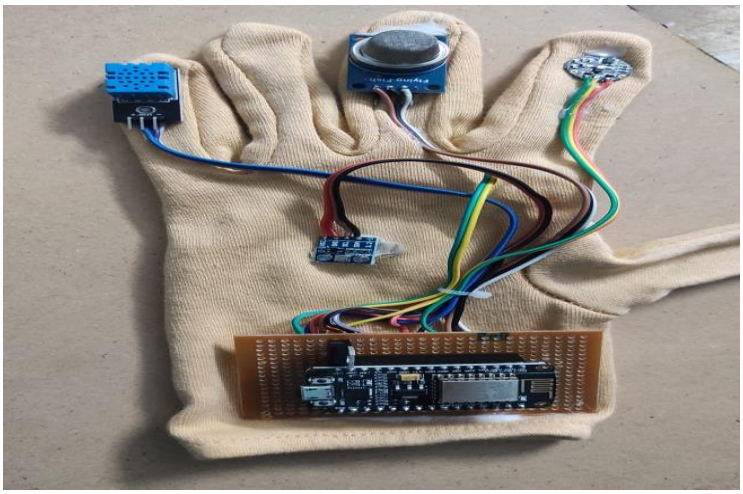
5.1. Applications:

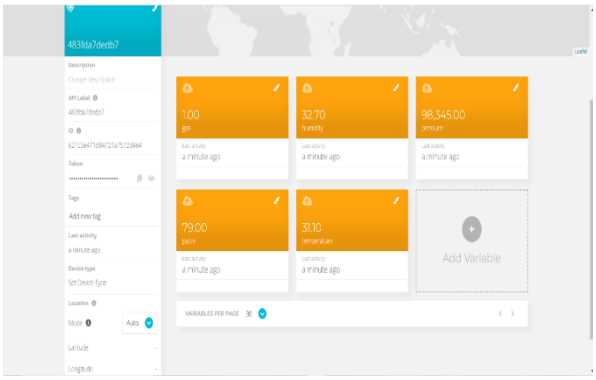
This is an essential sensor based totally project which has the today's era carried out in it. And it has many packages & blessings as referred to below.

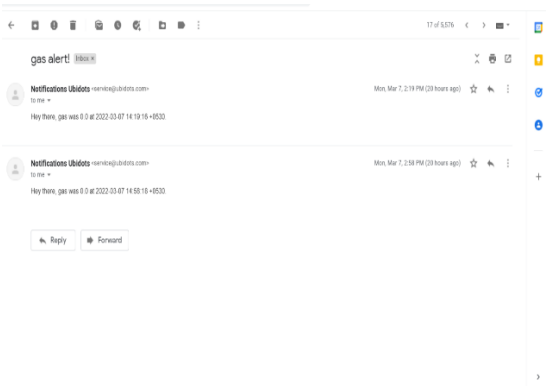
1) IOT Healthcare is the maximum demanding field within the clinical location. This undertaking is for, elderly character in our domestic. Also, for the senior citizen living alone or living with 1 or 2 participants. This mission certainly proves useful whilst own family members need to exit for some emergency paintings.

2) Disable patients can use this assignment. Disable sufferers who locate it definitely tough to go to medical doctors on every day basis or for those patients who want continuous tracking from the doctor.

5.2. Result screenshots:







5.3. Code:

climber_2

```
#include <Adafruit_Sensor.h>
#include <DHT.h>
#include <DHT_U.h>
#include <Adafruit_BMP085.h>
#define DHTPIN D5
Adafruit_BMP085 bmp;
#define DHTTYPE    DHT11

DHT_Unified dht(DHTPIN, DHTTYPE);
uint32_t delayMS;

#include "Ubidots.h"

const char* UBIDOTS_TOKEN = "BBFF-wsnJDDDUY01kDNedmZJuGoDzOKEs4X";  // Put here your Ubidots TOKEN
const char* WIFI_SSID = "climber";      // Put here your Wi-Fi SSID
const char* WIFI_PASS = "12345678";      // Put here your Wi-Fi password
Ubidots ubidots(UBIDOTS_TOKEN, UBI_HTTP);

void setup() {
  Serial.begin(9600);
  ubidots.wifiConnect(WIFI_SSID, WIFI_PASS);
  dht.begin();
  Serial.println(F("DHTxx Unified Sensor Example"));
  if (!bmp.begin()) {
  Serial.println("Could not find a valid BMP085 sensor, check wiring!");
  while (1) {}
  }
  pinMode(D0,INPUT);
  sensor_t sensor;
  dht.temperature().getSensor(&sensor);
  dht.humidity().getSensor(&sensor);
}

void loop() {
  int gas = digitalRead(D0);
  sensors_event_t event;
  dht.temperature().getEvent(&event);

  if (isnan(event.temperature)) {
    Serial.println(F("Error reading temperature!"));
  }
  else {
    Serial.print(F("Temperature: "));
```

```
  if (isnan(event.temperature)) {
    Serial.println(F("Error reading temperature!"));
  }
  else {
    Serial.print(F("Temperature: "));
    Serial.print(event.temperature);
    Serial.println(F("°C"));
  }
  dht.humidity().getEvent(&event);
  if (isnan(event.relative_humidity)) {
    Serial.println(F("Error reading humidity!"));
  }
  else {
    Serial.print(F("Humidity: "));
    Serial.print(event.relative_humidity);
    ubidots.add("Humidity", event.relative_humidity);
    Serial.println(F("%"));
  }
    Serial.print("Temperature = ");
    Serial.print(bmp.readTemperature());
    Serial.println(" *C");

    Serial.print("Pressure = ");
    Serial.print(bmp.readPressure());
    Serial.println(" Pa");

    Serial.print("Altitude = ");
    Serial.print(bmp.readAltitude());
    Serial.println(" meters");

    ubidots.add("Temperature", bmp.readTemperature());
    ubidots.add("Pressure", bmp.readPressure());
    ubidots.add("Gas", gas);
    ubidots.add("Pulse", random(79,88));
      bool bufferSent = false;
      bufferSent = ubidots.send();  // Will send data to a device label that matches the device Id

      if (bufferSent) {
        Serial.println("Values sent by the device");
      }
      delay(2000);
//  }
}
```

5.4. Conclusion:

This challenge is an IOT based device for fitness monitoring and monitoring of the climber. Sensors offer heartbeat, body temperature and environmental parameters of absolutely everyone to manipulate room. This technology can assist to provide the accurate vicinity of missing character in critical conditions, consequently we are able to conclude that this system will act as a lifeguard to the hiking character.

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6. Mohammad S. Jassas, Abdullah A. Qasem, Qusay H. Mahmoud, “A Smart System Connecting e-Health Sensors and the Cloud,” Proceeding of the IEEE 28th Canadian Conference on Electrical and Computer Engineering Halifax, Canada, May 3-6, 2015.