

SMART ASSISTING VISUALLY IMPAIRED STICK WITH MULTIPLE FUNCTIONS

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering in Electrical and Electronic Engineering

By

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DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING SCHOOL OF
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SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)

Accredited with Grade "A" by NAAC

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600119

APRIL 2020



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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonfire work of **RISHWANA S (REG.NO.38140047)**
AND RAMYA B (REG.NO.38140044) who carried out the project entitled “**SMART ASSISTING VISUALLY IMPAIRED STICK WITH MULTIPLE FUNCTIONS**” under my supervision from
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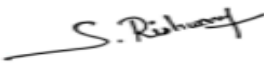
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DECLARATION

WE **RISHWANA S** (Reg. No.38140047), **RAMYA B** (Reg .No.38140044) hereby declare that the Project Report entitled “**SMART ASSISTING VISUALLY IMPAIRED STICK WITH MULTIPLE FUNCTIONS**” done by us under the guidance of **Dr. P. SIVAGAMI** is submitted in partial fulfilment of the requirements for the award of Bachelor of Engineering degree in **Electrical and Electronic Engineering**.

1. 

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DATE: 4.05.2022

PLACE: Chennai

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ABSTRACT

For the visually impaired, getting from one place to another, whether indoors or outdoors, is one of the most arduous jobs. Furthermore, the bad quality of the roads makes it much more difficult for them to stroll outside. They must maintain constant vigilance to avoid risky scenarios such as colliding with fixed or moving obstacles, entering or descending stairwells, or slipping on wet ground. They may become distressed and desire to send a distress message to their family or friends to let them know where they are. The problems that blind people experience can be overcome with the help of technology. The proposed approach makes advantage of the Internet of Things (IoT) concept to provide a bridge between the blind and the surroundings. Abnormalities such as barriers, stairwells, and moist terrains can be detected using several sensors. The smart blind stick prototype shown here is a simple, intelligent, and cost-effective smart blind stick with a range of Internet of Things sensors and modules. The ability to send a message to people worried about the user's whereabouts is also included in this solution. A software tool is also being developed to aid blind acquaintances in customizing the stick, such as adding or deleting phone numbers to which alarm messages must be sent.

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CHAPTER-1

INTRODUCTION

1.1 GENERAL INTRODUCTION:

An Intelligent Mobility Walking stick, often known as a "Smart Walking stick," is a stick developed for visually impaired people that allows them to move around their surroundings rather than just by avoid hitting things. Active or passive sensors can be used to record information about the presence of a road impediment. When a sensor is passive, all it does is receive a signal. It identifies natural energy sources by electromagnetic radiation reflected, emitted, or transmitted. When using an active sensor, the sensor sends a signal and gets a distorted version of the reflected signal. It detects reflected reactions from objects subjected to artificially generated energy. These active sensors can detect and sense obstacles from a long distance. They are unable to identify hidden obstacles that are extremely dangerous to the blind, such as descending steps, holes, and so on. Typically, vibration or sound signals are used to convey feedback information. As a result, these systems use sound or frequency vibration to transmit their recommendations to the user. As a result, training is required to help the user understand the signals and react to them in real time. Training, on the other hand, can be greater cost than the product itself. As a result, users are unable to buy it. If the information is communicated as a sound, the blind person may be embarrassed in public.

1.2 SURVEY OF LITERATURE:

ULTRASONIC SMART STICK FOR THE VISUALLY IMPAIRED

Today's world moves at a breakneck pace, and we must all walk together to ensure that no one falls behind. However, some segments of society are lagging behind due to disabilities. Blindness is one of them. For travel and other activities, blind people must rely on others. So, to address this issue, we are introducing the Ultrasonic Walking Stick for Blind People. This paper explains how this blind stick is made and how it will be beneficial to blind people. There are several approaches we can take, and we are drawing on ideas from each paper.

DEVELOPMENT OF AN AUTOMATIC OBSTACLE DETECTOR FOR BLIND PEOPLE

Our eyes are extremely important in our lives. We've all seen visually impaired people and are aware of the difficulties they face on a daily basis. When walking, blind people use blind sticks to detect obstacles, but this instrument can only help them find objects on the ground. Obstacle detection is a research area that has resulted in significant advances in main safety systems and the interaction of primary and secondary safety systems. A device that detects obstacles for blind people is known as an obstacle detector for the blind. This device's primary goal is to make walking easier for blind people. In this paper, an Android application is used to create a device that assists blind people. The device is first constructed, and then its performance is evaluated under three extreme conditions: normal, windy, and rainy. In all three conditions, the device performs satisfactorily. It allows the user to hear the distance and location in an automated voice.

A VISUALLY IMPAIRED WIRELESS NAVIGATION SYSTEM

Despite the fact that there are a sizable number of visually impaired people around the world, technology has not advanced far enough to meet their needs. This implies that current technology ignores a sizable portion of our population. Our research aims to develop a prototype that incorporates SONAR, GPS, Cloud Communication, Light Sensing, and Pulse Sensing technologies. This model will include sensing and wireless components that will provide the user with haptic feedback, ensuring a safe and precise navigation mechanism. Some of the subproblems we encountered during our research included selecting cost-effective and interoperable solutions, integrating the obstacle detection mechanism with location detection, and implementing open-source code and efficient coding techniques. The key component in developing our prototype was an economically viable product that used open source. Our system is a replacement for traditional navigation tools such as a stick and a guide dog. The disabled's primary needs are independence and health, and this device can assist them in achieving those goals.

OBSTACLE DETECTION USING ULTRASONIC SENSORS

The measurement of an object's distance is used in a variety of applications such as vehicle control, medical applications, robotic movement control, and so on. This can be accomplished using a variety of sensors, including ultrasonic, infrared, radar, and laser. Ultrasonic sensors are the least expensive and have the highest reliability of any measurement method. In this paper, we discuss how these sensors can be used to measure

distance in vehicular applications and compare them to a small automobile prototype that uses the Raspberry Pi as an output for obstacle detection.

GPS IS BEING USED TO LEARN IMPORTANT LOCATIONS AND PREDICT MOVEMENT ACROSS MULTIPLE USERS.

Wearable computers have the ability to behave as intelligent agents in everyday life, supporting users with a variety of activities by determining how to act in different situations based on context. The most prevalent sort of context that these agents employ to establish the user's task is location. Another potential use of geographical context is the creation of a model that predicts the user's future movements. We demonstrate a method that clusters GPS data acquired over time into meaningful places at different sizes. These locations are then merged into a Markov model, which can be used in a range of single-user and collaborative applications.

1.3 OBJECTIVES:

1. To automatically send information messages about their location to the caretaker or guardian via the message
2. To implement the GPS module with Google Maps to get the destination route.

CHAPTER-2

EXISTING AND PROPOSED SYSTEM

2.1 EXISTING SYSTEM:

- There is a sensor in this Smart stick that detects objects or walls from a distance of one or half metre, causing the stick to vibrate and emit a buzzing sound.
- This Smart Stick alerts a blind person when he or she is approaching an impediment or a wall.
- That person will then be warned about an impediment or a wall.

2.2 CIRCUIT DIAGRAM FOR EXISTING SYSTEM:

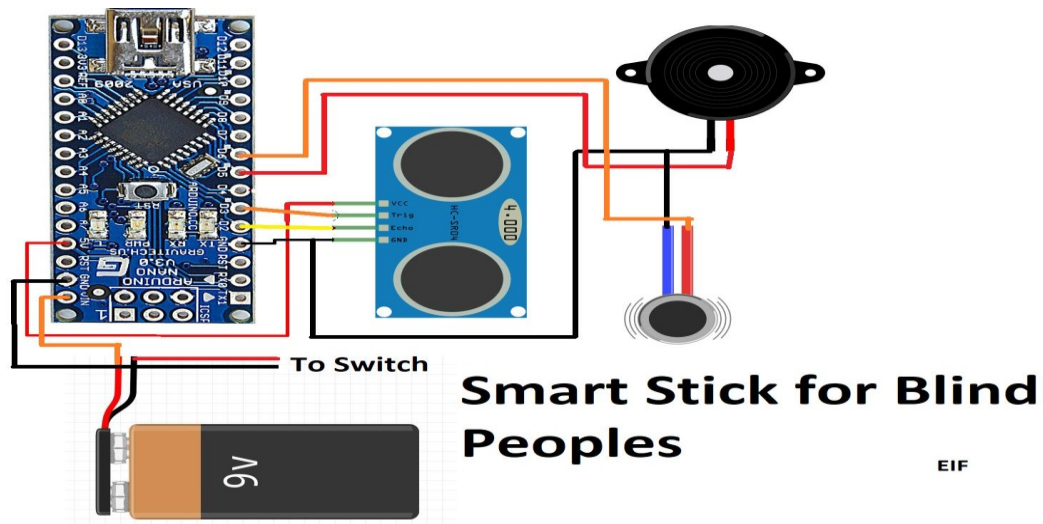


fig 2.1: circuit diagram of the existing system

2.3 PROPOSED SYSTEM:

- An ultrasonic sensor is employed in the suggested system to identify the distance to the obstruction. When the distance between the stick and the obstruction is less than 5 cm, the vibrator will sound an alert.
- A water level sensor detects the presence of water and emits a beeping sound. Finally, pressing the panic button causes the heart rate to be recognised, and a GSM message with the location is transmitted via the GPS module.

2.4 BLOCK DIAGRAM FOR PROPOSED SYSTEM:

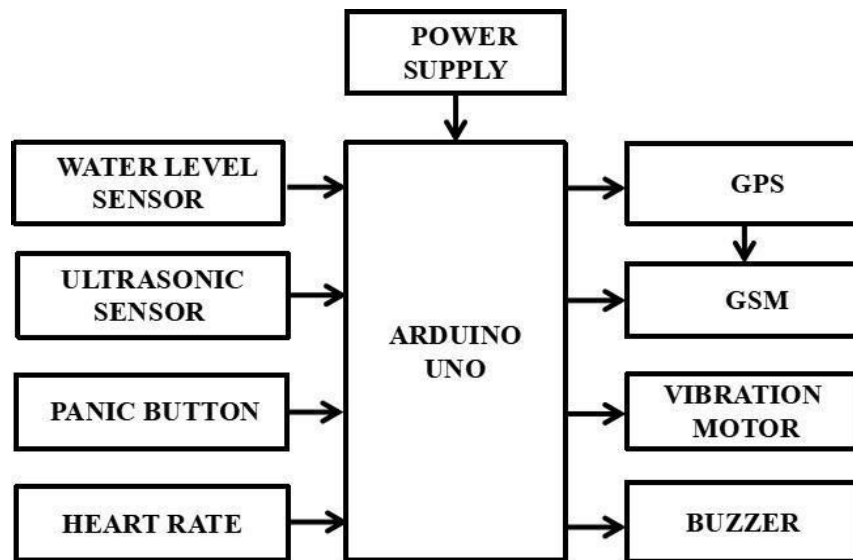


fig 2.2: block diagram of the proposed system

2.5 HARDWARE DESCRIPTIONS:

- Arduino Uno
- Ultrasonic Sensor
- Water level Sensor
- Buzzer
- GSM
- GPS
- Vibration Motor
- Panic Switch
- Power Supply

2.6 SOFTWARE REQUIREMENTS

- Arduino IDE

- Embedded C
- PHP

2.7 ARDUINO Uno:

- The ATmega328-based The Arduino Uno is a microcontroller board designed by Arduino (datasheet). On this board, there are 14 digital I/O pins (six of which can be used as PWM outputs), six analogue inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. Everything you need to get started with the microcontroller is included; all you have to do is connect it to a computer through USB or power it with an AC-to-DC adapter or battery. As with all prior boards, the FTDI USB-to-serial driver chip is missing from the Uno. Instead, it uses a USB-to-serial converter coded on an Atmega16U2 (Atmega8U2 up to version R2).0 pinout: SDA and SCL pins near the AREF pin, as well as two new pins, the IOREF near the RESET pin, allow the shields to adapt to the board's voltage supply. Shields will be compatible with both 5V AVR-based boards and the Arduino Due in the future, which operates at 3.3V. The second is a non-connected pin that will be used in the further generations.
- Stronger RESET circuit.
- The At mega 16U2 takes the place of 8U2. The name "Uno" is an Italian word that means "one," and It was picked as a symbol of the approaching Arduino 1.0 release. The Uno and version 1.0 will be the reference versions of Arduino in the future. The Uno is the latest in a line of USB Arduino boards, and it serves as the platform's reference model; for a comparison with previous models, see the table below, see the Arduino board index.

2.7.1 POWER:

- The board's regulator gives a controlled 5V to this pin. To power the board, you can use the DC power jack (7–12V), the USB connection (5V), or the board's VIN pin (7–12V). Using the 5V or 3.3V pins to supply power bypasses the regulator and may result in Arduino board damage. It is not something we recommend to use.
- 3V3. The on-board regulator generates a 3.3-volt supply. 50 milliamperes is the maximum current consumption (mA).

2.7.2 ARDUINO UNO:



Fig 2.3: Arduino uno

2.7.3 MEMORY:

The ATmega328 has a memory of 32 KB (with 0.5 KB used for the bootloader). Onboard memory includes 2 KB of SRAM and 1 KB of EEPROM (which can be read and written with the EEPROM library). Output and Input Using the pin Mode (), digital Write (), and digital Read () functions, The 14 digital pins on the Uno can be used as inputs or outputs. 5 volts is used to power them. Each pin has an inbuilt pull-up resistor of 20–50 kilo Ohm and may deliver.

IN ADDITION, SOME PINS HAVE SPECIALIZED FUNCTIONS:

- serial: 0 for RX and 1 for TX (TX). This device receives (RX) and transmits (TX) TTL serial data. These pins are linked to the ATmega8U2 USB-to-TTL Serial chip's corresponding pins.
- External Interrupts 2 and 3 On a low value, a rising or falling edge, or a value change, these pins can be adjusted to create an interrupt. For more information, see the attached Interrupt () function.
- PWM: 3, 5, 6, 9, 10, and 11. With the analog Write () function, you can output 8-bit PWM.

- SPI: SS (SS), MOSI (MOSI), MISO (MISO), 13 (MISO) (SCK). The SPI library is used to communicate with these pins.
- • Thirteen LEDs A wire connects a built-in LED to digital pin 13. When the pin is HIGH, the LED is turned on; when it is LOW, the LED is turned off. The Uno's six analogue inputs, labelled A0 through A5, each have a resolution of 10 bits (i.e., 1024 different values).
- They measure from ground to 5 volts by default, but you can With the AREF pin and the analogue Reference () function, you can change the upper limit of their range. Some pins include additional features, such as:
- To reset the microcontroller, pull this wire low. . It's commonly used to add a reset button to shields, which prevents boards from being accessed. Check out the ATmega328 port mapping as well as the Arduino pin mapping. The mapping for the Atmega8, 168, and 328 is the same. Communication The Arduino Uno has the ability to communicate with a computer, another Arduino, or other microcontrollers The standard USB COM drivers are used, and no external user is required.
- TWI communication is handled by the wire library. There are a two more pins on the board:
- On digital pins 0 (RX) and 1 (TX), the ATmega328 supports UART TTL (5V) serial connections (TX). An ATmega16U2 on the board routes serial connection through USB, which appears to software on the PC as a virtual com port. There is no need for an additional driver because the '16U2 firmware employs standard USB COM drivers.
- On Windows, however, a.inf file is required. A serial monitor is included in the Arduino software and allows simple textual data to be transmitted to and from the Arduino device. When data is transmitted via the USB-to-serial chip and USB connection to the computer, the RX and TX LEDs on the board will blink (but not for serial communication on pins 0 and 1). A software serial library can be used to interact across any of the Uno's digital pins. The ATmega328 also supports I2C (TWI) and SPI communication. The Arduino software includes a wire library that facilitates the use of the I2C bus; check the documentation for further information. For SPI communication, use the SPI library.

2.7.4 OVERCURRENT PROTECTION FOR USB

A resettable poly fuse on the Arduino Uno Protects the USB ports on your computer from shorts and overcurrent. Although most computers come with security built in, the fuse adds an extra degree of defence. If the USB port receives more than 500 mA, the fuse will automatically disconnect the connection until the short or overload is resolved.

2.7.5 PIN CONFIGURATION:

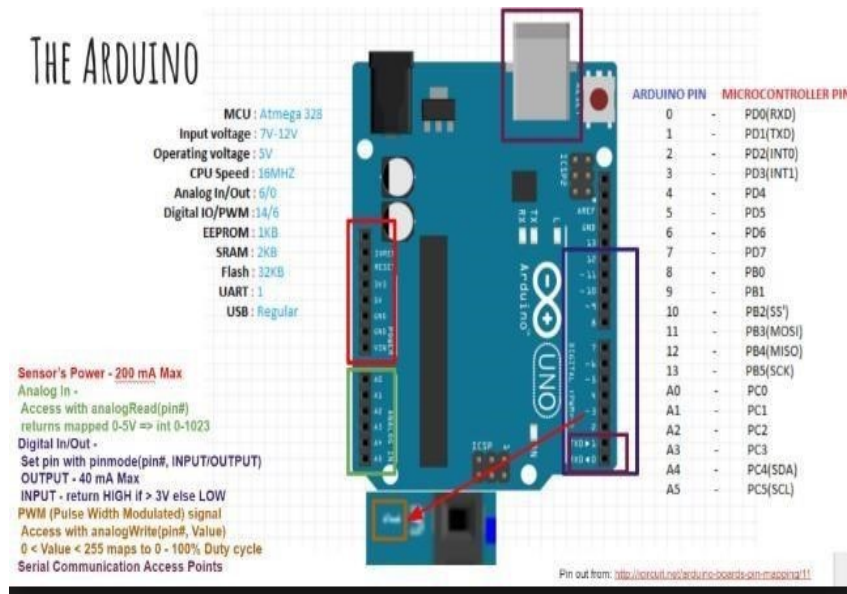


fig 2.4: Pin configuration

2.7.6 PHYSICAL ATTRIBUTES

Because the USB connector and power jack exceed the previous specification, the maximum length and width of the Uno PCB are 2.7 and 2.1 inches, respectively. The board has four screw holes for mounting to a surface or case. The distance between digital pins 7 and 8 is 160 mils (0.16"), which is not an even multiple of the 100-mil spacing between the other pins.

2.8 POWER SOURCE:

2.8.1 DEFINITION

A power supply (also known as a power supply unit or PSU) is a device or system that provides electrical or other types of energy to one or more output loads. The phrase is most commonly used to describe electrical energy sources, with mechanical energy sources appearing less frequently and others appearing only infrequently.

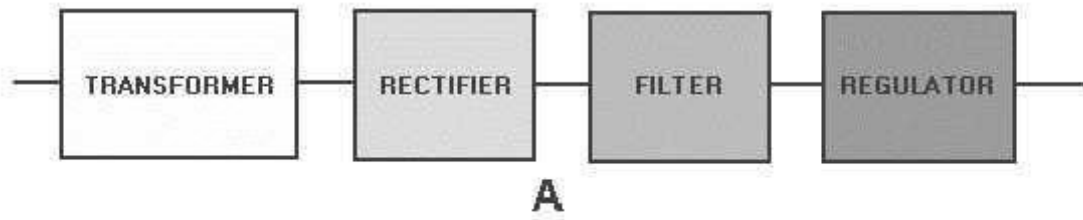


fig 2.5: Block diagram for a basic power supply

The transformer isolates the power source from stepping up or down the input line voltage on the power line. The rectifier portion turns the alternating current signal into a pulsing direct current signal. However, as you progress through this chapter, you'll see that pulsating DC isn't a good idea. As a result, a filter section is employed to convert pulsing DC to a cleaner, more acceptable DC voltage.

The regulator, the final component, does exactly what its name implies. It keeps the power supply's output constant in the face of significant variations in load current or input line voltages. Let's trace an AC signal through the power supply now that you know what each component does. You must now investigate how this signal changes in each of the power supply's segments. You'll see how these changes happen later in the chapter. The transformer is a step-up transformer with a one-to-three turn ratio. By multiplying the input voltage by the primary-to-secondary turn ratio, the output of this transformer can be calculated.; for example, At the output, $115 \text{ VAC} \times 3 = 345 \text{ VAC}$ (peak-to-peak). The rectifier's output will be half of the 360-degree input, or around 173 volts of pulsating DC, because each diode in the rectifier component conducts for 180 degrees of the 360-degree input. The filter section, which is made up of a network of resistors, capacitors, and inductors, controls the rise and fall time of the changing signal. As a result, the signal's DC level remains more consistent. We will see the filter process more in the discussion of real filter circuits.

The filter produces a signal of 110 volts DC, with AC ripple riding on top of it. It will be explained why the voltage (average voltage) is lower. The regulator maintains a constant 110-volt dc level in its output, which is used by electronic equipment (commonly called the load).

2.8.2 A SIMPLE 5 VOLT POWER SUPPLY FOR DIGITAL CIRCUITS

- A succinct overview of the procedure It produces a well-regulated +5V output with a 100-mA output current capability.

- If the regulator IC overheats, the built-in overheating protection reduces the output.
- Circuit complexity: extremely simple and straightforward to make.
- Circuit performance: extremely stable +5V output voltage, consistent operation
- Component availability: easy to obtain; uses only very common core components to make.
- Uses: as an electrical component; as a small laboratory power supply. • The power supply current is equal to the required output current plus 5 mA, and the power supply voltage is unregulated. 8–18V DC.

2.8.3 CIRCUIT DIAGRAM

When working with digital circuits, this is a simple +5V power supply that comes in handy. These transformers are widely available, but their voltage control is typically poor, making them unsuitable for digital circuit experimenters unless some sort of regulation can be achieved.

This circuit can produce a +5V output at roughly 150 mA of current, but it can be boosted to 1 A if the 7805-regulator chip is well cooled. Overload and terminal protection are built into the circuit.

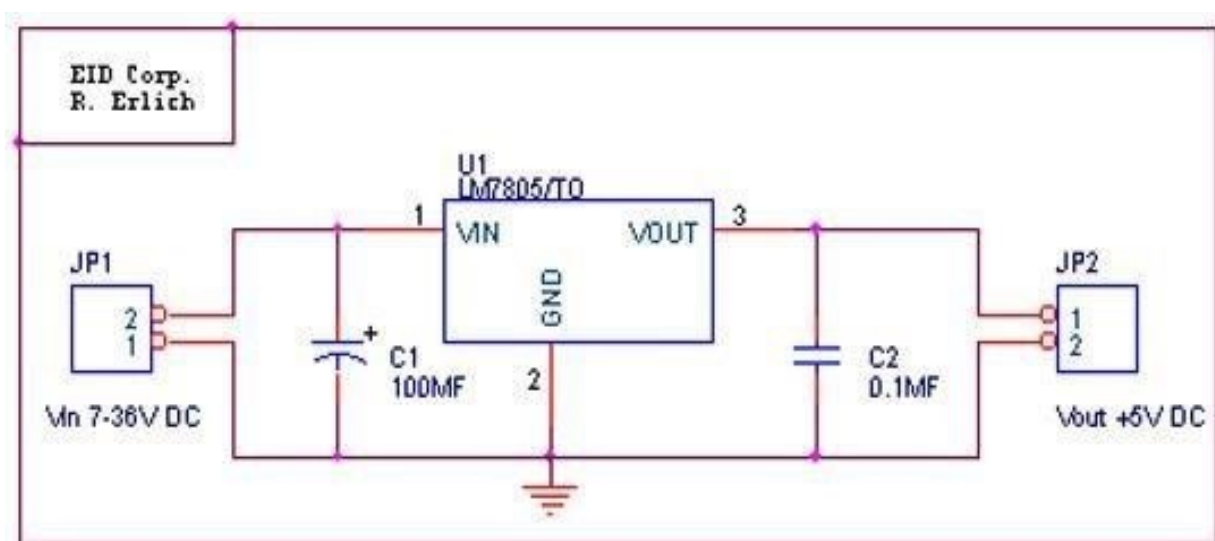


Fig 2.6: Circuit diagram

2.8.4 CIRCUIT DIAGRAM OF THE POWER SUPPLY

The capacitors must be rated at a high enough voltage to safely withstand the circuit's input voltage. The circuit is simple to incorporate onto a Vero board. The 7805 regulator's pinout.

1. Voltage that's not regulated in
2. Ground
3. Output voltage which is regulated

2.8.5 LIST OF COMPONENTS

- a voltage rating of at least 25 volts and a 7805 regulator IC
- A 6V voltage rating is required for at least one 10 μF electrolytic capacitor.
- Capacitance of 100 nF ceramic or polyester capacitor.

2.8.6 MORE CURRENT OUTPUT

- a voltage rating of at least 25 volts and a 7805 regulator IC
- A 6V voltage rating is required for at least one 10 μF electrolytic capacitor.
- Capacitance of 100 nF ceramic or polyester capacitor

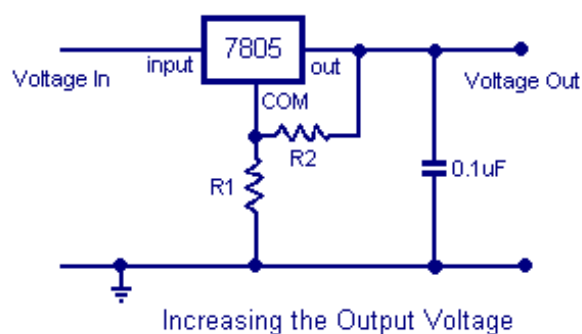


fig 2.7: More Output Current

2.8.7 ADDITIONAL OUTPUT VOLTAGES

If we need voltages rather than +5V, we can change the circuit by updating the 7805 chips with a different regulator with a different output voltage.

The 78X chip family is a subset of the 78X chip family. The output voltage is determined by the last integers in the chip code. The input voltage must be greater than or equal to 3V higher than the output voltage of the regulator; else, the regulator will not function properly.

2.9 ULTRASONIC SENSOR:

An ultrasonic sensor is a device that uses ultrasonic sound waves to determine the distance to an item. sensor an ultrasonic sensor, a transducer emits and receives ultrasonic pulses that convey information about an item's vicinity. The bouncing of high-frequency sound waves off walls produces different echo patterns.

The frequency of ultrasonic sound is higher than that of human hearing. The microphones that receive and transmit ultrasonic sounds are known as transducers. Our ultrasonic sensors, like many others, use a single transducer to send a pulse and receive an echo. The distance to a t-sonic pulse is determined by the sensor.

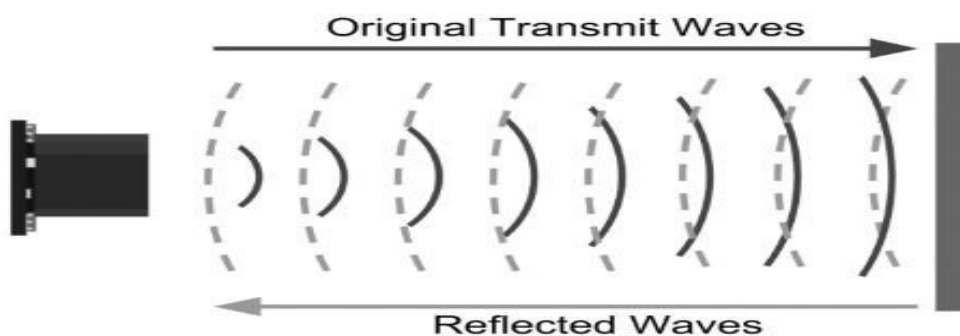


Fig 2.8: Wave Configuration for Sensor

Ultrasound works reliably in any lighting condition and can be used both indoors and outdoors. Ultrasonic sensors can manage collision avoidance as long as the robot is not moving too quickly.

2.9.1 MODULE FOR ULTRASONIC SENSOR



Fig 2.9: Ultrasonic Sensor

Because ultrasonics are so widely used, they can be relied on in applications like grain bin sensing, water level monitoring, drone applications, and car sensing at your local drive-thru restaurant or bank. Collision detection is often done with ultrasonic rangefinders.

2.9.2 THE BEST USE FOR ULTRASONIC SENSORS IS IN NON-CONTACT DETECTION OF:

- Presence
- Level

2.9.3 SOUND WAVE DEFINITION

Sound is a mechanical wave that travels through a solid, liquid, or gaseous media. Sound waves can move across a medium at a given velocity, which is determined by the medium for proliferation. High-frequency sound waves rebound off walls and produce a variety of echo patterns.

2.9.4 PHYSICAL LAWS GOVERNING SOUND WAVES

Sound waves oscillate at such frequencies, or oscillations per second. Noises in the 20 Hz to 20 kHz frequency range are detectable by humans. However, frequency ranges of 100 KHz to 50 MHz are commonly used in ultrasonic detection. The velocity of ultrasound in a medium remains constant at any given time and temperature.

The most prevalent ultrasonic examination procedures involve longitudinal or shear waves. Longitudinal waves are compression waves in which particle motion follows the propagation wave's path. A shear wave is one in which the particle motion is perpendicular to the propagation direction. The introduction of high-frequency sound waves into a test object in order to collect information about it without inflicting any

damage or alteration is known as ultrasonic detection. In ultrasonic detection, two values are measured.

The length of time it takes for sound to travel across a medium, as well as the signal's amplitude Thickness may be estimated using velocity and time.

Material thickness is proportional to the sound velocity of the material multiplied by the travel time.

2.9.5 TRANSDUCERS FOR WAVE PROPAGATION AND PARTICLE DETECTION

Ultrasonic sensors, also known as transceivers or transducers, will be used to transmit sound waves and receive echoes. They operate on the same principle as radar in that In the form of sound, electrical energy is turned into mechanical energy, and vice versa.

Some of the most popular types of transducers used are contact transducers, angle beam transducers, delay line transducers, immersion transducers, and dual transducers. Contact transducers are frequently used to locate cavities and cracks on the outside of a part, as well as to determine thickness. By combining the concepts of reflection and mode conversion, angle beam transducers generate refracted shear or longitudinal waves in the test material.

Variations, a quicker examination time, and increased sensitivity to small indicators are all benefits. Single-element longitudinal wave transducers with an adjustable delay line are known as delay line transducers. One of the advantages of employing a delay line transducer is the possibility to improve near-surface resolution. The delay allows the element to stop bouncing until the reflector's return signal arrives. Immersion transducers have a number of advantages over touch transducers, including consistent coupling, which reduces sensitivity.

2.9.6 ULTRASONIC SENSOR OPERATION:

When an ultrasonic transducer receives a high-voltage electrical pulse, It vibrates across a specific frequency spectrum, producing a burst of sound waves. When there is an obstruction in front of the ultrasonic sensor, the sound waves are reflected as an echo. Resulting in the generation of an electric pulse. It calculates the time it takes for sound waves to be sent and received as well as the time it takes for an echo to be heard. The echo

patterns will be compared to sound wave patterns to determine the state of the discovered signal.

2.9.7 APPLICATIONS INVOLVING ULTRASONIC DETECTION:

The time and the velocity of sound waves in a medium they travel. necessary for echo reception are related to the distance between barriers or discontinuities in metals. As a result, Ultrasonic detection can be used to calculate particle lengths, identify metal discontinuities, and measure liquid levels.

2.9.8 MEASUREMENT OF ULTRASONIC DISTANCE

For distance-measuring applications, ultrasonic sensors are used. These devices emit a burst of ultrasonic sound that is reflected back to the sensor on a regular basis by the target. The system then uses the speed of sound within the medium and the time it takes for the echo to return to the sensor to determine the distance to the target.

Ultrasonic cleaning equipment, which are commercially accessible, use a variety of transducers.

2.9.9 FEATURES OF THE ULTRASONIC DISTANCE SENSOR:

1. The supplied voltage is 5V (DC).
2. a 15-mA supply current
3. The frequency of modulation is 40 hertz.
4. Output voltage range: 0–5V (High when an obstacle is detected within range).
5. Maximum Beam Angle: 15 degrees.
6. The distance between two spots is 6. 2 cm – 400 cm.
7. Precision: 0.3cm
8. Positive TTL pulse for communication

2.10 WATER LEVEL SENSOR:

Many sensors can provide a continuous measurement of volume by detailing the specific amount of liquid in a container relative to the minimum and maximum levels.

2.10.1 WATER LEVEL SENSOR

Within a limited environment, level sensors are used to monitor and manage the levels of a free-flowing fluid. Although most level sensors are designed to monitor liquids, they may also detect solids like powdered substances. The usage of industrial level sensors is prevalent. Liquid level sensors are used in automobiles to monitor a range of liquids, including fuel, oil, and, on rare instances, speciality fluids such power steering fluid. They're also found in things like coffee machines and industrial slurry storage tanks. Basic level sensors can detect whether a liquid is below or above a priest minimum or maximum level.



Fig 2.10: Water Level Sensor

There are several distinct types of liquid level sensors that can be used to detect a liquid's point level. In some varieties, a magnetic float that rises and falls with the liquid in the container is used. When the liquid, and thus the magnet, is present, a reed magnetic switch is activated., reaches a particular level. Typically, a switch is located near the top and bottom of the container, allowing for the sensing of minimum and maximum liquid levels. A protective shield is often included with many sensors to Keep the magnet safe from turbulence or interference caused by direct contact with liquid.

2.10.2 GENERAL LIQUID LEVEL SENSOR SELECTION CONSIDERATIONS:

- Vapour dust and mist
- Chemical composition
- Density and viscosity
- Ambient temperature

- Humidity/moisture
- Process temperature
- Process pressure
- Regulated environment
- Interfaces and gradients

The point level measurement and detection systems are the subject of this article, whereas detection systems are briefly mentioned, as well as continuous level measuring. Different types of level sensors are covered by these two measurement methods.

2.10.3 SPECIFICATIONS

- 1 Product Name: water level sensor
- 2 Item :. K-0135
- 3 Operating voltage :. DC5V
- 4 Working current : less than 20mA
- 5 Sensor Type : Analog
- 6 detection area :. 40mm x16mm
- 7 Production process :. FR4 double-sided HASL
- 8 mounting hole size : 3.0mm
- 9 user-friendly design : half-moon -slip handle depression
- 10 Working temperature :. 10 °C -30 °C
- 11 Operating Humidity : 10% ~ 90 % non -condensing
- 12 Weight :. 3g
- 13 Product Dimensions : 65mm x 20mm x 8mm

Fig 2.11: Specifications of water level sensor

2.10.4 POINT LIQUID LEVEL SWITCH MEASUREMENT AND DETECTION SYSTEMS

The objective of point level measurement sensors is to mark a single water height or to pre-set a level condition. Typically, this sensor serves as a huge alarm, measuring

overflow circumstances in tanks via water level sensors, or as a marker, noting low alarm conditions. The following are the various types of sensors:

- Conductivity Probes
- Float Sensors
- Capacitance Sensors

2.10.5 LEVEL DETECTION AND MEASUREMENT BY USING A FLOAT SENSOR

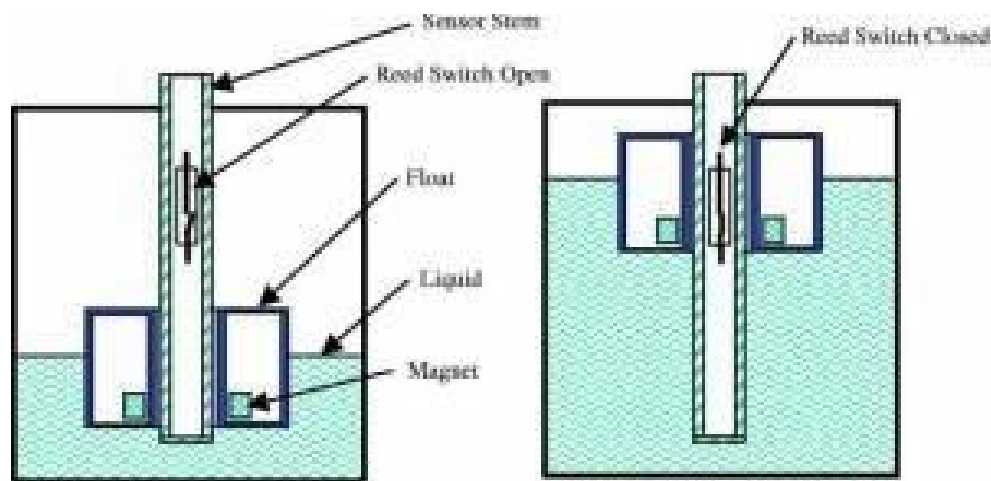


Fig 2.12: Level Detection Using a Float Sensor

2.10.6 OPERATING PRINCIPLE:

According to buoyancy theory, "a float immersed in a liquid is lifted upward by an applied equal force to the weight of the displaced liquid." This concept is used in a water level control system with a float sensor. As a result, the body travels the same distance as the liquid level by partially driving and submerging on the liquid surface.

2.10.7 CONSTRUCTION:

A float, a sensor stem, a magnet, a reed switch, and a weight mounted on the exterior of the open tank make up a level measurement float system. The location of the weight along the scale, which is attached to the outside of the tank, indicates the contents of the tank's level.

2.10.8 WORKING:

To measure liquid level, a float-type liquid level switch is usually employed. When the level rises, the float is transferred to a mechanical arm or sliding pole, which activates a switch. It may include a small magnet that changes the state of a switch as the liquid level rises and the float returns to its original location. This type of level sensor has a number of benefits, including being easy to use, accurate, and adaptable to a variety of applications.

2.10.9 LEVEL DETECTION AND MEASUREMENT BY USING CAPACITANCE SENSOR

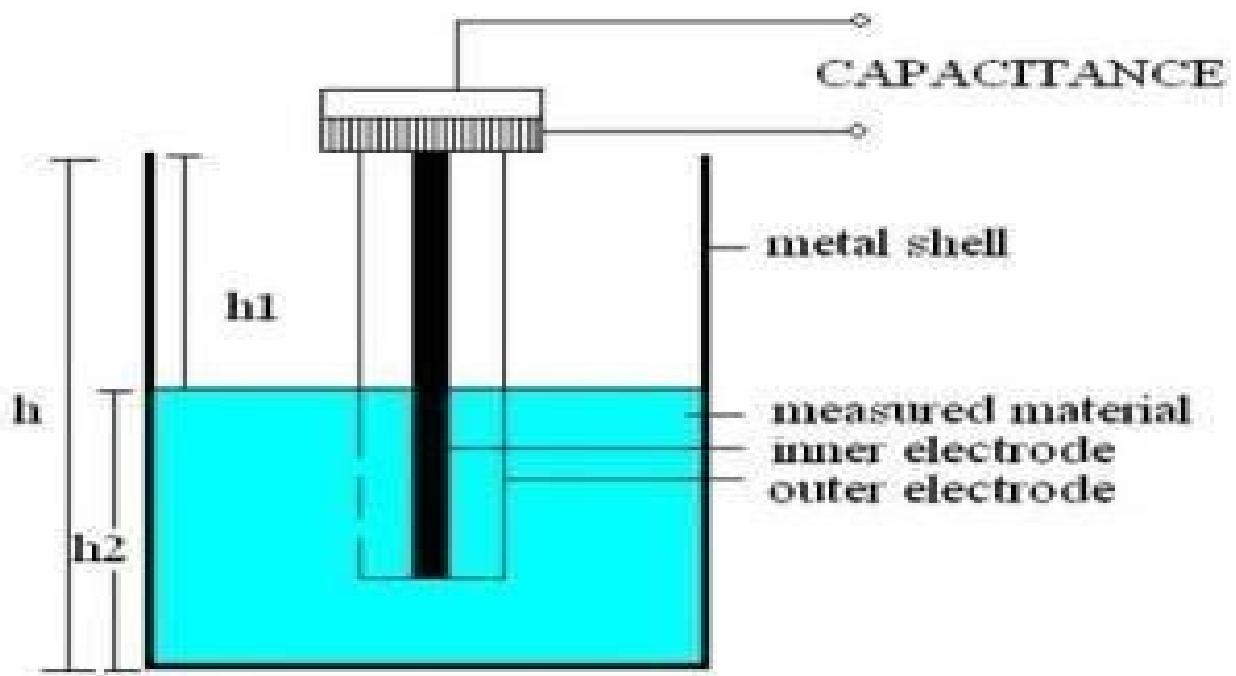


Fig 2.13: Level Detection Using Capacitance Sensor

2.10.10 RINCIPLE OF OPERATION:

Capacitive level measurement is based on changes in capacitance. A capacitive sensor has two plates, one of which serves as an insulated electrode and the other as a tank wall. The capacitance is proportional to the liquid level. An empty tank has a low capacitance, whereas a filled tank has a higher capacitance. A basic capacitor is composed of two electrode plates separated by a thin insulator layer (solid, fluid, gas, or vacuum).

2.11 BUZZER

A buzzer, often known as a beeper, is an aural signalling device that is mechanical, electromechanical, or piezoelectric (piezo for short). Alarm clocks, timers, and confirmation of human input such as a mouse click or keyboard keystroke are all popular uses for buzzers and beepers.



Fig 2.14: Buzzer

2.11.1 TYPES

2.11.1.1 ELECTROMECHANICAL

Early systems used an electromechanical system similar to that of an analogue bell, but without the use of a metal gong. A relay might also be connected to interrupt the contact's own actuating current, causing it to buzz. To function as a sounding board, these machines were typically mounted to a wall or ceiling. The term "buzzer" comes from the rasping sound emitted by electromechanical buzzers.

2.11.1.2 MECHANICAL

A pleasure buzzer is an example of a buzzer that is entirely mechanical. That necessitates the use of drivers. Doorbells are another example of them.



Fig 2.15: Mechanical Buzzer

2.11.1.3 PIEZOELECTRIC

An oscillating electrical circuit or similar audio signal source can drive a piezoelectric device, A piezoelectric audio amplifier then amplifies the signal. The noises of a "click," "ring," or "beep" are all popular indicators There has been a button pressed. The beep of a piezoelectric buzzer/audible beeper is also affected by acoustic cavity resonance, also known as Helmholtz resonance.

2.11.2 APPLICATIONS

While technology improvements have rendered buzzers obsolete and unattractive, buzzers and comparable circuits can still be useful in some situations. The following are examples of current applications: • Novelty uses

- Panels of judges
- Intended for educational purposes

Panels with annunciators

- Metronomes (electronic)
- Video game lockout device • Household equipment like microwave ovens and dishwashers
- An athletic event is a basketball game, for example.
- Electrical security alarms
- A joyous buzzer (mechanical buzzer)

2.11.3 CIRCUIT DIAGRAM OF A SIMPLE PIEZO BUZZER

One of the most frequent buzzers is the piezo buzzer. The active element is made of piezoelectric material, which gives them their name.

These buzzers are typically run at a greater voltage but low current, consuming minimal power but nevertheless creating an extremely loud sound.

The piezo element must have three terminals, as shown in the illustration.

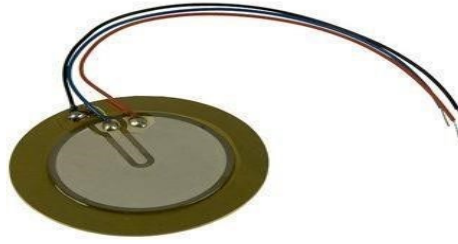


Fig 2.16: Piezo Buzzer

The blue wire goes to the feedback (F) terminal, the red to the main (M) terminal, and the black to the ground (G) plate of the piezo element.

The value and shape of the inductor coil are unimportant. You can use any coil with a measured value of 1mH to 10mH or more, or even none at all. I utilised a 40-turn coil on a tiny ferrite toroid in the final design.

2.11.4 PIEZO BUZZER CHARACTERISTICS.

- 3250 V is a wide operating voltage.
- Less than 30 mA lower current consumption
- higher rated frequency
- wider footprint
- increased sound pressure level

2.11.5 PIEZO BUZZER STRUCTURE

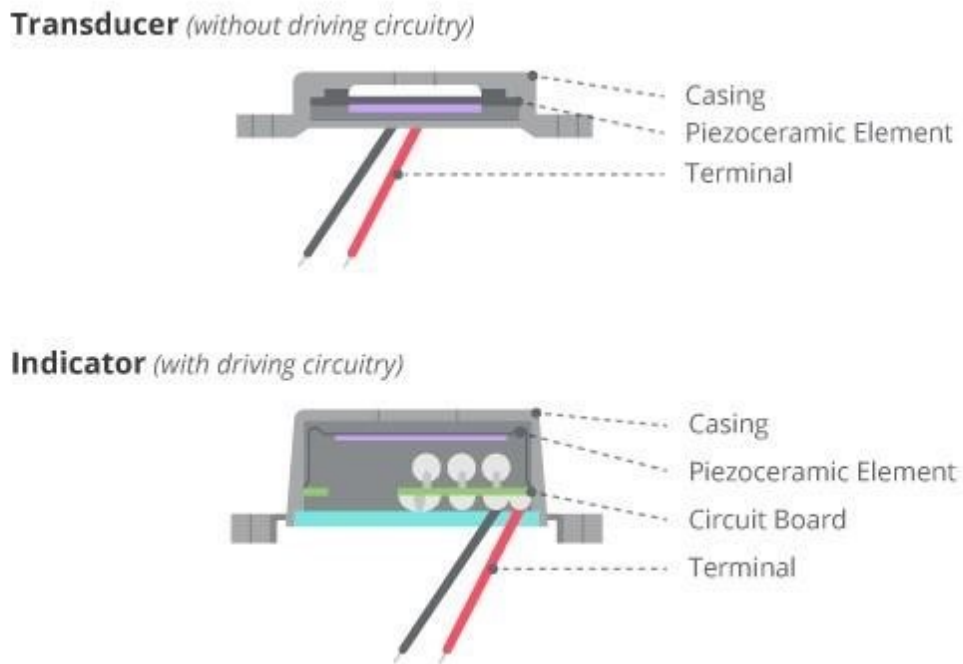


Fig 2.17: Piezo Buzzer Structure

Transducers and indicators are the two sorts of piezo buzzers. A housing, a piezoceramic element, and a termination make up a transducer. To operate the transducer, the user must send a square wave signal to the buzzer. A housing, a piezoceramic element, a terminal, and a circuit board make up an indicator. The user must give a specified DC voltage to the buzzer in order to operate an indication.

2.12 VIBRATION MOTOR:

Vibration motors are divided into two categories: When a DC motor turns, An eccentric rotating mass vibration motor (ERM) generates vibrations by using a small unbalanced mass. A linear resonant actuator (LRA) has a small internal mass that is coupled to a spring that generates force when it is driven. Because we are experts in the supply and design of vibration motors, our supplied motors can be found in our product catalogue. If you can't find what you're looking for or if you'd like to discuss a project, please don't hesitate to contact our engineers. If you prefer to read online, there is a wealth of material and tutorials available to assist you understand how vibration motors work.



Fig 2.18: Vibration Motor

2.13 GSM MODEM:

The GSM is a digital cellular communication system that is universally recognised. GSM full form is Global System for Mobile Communications, and it was founded in 1982 with the goal of developing a unified A pan-European mobile cellular radio system operating at 900 MHz would be defined under a European mobile telephone standard.

2.13.1 DEFINITION:

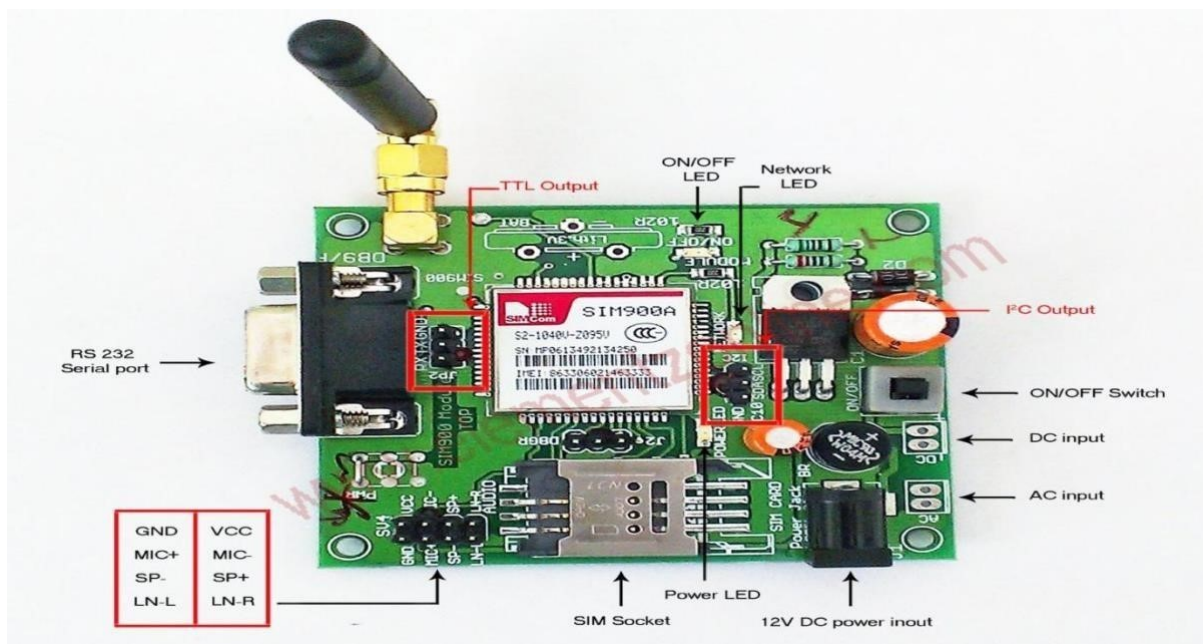


Fig 2.19: GSM MODEM

2.13.2 THE GSM NETWORK:

Rather than making demands, GSM makes suggestions The GSM specifications go into great detail about the functions and interface requirements, but they don't go into detail about the hardware. The goal is to constrain designers as little as possible while still allowing operators to obtain equipment from a variety of sources. The switching

system (SS), base station system (BSS), and operation and support system (OSS) make up the GSM network (OSS). The diagram below depicts the core GSM network

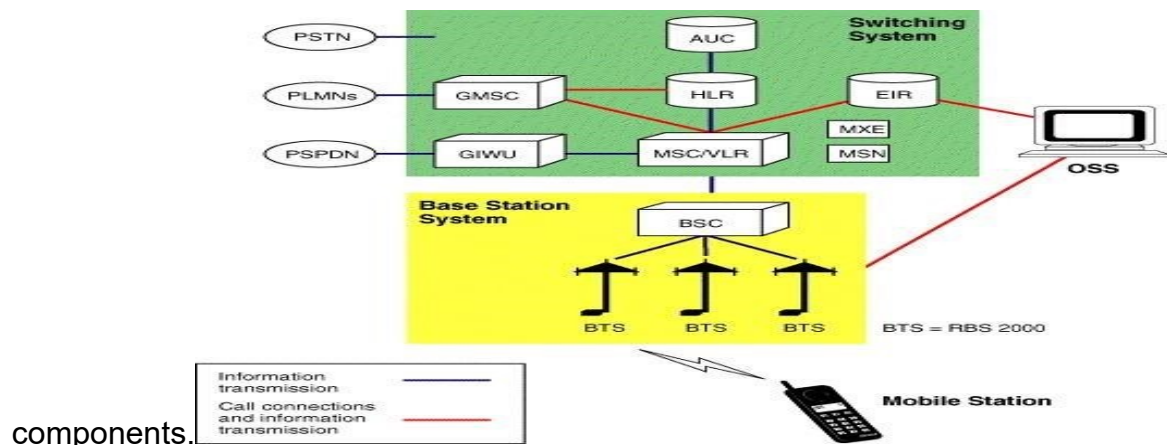


fig 2.20: GSM Network Elements

A GSM modem is a wireless modem that communicates over the GSM network. A wireless modem works on the same principle as a dial-up modem. The key distinction is that a dial-up modem delivers and receives data over a fixed phone line, whereas a wireless modem sends and receives data via radio waves.

GSM modem (external), as well as a PC card or PCMCIA card, can be used. To connect an external GSM modem to a computer, a serial or USB cable is commonly used. Computers control modems using AT commands, as discussed in previous portions of this SMS lesson. A single set of standard AT instructions is supported by both GSM and dial-up modems. You can make use of a GSM phone.

In addition to the standard AT commands, GSM modems support an expanded set of AT instructions. The GSM specifications define these enhanced AT commands. • Reading, writing, and deleting SMS texts are all possible with the enhanced AT commands.

- Messaging via SMS
- Keeping an eye on the signal strength
- Keeping an eye on the charging level and charge status of the battery
- Reading, writing, and looking up phone numbers in the phone book

The number of SMS messages that a GSM modem can process per minute is quite low—roughly six to ten SMS messages per minute.

2.13.3 GSM MODEM APPLICATIONS:

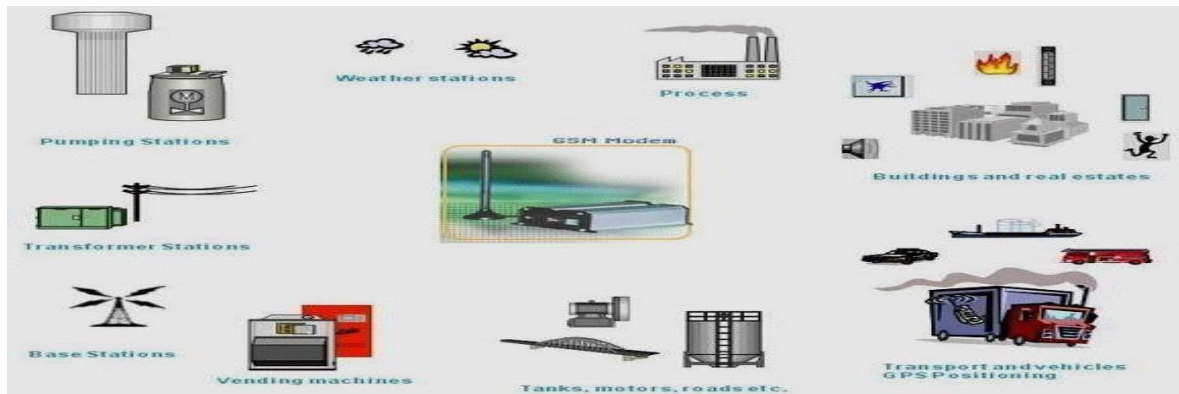


Fig 2.21:Gsm Modem Application

2.13.4 GSM/GPRS MODEM FACTS AND APPLICATIONS

The GSM/GPRS Modem has a serial port that can be used to control the modem via an AT command interface. An antenna is included, as well as a power adapter. The following is the basic modem work separation:

- Voice calls
- SMS communications
- GSM data transmissions
- GPRS

2.13.5 APPLICATIONS THAT CAN BE USED FOR GSM COMMUNICATION

GSM is more cost-effective than other communication technologies if one or more of the following features are required by your application.

2.13.5.1 MINIMAL DATA SIZE:

Each transaction should have a little amount of data, such as 1-3 lines. Data from banking transactions, sales and purchases, consignment tracking data, and updates, for example. SMS messaging, which costs less than a local phone call and is sometimes free worldwide,

can be used to send these little but crucial transaction details. You may send important information to your main office from many locations around the world for very little money.

GSM may also be used to send faxes and big amounts of data, although it is just as expensive as landline networks.

2.13.5.2 A VARIETY OF REMOTE DATA COLLECTION POINTS:

You will profit the most if you have several data gathering stations located throughout your city, state, country, or even the planet. GSM modems connected to PCs, GSM electronic terminals, and mobile phones are all available, data may be delivered from different points branch offices, business colleagues, warehouses, and agents are just a few examples. Many times, rural locations, such as warehouses, do not have a landline or an internet connection, but they do have a GSM network that is easily accessible.

2.13.5.3 HIGH AVAILABILITY:

If you need high uptime and availability for your organisation, GSM is the ideal option because GSM mobile networks have a higher uptime than landlines, the internet, and other communication mediums. You can also rely on GSM wireless communication in instances where you expect someone to destroy your communication equipment by cutting wires or taping landlines.

2.13.5.4 EXCESSIVE TRANSACTION VOLUME:

GSM SMS messaging has the ability to manage a several number of transactions in a short amount of time. You can receive enormous quantities of SMS messages on your server, just like emails, even if you don't have internet access. E-mails are frequently delayed, whereas SMS texts are nearly immediate for real-time transactions. Consider the case of a shop owner who uses GSM technology instead of traditional landlines to conduct credit card transactions. Local transaction servers are busy at that time because they need numerous telephone lines to process multiple transactions, whereas a single GSM connection can manage hundreds of transactions.

2.13.5.5 MOBILITY AND EASE OF INSTALLATION:

GSM technology allows for mobility. GSM terminals and modems, unlike telephone connections, can be easily taken up and relocated. You can also use your cell phone to

communicate with the server. if you use GSM terminals. GSM gear, such as terminals, and mobile handsets, may be purchased, SIM cards inserted, and software configured, and you're ready to go.

2.14 GPS:

"Global Positioning System" is an acronym for "Global Positioning System." The Global Positioning System (GPS) is a satellite navigation system that detects where an object on the ground is located. In the 1960s, the US military was the first to employ GPS technology, followed by civilian use over the next few decades. GPS receivers are now found in a wide range of commercial products, including automobiles, smartphones, fitness watches, and GIS systems.

The GPS system is made up of 24 satellites that orbit the Earth at a height of about 12,000 miles (19,300 kilometres). Every 12 hours, they travel around the Earth at a speed of approximately 7,000 mph. Four of the satellites are evenly spaced, allowing direct line-of-sight access from everywhere on the earth. Each GPS satellite transmits a message containing the satellite's current position, orbit, and precise time. A GPS receiver calculates its precise position by combining signals from multiple satellites. A connection to three satellites is required to calculate a receiver's location, but a connection to four satellites is preferred because it provides high accuracy.

2.14.1 GPS ON MOBILE WORKING

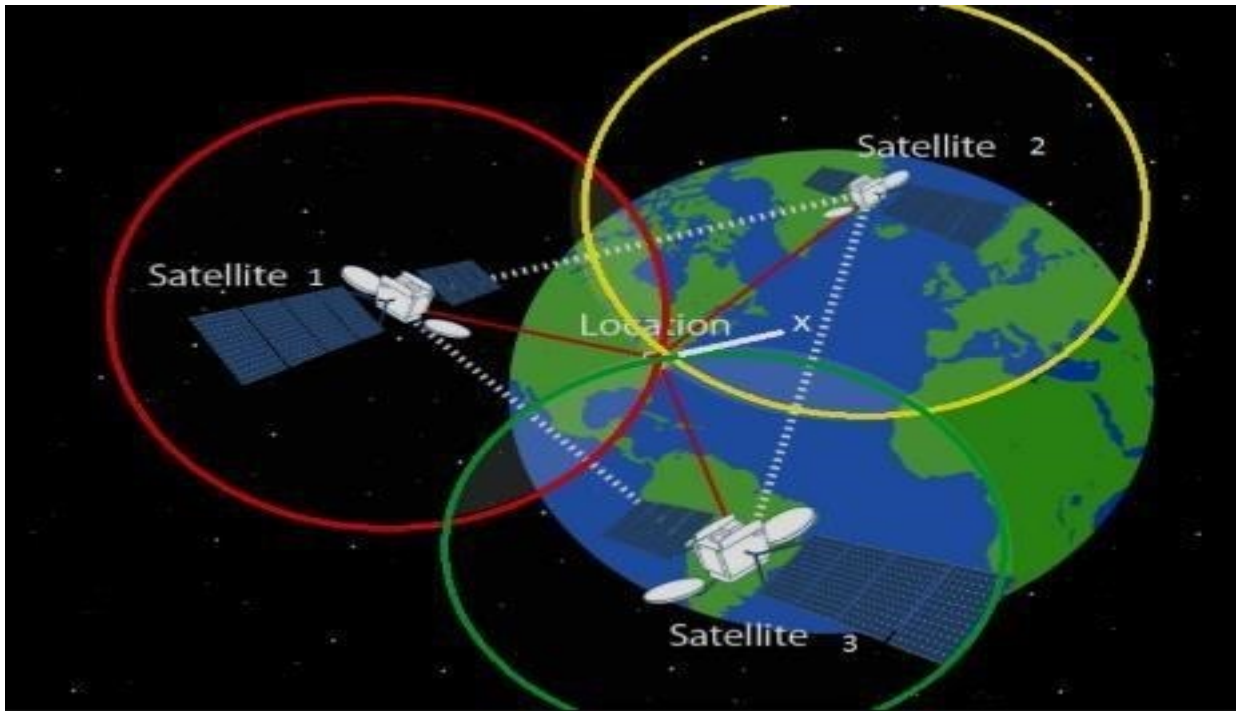


Fig 2.22: GPS On Mobile Working

In order to function effectively, a GPS gadget must first connect to the required number of satellites. This procedure can take anything from a few seconds to many minutes, depending on the receiver's strength. For example, the GPS unit in a car will frequently establish a GPS connection faster than the reception of a smartphone or watch. Most GPS systems use some type of location tracking to help them discover GPS signals faster. By remembering its previous location, a GPS device can quickly determine which satellites will be available when it scans for a GPS signal.

2.14.2 WORKING

In a precise orbit, GPS satellites circle the Earth twice a day. Each satellite transmits its own signal, as well as its orbital parameters, which GPS systems can decode and use to calculate the satellite's precise location. This information, together with trilateration, is used by GPS receivers to calculate a user's precise location. The GPS receiver uses the time it takes to receive a broadcast signal to calculate the distance between satellites. The receiver can calculate and display a user's position by using distance data from a couple extra satellites. This can be used to chart your golf course, measure your running route, or locate your way home after an expedition.

2.14.3 ACCURACY

Because of their simultaneous multichannel design, GPS receivers today are extremely accurate. When we first turn on our receivers, they immediately lock onto satellites. They keep a tracking lock in dense woodland or urban settings with tall structures. Atmospheric fluctuations and other causes of error can impair the precision of GPS receivers. Garmin GPS receivers are typically accurate to within 10 metres. On the water, accuracy is even better.

Garmin GPS receivers' accuracy is improved by WAAS. This capability can improve accuracy to more than 3 metres by adjusting for the atmosphere. WAAS satellites do not necessitate the purchase of new equipment or incur any additional costs. Differential GPS (DGPS) can also improve accuracy by correcting GPS distances to within one to three metres on average. The most widely used DGPS correction service is provided by the US Coast Guard, which consists of a network of towers that receive GPS signals and deliver a corrected signal via beacon transmitters. In addition to their GPS, users will need a differential beacon receiver and a beacon antenna to receive the corrected signal.

2.15 SWITCH

A switch is an electronic device that is used to alert someone in an emergency situation involving a threat to life or property.

A panic alarm is usually operated by a hidden panic alarm button, but this is not always the case. These buttons can be linked to a central monitoring station, a silent alarm, or an audible bell/siren that can be heard locally. In an emergency, the alarm can be used to summon local security, police, or emergency services. Some systems can use closed-circuit television (CCTV) to record or analyse the event. Many panic alarm buttons activate when pressed and must be reset with a key.



Fig 2.23: Switch

2.16 ALARM

Examples of panic buttons are:

- In a critical system (such as a nuclear weapon system), a panic button is used to immediately initiate an extreme step to mitigate an emergency scenario.
- The siren on a car alarm is activated by pushing a red button on the key fob.
- A device given to older adults to allow them to maintain their freedom while also allowing them to request assistance if they require it outside of an aged care facility . An Emergency Medical Alert (EMA) button is a device like this that comes in the shape of a pendant or a bracelet that the user can wear. The majority of MABs (Medical Alert Bracelets) are connected to a contact centre and are wireless. An operator will call the person's home after the alarm goes off to make sure it wasn't a false alarm; If no one answers, the operator will contact family members, emergency services, or both if no one answers. A button similar to the one pictured above, which is used indoors in self-contained houses for the elderly, alerts someone within the house, who will first check for a false alarm by calling the individual, and if one exists, will call 911. They will enter the person's flat to see what the problem is if there is no false alarm.
- A late-night button commonly found in convenience stores, petrol stations, and other single-employee businesses. The button, which is normally found under the counter near the cash register or safe, can be touched to activate a silent alarm in times of problem (such as robbery, disruptive or threatening behaviour, or a situation that may require assistance). A fee may be charged each time the button is touched if the device informs a private security company. This prevents misuse and frequently assists the employee in determining whether the problem necessitates a charge in order to receive treatment.
- There are also comical forms of a panic button in pop culture, such as a wearable button with only the word "PANIC" on it or an adhesive key that resembles a computer keyboard key but is red and has only the word "PANIC" on it.

CHAPTER-3

SOFTWARE DESCRIPTIONS

3.1 IDE ARDUINO:

The Arduino IDE, despite its simplicity, offers a nearly full environment for most Arduino-based projects. "File" (new, load, save, etc.), "Edit" (font, copy, paste, etc.), "Sketch" (for compiling and programming), "Tools" (useful choices for testing projects), and "Help" are all accessible from the top menu bar. The IDE's middle section includes a simple text editor where you can enter computer code. The output window at the bottom of the IDE displays the compilation process, the amount of memory spent, any software errors, and a number of other essential messages.



Fig 3.1: Arduino IDE

Sketches are Arduino projects written in a trimmed-down version of C++ that lacks several C++ features. There are several device-specific libraries available since programming a microcontroller differs from programming a PC. Users who believe Arduino is programmed in a "Arduino language" may be confused by this. The Arduino, on the other hand, is written in C++. It merely makes use of device-specific libraries.

3.2 THE BUTTONS

While more complicated projects will make use of the IDE's built-in features, the majority of projects will rely on the six buttons beneath the menu bar.

Fig 3.2: The Buttons

3.3 EMBEDDED C:

In the software industry, Embedded C is the most commonly used programming language for creating electronic devices. Embedded software is coupled with each processor in an electronic system.

Embedded C programming is essential for the CPU to accomplish specified tasks. We utilise a variety of technological equipment in our daily lives, including cell phones, washing machines, digital cameras, and so on. This multi-device project is based on embedded C-programmed microcontrollers.

The above block diagram's embedded C code is used to flash the LED attached to Port 0 of the microcontroller.

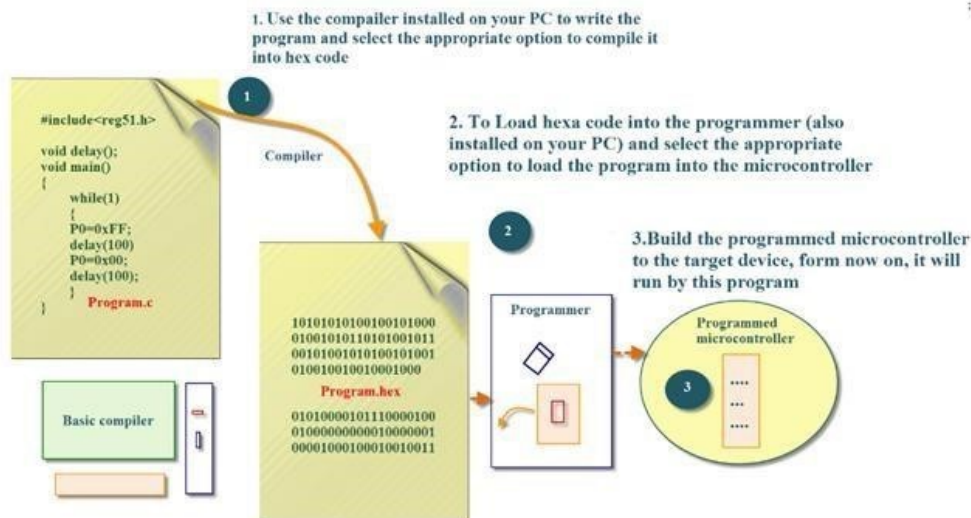


Fig 3.3: Embedded C

A programming language is a collection of one or more functions, and a function is a collection of statements that are used to complete a certain task.

Application software, which provides functionality on a computer, is familiar to the majority of users. Embedded software, on the other hand, is less apparent but no less complex.

Embedded software, unlike application software, has fixed hardware requirements and capabilities, and the inclusion of third-party hardware or software is highly regulated.

Embedded software must include all device drivers required at the time of manufacture, and the device drivers must be created specifically for the hardware. The programme is extremely reliant on the CPU and the individual chips used. Most embedded software engineers have a basic understanding of reading schematics and component data sheets to discover how registers and communication systems are used. Bit manipulation and conversion between decimal, hexadecimal, and binary are both useful.

Although XML files and other output can be transferred and displayed on a computer, web applications are rarely used. SQL databases, as well as file systems with directories, are usually not present.

For software development, a cross compiler is required, which runs on a computer but generates executable code for the target device. An in-circuit emulation, such as JTAG or SWD, is required for debugging. The source code for the kernel (OS) is frequently available to software developers.

CHAPTER-4

RESULTS

4.1 STIMULATION :

SOFTWARE OUTPUT AT NORMAL CONDITION

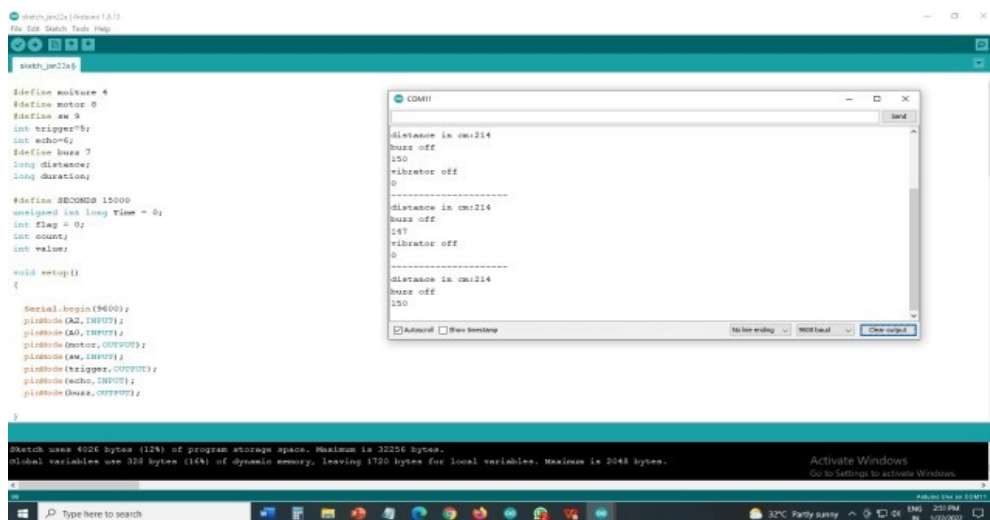


Fig 4.1: Stimulation of software output at normal condition

SOFTWARE OUTPUT AT WATER DETECTION

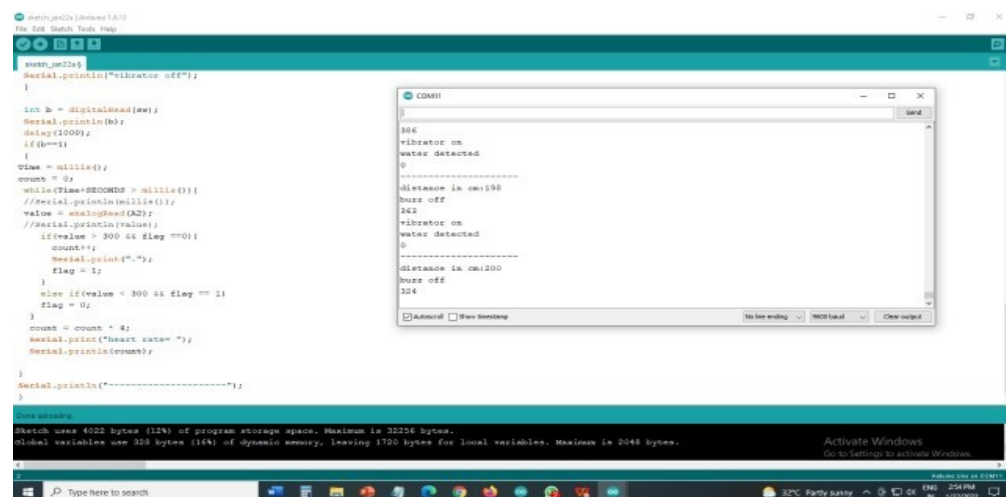


Fig 4.2: Stimulation of software output at water detection

SOFTWARE OUTPUT AT PANIC ALERT

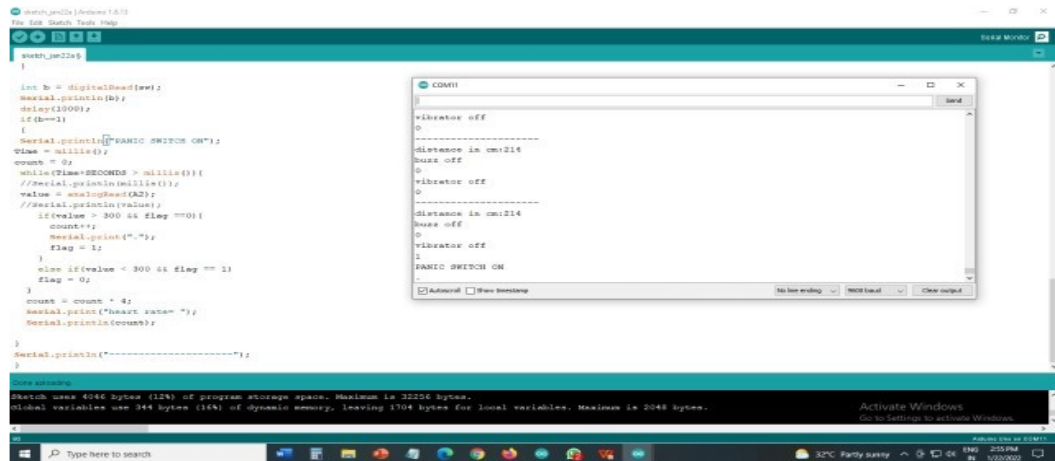


Fig 4.3: Stimulation of software output at Panic Alert

SOFTWARE OUTPUT AT GSM MESSAGE SEND

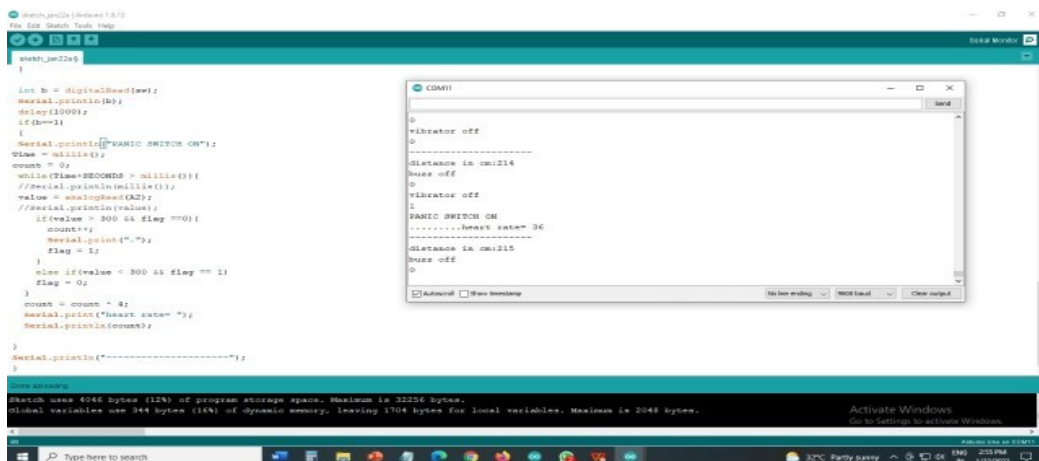


Fig 4.4: Stimulation of software output at GSM message sent

4.2 SOFTWARE OUTPUT

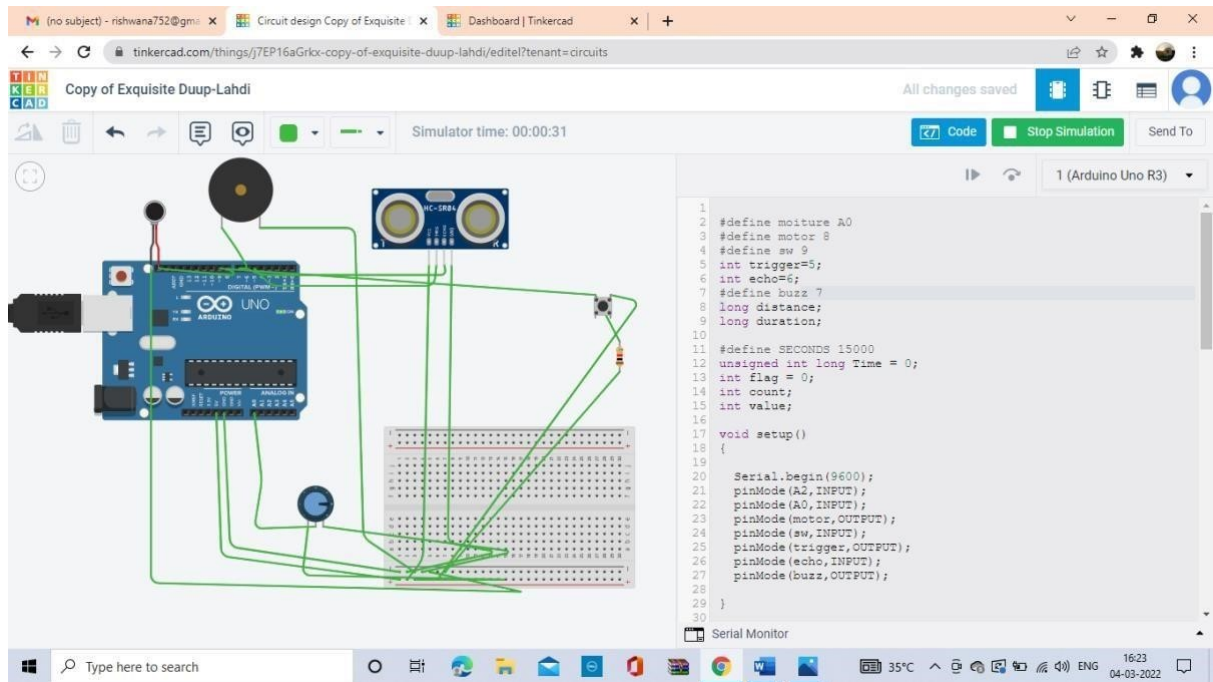


Fig 4.5: SOFTWARE OUTPUT

4.3 HARDWARE OUTPUT

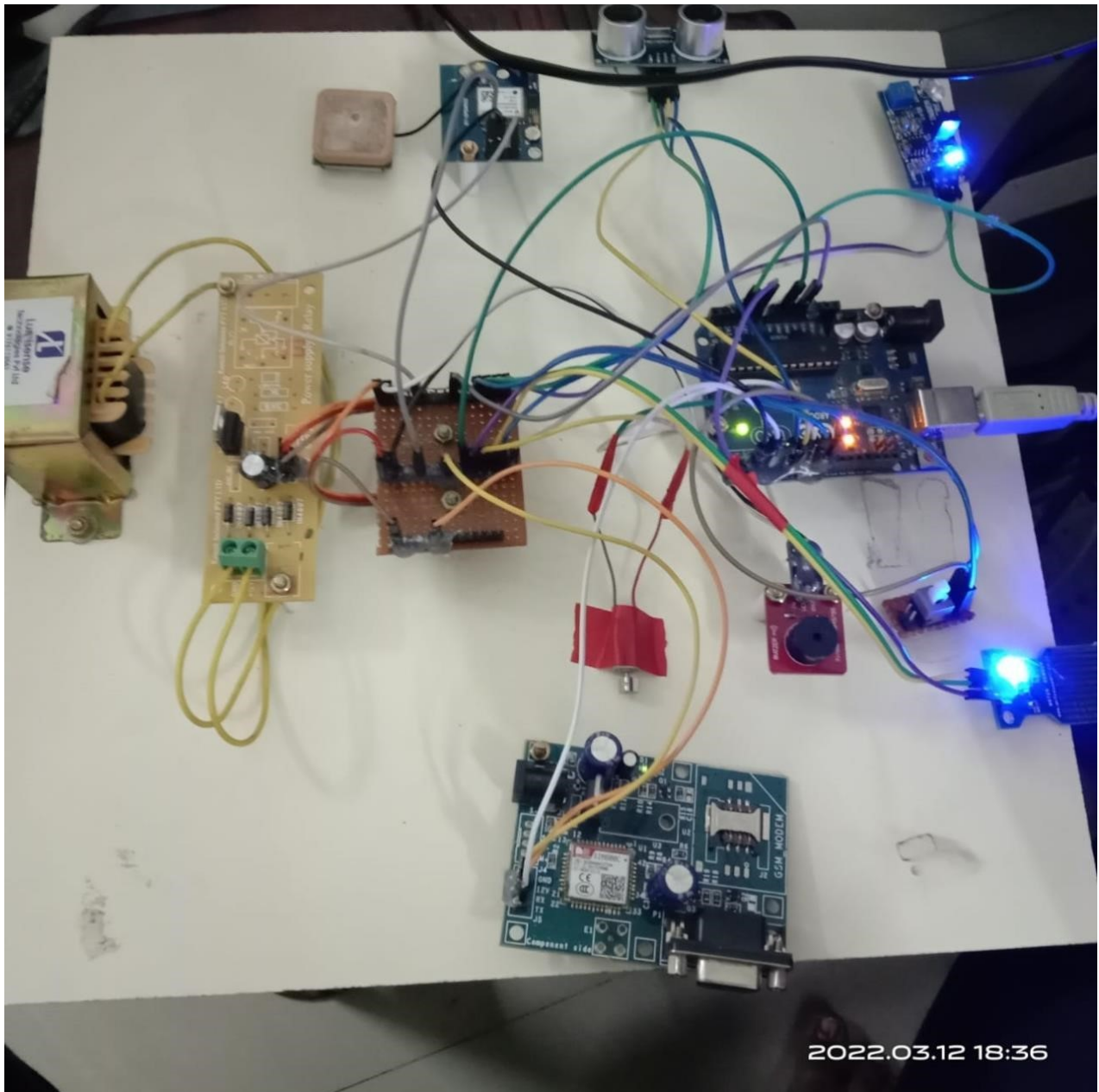


Fig 4.6: HARDWARE OUTPUT

4.4HARDWARE CONNECTION



Fig 4.7: HARDWARE CONNECTION

4.5 MESSAGES OF BLIND STICK

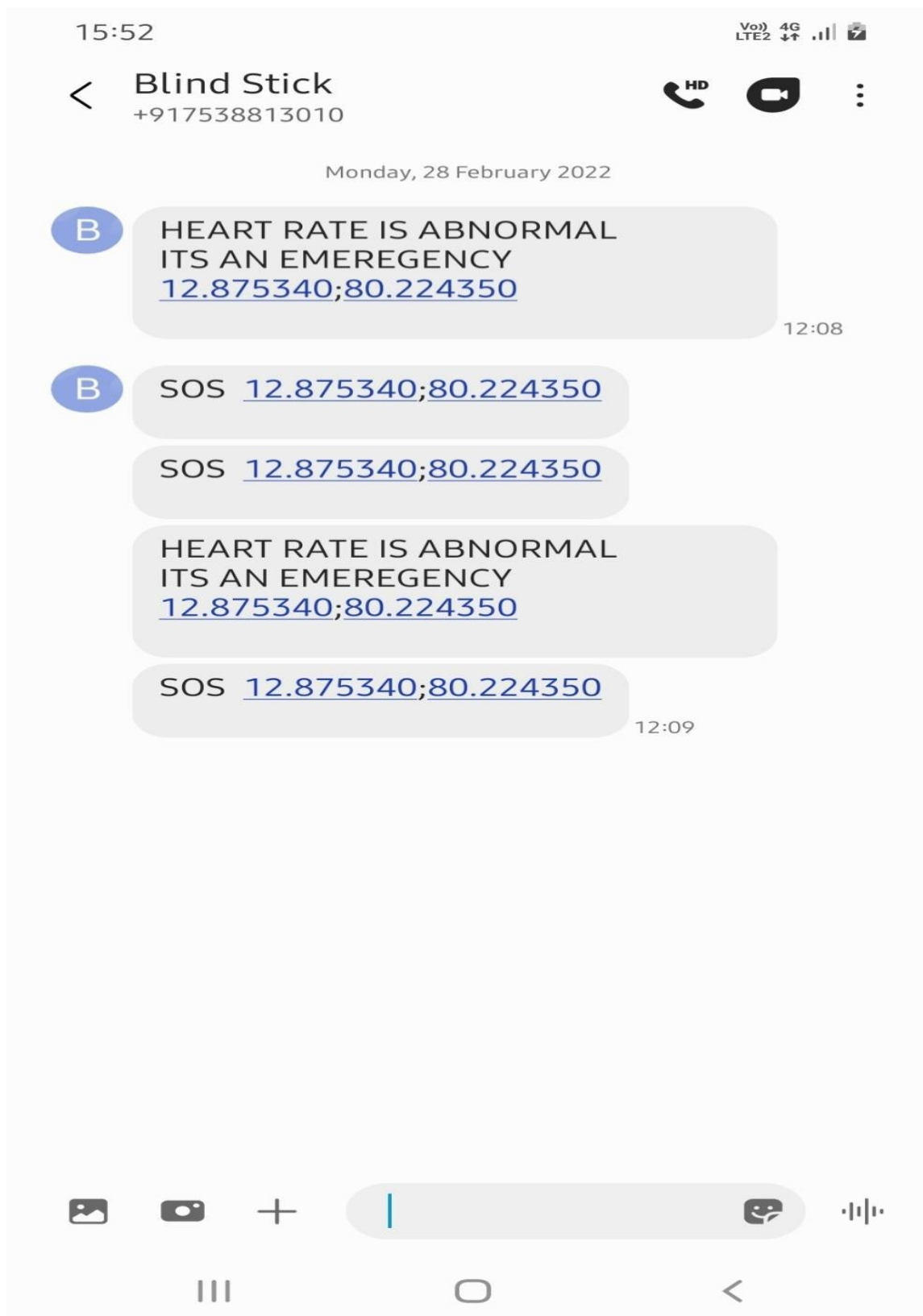


Fig 4.8: Messages from Blind Stick

CHAPTER-5

SUMMARY

5.1 CONCLUSION:

Humans are not handicapped in any way. It is impossible to break a person. Our constructed environment, as well as our technologies, are in a state of disarray. We, the people, do not have to accept our limitations; via technical innovation, we can transmit incapacity. This system provides a low-cost, dependable, portable, low-power, and robust navigation solution with a lightning-fast response time. The system is lightweight despite being hardwired with sensors and other components. Wireless communication between system components can improve other system features such as increasing the range of the ultrasonic sensor and incorporating a technique for detecting the speed of approaching objects. As we developed such an empowering solution, we kept visually impaired and blind people in all developing countries at the forefront of our minds.

REFERENCE

- Adhi, Shubham, SachinKunthewad, PreetamShinde, and Mrs VS Kulkarni. "Ultrasonic Smart Stick for Visually Impaired People." Dimension 45, no. 20 (2015): 15mm.
- Sangami, A., M. Kavithra, K. Rubina, and S. Sivaprakasam. "Obstacle Detection and Location Finding For Blind People."
- Gilson, Sherin, SagarGohil, Faisal Khan, and Vishal Nagaonkar. "A Wireless Navigation System For the Visually Impaired." (2015).
- Vidya, D.S Miss DeliciaPerlineRebelo, Miss Cecilia Jane D'Silva"Obstacle detection using Ultrasonic Sensor"
- Shbrook,Daniel,and Thad Starner" Usung GPS to learn significant locations and predict movement across Multiple user"
- J.M. Hans du Buf, J.Barroso, Jojo M.F. Rodrigues, H.Paredes, M.Farrajota, H.Fernandes, J.Jos, V.Teixeira, M.Saleiro."The SmartVision Navigation Prototype for Blind Users". International Journal of Digital Content Technology and its Applications, Vol.5 No .5, pp. 351 – 361, May 2011.
- I. Ulrich, and J. Borenstein, "The guide cane-Applying mobile robot technologies to assist the visually impaired," IEEE Transaction on Systems, Man, and Cybernetics-Part A: Systems and Humans, vol. 31, no. 2, pp. 131-136, 2001.
- P. Meijer,"An Experimental System for Auditory ImagRepresentations," IEEE Transactions on Biomedical Engineering, vol.39, no 2, pp. 112-121, Feb 1992.
- M. Nie, J. Ren, Z. Li et al., "SoundView: an auditory guidance system based on environment understanding for the visually impaired people," in Proceedings of the 31st Annual International Conference of the IEEE Engineering in Medicine and Biology Society: Engineering the Future of Biomedicine (EMBC '09), pp.7240–7243, IEEE, September 2009.
- G. Balakrishnan, G. Sainarayanan, R. Nagarajan and S. Yaacob,

- **“Wearable Real-Time Stereo Vision for the Visually Impaired,”
Engineering Letters, vol. 14, no. 2, 2007.**
- **G. P. Fajarnes, L. Dunai, V. S. Praderas and I. Dunai, “CASBLiP- a new cognitive object detection and orientation system for impaired people,”
Proceedings of the 4th International Conference on Cognitive Systems,
ETH Zurich, Switzerland, 2010.**
- **ShashankChaurasia ,K.V.N. Kavitha ,”An Electronic Walking Stick For
Blinds”International Conference on Information Communication and
Embedded Systems(ICICES 2014).**

CHAPTER-6

APPENDIX

7.1 PROGRAM CODING FOR COMPONENTS:

```
#include <SoftwareSerial.h>
```

```
SoftwareSerial gsm(2, 3); //rx--2 Tx--3
```

```
#include <TinyGPS.h>
```

```
float lat = 28.5458, lon = 77.1703;
```

```
TinyGPS gps; // create gps object
```

```
#define moiture A0
```

```
#define motor 8
```

```
#define sw 9
```

```
int trigger = 5;
```

```
int echo = 6;
```

```
#define buzz 7
```

```
long distance;
```

```
long duration;
```

```
#define SECONDS 15000
```

```
int flag = 0;
```

```
int count; unsigned int long Time = 0;
```

```
int value;
```

```
void setup() {
```

```
    Serial.begin(9600);
```

```
    gsm.begin(9600);
```

```
    pinMode(A2, INPUT);
```

```
    pinMode(A0, INPUT);
```

```
    pinMode(motor, OUTPUT);
```

```
    pinMode(sw, INPUT);
```

```
    pinMode(trigger, OUTPUT);
```

```
    pinMode(echo, INPUT);
```

```
    pinMode(buzz, OUTPUT);
```

```
}
```

```

void loop() {

    if (gsm.available())

    {

        // check for gps data

        if (gps.encode(gsm.read())) // encode gps data

        {

            gps.f_get_position(&lat, &lon); // get latitude and longitude

            // display position

            Serial.print("Position: ");

            Serial.print("Latitude:");

            Serial.print(lat, 6);

            Serial.print(",");

            Serial.print("Longitude:");

            Serial.println(lon, 6);

        }

    }
}

```

```

else {

    lat = 12.875340;

    lon = 80.224350;

}

String latitude = String(lat, 6);

String longitude = String(lon, 6);

Serial.println(latitude + ";" + longitude);

digitalWrite(trigger, 1);

delayMicroseconds(10);

digitalWrite(trigger, 0);

duration = pulseIn(echo, HIGH);

// Serial.print("duration in micro second:");

// Serial.println(duration);

distance = duration * 0.0343 / 2;

Serial.print("distance in cm:");

Serial.println(distance);

if (distance < 30) {

```

```
tone(buzz, 600, 700);

Serial.println("buzz on");

Serial.println("obstacle detected");

}

else

{

noTone(buzz);

Serial.println("buzz off");

}

int a = analogRead(moiture);

Serial.println(a);

if (a > 300)

{

digitalWrite(motor, HIGH);

Serial.println("vibrator on");

Serial.println("water detected");

}
```

```
else
```

```
{
```

```
digitalWrite(motor, LOW);
```

```
Serial.println("vibrator off");
```

```
}
```

```
int b = digitalRead(sw);
```

```
Serial.println(b);
```

```
if (b == 1)
```

```
{
```

```
Serial.println("PANIC SWITCH ON");
```

```
Time = millis();
```

```
count = 0;
```

```
gsm.println("AT+CMGF=1"); //Sets the GSM Module in Text Mode
```

```
delay(1000); // Delay of 1000 milli seconds or 1 second
```

```
gsm.println("AT+CMGS=\"" + 919994590752 + "\""); // Replace x with mobile number
```

```
delay(1000);
```

```
gsm.print("SOS "); // The SMS text you want to sen
```

```
gsm.print(latitude);

gsm.print(";");

gsm.println(longitude);

delay(100);

gsm.println((char)26);

delay(1000);

Serial.println("STAND");

while (Time + SECONDS > millis()) {

    //Serial.println(millis());

    value = analogRead(A2);

    //Serial.println(value);

    if (value > 300 && flag == 0) {

        count++;

        Serial.print(".");

        flag = 1;

    }

    else if (value < 300 && flag == 1)
```

```

    flag = 0;

}

count = count * 4;

Serial.print("heart rate= ");

Serial.println(count);

if (count > 100 || count < 60) {

    gsm.println("AT+CMGF=1"); //Sets the GSM Module in Text Mode

    delay(1000); // Delay of 1000 milli seconds or 1 second

    gsm.println("AT+CMGS=\"+919994590752\\r\""); // Replace x with mobile number

    delay(1000);

    gsm.print("HEART RATE IS ABNORMAL ITS AN EMERGENCY ");// The SMS text you want to
sen

    gsm.print(latitude);// The SMS text you want to send

    gsm.print(",");

    gsm.println(longitude);// The SMS text you want to send

    delay(100);

    gsm.println((char)26);

    delay(100);

```

```
gsm.println((char)26);
```

```
delay(1000);
```

```
Serial.println("Send");
```

```
}
```

```
}
```

```
Serial.println("-----");
```

```
delay(1000);
```

```
}
```