

VOICE ALERT AND LOCATION IDENTIFICATION FOR BLIND PEOPLE

Submitted in partial fulfilment of the requirements for the award of Bachelor of
Engineering degree in Electronics and Communication Engineering

By

PALLE.HARINADH REDDY(RegNo:37130297)

PARA.JASWANTH KUMAR(RegNo.37130301)



**DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING
SCHOOL OF ELECTRICAL AND ELECTRONICS ENGINEERING**

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

**(DEEMED TO BE UNIVERSITY)
Accredited with Grade "A" by NAAC**

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI – 600 119

APRIL - 2021



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited "A" Grade by NAAC | 12B Status by UGC | Approved by AICTE

www.sathyabama.ac.in

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of PALLE.HARINADH REDDY (RegNo:37130297) and PARA.JASWANTH KUMAR (RegNo:37130301) who carried out the project entitled VOICE ALERT AND LOCATION IDENTIFICATION FOR BLIND PEOPLE under my supervision from December 2020 to March 2021.

Internal Guide

Dr.U.ANITHA,M.E.PhD.,

Head of the Department

Dr.T.RAVI,M.E.PhD.,

Submitted for Viva voce Examination held on_____

Internal Examiner

External Examiner

DECLARATION

We, **PALLE.HARINADH REDDY** (Register No: 37130297) and **PARA.JASWANTH KUMAR**(Register No: 37130301) hereby declare that the Project Report entitled **VOICE ALERT AND LOCATION IDENTIFICATION FOR BLIND PEOPLE** done by us under the guidance of **Dr.U.ANITHA,M.E.Ph.d.**, is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in Electronics And Communication Engineering.

DATE :

PLACE: CHENNAI

P.HARINADH REDDY(37130297)

P.JASWANTH KUMAR(37130301)

SIGNATURE OF CANDIDATES

ACKNOWLEDGEMENT

We are pleased to acknowledge my 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 and **Dr. T. RAVI, M.E., Ph.D.**, Head of the Department of Electronics and Communication Engineering To give me the encouragement and information required for the progressive feedback at the right time.

We would like to express my sincere and deep sense of gratitude to my Project Guide **Dr.U.ANITHA,M.E.Phd.**, for her valuable guidance, suggestions and constant encouragement paved way for the successful completion of our project work.

Thanks to all teaching staff members and teachers who have been supportive with the project in many ways in the **Department of Electronics and Communication Engineering**.

ABSTRACT

The Global Positioning System (GPS) is a radio navigation device that provides civilian users with national positioning, navigation, and temporary order. The unit can give location and time to anybody got a GPS receiver. GPS provides a variety of users with precise place and time details, everywhere in the world, at any time of day or night. This location is intellectually found by GPS, which is mainly a visually impaired device with user input (voice based) that informs the visually impaired person if his/her destination has already been visited. Arduino serves as the unit's central processing unit.

It saves the information from a GPS device from this location to ensure that the data is used so that it matches the user's destination. It will therefore map the distance from the destination partner to warn the user in advance. The software is meant to provide the user with a speech-based ad, i.e. when the user is about to enter the destination, the voice that declares his destination is received. The visually disabled person actually listens to the condition reported by the user himself instead of the corresponding degree warning.

TABLE OF CONTENTS

CHAPTER NO	TITLE	PAGE NO
	ABSTRACT	v
	LIST OF FIGURES	vii
	LIST OF TABLES	x
1	INTRODUCTION	1
2	LITERATURE SURVEY	2
3	Aim And Scope	4
	3.1.BlockDiagram	4
	3.2.Hardware Required	5
	3.3.Existing System	5
	3.4.Proposed System	5
4	Materials and methods	6
	4.1.Overview Of Embedded Systems	6
	4.2.Block Diagram Of An Embedded System	7
	4.3.Characteristics Of An Embedded Systems	8
	4.4.Transformer	9
	4.5.Rectifier	9
	4.6.Filters	10
	4.7.Regulators	10
	4.8.Overview	11
	4.9.Node Mcu	22
	4.9.1.Working Principle	24

	4.9.2.Transformer	25
	4.9.3.Bridge Rectifier	25
	4.9.4.Ic Voltage Regulators	26
	4.9.5.IOT	26
	4.9.5.1.History	27
	4.9.5.2.Applications	28
	4.9.5.3.Frameworks	34
	4.9.5.4.Enabling Technologies For IOT	34
	4.9.5.5.Government Regulation On IOT	36
	4.9.5.6.Criticism And Controversies	36
	4.9.5.7.Privacy,Autonomy And Control	37
	4.9.5.8.Traditional Governance Structures	37
	4.9.6.Ubidots Explorer	40
5	Result And Discussion	46
6	Conclusion And Future Scope	52

LIST OF FIGURES

FIGURE NO	TITLE	PAGE NO
3.1	BLOCK DIAGRAM	4
4.1	BLOCK DIAGRAM OF A TYPICAL EMBEDDED SYSTEM	7
4.2	GENERAL BLOCK OF POWER SUPPLY UNIT	9
4.3	AURDINO IDE	11
4.4	AURDINO IDE SETUP	15
4.5	ULTRASONIC TRANSDUCERS	16
4.6	THE FREQUENCY RANGES OF THE SOUND	17
4.7	ULTRASONIC MEDIUM RELATION	18
4.8	AXIAL AND CROSS SECTIONAL BEAM PROFILES	19
4.9	FLAW DETECTION USING ULTRASONIC SENSORS	21
4.10	NODE MCU	23
4.11	CIRCUIT DIAGRAM OF POWER SUPPLY	24
4.12	WORKING PRINCIPLE	24
4.13	BUTTONS ON A HAND HELD CALCULATOR	38
4.14	BUTTON SHAPED AS AN OCTAGON	39
4.15	UBIDOTS	41
4.16	UBIDOTS TIME SERIES	43
4.17	API	45
5.1	LOCATION OF BLIND PERSON	46

5.2	VOICE MESSAGE	47
5.3	VOICE MESSAGE	48
5.4	VOICE MESSAGE	49
5.5	PANIC ALERT MESSAGE	50
5.6	FINDING THE BLIND STICK	51

LIST OF TABLES

TABLE NO	TITLE	PAGE NO
4.1	APPLICATIONS OF ULTRASONIC SENSORS	21
4.2	ITEMS IN UBIDOTS	41
4.3	HTTP	44
4.4	UBIDOTS WEBSITE	44
4.5	HTTP AUTHENTICATION	45

CHAPTER 1

INTRODUCTION

Individuals with visual impairment have a reduced capacity to do normal tasks, which may have an effect on their quality of living and ability to engage in society as a whole. Blindness, the most severe disability, reduces people's willingness to perform their daily activities and deal with them on their own. A well-qualified recovery allows disabled people to truly enjoy life, to achieve their bacon dreams, to travel, and to be active members of society today. Extensive efforts are being made to assist blind individuals using cutting-edge technologies. According to "The rising ethics of human central GPS trailing and monitoring", the most factors targeted whereas trailing individual square measure privacy, accuracy, accessibility.

The provisions for blind people have significantly increased by introducing a simple sensing feature. Various colleges and companies such as IBM focused on the event of service to blind people. Any of the popular square test sensitive dogs and sensors of obstacles. Recent developments include vehicles that drive themselves and sensitive lenses. Many alternate square measures of text, voice or mobile devices and applications have been created during the last thirty years. Furthermore they would be terribly beneficial for the structures that square measurements are designed for AI and AI.

CHAPTER 2

LITERATURE SURVEY

Author: Chandni asvitha thumma, shravya amarnath, hanna philipose, gayathri. P

When given a present, a blind person is expected to believe that someone else is going to visit somewhere and may suffer greatly when others do not. This campaign aims to help visually impaired people develop a responsive stick. A decent stick will have a GPS/GSM feature as well as an obstacle tracking device. The user uses the GPS system to understand his or her location and share words about it to a friend or relative. This could contribute to increased consumer mobilization..

Author: Ayat nada, samia mashelly, mahmoud A. Fakhr, and ahmed F. Seddik

Visually impaired individuals realize difficulties detecting Obstacles ahead of them, throughout walking with in the street, that makes it dangerous. The sensible stick comes as a projected answer to modify them to spot the planet around. During this paper we have a tendency to Propose an answer, described in an exceedingly sensible follow infrared device to find stair cases and combine of inaudible device to find the other obstacles ahead of the user, inside a spread of 4 meters. Moreover, for the sake of avoiding puddles, another unit is put at very low cost. Speech warning signals and hence the vibration engine are activated until an obstacle has been observed.

Author: Dada emmanuel gbenga #1, arhyel ibrahim shani #2, adebimpe lateef adekunle

This paper presents the sensible walking stick supported inaudible sensors and aurdino for visually folks. There area unit around 37 million folks Health organizations around the world unit blind per global health agency. global health organisation. People with a vision impairment region are generally enthralled by additional assistance, which may be supported as decision support mechanisms by humans, skilled dogs or special electronic equipment. We thus tend to achieve this objective by attaching inaudible sensors at certain locations to the cane, including information on how the user can be set by triggering the buzzer.

Author: Naiwrita Dey, Ankita Paul, Pritha Ghosh, Rahul De, Chandrama Mukherjee, Sohini Dey .

This article depicts the design and implementation of an inaudible sensing sensor-based element, primarily For those with vision impairment, on a walking cane. The HC-SR04 is a sensor feature unheard of. that is used to locate obstacles in the path of the blind man, and a buzzer serves as the warning man. The PIC microcontroller 16F877A is the intended mechanism for victimization implementation. Blind people will need this walking stick for safe navigation. The challenge changes at intervals of 5 to 35 cm.

CHAPTER 3

AIM AND SCOPE

3.1.Block diagram:

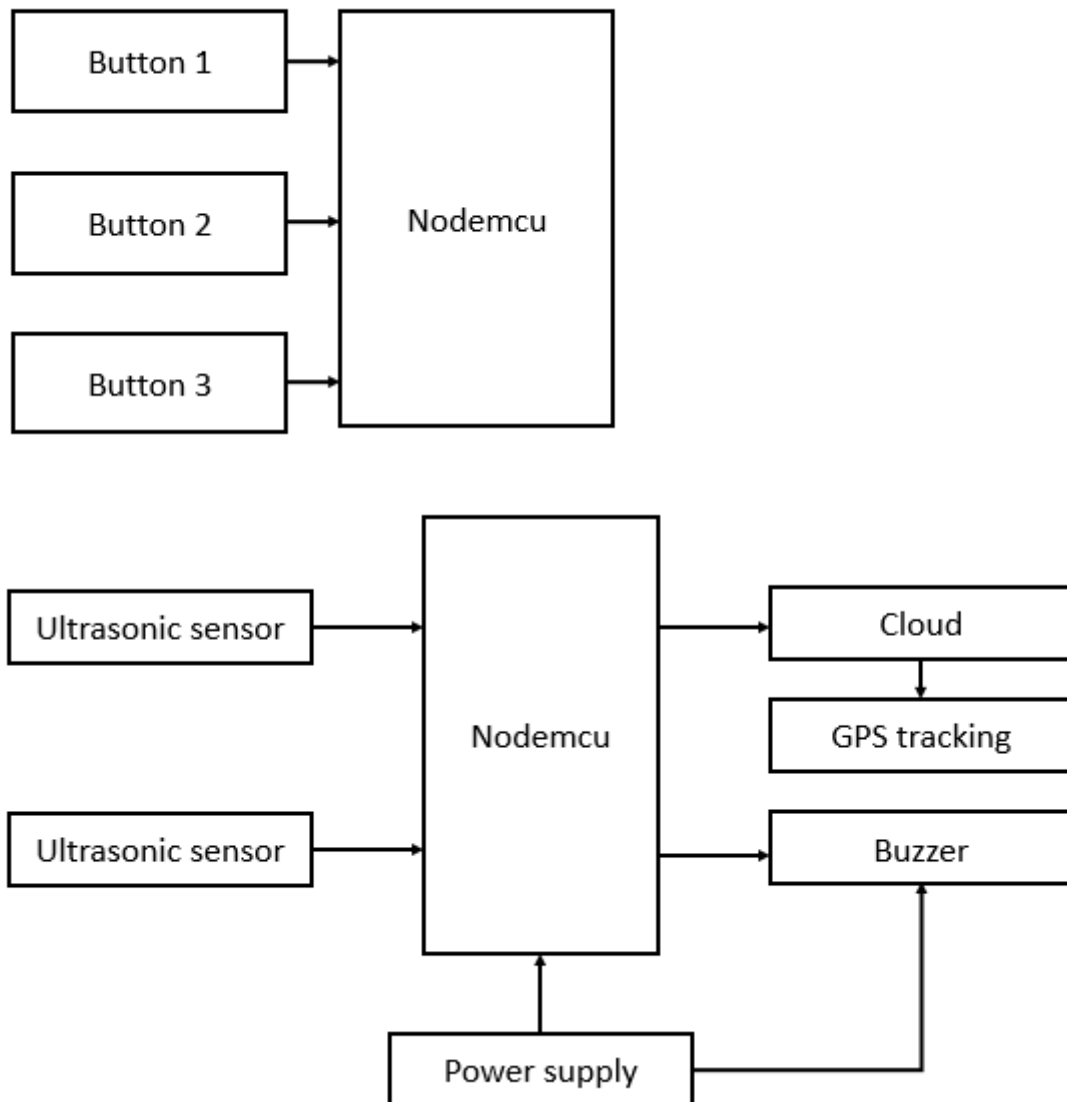


Fig : 3.1 Block Diagram

Here we have nodemcu connected to control buttons i.e., whenever the blind person presses the first button the blind stick can be find and when he presses the other two control buttons the location and panic alert message of the blind person will be shared to the guardian.Ultrasonic sensors are used to find the obstacles in

Front of the blind person and the buzzer gives the sound. Gps tracking is used to track the location of the blind person.

3.2.Hardware required:

Nodemcu

Ultrasonic sensor

GPS tracking

Relay

Buzzer

Control buttons

3.3.Existing system:

In the existing system, there is only technology to detect the obstacle and to notify the blind by having some warning sound.

3.4.Proposed system:

Whereas a blind person goes on the road carrying this footstool when there is a barrier, in this proposed scheme, it is being detected using ultrasonic sensors and then the buzzer should be on to object identifying and give warning to the blind people. Additionally, the gadget has a walkstick-in RF receptor controller. When a blind person carries the RF transmitter, whether they lose their stick or it is lost, when the button1 in the transmitter is pressed, a walking stick emits a beep signal.

If you press the button2, you will be able to locate your walking stick as well as the places around you. You'll find it. Similarly, when you press button 3, your current location will be read and you will be navigated to your predefined home.

CHAPTER 4

MATERIALS AND METHODS

4.1 Overview of embedded systems:

An embedded system is a system with a particular use, configured to execute one or more specific tasks, often with computer compliance requirements in real time. It is typically integrated into a complete package including hardware and mechanical components. In comparison, a computer of general use such as a personal computer may perform various programming tasks. Today, embedded systems are very critical as they power all of our everyday devices.

The built in software can be customized by design engineers to reduce size and costs while improving reliability and performance. The device is designed for particular purposes. Embedded equipment is mass-produced which saves costs.

Embedded system physically provide handheld equipment such as digital watches and MP3 players or large-scale stationary systems such as traffic lights, warehouse controls and nuclear power systems. The complexity ranges from the low level, with a single chip, to the extremely high level, with multiple modules, peripherals and networks within a large chassis.

"Embedded system" in general is not a precisely defined term, since systems have a programming element. For example, current advance computers share many features with integrated systems, such as operating systems and microprocessors, but they are not entirely integrated systems so they allow loading and connection between different programmes.

Embedded systems provide several functions:

Climate monitoring; input sensor data read by embedded systems. These data will then be interpreted and the results seen in some format in the user or user context control, embedded systems will produce and transmit controls for actuators, and embedded systems will translate the data obtained, such as compression/decompression of the data, to some extent.

While integrated systems must communicate with the outside world via sensors and actuators, these systems provide their applications with unique functionality. Embedded machines usually run programs such as operating rules, finite state machinery, and signal processing algorithms. In addition, the systems must detect and respond to failures in both the internal and external computer environments.

4.2 Block diagram of an embedded system:

A built-in computer usually has an embedded processor. Many digital appliances, such as microwaves, VCRs, and automobiles, have built-in systems. An operating system is used in all embedded systems. Others are highly specialized in implementing the entire logic as a single program. This technology is embedded in specific computers for applications other than general computing. Figure 1.1 depicts a typical embedded device.

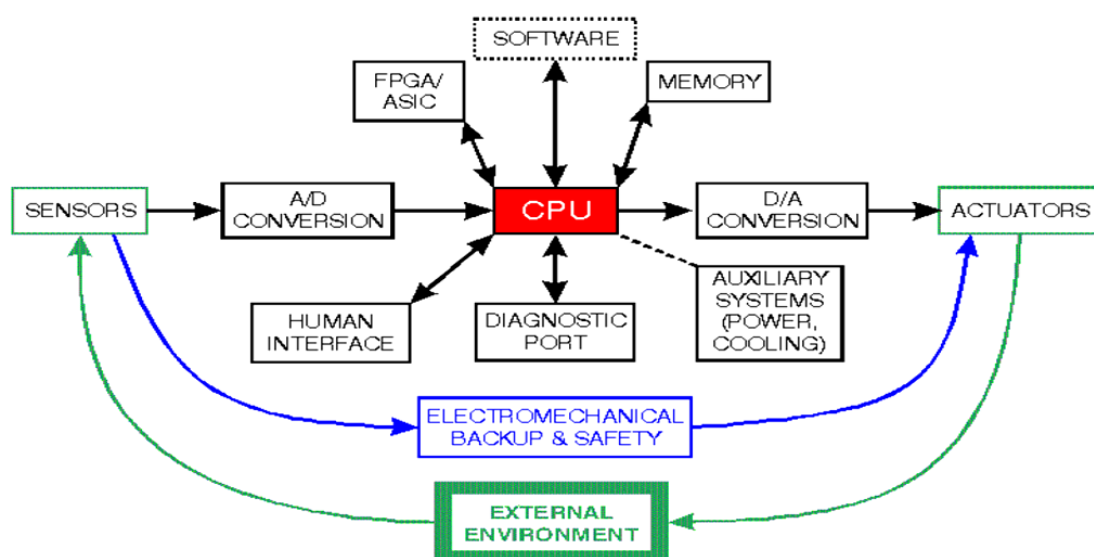


Fig 4.1: Block diagram of a typical embedded system

4.3 Characteristics of embedded systems:

Embedded system feature a special range of features. Any of these features put on embedded systems designers a complex collection of design constraints. The challenge to develop embedded systems is to comply with the relevant implementation constraints.

Application Specific Systems:

Embedded system are not general-purpose computers. Embedded computer architectures are customized to a specific purpose. Many of the job features are understood before the hardware is installed. This encourages the designer to concentrate on the basic design shortcomings of a well-defined use. As a result, interface reprogramming is kept to a minimum. Some embedded systems, however, need reprogrammability and flexibility. Programmable DSPs are common for such applications.

Reactive Systems:

As previously mentioned, a standard embedded device model uses sensors to respond to the environment and actuators to control the environment. To run at environmental speeds, embedded systems are needed. In the embedded world, this is referred to as "reactive." Reactive computation guarantees that the device (primarily the program component) operates in response to external circumstances. External events may be scheduled on a daily or ad hoc basis. Periodic events make it easier to schedule processing to ensure results.

Aperiodic activities are more challenging to plan. In order to accommodate worst conditions, the overall arrival rate for events must be calculated. The majority of embedded systems have a major reactive function. A reliable, worst case architecture study of applications with statistics output characteristics is one of the major challenges for integrated device designers. The effective function of the time system means that the correctness of the computation depends partly on the delivery time. Systems with this condition often have to provide the worst outcome.

POWER SUPPLY:

Only at low DC voltage do we need a power supply unit to provide the required power for the proper operation of the electronic circuits. A converter, rectifier, filter, and controller are all part of the system. AC voltage is used to transfer power to achieve the desired AC voltage, which is usually 230 volts rms. A diode rectifier that provides a full-wave rectified voltage that was originally routed through a single condenser filter. Typically, this DC voltage differs from the tensile ripple AC voltage. A DC input should be used by a regulator circuit to have DC voltage that is not only much less rippled, but keeps the same DC value, whether the voltage DC differs slightly, or whether the load attached to the voltage DC output varies.

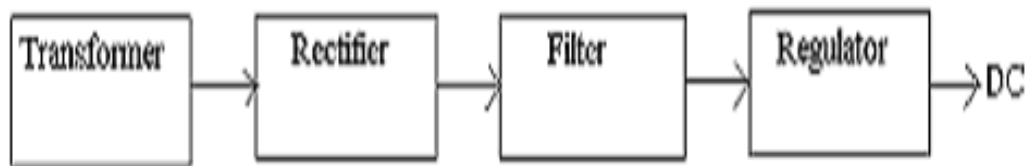


Fig 4.2: General Block of Power Supply Unit

4.4 TRANSFORMER:

Transformer is a static element that converts electric power from one circuit into the same frequency electric power from another. It will increase or decrease the voltage in the circuit, but it cannot change the current. It is based on the concept of reciprocal induction. To power our projects' electrical circuits, we use a step-down transformer. This is a 230volt operation in a 12volt alternating current.

4.5 RECTIFIER:

The procedure of full wave correction will increase the degree of DC obtained from a sinusoidal input by 100 percent. In our whole wave rectification mission, we use bridge rectifiers. The two diodes (D2 and D3) are clearly conducted from the bridge's basic configuration, while the other two diodes (D1 and D4) are not in state from $t = 0$ to $T/2$. The conducting diodes are then D1 and D4 for the input's negative loop. As a result, the polarity over the load is the same.

Diodes of varying forms such as The bridge rejuvenators may be used for 1N4001, 1N4003, 1N4004, 1N4005, IN4007, etc. But we use 1N4007 here, as it can stand up to 1000v.

4.6 FILTERS:

A low-pass filter must be used to achieve a dc voltage of 0 Hz. The right source has a condenser linked to through a filter circuit, and dc is obtained over the rectifying stream. The filtered waveform is basically a dc voltage that is supplied to the load by small torsions.

4.7 REGULATORS:

The condenser output voltage is more filtered and adjusted eventually. The voltage controller is a system that keeps the output voltage constant, regardless of difference in supply, change of loads and temperature. We use the LM7805 fixed tension controller here. IC LM7805 is a +5v control unit for microcontroller applications.

ARDUINO ide AND ITS PROGRAMMING:

Instead of your laptop, Arduino is a digital instrument that can sense and watch the physical world. It is an open-source physical computer platform, built on a basic microcontroller and a software board environment.

It can be used to create interactive objects, collect input from different switches or sensors, and monitor different lights. Arduino companies may be independent or communicate on your computer through apps. The boards may be constructed manually or preassembled; the open-source IDE is free to use

Arduino is a programming language that is based on the multimedia programming processing environment and implements Wiring, a similar physical computing platform.

Arduino ide:



Fig 4.3: Aurdino Ide

4.8 Overview:

The Arduino microcontroller is a single rugged computer with a large hobby capability as well as business leading capability. Since the Arduino is open source, the hardware is comparatively inexpensive and the software is free. This guide will be available to ME students in 2011, or whenever you first encounter the Arduino. There are several web-based programs available for experienced Arduino users.

The Uno Arduino Board (Spark-Fun for DEV-09950, \$29.95) is also included in this student and instructor guide. Through simply building interface and programming circuits, you can read switches, other sensors, power motors, and light with the Arduino Module. This guide contains both photographs and diagrams. The Duemilanove microcontroller is powered by a 5v Atmel ATmega328 with 2kb RAM, 32kb flash disk memory, and 1kb EEPROM for parameter storage.

The Uno does not use the USB-to-Serial driver chip from all previous boards. The Atmega16U2, which is programmed as a USB-to-serial adapter, is used instead.

Summary:

Input Voltage (recommended) 7-12V

Input Voltage (limits) 6-20V

Digital I/O Pins 14 (of which 6 provide PWM output)

Analog Input Pins 6

DC Current per I/O Pin 40 mA

DC Current for 3.3V Pin 50 mA

Flash Memory 32 KB (ATmega328) of which 0.5 KB used by bootloader

SRAM 2 KB (ATmega328)

EEPROM 1 KB (ATmega328)

Clock Speed 16 MHz

Pin Configuration:

External power supply for the power supply of the Arduino Uno using a USB connection. Automatically the power source is selected.

The Wall-Wart or battery-powered AC-to-DC converter can provide external access (non-USB). With a 2.1mm center-positive port, mount the plug to the board's power jack. Battery leads can be threaded into the POWER connector's GND and Vin pin headers.

External supplies are available from 6 to 20 volts. When the 5V pin comes with less than 7V, the board becomes fragile, making it less than five volts. The voltage controller will overheat and destroy the board if it is used for more than 12V. The voltage range recommended is between 7 and 12 volts.

Memory:

ATmega328 32 KB (with 0.5 KB used for the bootloader). The SRAM is 2 kB and the EEPROM is 1 kB in number.

Input and Output:

An input or output for each of the 14 uno digital pins is available using pinMode(), digital Write() and digital Read(). It works at 5 volts. Each pin will supply or receive a maximum of 40 mA with a 20-50 kohms internal (default) pull-up resistor. Furthermore, some pins have specialized functions:

Serial: (RX) 1 and 0 (TX). Receives serial TTL data (RX) and transmits data (TX) (TX). The ATmega8U2 USB-to-TTL pins are wired to these pins. International cuts are 2 and 3. These pins may be programmed to cause an upside or down side disturbance to low value or to alter value. See the Interrupt () feature for more information. Three, five, six, nine, ten, and eleven are the PWM. Provide an analog Write () function for an 8-bit PWM display.

SL: 13. The LED link to the optical pin 13 is integrated. If the slice is HIGH, the LED will be enabled, and the pin will be LOW. The Uno has 6 analog inputs numbered A0 to A5, each with a resolution of ten bits (i.e. 1024 different values). The measurements from ground to 5 volts are automatic, but with the AREF and analog reference () functions the upper part of their range may be modified. Furthermore, some pins have unique features. TWI: pin A4 or SDA and pin A5 or SCL. The Wire library supports TWI connectivity.

Communication:

Microcontrollers depend on a host computer to plan and create programs. A developer-integrated environment, or IDE, is the program that runs on the host computer. The arduino programming platform is based on the open-source processing system (www.processing.org), which its authors describe as "a language and environment for people who want to program images, animation, and interactions." The Arduino programming language makes use of an open source initiative named wiring (wiring.org.co). The Arduino programming language is based on the well-known C programming language. Don't panic if you're unfamiliar with this language; it's not complicated to learn, and when you make mistakes with the programs, the Arduino IDE provides feedback.

The Uno has a variety of cpu, Arduino, and other microcontroller communication capabilities. The Atmega328 provides UART TTL (5V) serial connectivity on

optical pins 0 (RX) and 1. (TX). An Atmega16U2 transmits the serial communication on the board to the computer, which appears on the screen as a virtual com port. The firmware for the 16U2 uses standard USB COM drivers and does not require an additional driver. As a result, Windows needs an inf file. The software generates a serial display that can be transmitted to and received from the Arduino Board using basic textual data. The RX and TX LEDs on the board flash as data is sent to the computer through a USB-enabled chip and USB connection (but not for serial communication on pins 0 and 1).

A The serial library allows serial access on all of Uno's digital pins. The Atmega 328 also supports I2C (TWI) and SPI Touch. The Arduino software has a Wire library that makes it easier to use the I2C bus. To work with SPI, use the SPI catalog.

You could feel that there is not enough power to do things such as drive service trucks, step engines, read potentiometers or show text on an LCD when you look at the programming statements available on the Arduino IDE (select Help->Reference).The Arduino uses the idea of "libraries" to refer to any language that is based on the word C.

A stealing it With the default Arduino program installation, you can import several libraries from Arduino Websites supporting Arduino Library Code and third-party websites. Servo is a nice example of the libraries of Robot and maybe others that you are going to use.

You can add one or more R/C hobby service(s) to the Arduino Digital I/O Pins in this library. The basic arduino installation kit Library->Servo is provided for the Servo library. This adds the row

```
#include <Servo.h>
```



Fig 4.4: Aurdino Ide Setup

This instructs the Arduino IDE to use the Servo library in your sketch. When the library's features are activated, you can use its various functions to control one or more servos. The style function, for example, will rotate a servo from 0 to 180 degrees. The code is as follows:

```
myServo.write (90);
```

Shift a servo to its middle or a 90-degree angle. The structural simplicity of Arduino's sketches makes them easy to read and comprehend. Initialization () and loop () are the two main sections in Arduino (). There are programming functions that perform the following tasks: Setup () tells Arduino how to configure the hardware, such as which I/O lines to use and whether to use them. It's a choice of inputs and outputs. The loop () cycle is repeatedly repeated as the Arduino runs.

The software is written and dumped onto an Arduino board using Arduino IDE (integrated production environment).

Ultrasonic (UV) Sensors or Ultrasound Sensors:

Bats are amazing creatures. And while soaring at great heights, he could tell the difference between a moth and a split leaf while being blind in one eye. Without a doubt, the future is clearer than ours and well beyond our vision, but it is not out of reach. Bats and many other animal species use ultrasonic spectrum as a means of

navigation.making the most use of their ability to replicate the forms in which nature takes the lead in everything.

Ultrasonic Transducers: Historical Perspective

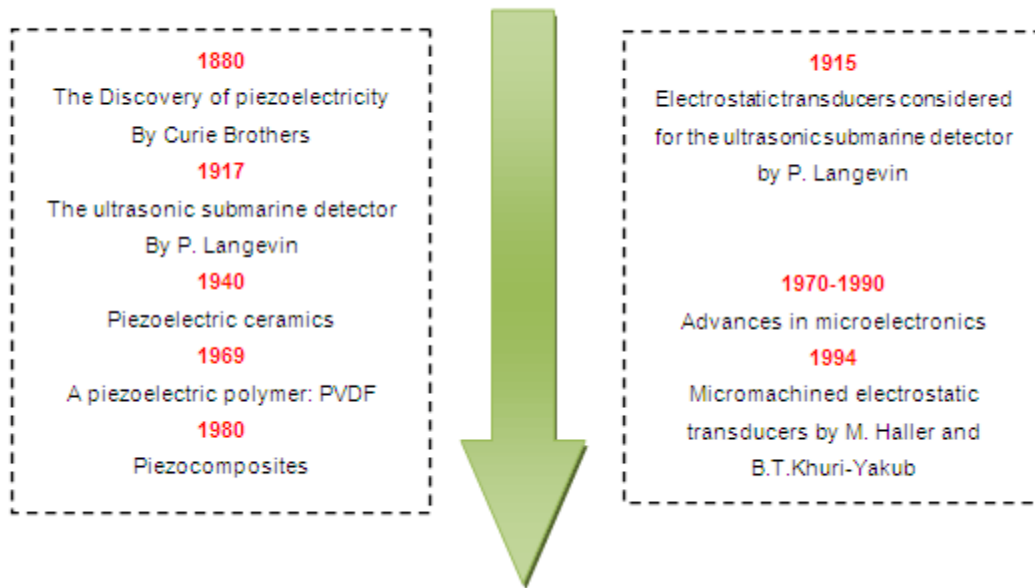


Fig: 4.5: Ultrasonic Transducers

For the first time in history, instead of their eyes at takeoff. Jean-Daniel Colladon used an underwater whistle to accurately and accurately measure the frequency of sound in water in 1826. Study and analysis in this field continued unabated until 1881, when Pierre Curie's discovery paved the way for modern ultrasound transducers. He discovered a correlation between crystalline material strain and electric voltage. The ultrasonic transducer was the first of its kind. The hydrophone could transmit and receive low-frequency sonic waves, which were later used in submerged tracking and submarine detection during World War I. Icebergs could be detected using the hydrophone.

In tandem with the SONAR, medical studies also began to focus on ultrasound. In the late 1930s, Dr. Karl Dussik employed a method called hyperphonography, which registered echos on a sensible paper of ultrasonic waves. Used to make ultrasound images of the brain and better identify cancers and mark the advent of ultrasound imaging. After this, several researchers, allowed the diagnosis of stomach cancers, ovarian cysts, the identification of twin pregnancies, tumors and other side effects of the ultrasound sensors. In industry too, jumping to the band

car was not wasted time, and at the beginning of the 1960s, Ultrasonic and non-destructive soldering devices were quickly patented.

How Ultrasonic Sensors work?

Electromechanical energy transformation is used by ultrasonic sensors to calculate the difference between sensors and the target. item using mechanical energy in the form of ultrasonic waves. Longitudinal mechanical waves are ultrasonic waves that propagate in a straight line through a medium in the direction of propagation.

The frequency spectrum was commonly categorized based on the type of operation, as seen in the diagram below:

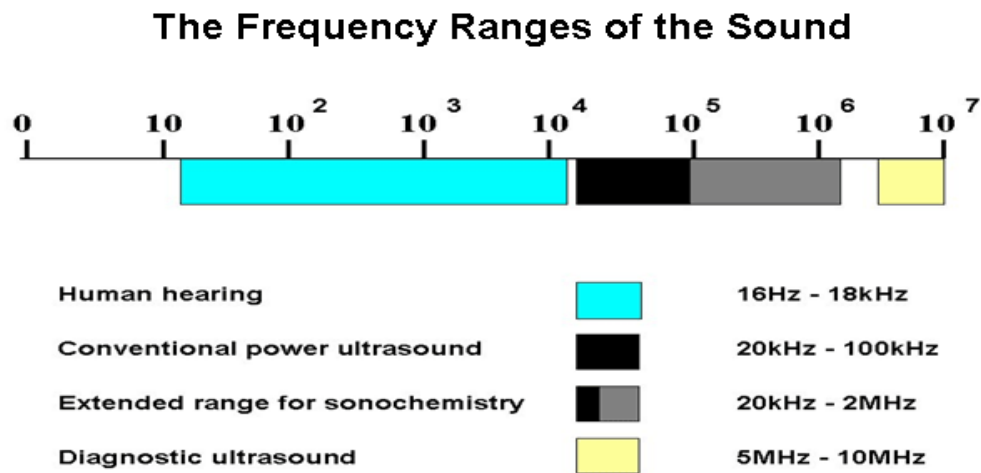


Fig: 4.6: The Frequency Ranges Of The Sound

Radiant energy reflections occur at a deep solid angle that can be as high as 180 degrees when an object is hit by ultrasonic waves. As a result, some of the incident energy is reflected in the echoes and detected by the transducer. The distance from the object (L) can then be determined using the relation by the rate of ultrasonic waves (v)

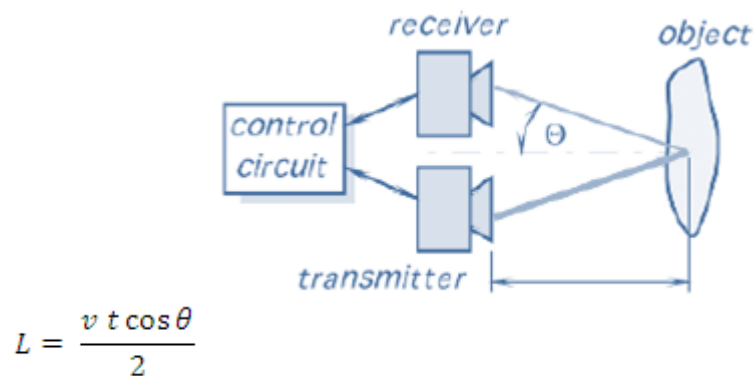


Fig:4.7:UltraSonicMediumRelation

The time the wave takes to hit the sensor is not where it is and the angle between the horizontal and the trajectory, as seen in the diagram. When the object moves, Doppler-based devices are used. Get all information about the internal configuration of an ultrasonic sensor in Insight-How Ultrasonic Sensors Operate.

Generating Ultrasonic Waves:

When ultrasound waves bounce from the target and influence the ceramic structure, piezoelectricity induces electrical tension, which is a reversible phenomenon. This allows a transducer to act as both A receiver in pulsed mode and a transmitter. Separate transducer for transmission and reception where continuous distance measurement is necessary. In the production arrays, sensors are always found, and may involve mechanical arrays of oscillating or spinning sensors, as well as linear, curved, or phased electronic arrays. The signal from an ultrasonic sensor is displayed on a variety of displays, depending on the form and purpose of the transducer array. A sectoral field of view is produced by mechanical, curved, and phased electronic arrays, while a linear field is produced by linear arrays. The show modes include linear, y-axis magnitude, x-axis time plotting, and B-scans with modulated intensity, with the spot brightness indicating In general, The manipulation of the reflected and transmitted signals provided by an axial movement of a transducer is carried out laterally, while the target is retained in a particular medium (water in general). The sound beam differs quickly, since the transducer provides the smallest possible beam. The more sensitive the sensor, the smaller the beam pattern. As a consequence, as the beam diameter

increases the angles between the transducer and the surface. The following beam patterns have been observed: Such instances are as follows:

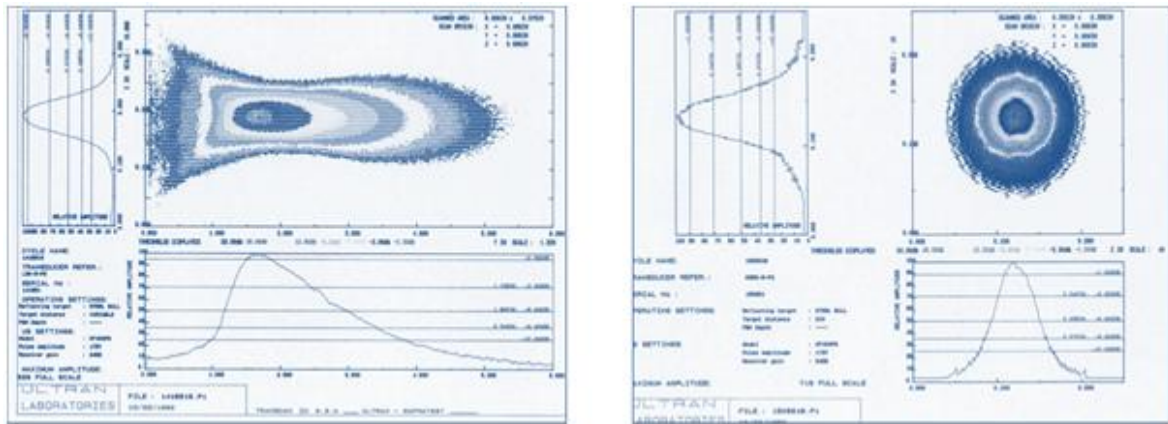


Fig: 4.8:Axial And Cross Sectional Beam Profiles

Bandwidth, mitigation, dynamic range and resolution, including gray scale, axial and lateral resolution, are the measurements used to calculate the performance of an ultrasound sensor. Others are nominal frequency, peak frequency, frequency middle of the bandwidth, pulse longitudinal, signal to noise ratio (SNR).

Importance of Ultrasonic Sensors:

Other physical transduction concepts are used for multiple instruments, such as optical sensors and microwave-based systems. So why do we start with ultrasonic transducers, which have a far lower sound strength than electromagnetic waves? The answer is the question itself. The devices based on EM waves, however, are too fast. Ultrasound waves are less slow than EM waves and take a long time to count, much longer than those of the latter, making them faster and less expensive to calculate.

Light-based sensors, for example, would suffer greatly due to the propagation of the objective or translucent medium in the case of clear target recognition and liquid level measurement under high glare conditions. Ultrasonic equipment can remain unaffected in use based on sound amplification. They also perform well under humid environments where optical rays can be refracted by water droplets in the atmosphere. the lower end of the Infrared sensors and the upper end of the LIDARs. Ultrasonic scope receivers are not as accurate or as long-distance as LIDARs, but they are more vulnerable to atmospheric conditions and must be re-calibrated if the atmosphere changes. These instruments have benefits in medical

imaging over ultrasonic waves have no harmful effects at intensity levels and are especially useful for imaging soft tis.

Problems & Concerns:

However, ultrasonic sensors are not without their own set of challenges. The speed of sound in a medium increases as the medium's temperature rises. Even if the target remained in place, it seems to have shifted closer to the sensor. Air currents may block a wave path for a variety of reasons, resulting in 'missed detection' or an incorrect measurement.

At frequencies above the operating frequency, the sensor signal will interfere with acoustic noise, such as high pitched noises made by the hissing of valves and pneumatic appliances. Electric noise has an effect on sensor performance as well. This which result in artifacts that do not accurately represent the picture object. Just as how the image distorts when an object is too small to be seen by the eye, ultrasound sensors have a 'died field' where the device cannot measure correctly. This is due to a noise known as ringing, which is caused by the transducer's continuous vibration after the pulse is emitted. As a result, when the distance has become too small, the transducer is unable to differentiate between the pulse caused by the radiation event and the oscillation caused by the electrical excitation. There is also a legitimate chance of ultrasonic waves. When the intensity is so strong, it can heat human tissues and cause ruptures in individuals who are exposed to it. There are also widespread reservations over legal issues such as the diagnosis of fetuses and the subsequent surgical abortions.

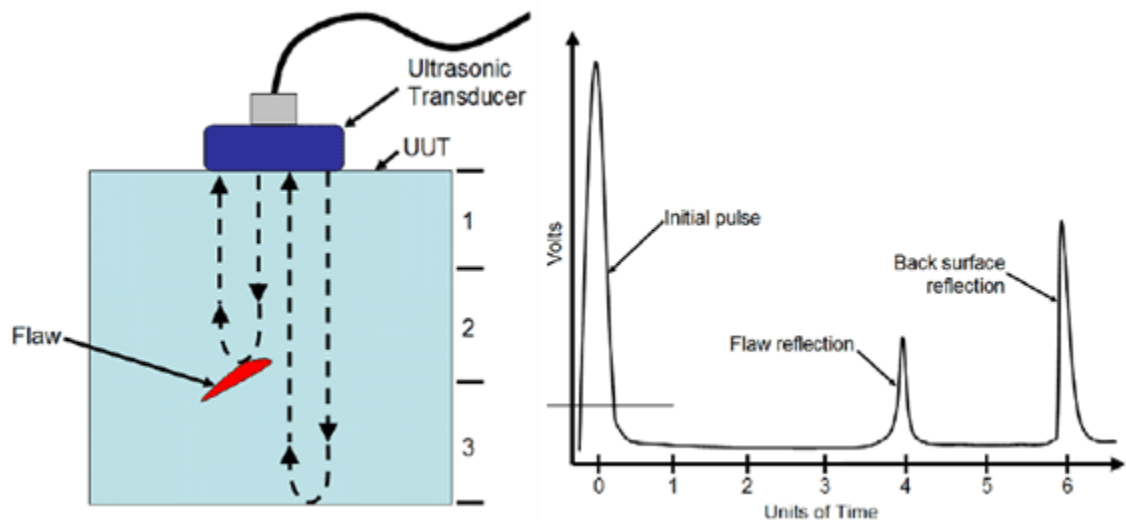
Applications:

Ultrasound sensor systems can be categorized according to the property they use. Both are as follows:

Table 4.1: Applications Of Ultrasonic Sensors

Domain	Parameter	Applications
Time	Time-of-Flight, Velocity	Density, Thickness, Flaw Detection, Anisotropy, Robotics, Remote Sensing etc.
Attenuation	Fluctuations in reflected and Transmitted Signals	Defect characterization, microstructures, interface analysis
Frequency	Ultrasonic Spectroscopy	Microstructure, grain size, porosity, phase analysis.

The issue of ultrasound sensors has been researched, In medical pictures in particular, where ultrasound is known. Ultrasonic sensors are used to distinguish solid tissue from cystic tissue, such as acoustic shadows and acoustic amplification. In applications like plastic soldering, gemstone washing, remote sensing and telemetric devices, car parking assistance, etc, the industries benefit from ultrasound sensors. Robotics has traditionally used ultrasonic rangefinders as a preferred form of distance mapping. Hair styling ultrasonic sensors, such as hair extension implants, are now used in the cosmetic industry.

**Fig: 4.9: Flaw Detection Using Ultrasonic Sensors****Future:**

Ultrasound waves in different modes are used for the non-destructive monitoring and identification of defects of the components. With the progress of science, new

materials that provide better efficiency at lower voltages such as the capacitive CMUTs are being produced that would have improved bandwidth and greater integration capacity.

These sensors use non-invasive methods to detect problems in a variety of components, including living tissue and non-living products. In the case with a healthy background, ultrasonic sensors will detect a variety of complications; otherwise, doctors will be blinded and the disease will go untreated.

4.9.NODE MCU:

NodeMCU is an open source IoT platform. [number four] [4] It consists of firmware operating on the ESP8266 Wi-Fi SoC and hardware running on the Espressif Systems ESP12 module. The default term "NodeMCU" refers to the firmware rather than the production package. The firmware is written in the Lua scripting language. The ESP 8266 Espressif NOS SDK was used to create it. It's focused on the eLua initiative.

In the summer of 2015, the founders left the firmware group, leaving behind a community of independent developers. By the summer of 2016, the NodeMCU was supplied by more than 40 modules. Due to resource constraints, users must choose and build a firmware tailored to their needs for their project modules.

Arduino.cc had developed and used in the Arduino Due the Arduino IDE to make it reasonably straightforward to update the IDE to enable Arduino C/C++ compiles with the latest processors, using non-AVR-processors, such as the ARM/SAM MCUE. This was done with the introduction of the management board and the SAM Core. A "heart" consists of a set of components of software needed to compile the Arduino C/C++ source file for the target MCU machine language by the Board Manager and Arduino IDE. Any enthusiasts from ESP8266 designed a key Arduino for the ESP8266 WiFi soC, commonly known as the "ESP8266 core for the IDE." [16]. This has been a leading forum for the production of numerous modules and development boards based on ESP8266, including NodeMCUs.

Because of its lightweight, compatible, and simple interface to a variety of other controllers such as the Programmable Integrated Circuit (PIC), Figure-3 depicts the NODEMCU map (ESP8266). The processor has a Tensilica Xtensa Diamond

Standard 106Micro processing unit called L106 32bits RISC Microprocesor core with 80 MHz and a 32 Kbit RAM, 32 Kbit RAM cache instruction, 80 Kbit RAM, and 16 KbitETS system data. The IEEE 802.11 b/g/n Wi-Fi module was used.

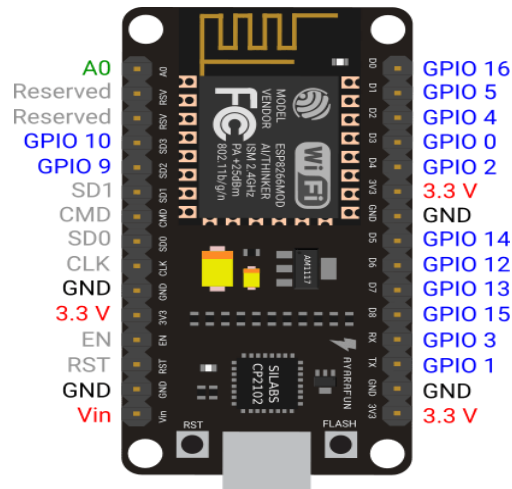


Fig: 4.10: Node Mcu

CIRCUIT DIAGRAM DESCRIPTION:

Filters, correction devices, and voltage regulators control power supply circuits. A steady DC voltage is obtained from an alternating current voltage, then from a direct current voltage, and finally from the filtering of the direct current voltage and from the regulation to obtain the desired given DC voltage. Regulation is usually accomplished with a DC voltage unit that has a little less DC voltage, the same even though the DC voltage changes or the output load connected to the DC voltage varies. The control unit has the same DC voltage voltage as the rest of the system.

POWER SUPPLY UNIT:

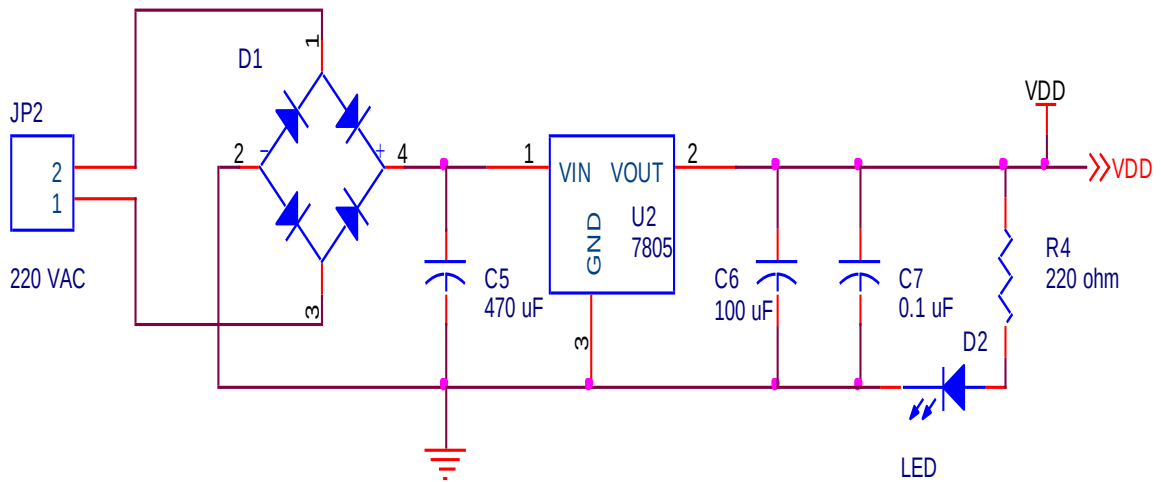


Fig: 4.11: CIRCUIT DIAGRAM OF POWER SUPPLY

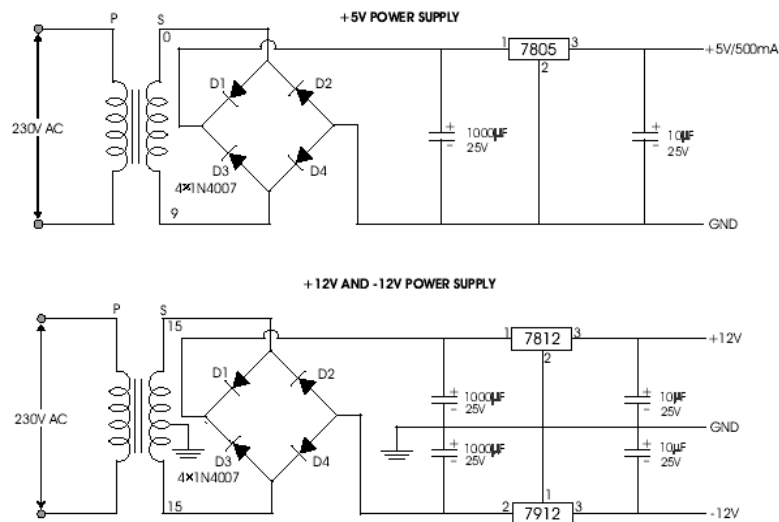


Fig: 4.12. WORKING PRINCIPLE

4.9.1: Working Principle:

The AC voltage is wired to a transformer, usually 220 V rms. It takes this AC voltage to the desired DC voltage level. A diode rectifier then supplies a full-wave rectified voltage, filtered first to generate a DC voltage using a simple condenser filter. Currently, this DC voltage has some difference in tension or AC.

A controller circuit will delete the ripples and still stay the same dc value, even when the voltage of the input dc or the charge attached to the voltage of output dc increases.

4.9.2 TRANSFORMER:

From the potential transformer, the power supply voltage drops from (0 - 230V) to (0 - 6V). The accurate correction unit, which is equipped with an op-amp, is then connected to the secondary component of the future transformer. The precision rectifier has the advantage of having a DC maximum output voltage.

4.9.3 BRIDGE RECTIFIER:

The circuit is known as a bridge rectifier, because 4 diodes are connected as seen in the diagram. The input of the circuit is implemented in opposite corners of the network, and the feedback of both corners of the circuit is applied.

Suppose that the transformer works correctly and that the potential at A and B is positive. Point A will change the trend towards optimistic potentials for D3 and D4.

The negative potential of Argument B will revert D2 and D1. D3 and D1 are currently forward-looking and allow current to flow in, while D4 and D2 are reverse-looking and block current flow.

The present flow direction from B to D1, up to RL, through D3, then down to B secondary to the transformer. This is shown by the strong bows. Waveforms (1) and (2) can also be used in D1 and D3 (2).

Half a loop later, the secondary portion of the transformer reverses, forward-biasing D2 and D4, and reverse-biasing D1 and D3. The current flow can now be done from point A to D4, to RL, to D2, to secondary point T1, then back to point A. This is shown by the broken bows. Observations can be made through the D2 and D4 versions (3) and (4). The current flow is in the same direction as the old one by RL. This current generates the same voltage as the observed waveform (5). When the new is being loaded (RL). During all half cycles of the applied power, this bridge rectification acts as a full-wave rectifying agent.

A bridge rectifier has one benefit over a traditional full-wave rectifier, since the bridge rectifier generates about twice as much a voltage as the conventional full wave circuit with a provided transformer.

4.9.4 IC VOLTAGE REGULATORS:

Voltage regulators are a common kind of integrated circuit. The regulator's IC modules are made up of a reference source circuitry, comparator amplifier, control unit, and overload protection all in one IC. The IC units can manage a fixed positive tension, a fixed negative tension, or a tension that can be adjusted. Regulators with power ratings ranging from 1 to 10 watts can be used to service charging streams ranging from hundreds of thousands to tens of thousands of amperes.

The 3-terminal fixed voltage regulator, V_i , has an unrestricted dc inlet voltage from the second terminal and is attached to the terrestrial terminal by the third. V_i , a controlled dc outlet voltage from the third terminal. Set positive controlled voltages range between 5 and 24 volts are provided by the 78 series. Similarly, the 79 series regulators deliver 5 to 24 volts of preset, negative regulated voltages

4.9.5.INTERNET OF THINGS:

The Internet of Things (IoT) is a network of interconnected physical devices, cars, and other objects that have processors, software, sensors, actuators, and network connections that allow these items to collect and exchange data (also known as "connected devices" and "Smart devices"). The Global Standards Initiative designated the IOT as IOT in 2013. (IOT-GSI). "a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies" and for these purposes a "thing" is "an object of the physical world (physical things) or the information world (virtual things), which is capable of being identified and integrated into communication networks". The Internet of Things allows devices to be remotely sensed or controlled using existing network infrastructure, opens up ways to connect the physical world more closely with computer-based networks, and contributes to improved efficiency, accuracy, and economic benefits, as well as reduced human interaction. If IOT is enhanced to incorporate sensors and actuators, it becomes an example of

cyberphysical devices in a broader class that includes innovations such as intelligent grids, virtual power plants, intelligent buildings, smart transportation, and smart cities. An embedded computing system can identify each thing, but it can also communicate with an existing Internet infrastructure. Experts predict that the Internet of Things (IOT) will have 30 billion goods by 2020. In certain cases, IoT can offer integrated machine-to-machine networking for hardware, software, and utilities.

Protocols, domains, and interfaces are both communicated and secured. These embedded devices (including mobile devices) are expected to communicate with automation in nearly all industries, allowing advanced technology such as the smart grid to expand into fields such as intelligent cities. IOT may apply to a broad variety of devices, such as cardiac monitoring equipment, farm animal biochip transponders, electrical clams, built-in sensor vehicles, environmental/food/pathogen monitoring DNA analysis equipment, or firefighters' assistance in search and rescue operations. In IOT, firefighters can also use "material."

4.9.5.1.HISTORY :

Since 2016, the Internet vision has evolved as a result of the convergence of many technologies, including wireless networking, real-time computation, artificial intelligence, commodity sensors, and embedded computers. This denotes general areas including interconnected platforms, wireless sensor networks, control systems, and automation (including home and building automation) (IOT). At the University of Carnegie Mellon, the concept of a network of intelligent machines was first commented on in 1982, and it became the first Internet-connected device to report its stock and whether freshly loaded drinks were cold. Their appearance has been altered. In scholarly locations such as UbiComp and PerCom, Mark Weiser's seminal paper on ubiquitous equations, "The Computer of the Twenty-First Century," and the contemporary vision of IOT was created in 1991.

Reza Raji described the IEEE Spectrum concept in 1994 as "[moving] small data packets across a wide range of nodes so that anything from home devices to whole factories can be interconnected and automated." Between 1993 and 1996, some companies suggested alternatives, such as Microsoft at Work or NEST in

Novell. However, the business did not take off until 1999. Bill Joy suggested Device to Device (D2D) networking as part of his Six Webs framework at the 1999 World Economic Forum in Davos. The internet of things became well-known in 1999 as a result of the Auto-ID Center at MIT and related reported industry studies. Kevin Ashton (one of the original Auto-ID centre's pioneers) saw radio frequency identification (RFID) as a standard for the Internet of Submissions. Ashton chose the phrase "Internet for Things." Computers can manage and store identifiers for all objects and people in daily life. Labeling can also be accomplished using technology such as near field communication, barcodes, QR codes, and wireless watermarking in addition to RFID. The transformation of daily life will be one of the first consequences of incorporating the Internet of Things by equipping all things with small tracking devices or readable machine identifiers. According to the original interpretation Stock tests, for example, would become ubiquitous and uninterrupted. In accordance with existing end-user agreements, a person's ability to interact with objects can be remotely changed based on immediate or actual needs. Such a technology, by remote regulation of copyright laws and digital rights control, could allow movie creators much more oversight for private end-user devices, for example, so that the ability for a viewer who bought Blu-ray to see the movie could be made dependent, similar to Circuit City's failed DIVX.

4.9.5.2.APPLICATIONS:

According to Gartner Inc., the Internet of Things will have up to 20.8 billion users by 2020. (a technology consulting and consultancy company). According to ABI Research, more than 30 billion people will be connected to the Internet by 2020. with everything from urban transit and hospitals and home appliances being integrated. The next move is the Internet with Services. Because of its ability to network embedded devices with limited CPU, memory, and power sources, IOT can find applications in almost any sector. [48] These technologies may be responsible for gathering knowledge from natural environments to houses and industries, having uses in the areas of environmental sensing and urban planning.

On the other hand, IOT devices can also execute actions and not just senses. For example, intelligent shopping systems may detect the buying patterns of individual consumers in a shop by monitoring their cell phones in particular.

ENVIRONMENTAL MONITORING :

Environmental IOT systems typically employ sensors to track air and water quality, plants, or atmospheric temperatures in order to help in environmental protection, and may also include areas such as animal migration and its habitats. The implementation of resource-rich Internet-based equipment also means that emergency services can provide more effective assistance through other applications such as earthquake or tsunami early-warning systems. In this application, IOT devices usually cover a large geographical area and can also be handheld. It was suggested that IoT standardization would allow wireless sensing to revolutionize this area.

INFRASTRUCTURE MANAGEMENT:

The major application of the IOT is tracking and monitoring of urban and rural transportation operations such as bridges, ferroviaire highways, and onshore and offshore farms. IoT infrastructure should be used to detect accidents or structural changes that may compromise protection and increase risk. It can also be used to schedule and manage repairs effectively by organising projects among different service providers and customers. IoT systems can also be used to monitor essential infrastructure such as bridges used to access vessels. The use of IOT equipment for monitoring and operating infrastructure is intended to improve incident management, emergency response coordination, and service quality in all technology-related regions. The Internet of Things (IOT) can be used to automate and optimize processes in fields such as waste management.

MANUFACTURING NETWORK:

The Internet of Things is now being used in the area of industrial technologies and intellectual fabrication, such as the monitoring and repair of manufacturing plants, Management of assets, situations and process control of production. Intelligent IOT systems allow for fast product creation, dynamic product response, and the

optimisation of output and supply chain network in real time by combined networking devices, sensors and control systems. Digital access, operator and operating information processing systems are among the IOT's competencies for automating process controls and maximizing plant safety and security.

But asset management also refers to automated maintenance, statistical assessment and analyses to optimize reliability. The Smart Grid will also include smart industrial management systems, allowing energy optimization in real time. A vast range of networked sensors provide measurements, automatic controls, system optimisation, health and safety management and other features. In 2001 the National Science Foundation developed an Intelligent Maintenance Systems Cooperative Research Center (IMS) in an Industry/University with a research objective to track machine connection and machine deterioration through IOT-based predictive computational technology, and to avoid further possible loss. With the intention to achieve a close-zero collapse with IOT prediction analytics, e-manufacturing and e-maintenance work was further developed. The expression IIOT (Financial Internet of Things), which refers to the IOT industrial subset, is often used in manufacturing industries.

ENERGY MANAGEMENT :

The integration of Internet-connected sensing and actuation systems is likely to reduce total energy consumption. IOT systems are designed to be installed with a variety of energy-consuming equipment (switches, power sockets, lamps, TVs, and so on) and to communicate with the utility provider in order to effectively integrate electricity generation and energy use. Such devices frequently allow users to remotely access or centrally manage their devices using a cloud-based interface. Electrical services not only collect data from end-user connections, but also manage other dealer automation equipment, such as transformers and clusters, via advanced AMI devices connected to the Internet backbone.

MEDICAL AND HEALTHCARE:

IoT computers may benefit from remote health monitoring and emergency alert systems. This health monitoring will include everything from blood pressure monitoring and heart monitoring to complex device management devices such as pacemakers, fit wearable wristbands, and specialized hearing aids. Any hospital

has begun to implement "smart beds," which detect when the patient is occupied and when he is about to get up. It can also adjust to ensure that adequate pressure and assistance is applied to the patient without the need for manual intervention from nurses. Specialized sensors in living environments may also be equipped to track the fitness and general well-being of elderly individuals, while also ensuring adequate support and assisting people in regaining lost mobility through recovery. Such electronic goods, such as wired scales or handheld heart sensors, will also benefit from the Internet of Things. Antenatal and chronic patients are increasingly being given end-to-end IOT wellness treatment platforms to assist with urgent wellbeing conditions and repeated opioid needs.

BUILDING AND HOME AUTOMATION:

IOT sensors can be used in the field of house automation and building control systems to monitor and automate the mechanical, electricity, and electronic systems used by various building types (e.g. public or private, commercial, institutional or residential). This background includes three main areas of literature: Online integration of building energy management systems to create efficient, IOT-driven "smart buildings." Methods for tracking energy use and monitoring inhabitants in real time. The use of mobile devices and how to incorporate them into future applications within the built-in environment.

TRANSPORTATION:

IoT can aid in the integration of networking, tracking, and information retrieval in various transportation networks. The IOT application encompasses all aspects of transportation networks (i.e. the vehicle, the infrastructure, and the driver or user). Via a dynamic partnership with some elements of the transportation infrastructure, inter and intra-vehicle synchronization, smart transport control, smart parking, electronic toll collection systems, logistics and fleet maintenance, vehicle tracking, and safety and road assistance are all available.

METROPOLITAN SCALE DEPLOYMENTS :

Several large-scale IOT deployments are planned or in progress, allowing for better monitoring of cities and networks. Songdo, South Korea's smart, fully-equipped, wired capital, for example, is nearly finished. About everything in town is

connected, interconnected, and converted into a continuous data stream that is monitored and processed by a variety of machines with little to no human intervention. Another application is the latest initiative in Santander, Spain. For this deployment, two new tactics were added. There have been 18,000 downloads of local smartphone applications in this town of 180,000 inhabitants.

This app is connected to 10,000 sensors, which allow services including parking search, environmental surveillance, and the city's digital agenda. In this rollout, merchants will be assisted by using a mechanism based on city activity, which aims to optimize the impact of any warning. The Sino-Singapore Guangzhou Knowledge City, work on improving air and water quality as well as noise reduction, improved transport efficiency, and smart traffic management in Singapore's west are all examples of large-scale deployments.

The Commission then reported that by the end of 2016, it will have established 4,000 base stations in 30 cities across the United States, making it the country's largest network IOT coverage service provider. Another prominent example is New York Waterways in New York City, which connects all of the city's ships and can track them live around the clock. Fluidmesh Networks, a Chicago-based company that creates wireless networks for sensitive devices, designed and installed the network. Today, the NYWW network protects the Hudson River, the East River, and Upper New York Bay. NY Waterway is now able to track its fleet and customers in unprecedented ways thanks to its wireless network.

CONSUMER APPLICATION:

The number of IoT products are being produced for consumer use. Interactive vehicles, entertainment, homes and intelligent buildings, smart devices, quantifiable self, interconnected health, and intelligent stores are only a few examples of user applications. Consumer IoT allows for new user interfaces and user experiences. Some user apps were chastised for their lack of redundancy and coherence, prompting the creation of "The Internet of Shit," a viral spoof. Companies were chastised for their IoT admission, development of dubious technologies, and inability to maintain stringent safety standards.

UNIQUE ADDRESSABILITY OF THINGS:

The Auto-ID Center's original concept is focused around the use of RFID tags and a uniquely identified code but has developed into artifacts having a URI or an IP address. An alternate view of the Semantic web environment is focused instead on the need to use current naming protocols such as URI to handle any item (not just those that are electronic, smart, or RFID enabled). The artifacts themselves don't talk, but other agents, including powerful centralized servers for their human owners, can now mention them.

Internet integration means computers use an IP address as a single ID. During this time, IOT artifacts for the size of the incredibly wide address space required, due to the limitable address spaces for IPv4 (which permits 4.3 billion unique addresses). In addition, the internet of stuff devices benefits from the stateless auto-configuration address available in IPv6, which eliminates overhead hosts configuration and compression of the IETF 6LoWPAN header. The future of the Internet of Things will largely not be feasible without the assistance of IPv6, and thus the global acceptance of IPv6 will be vital for the future sustainable growth of the IOT. The new global GS1/EPC EPC Information Services (EPCIS) requirements contain a mixture of these concepts. This framework identifies structures from aerospace to fast moving consumer goods and transport logistics.

4.9.5.3.FRAMEWORKS:

IoT systems can help with interoperability and allow more complex architectures like distributed computing and distributed application development. Some IoT deployments now seem to rely on real-time data logging solutions, which provide background for dealing with and interacting with a large number of "things." Future technologies will aid in the development of new software creation environments for the Internet of Things' software to communicate with hardware. Companies create technology systems to provide this functionality to the Internet of Things. New platforms are being developed that add more intelligence. REST is a modular architecture that allows Hypertext Transfer Protocol to connect, and it can be used to easily communicate with IoT applications from a single source to a central Web server. MQTT is a TCP/IP subscription publishing architecture that allows an object to communicate with a MQTT broker in both directions.

4.9.5.4.ENABLING TECHNOLOGIES FOR IOT:

Several technology allow the Internet of Things. The key to this field is a network that interacts between the machines in an IOT installation, a role that can be performed by a variety of wireless and wired technologies.

SHORT-RANGE WIRELESS:

Bluetooth low energy (BLE) – Specification for a low power variant of Bluetooth with a similar touch range to traditional Bluetooth. Wireless networking technology similar to Wi-Fi, but with increased bandwidth and seamless lighting communication. Light-Fidelity (Li-Fi) is a process.

Radio-frequency identification (RFID) – Technology for reading data contained in tags integrated into other objects using electromagnetic fields. Thread – IEEE 802.15.4-based network protocol, which gives IPv6 addressing similarly to Zigbee. Network Protocol (Network Layer Authentication) | TLS - security protocol for network.

Wi-Fi – Widespread local area networking infrastructure built on IEEE 802.11, where computers can connect over a centralized access point. Wi-Fi direct – Wi-Fi standard variant.

Z-Wave – Communication protocol that provides low-latency data transmission at speeds and utilization below Wi-Fi. It is mostly used in domestic automation.

Zigbee — Personal area networking communication protocols based on IEEE 802.15.4, offering low power use, low data rates, low cost and high output.

MEDIUM-RANGE WIRELESS:

Hallow – Wi-Fi Standard variant that gives an extended range with a lower data rate of low power connectivity. LTE-Advanced – Cell communications high-speed specification. Provides improved coverage, increased throughput, and reduced latency to the LTE level.

LONG-RANGE WIRELESS:

Low power is that reduces transmission capacity and costs. Quite limited opening terminal (VSAT) - Satellite networking technology for narrowband and broadband data with small dish antennas.

WIRED:

Ethernet – General purpose networking standard for hubs or switches, using twisted pair and fiber-optic connections. Multimedia over Coax Alliance – Specifying that high-definition video and material can be distributed across the house through existing coaxial cabling. Powerline (PLC) – Networking technology for power transmission and data using electrical wiring. PLC for networking IOT devices are used for specifications such as home plug.

SIMULATION:

IOT modeling and simulation (and emulation) is usually done before network implementation at the design level. The IOT networks can be simulated using network simulators such as OPNET, Net Sim and NS2. Digital twins can be used to provide alerts on an asset's state and wellbeing, based on sensor readings built into the asset's computational model.

POLITICS AND CIVIC ENGAGEMENT:

Some academics and advisor contend that if interface networks are open to user access and interoperable platforms, the IOT can be used to build new models of political participation. In both democracy and totalitarian governments the Internet of Things, according to Philip N. Howard, a professor and theorist, will influence political life. To this end, it claims that each device linked must be able to disclose its sensor data's list of "ultimate recipients," and that individuals must be able to add new entities to the list. He also believes that civil society organizations should begin developing their IOT plan for using data and communicating with the public.

4.9.5.5.GOVERNMENT REGULATION ON IOT:

Data is one of the IOT's main motors. The performance of connecting devices is based on connectivity, storage and processing of information. To this end, IOT-based businesses gather data from many source sites and store it for further analysis in their cloud network. This makes the door widely open for privacy and security risks and different systems' single-point vulnerability. Other questions include user preference and data control and how they are used. The regulators are currently showing more concern in defending the above three problems. Current regulatory framework: The following three recommendations was made in a January 2015 investigation by the Federal Trade Commission (FTC) :

Data security – When developing IOT businesses, Ensure still safe data acquisition, retrieval and analysis. Companies can adopt an approach of "security in detail" and encrypt data at any point. Computer approval –Consumers can choose to exchange information with IOT firms and users, if their data is revealed. Data minimization – IOT businesses only need to gather the data they need and only keep the data they collect for a short period.

The FTC, however, only made suggestions for the time being. The current, industry guidelines, multi-stakeholder engagement and lobbying of all federal, state and local entities are sufficient to secure the interests of consumers, according to an analytical review by the FTC.

4.9.5.6.CRITICISM AND CONTROVERSIES:

PLATFORM FRAGMENTATION:

The diversity of IOT devices is responsible for designing applications that operate reliably within various incompatible technology environments, both for hardware and software disparities, due to the heterogeneity of platforms and the lack of technical standards under which the diversity of IOT devices is responsible for designing applications that operate reliably within various incompatible technology environments. Customers may be hesitant to invest in software or hardware that relies on fading proprietary protocols that are difficult to install and connect. Since error patches, the amorphous nature of IOT is also a security problem. According to a host of experts, the weakness stems from manufacturers that refuse to assist ageing smartphones with repairs and updates.

4.9.5.7.PRIVACY, AUTONOMY, AND CONTROL:

Professor and author Philip N. Howard writes that the Internet of Things provides huge potential to inspire people, transparently enhance the public access to government and expand access to transparency. However, Mr. Howard warns that privacy risks are huge and social control and political exploitation potentials are immense. Privacy concerns have prompted us to consider the likelihood of the potentially incompatibility of Big data infrastructures like Things like Data Mining Internet. Adam Greenfield claims that these instruments are not only a public land misuse but also used to maintain regulatory behaviour; providing an example of billboards with hidden cameras, tracking passersby demographics, avoided reading the ad. The Internet of Things Council contrasted Jeremy Bentham's philosophical panoptics of the XVIIIth century to the increasing proliferation of remote monitoring across the Internet of things. The argument has been defended by Michel Foucault and Gilles Deleuze, French philosopher. The birth of prison in discipline and punishment The panopticon is a key element in the disciplinary society built over the Industrial Era, Foucault claims. Foucault argued that Bentham's vision of panopticism mirrored the discipline structures that were developed in factories and schools. Deleuze wrote in his 1992 paper 'Postscripts on Control Societies': Discipline society has become a control society, power but also retaining the characteristics that are close to that of panopticism.

4.9.5.8.TRADITIONAL GOVERNANCE STRUCTURES:

According to Ericsson's report on the usage of the Internet of Things by Danish businesses, there is a "clash between IOT and the traditional corporate governance structure, as IOT remains both ambiguous and unparalleled." Sixty percent of those polled said they "don't believe they have the organization's ability; three out of four don't believe they have the requisite processes to take advantage of the IOT." This necessitated the consideration of business culture in order to foster organizational design practices and to affirm new approaches to innovation management. Many companies have been "waiting the dynamics of the market" or "pending competitor moves, customer drive, or regulatory requirements" for further action with regard to IOT in light of uncertainty due to a The lack of digital leadership, suffocating creativity and IOT adoptions in a moment of digital transformation.'Kodak is a market market leader since the internet disruption has overshadowed video photography with digital pictures,' —'saw the competitive trends that have an influence on their business.' Kodak "created a digital camera, invested in technology, and realized that pictures should be shared on the internet," according to Scott Anthony of Harvard Business Review, but "online photo sharing is not just a way of extending the printing industry."

Every part of a device or an operation can be regulated by a pushbutton (either pronounced pushing button) or simply by a button. Buttons are traditionally made from plastic or metal, a stiff material. [1] Usually the surface is smooth or modeled such that it is easy to click, drag, and fit the human finger or palm. However, certain unbiased buttons (due to their physical character) need a spring to return to their unpushed state. The terms used to "lift" a button include tapping, depression, clogging, kicking and hitting.



Fig: 4.13: Buttons on a handheld calculator.

In calculator, push-button and kitchen equipment, as well as numerous other computer and mechanical instruments, both home and industrial, the "push-button" has been used.

The push buttons can be linked to each other in industrial and commercial applications with a mechanical connection to unlock the other button by pressing a button. A stop button will "force" to unlock a start button. In basic manual operations, this approach is used where there are no electric circuits for control on the system or procedure. Red buttons also can be equipped with big heads (called mushroom heads) to enable service and computer stoppage. These buttons are referred to as emergency stop buttons, and the electrical code in many jurisdictions requires greater security. The big mushroom form is also available in operator keys, which have to wear gloves for their jobs and are unable to operate a standard flush-mounted pushbutton.



Fig: 4.14: Button shaped as an octagon.

A pilot light is usually introduced as an assist for operators and consumers in industrial or commercial applications to attract the user's attention and provide input while pressing the button. This light is usually inserted in the middle of the button and the lens replaces the hard center disk with a button. The light source energy is not specifically linked to the pushbutton contacts on the back but rather to the pushbutton motion. This will allow to start the process or system procedure by pressing a Start button which will allow a secondary touch designed for operation or process to close the pilot light and indicate the action of pushing the button to start the resulting process or activity.

In order to prevent an operator from misplacing the incorrect button, pushbuttons are also color coded to match their functions. Common color is red to interrupt or process the machine and green to start or process the machine.

Popular media commonly refers to a button (usually fictitious) that might be pushed by a military or government official to unleash nuclear missiles.

Scram and scramble switches:

Akin to fire alarm switches, a number of large red buttons are known as "scram switches," when deployed with appropriate visual and auditory alerts, for example, flash lights and sirens (from the slang term *scram*, "get out of here"). These buttons are generally related to vast functions outside the usual fire warning, for example automatic shutdown, full power cutting, halon removal, etc.

The scramble switch activates an alert to prompt emerging staff to take action in these disasters. A variation is the scramble switch. An aerial siren in an air base starts an operation that alerts and "scrambles" the fighter pilots to protect the basis of their aircraft.

4.9.6.UBIDOTS EXPLORER:

Introduction:

Welcome to the hardware documentation for the Ubidots REST API. You'll learn how to transmit and receive data from your hardware devices using the HTTP, MQTT, and TCP/UDP networking protocols that we provide.

The aim of this segment is to explain what happens behind the scenes when interacting with Ubidots so that you can reproduce it in your firmware. As a result, we stop including examples that include libraries.

How Ubidots Works?

A data-point or "dot" is generated every time a system changes a sensor value in a vector. Ubidots stores dots from your computers within variables and assigns timestamps to them:

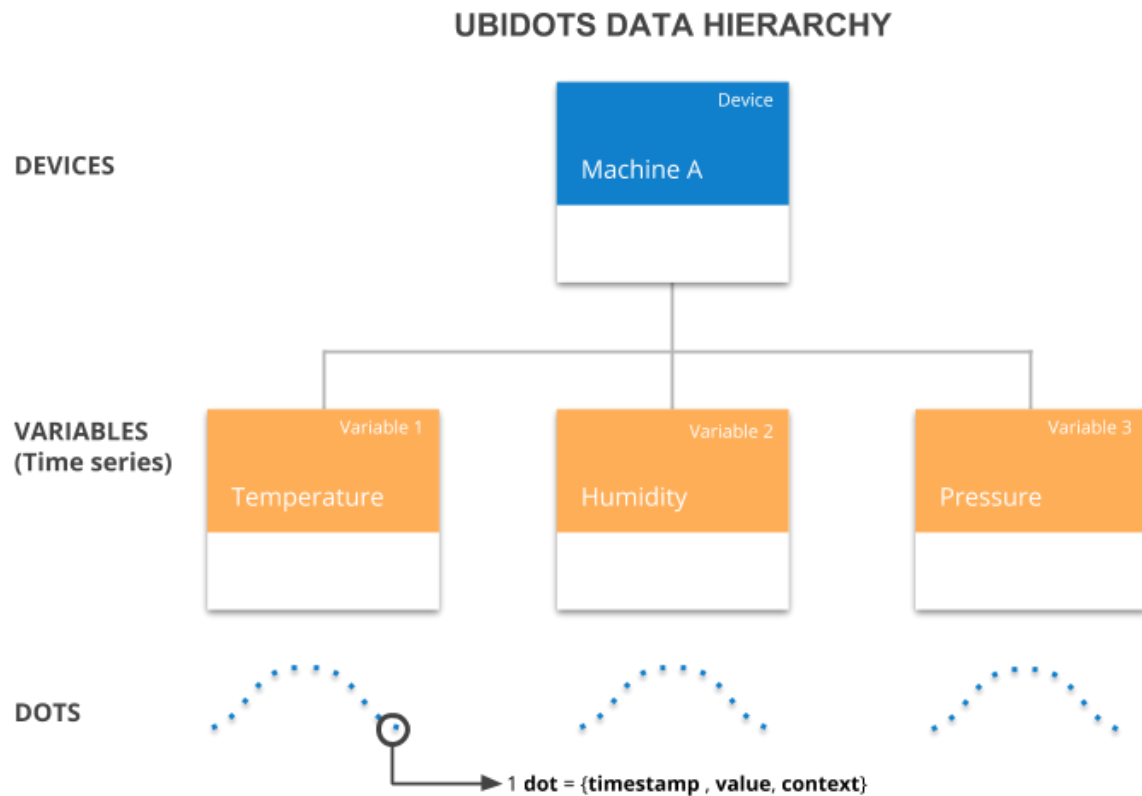


Fig:4.15:UbiDots

Each dot contains these items:

Table: 4.2: Items In UbiDots

Item	Description	Mandatory
Value	A numerical value. Ubidots accepts up to 16 floating-point length numbers.	YES
Timestamp	Unix Epoch time, in milliseconds. If not specified, then our servers will assign one upon reception.	NO
Context	An arbitrary collection of key-value pairs. Mostly used to store the latitude and longitude coordinates of GPS devices.	NO

A numerical value. Ubidots accepts up to 16 floating-point length numbers.

```
{"value" : 34.87654974}
```

Timestamps:

A timestamp is a way to measure time as a running number of seconds, as best explained here. The Unix Epoch, which began on January 1st, 1970 at UTC, is the starting point for this count. As a result, the unix time stamp is simply the difference in seconds between a given date and the Unix Epoch. Please bear in mind that you must set the timestamp in milliseconds when sending data to Ubidots, and that the timestamp will be in milliseconds when retrieving a dot's timestamp.

CONTEXT:

You can also store string or char data types within what we call context, which is not limited to numerical values. The background is a key-value property that can be used to store both numerical and string values. The below is an explanation of how the context might be used:

```
"context" : {"status" : "on", "weather" : "sunny"}
```

In the GPS/tracking program scenarios, a background is usually used to store your device's latitude and longitude co-ordinates. In every Ubidot map, the `lat` and `lng` keys are used from a dot to draw your unit coordinates, so that a single dot with coordinate values in the vector sense can be sent to draw a map rather than sending both latitude and longitude separately in two distinct variables. This is a standard background with the values of coordinates:

```
"context" : {"lat":-6.2, "lng":75.4, "weather" : "sunny"}
```

Please note that both string and numerical values can be mixed in context. Be sure that the coordinates are set in decimal degrees while the application is for geo-localization. We can explain a time series like this based on the above:
Ubidots

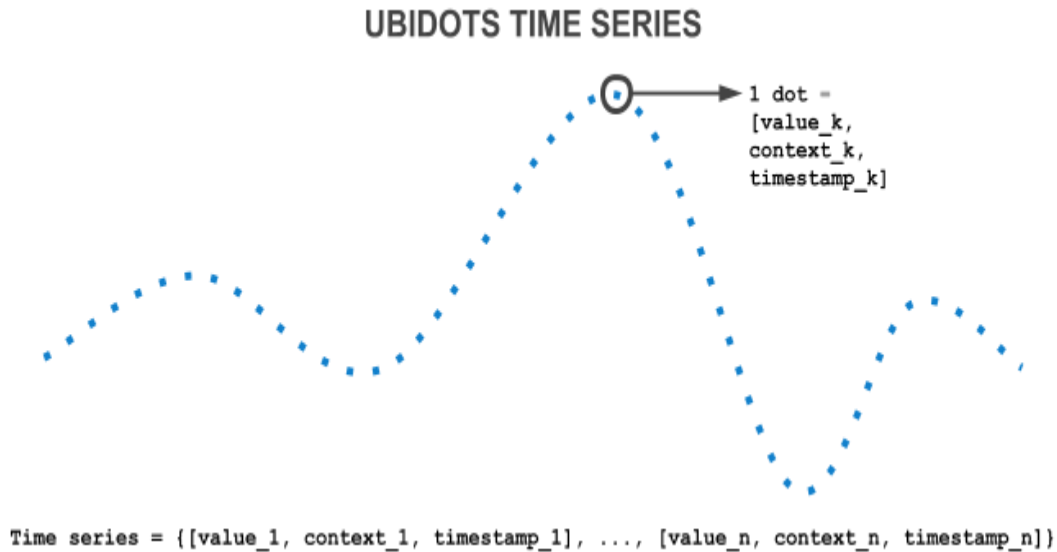


Fig: 4.16: UbiDots Time Series

Ubidots is a forum for the agnostic, but you don't really worry about which hardware you use until at least one of these protocols allows you to communicate with us:

HTTP

MQTT

TCP/UDP

HTTP:

HTTP is the dominant standard for Internet information sharing. It also supports data protection, often referred to as stable HTTP or HTTPs. You send and receive packages via HTTPs or HTTPs when you use a web browser (MS Edge, Firefox, Google Chrome, etc). Become thus a common alternative for data sharing within IoT, it was not shocking that HTTPs were created.

You can search a rESTful application interface or a REST API to perform HTTP communication with all the end points necessary for communicating with a third party application (like Ubidots). You will find information about sending and collecting information from our servers in our REST API in this section.

Note: Our purpose in this area is to help you understand and replicate events in your own firmware behind Ubidots. Therefore, we can't use our custom libraries for all examples.

HTTP requests

The following methods are specified within the *HTTP* standard:

Table: 4.3: Http

HTTP Method	Description
GET	Used to retrieve information
POST	Used to create a new element
PATCH	Used to update existing elements

This ensures that any request you request is replied via the server. HTTP is a request / response protocol. A number (answer code) and a body form part of this response. If you want a "(e.g. "Get me the file 'websiteside.html') file, you can create a GET request, for instance. If the request is valid, a 200 response code with the requested file is usually returned by the server (body).

When a device sends a GET request to the Ubidot server, the server will return a response to the request's state (response code) and a body containing the context and timestamp (e.g. asking the last value of the variable).

Table: 4.4: UbiDots Website

Ubidots Account	Endpoint	Port
Educational	http://things.ubidots.com	80
Industrial	http://industrial.api.ubidots.com	80

Ubidots Account	Endpoint	Port
Educational	https://things.ubidots.com	443
Industrial	https://industrial.api.ubidots.com	443

Ubidots supports SSL v1.1, TLS v1.2 and v1.3. You can download our root certificates in different formats:

PEM file: A certificate chain with two root certificates from our certificate authorities (CAs).

DER file: Same as the PEM file, with an alternative encoding.

CRT file: Same as the PEM file, with a different extension. Often referred to as .crt, .cert or .cer.

NOTE: We recommend including all credentials in the automated routines of your system to prevent potential inconveniences. The second credential is currently valid, but the first is used until 2021.

Fixed Ips

Ubidots will also accept fixed IP addresses for data intake. However, we strongly advise our users to use the dns endpoints rather than fixed IP's to execute their firmware routines as the latter can alter.

Table: 4.5: HTTP Authentication

Ubidots Account	ipv4	ipv6	Port
Educational	50.23.124.68	2607:f0d0:2101:39::2	80/443
Industrial	169.55.61.243	2607:f0d0:3:b::2	80/443

Each application needs a token. A token is a single key that allows your computer to enter data into your Ubidots account. Tap on "API Credentials" below your profile tab for the fastest way to get yours:

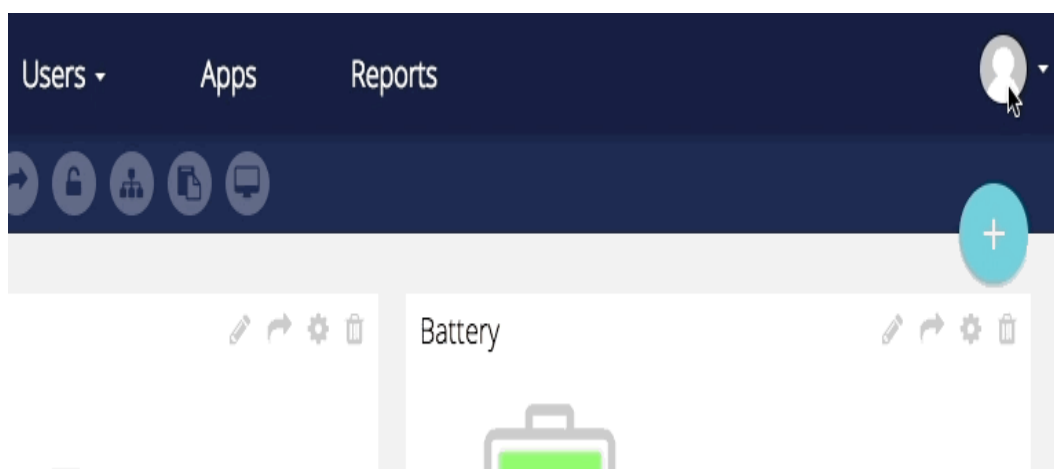


Fig: 4.17: Api

CHAPTER 5

RESULTS & DISCUSSION

In the present situation a blind person or an visually impaired person cannot walk on roads or streets without the help of others. So to provide the support to the blind person without the other people we have exclusively designed this blind stick. Here in this we have used ultrasonic sensors, node mcu, control button etc.

So here with the help of this stick we get location, panic alert message and voice.

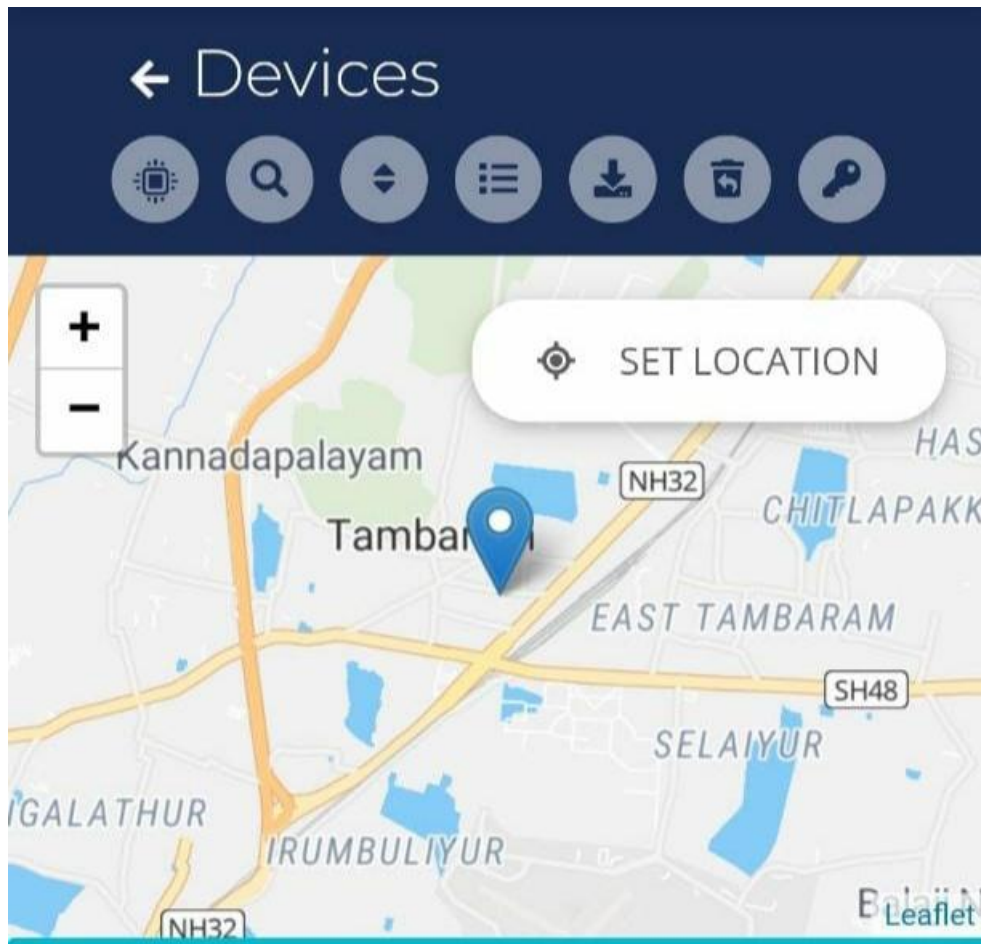


Fig: 5.1: Location Of Blind Person

In the above figure we can see that the location. Actually it is the location of a blind person. Whenever he presses the remote the guardian of blind person gets the location and panic alert messages.

BLIND STICK

FORWARD

<http://192.168.43.162/>

TEXT TO SPEECH

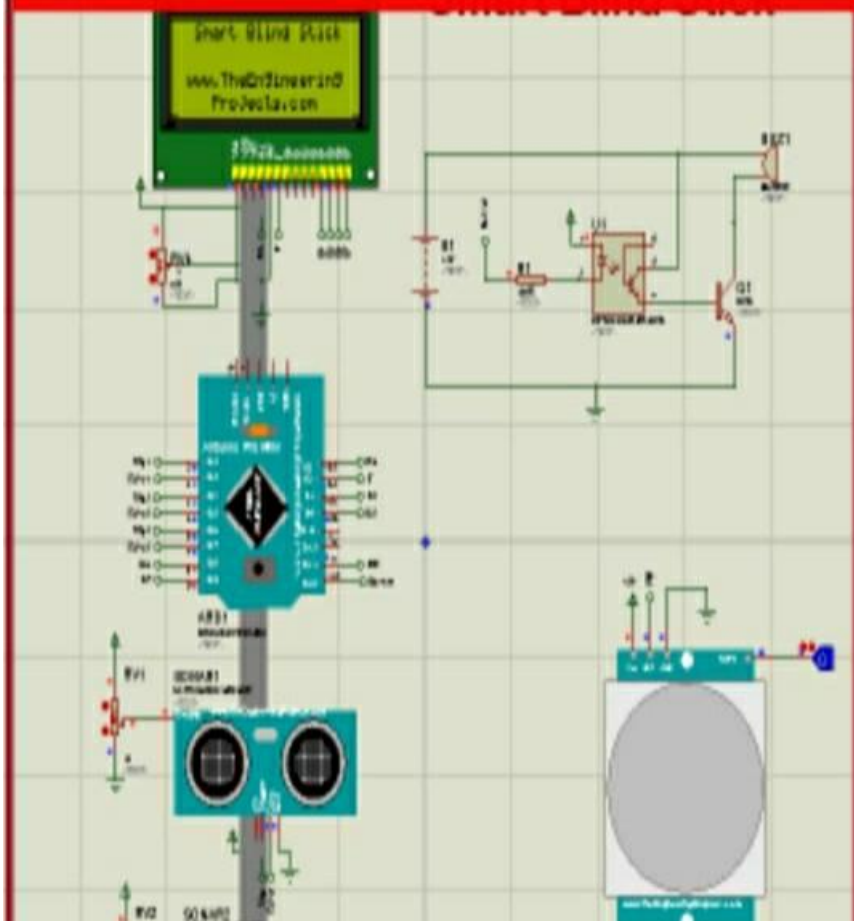


Fig: 5.2: Voice Message i.e., Forward Obstacle

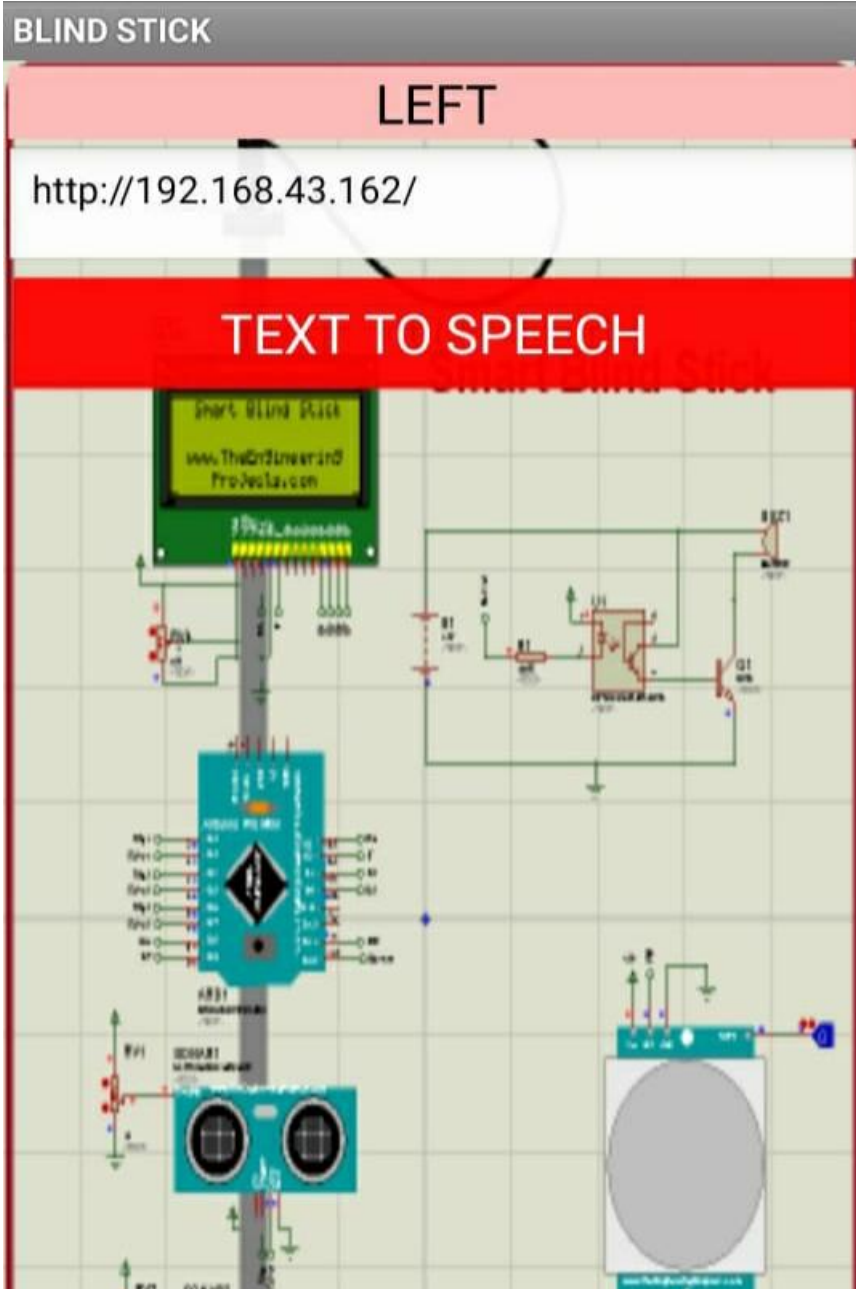


Fig: 5.3: Voice Message i.e., Left Obstacle

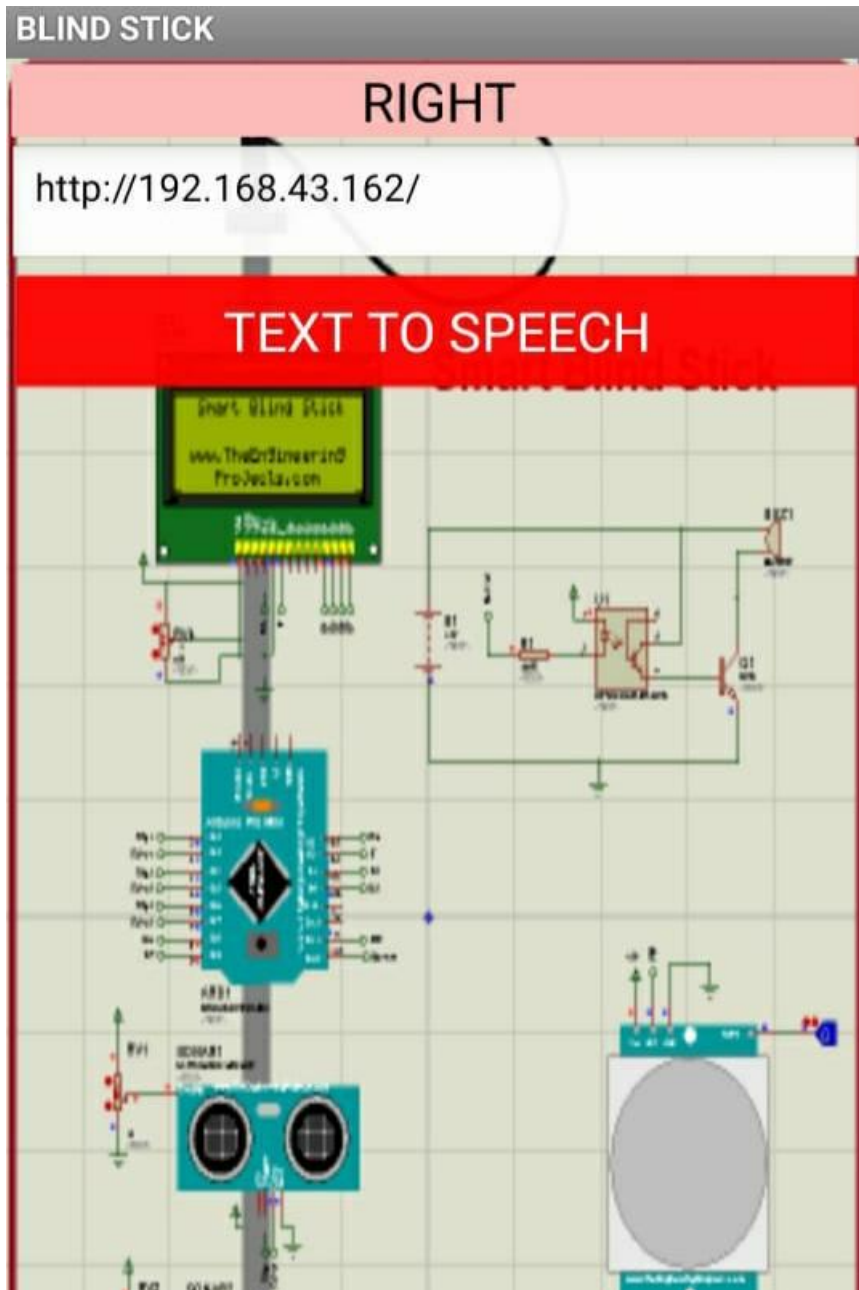


Fig: 5.4: Voice Message i.e., Right Obstacle

In the above three figures we can see that these are the messages of the obstacles. When the ultrasonic sensors in the stick detects whether there are any obstacles it says that they are right obstacle, left obstacle and forward obstacle etc.

button alert! Inbox



Notifications Ubidots 12:33 PM

Hey there, button was 0.0 at 2021-03-11
12:33:21 +0530.

3



Notifications Ubidots 7:25 PM

to me ▾



Hey there, button was 0.0 at 2021-03-11 19:25:18 +0530.

Fig: 5.5: Panic Alert Message

Here in the above figure we can see that there is a message .This message tells us that the person is in danger and needs immediate help.By pressing the button on the remote the message goes to the guardian of the blind person and says that he is in danger.

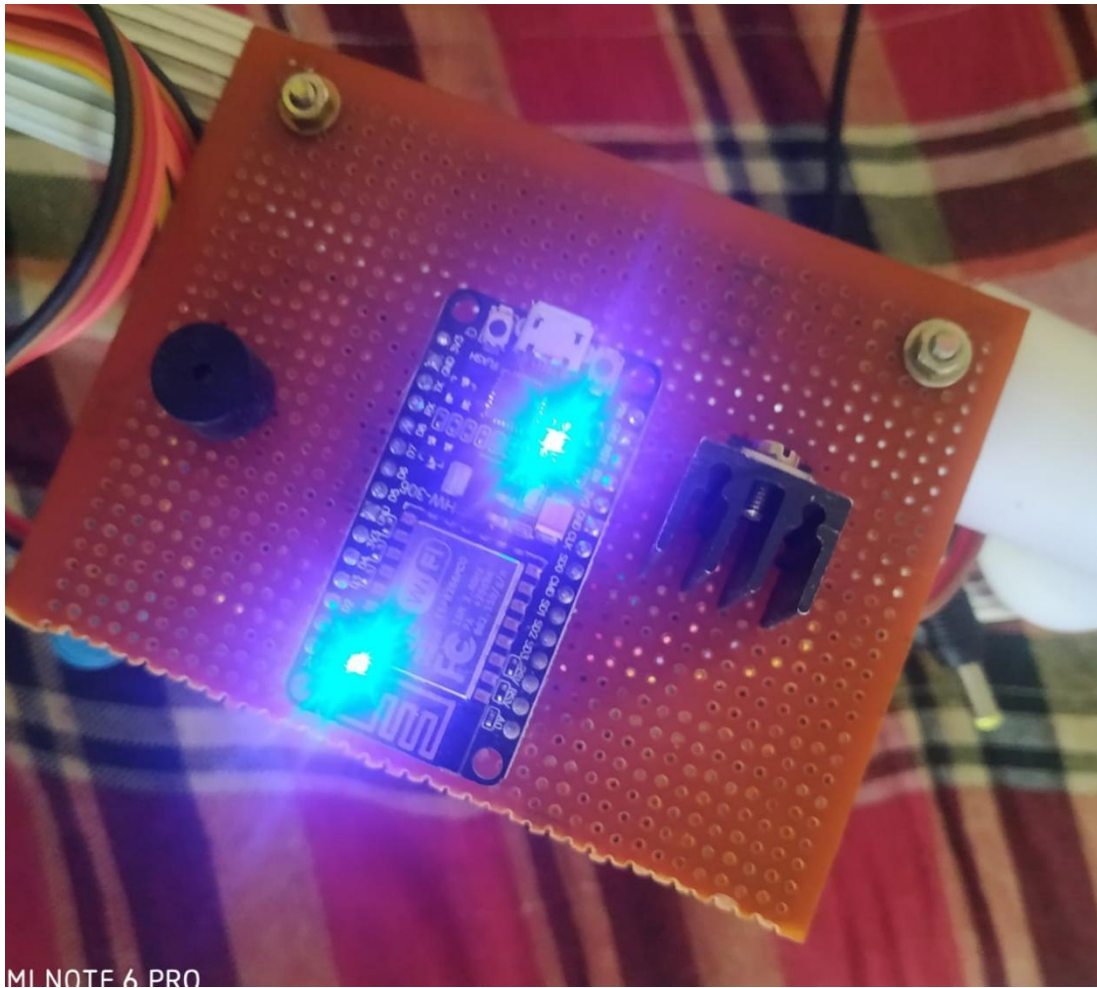


Fig: 5.6: Finding the blind stick

Here we are finding the blind stick i.e., if a blind person loses his stick or misses somewhere else, we can easily find the blind stick with the help of buzzer in the stick.

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

Finally, the blind walking stick was turned into a product that can be used to guide the blind. The goal is to solve the problems that blind people face in their everyday lives. The program is also taking the step to guarantee their safety. The study's main purpose is to develop a prototype in the forms of voice messages that can detect objects or obstacles in front of users and feeds alarm back. This program targets people with disabilities who are blind to encourage movement and improve health. The second goal is accomplished using ultrasonic sensor and voice module to complete the design to investigate the nature of the smart blind handle. This is an Automatic System project. Allow people with disabilities to move around freely. The initiative will work to help all of our country's blind people make it easier for them to travel wherever they wish. This project is being done to help the blind man travel very well in front. This is a low-cost, efficient, lightweight, low-power, and stable navigation solution with a noticeable fast response time. With sensors and other components, the device is not only durable but also lightweight. Wireless communications between device components can increase other elements of this unit, such as the the range of the ultrasonic sensor and incorporating technology to measure barrier speed. When such a revolutionary solution was developed, people who are visually impaired or blind were at the top of our priority list in all developed countries.

REFERENCES

- [1].Alshbatat,Abdel IlahNour."Automated Mobility and Orientation System for Blind or Partially." INTERNATIONAL JOURNAL ON SMART SENSING AND INTELLIGENT SYSTEMS, 568-582, 2013.
- [2].HarshadGirishLele,Viten Vilas Lonkar, VarunVasantMarathe, Mrunmayi Mohan Modak. "Electronic path guidance for visually impaired people." The International Journal Of Engineering And Science (IJES), 09-14, 2013.
- [3].Mahdi Safaa A., MuhsinAsaad H. and AlMosawi Ali I. "Using Ultrasonic Sensor for Blind and Deaf persons Combines Voice." International Science Congress Association, 50- 52, 2012.
- [4].LamyaElalamy,SaraLhaddad,SoukainaMaalal,YasmineTaybi,YassineSalihAlj. "Bus Identification System for Visually Impaired Person."International Conference on Next Generation Mobile Applications, Services and Technologies, pp.13-17, 2012.
- [5].A.R.Garcia,R.Fonseca.A.Duran."Electronic long cane for locomotion improving on visual impaired people."IEEE, pp.58-61, 2011.
- [6].World health organization,"visual ipairment and blindness",fact sheet n "282",oct 2014.
- [7].Manoj Badoni and Sunil Semwal, "Discrete Distance And Water Pit Indicator Using Avr Atmega8 In Electronic Travel Aid For Blind", *International Journal of Disaster Recovery and Business Continuity* Vol. 2, November, 2011.
- [8].Sung Jae Kang, Young Ho, Kim, In Hyuk Moon, "Development Of An Intelligent Guide-Stick For The Blind", *IEEE International Conference on Robotics & Automation* Seoul, Korea, May 21-26, 2001.
- [9].Alessio Carullo and Marco Parvis, "An Ultrasonic Sensor For Distance Measurement In Automotive Applications" , *IEEE Sensors Journal*, Vol.1, No.2, August 2001.
- [10].Zul Azizi Hailani, Sakinah Jamaludin, "An Electronically Guided Walking Stick For The Blind" University Tenaga Nasional, Malaysia.

- [11].Johann Borenstein and Iwan Ulrich, "The Guide Cane- A Computerized Travel Aid for The Active Guidance Of Blind Pedestrians", *IEEE International Conference on Robotics and Automation*, Albuquerque, NM, Apr. 21-27, 1997.
- [12].Mohd Helmy Wahab, Amirul A. Talib, Herdawatie A. Kadir, A.Noraziah, Roslina M. Sidek, "Smart Cane: Assistive Cane For Visually-Impaired People", *IJCSI International Journal of Computer Science Issues*, Vol. 8, Issue 4, No 2, July 2011.
- [13].National disability policy: a progress report – october 2014,national council on disability,oct 2014.
- [14].T.terlau and W.m.penrod,k'Sonar curriculam handbook",available from <http://www.aph.org/manuals/ksonar.pdf>,june 2018.
- [15].Zhao Y.,Zhou,Z. and Xu. M, "Design and development of electronic stick for blind with panic button alert", *Journal of Electrical and Computer Engineering*,Volume 2015, Article ID 706187, 7 pages, <https://doi.org/10.1155/2015/706187>