UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF SMART ASSIST DEVICE FOR VISUAL IMPAIRED PERSON

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor's Degree in Electronic Engineering Technology (Telecommunication) (Hons.)

by

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Electronic Engineering Technology (Telecommunication) with Honours . The member of the supervisory is as follow:

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ABSTRAK

Sekarang terdapat banyak produk elektronik di pasaran yang boleh digunakan oleh orang yang buta untuk membimbing mereka berjalan berseorangan. Sebagai contoh, tongkat orang buta . Walau bagaimanapun, tongkat orang buta ini tidak dapat mengesan halangan diperingkat kepala dan kebanyakan mereka tidak mempunyai peranti untuk mengetahui lokasi orang buta jika hilang. Projek ini direka untuk membantu orang-orang buta untuk mengesan halangan di sekeliling mereka di peringkat kepala. Ultrasonik sensor dan penggetar telah dipasang dengan cermin mata hitam. Sensor telah ditetapkan pada sebelah kiri, sebelah kanan dan hadapan cermin mata hitam. Ia akan memberi amaran kepada pengguna kerana kedudukan halangan sama ada di sebelah kiri, kanan atau di hadapan pengguna. Selain itu peranti ini juga dapat mengesan lokasi orang buta dengan menghantar SMS kepada GPS dan GSM akan memberi lokasi langitude dan longitude kepada penjaga .

ABSTRACT

Now here are a lot of electronic products on the market that can be used by blind people to guide their walking alone. For example, the stick of the blind. However, these products can not detect obstacles ranked head and most of them do not have a device to determine the location of the blind if it gets lost. This project is designed to help the blind to detect obstacles around them in the head. An ultrasonic sensor and a vibrator mounted with sunglasses. The sensor is fixed on the left, right and front of the sunglasses. It will warn the user because of the position of obstacles either to the left, right or in front of the user. Besides, this device can also track the location of the blind man by sending SMS to the GPS and GSM will give langitude and longitude location to a caregiver.

DEDICATION

This report is dedicated to my beloved parents who always stay by my side and taught me that
to have the best knowledge is learned from my own experience life.

ACKNOWLEDGEMENT

In the name of Allah, I am very grateful to be given this opportunity to express my appreciation goes to my family who have always supported me spiritually during my studies at the university. Secondly, I would like to thank my supervisor En Wan Norhisyam Bin Abd Rashid and assistant supervisor Pn. Raeihah Binti Md Zain for their cooperation, guidance and work hard to ensure the completion of this project. Besides, thanks to all my friends who have motivated me. Finally special thanks to University Technical Malaysia Melaka (UTeM) for their efforts to provide me with all the facilities and technical expertise to make this project a success.

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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

GSM	-	Global System for Mobile Communications
GPS	-	Global Positioning System
USB	-	Universal Serial Port
PWM	-	Pulse Width Demodulation
SMS	-	Short Message Service
CM	-	Centimetre
M	-	Meter

CHAPTER 1
INTRODUCTION

1.1 PROJECT BACKGROUND

There are lots of electronic products in the market that can be used by a blind person to guide them. Some of the examples are, miniguide (ultrasonic mobility aid), ultrasonic ranging system stick and mobility aid using artificial vision. However, the cost of these products are quite expensive for a person with vision impaired to purchase. Besides that, these products have limitation to detect obstacles at the head level. Thus, this project aims to design a mobility aid for the blind people to detect any obstacles around them specifically at the head level. An ultrasonic sensor and a vibrator are planned to be mounted at a sunglasses worn by the blinds. The sensor will be fixed at the center of the sunglasses is functions to alert the position of any obstacle whether it is on the left, right or in front of the user. Besides that, the vibrator will vibrate in different frequency depending on the location of the obstacle. By using the device, the blind people can move around safer. The ultrasonic ranging system is to be used because the cost is lower and can cover a wider range of length in detecting obstacle. A sunglass is a great alternative for the impaired person to use because it is easier to carry.

I.1.1 OBJECTIVE

The objectives of this project consist of three;

i. To design a device that can help the blind person to detect the obstacle at the head level.
ii. To design a device that is able to alert the user about the position of the obstacle either on the left, right or in front of them.
iii. To design device is able to alert the location of the blind people.

I.1.2 PROBLEM STATEMENT

Most of blind people use a stick to help them moving around from one place to another. However, this is not enough for them because any obstacle on the head level is hard to be detected using a stick. Due to this problem, additional tools with security measures need to be designed to help them improve their safety. By designing the project, this will help to alert the user to avoid the obstacles that it is located at the same level and in front of the user's head. This device is designed to be mounted on a sunglass used by the visually impaired person. It also is a very useful tool for the caregiver to locate the position of the blind by using the GSM and GPS devices. At the same time, if there are any difficulties faced by the blinds, they can ask for help by pushing an alert button that is also designed at the sunglass, to alert their caregiver.

I.1.3 SCOPE OF WORK

This project has both hardware and software parts. For the hardware, this device consists into two parts, the range finder system circuit and the sunglasses with sensors, vibrator, GSM and GPS. The range finder system is from 0 to 0.8 meter because normally the blind person moves slowly and they are able to avoid the obstacle which is near to them. The project focuses primarily on comfort and movement every day to the blind and also concerned about the limited terms of safety where using GSM as the interface circuit to provide instructions to contact someone. A control unit for controlling all the elements are using Ultrasonic and vibration device. In addition, the driving force of this project is Arduino. It will act as the master device which controls the entire system of the project. In order to achieve the objectives of this study, this project will include all the information on the specifications of the device such as the characteristics and applications of the ultrasonic,GSM,GPS, and Arduino. Finally, it is necessary to select and analyse the data for the optimal results.

1.1.4 HARDWARE

The hardware part is the most important part because this is where the output signals come from. It consists of the sunglass, GSM, GPS and circuit box. In this project, Ultrasonic Range Finder will be choosing to be used to detect the obstacle. Three ultrasonic sensors will be built at the left, right and front of the sunglasses. The three vibrators will be placed at the left, right and front of the sunglasses and a circuit box will be placed in the beg. Once an obstacle is detected by the ultrasonic sensor, the vibrator will vibrate to alert user. If the obstacle is to be detected at the left side, the vibrator will vibrate once at the left side. If the obstacle is to be detected at the right side, the vibrator will vibrate once at the right side. Lastly, if the obstacle is to be detected in front of user, the vibrator will vibrate once at the in front sunglasses. When all sensors detected an obstacle, the vibrator will keep on vibrating continuously and the buzzer was function. GSM is used to transmit the data to caregivers. GPS is used to tell the location of the blind man.

1.1.5 SOFTWARE

The software used in this project will be the Arduino software. It functions as the program editor to write a programming for ultrasonic sensors, GSM and GPS. Proteus software is going to be used to simulate LM7805 voltage regulator circuit, LCD , buzzer, pager motor (vibrator) circuit and Arduino circuit designed in this project to achieve the expected result.

CHAPTER 2
LITERATURE REVIEW

2.0 INTRODUCTION

For the successfulness of this project, some studies and research of information have been done. The information is from research from many sources such as books, articles, journals, and the internet. All of this information is a guideline in conducting the project. The studies of information are based on some major component and topic that is related to the project hardware and software.

2.1 BACKGROUND OF VISUALLY IMPAIRED PERSON TRACKER

Now the technology development system detects obstacles and track the location of a person is growing very fast every year. The development of this technology not only be felt by normal people but also no exception to the disadvantaged (OKU). Control system design of this project showed a significant effect in terms of cost of production and maintenance costs. Based on this, the development of this project should take into account to meet user needs and affordable. At present, most systems detect obstacles problem solving used by a blind person through the use of technology has made people blind stick. Unfortunately, it is less secure because its use is only used to detect obstacles in the bottom of the foot. At the same time also stick blind people can not detect obstacles that are in your head. In this project, the mobile phone is used to track the location of the visually impaired with a better way to implement the GSM technology. Hardware circuit is an important part where all the corresponding components need to be considered before it can be gathered. In this project, Arduino Mega 2560 has been used as the main controller circuit. The device designed in this project was a mobility aid for the blind people to detect the obstacle around them at the head level. An ultrasonic sensor and vibrator were mounted to the sunglasses. The sensors were fixed at the left and right side at the sunglasses it would alert the user due to the position of the obstacle whether on the left or right of the user. Besides that, the vibrator was vibrated in different frequency due to the location of the obstacle. By the guide of the device, blind individuals can move around more secure.

2.2 ULTRASONIC

Steve Johnson (2011) from Computational Systems, Inc have done an examination as for ultrasonic. He communicates that clatter is a vibration of particles through a medium, like air, oil, or metal, which moves entirely outward from its source. Vibrations can be separated to vitality levels at discrete frequencies and when the human ear distinguishes these levels and frequencies, it makes an interpretation of them into intensities and tones which are then transmitted to the cerebrum. The human ear can perceive frequencies between 20 Hz (Hertz) and 20 kHz. This degree is proposed as the organized being tuned in, or sonic, range. Frequencies over this reach are alluded to as ultrasonic. Ultrasonic instruments measure the ultrasonic frequencies and, through a technique called heterodyning, make an elucidation of the frequencies down into the discernable range. Moreover, the instruments will normally give a sort of visual sign (an advanced presentation or a simple meter) of the clamor force either as some rate of the instrument's yield or a real adjusted sound estimation in dB (decibel).

According to Michal Kelemen, Ivan Virgala, Tatiana Kelemenová, Ľubica Miková, Peter Frankovský, Tomáš Lipták, Milan Lörinc, Distance Measurement by means of Using Ultrasonic Sensor (2015). Ultrasonic partition sensors are proposed for non-contact division estimation and these sorts contain transmitter and gatherer or handset which can transmit and to get ultrasonic sound (Figure 2.1). Rule accepted is to assess time to fly of ultrasonic sound wave from sensor to saw article. An ultrasonic transmitter sends a sound rehash of above 18 kHz detectable all around at the rate of 344 meter for consistently (at 20°C) and the beneficiary gets the reflected sound from the article. Division between the transmitter and the thing can be figured by essential estimation by considering the time taken by the ultrasonic wave to go from transmitter and got back (reflected) by the beneficiary. Estimation reach is up to a few meters.

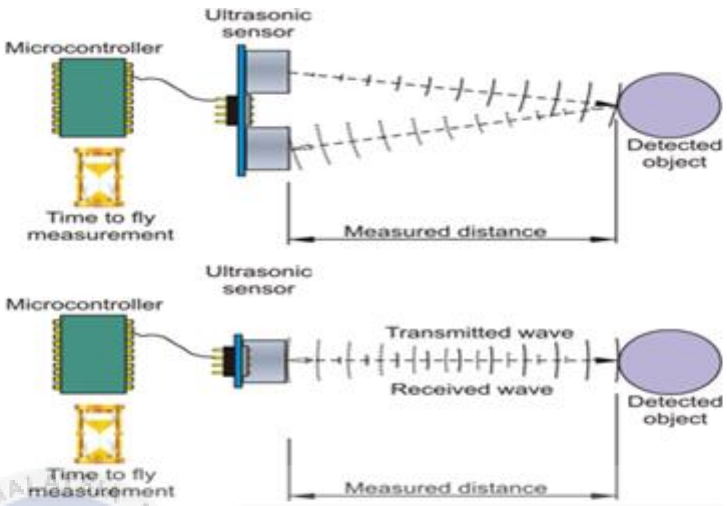


Figure 2.1:Ultrasonic sensor working principle

All materials reflect sound waves, so ultrasonic sensors are a fine decision for some errands. Incredibleness in the identification and estimation of movies, straightforward items, and fluids isolate these sensors from their photoelectric partners. Target shading or continuous shading changes likewise have no impact on ultrasonic sensors. Because of their utilization of sound waves, ultrasonic sensors likewise perform well in dusty, messy situations. Be that as it may, they don't work well with little focuses against vast foundations or targets, for example, froth batting that are phenomenal for retaining sound waves.

On the other hand, by referring to C. V. Subramanian, sound wave with frequencies more than 20 kHz are known as ultrasonic waves. The general frequencies range utilized are 0.5 MHz (Megahertz) to 20 MHz. The principle parameters about the ultrasonic are acoustic impedance, weight and power. Ultrasonic waves are grouped to four sorts admiration to the course of spread. These four types are longitudinal, transverse, surface and Lamb waves.

2.2.1 PROPAGATION OF ULTRASONIC WAVE

The movement of the ultrasonic wave can be comprehended through the vibration of a weight joined to a spring as in Figure 2.2. The augmenting and shortening movement happened for the spring is the way that the ultrasonic wave spreads. The groupings of relocations of mass for l (length) is termed a cycle. The quantity of cycle is known as the time of the vibration. The greatest removal for the mass is the plentifulness of vibration or wave. At the point when the wave is episode typical to an interface between two media, it is mostly reflected and incompletely transmitted.

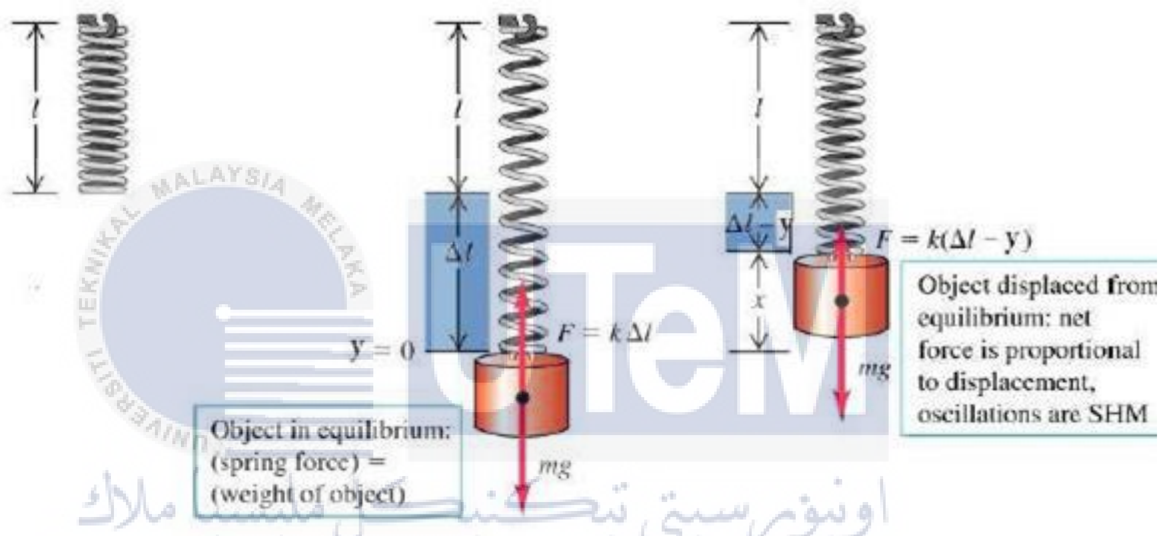


Figure 2.2: Spring in a relaxed position, Spring extend when load is added, Spring curtail when the potential energy of spring pulls back the load

As in Figure 2.3, the ultrasonic sensor determines the distance to a reflective surface by emitting high-frequency sound waves and measuring the time it takes for the echo to be picked up by the detector. The ultrasonic sensor can determine the distance to an object between 3 cm (centimetre) and 3 m away. If closer than 3 cm, the results are the sound waves echoing back to the sensor before the detector is ready to receive.

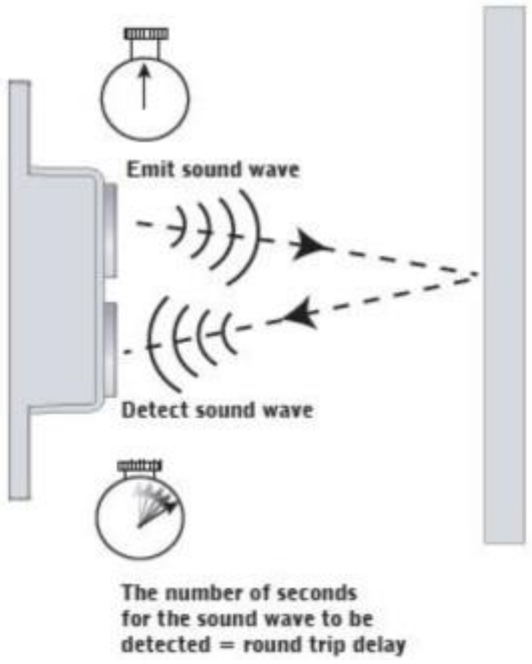


Figure 2.3: An ultrasonic sensor determines the distances

2.2.2 ULTRASONIC RANGING SYSTEM

According to Sanda-Ioana Morar, Amar Aggoun and Mircea-David Morar, the method mostly used in the ultrasonic measurement is the ultrasonic pulse echo method. Pulse-echo methods are generally based on the determination of the time of flight between a transmitted pulse and its echo. It is quite easy to measure the exact moment of pulse transmission. However, the moment of arrival is difficult to measure with high accuracy because of interference and noise. Sometime the ultrasonic ranging system may combine with optical scanning system. Compare within infrared and ultrasonic, infrared is more expensive and inaccessible as an ultrasonic system. The infrared running is impact by the shade of the deliberate item. Figure 2.4 shows the block diagram.

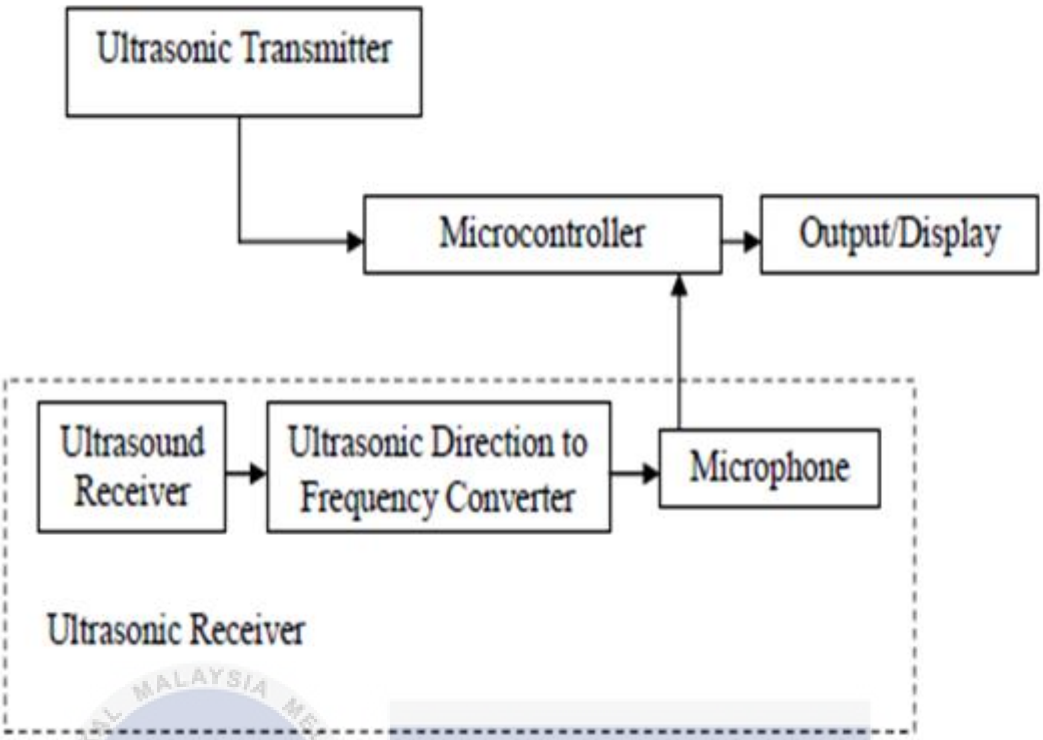


Figure 2.4: Block diagram of Ultrasonic Ranging System

2.3 GLOBAL SYSTEM FOR MOBILE COMMUNICATION (GSM)

Oke A. O., Emuoyibofarhe J. O., Adetunji A. B displays the advancement and usage of a Global System for Mobile Communication (GSM)(2013). Based control framework for electrical apparatuses that empowers the complete control of the interface on which it is based. GSM module was utilized for getting short message administration (SMS) from client's cellular telephone that consequently empower the controller to take further activity like exchanging ON and OFF electrical apparatuses. The framework was coordinated with microcontroller and GSM system interface utilizing C dialect. The framework is actuated when client sends the SMS to the controller at home. Upon getting the SMS charge, the microcontroller unit then consequently controls the electrical apparatuses by exchanging ON then again OFF the gadget as indicated by the client's request. In other word, it peruses message from the cell telephone and react to control the gadgets as indicated by the got message.

2.3.1 SYSTEM DESIGN

The System was outlined with Figure 2.5 as the square chart, the main Mobile station is utilized as a transmitting segment from which the endorser sends instant messages that contain summons and directions to the second portable station which depends on a particular range where our control framework is found. It can pick signal in the most exceedingly awful places and the battery is solid. The got SMS message is put away in the SIM memory of the telephone and after that separated by the microcontroller and handled in like manner to complete particular operations. The transfer driver is utilized to drive the hand-off circuits which switches the distinctive machines associated with the interface. Figure 2.6 demonstrates the framework stream outline for this work. The SMS from the client mobile phone was transmitted through the GSM chip to the microcontroller and the microcontroller at long last performed the required directions as expressed by the client. Expecting that the control unit is fuelled and working appropriately, the procedure of controlling a gadget associated with the interface will continue through the accompanying strides:

- The remote client sends instant messages including summons to the collector.
- GSM collector gets messages sent from the client phone.
- GSM collector disentangles the sent message and sends the summons to the microcontroller.
- Microcontroller issues summons to the apparatuses and the gadgets associated will switch ON/OFF.

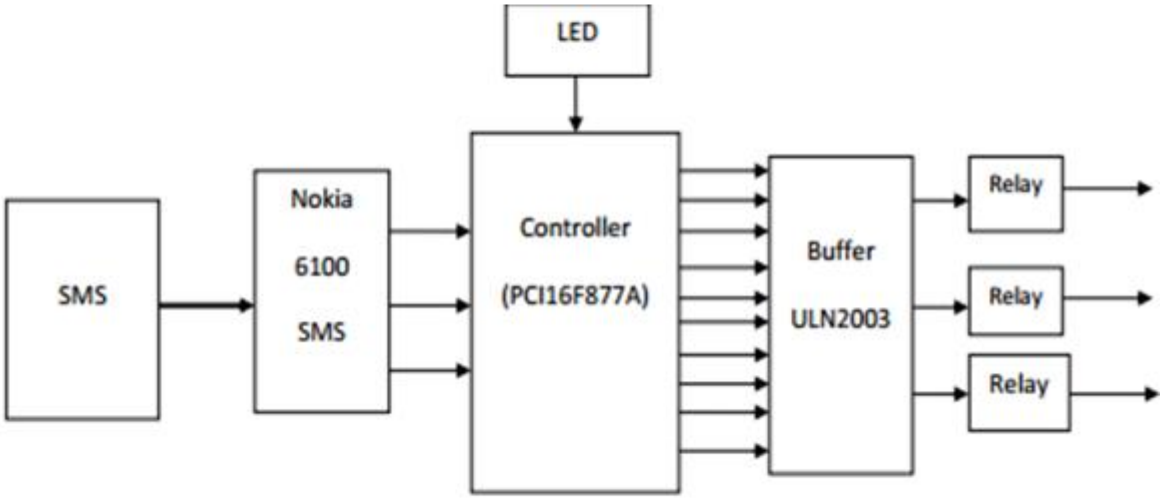


Figure 2.5: System Block Diagram

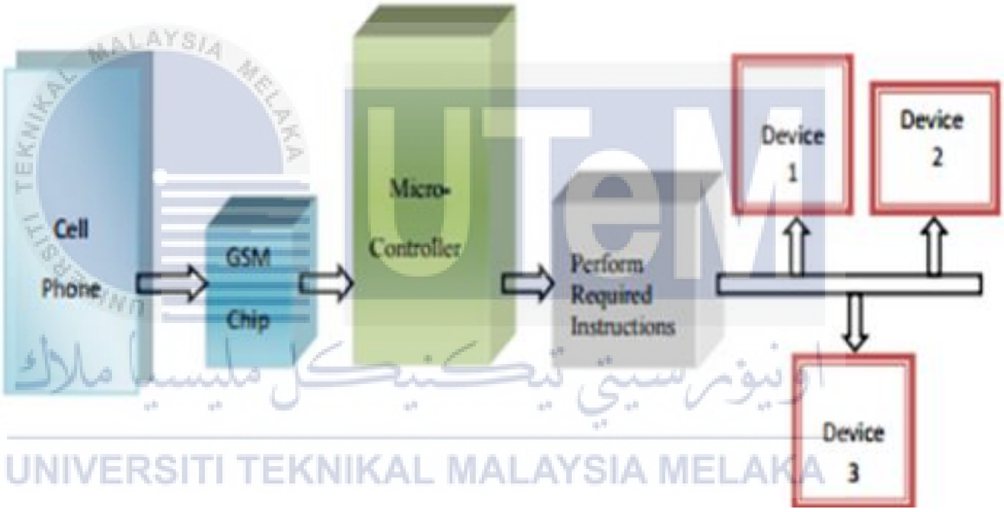


Figure 2.6: System Operation Flow Diagram

2.4 PAST RELATED PROJECT RESEARCH

2.4.1 SMART CANE: ASSISTIVE CANE FOR VISUALLY-IMPAIRED PEOPLE

This system has the hardware and software. Where the hardware using ultrasonic, vibration, and a microphone (a voice message). And while the software uses microntroller. This system was created to help detect obstacles in front of a blind person without using a white cane. This system can detect objects or obstacles in front of consumers and feedback warning, in the form of a voice message and vibration, to the user. Power supply meter readings can be installed to monitor the power status alarms. The system can also be put to use in a very crowded and replacing PVC with steel so it will be more durable and robust. In addition, a timer buzzer can be added so that the buzzer will start to operate in a specific period. This system has also been testing the voice alert. The voice data messages have been at the Table 2.1 show.

Table 2.1: Voice messages

No	Voce message	Distance
1	No object in 4 feet in front of you	Far
2	Objects are between 3 to 4 feet in front of you	Medium
3	An object is right in front of you	Close

At the same time the system investigates how the ultrasonic sensor works. The data presented in table 2.2. The table 2 shows analysis of the ultrasonic sensor analog voltage value between the value calculation and measurement value. *(Mohd Helmy Abd Wahab , Amirul A. Talib , Herdawatie A. Kadir , Ayob Johari , A.Noraziah, Roslina M. Sidek ,and Ariffin A. Mutalib ,2011).*

Table 2.2: Result Of Analyzing The Ultrasonic Sensor

No	*Range (Inches)*	*Calculation (mV)1 inch = 10 mV*	*Measured (mV)*	*Error % ((cal)- (mea))/ cal) * 100%*
1	0	0	0	0
2	5	50	42	16
3	10	100	94	6
4	15	150	142	5.3
5	20	200	193	3.5
6	25	250	245	2.0
7	30	300	269	1.3
8	35	330	346	1.1
9	40	400	396	1.0

2.4.2 VOICE NAVIGATION STICK FOR BLIND

The project is designed for the blind and visually impaired persons are at a disadvantage when they travel because they do not receive enough information about the location and orientation with respect to traffic and obstacles on the way and things that can be easily viewed by the efforts visual , in this project it using a navigation system that consists of three parts to help people to travel with higher levels of psychological comfort and independence People who are blind to get to his destination by voice. It can be said that he was starting and destination points. All details are displayed on the LCD. Keyboard is used to enter the position of the destination you want to go. Will track its location using GPS. The coordinates given by GPS is stored in EEPROM. And it is given to the micro-controller. If it corresponds to the coordinates and displayed on the LCD and the speaker will produce voice blind people will turn to any directions left, right, forward and back using stem. Ultrasonic sensor and IR sensor is used to detect obstacles. Obstacles such as vehicles, any person and other obstacles detected a giant warned by loudspeaker. It can avoid any mishap. Figure 2.7 show about proposed sytem of this project. *(Prof.Bhavna Ambudkar, Pankaj Patil, Kunal Bonage, Bhimsen Gire, Padmashree Dr.D.Y. Pimpi Savitribai Phule ,2015).*

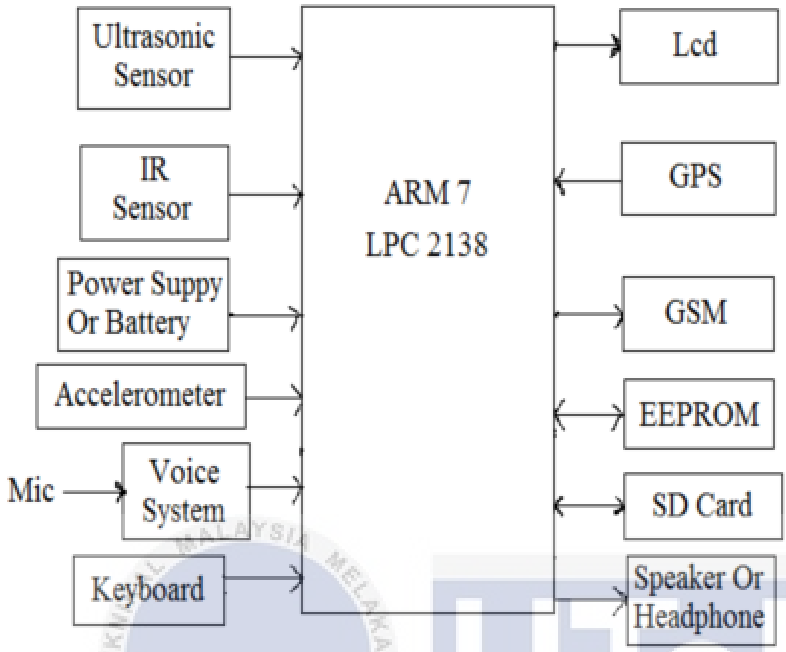


Figure 2.7: Proposed System

2.4.3 STUDY OF CONSTRUCTION A TECHNICAL DEVICE NAMED WALKING STICK FOR THE BLIND USING GPS

On this project it using stick, the blind will be confirmed, he had come to the place where he wants to go. It is very easy and comfortable to use. The power consumption of timber handled easily. In addition, it is fully automatic. Stick also allows the user to detect obstacles in the way of using IR sensor. Therefore it helps to blind people reach their destination safely. It consists of 5 components: Arduino, GPS module with GPS antenna, IR sensor, clock and battery. Longitude and latitude final destination programmed in Arduino was blind. Arduino is associated with regulated power supply. When walking blind with stick connected GPS module continuously shows current longitude and latitude. So, Arduino has a programmed value and the related GPS module shows the current location of the user. When these two values become equal to each other, buzzer continuously busy. It means, the blind has reached its destination. By listening to this kind of continuous sound of the buzzer, the blind will be confirmed that he had reached the place where he wants to go. At the end of the rod, there is an IR sensor. If what's up any obstacles in front of the user, a sensor detects and makes the buzzer sounds discontinuously. Thus, the blind can avoid any obstacles on the way. (*U. K. Alam, Md. Al-Amin, Fazle Rabby, Nahin Bahar Chowdhury4, M. T. Islam, 2014).*

2.4.4 (SHORT MESSAGING SERVICE) FOR APPLICATION SYSTEM PERSONAL TRACKING

Base on technology for the building on innovation advancement and utilization of following frameworks position (following), then individual following framework with information transmitting GPS (Global Positioning System) utilizing innovation SMS (Short Messaging Service) on the GSM (Global System for Mobile Communications) as the transmission medium. With the GPS framework will information got scope and longitude from a GPS beneficiary. The information will be sent by the microcontroller to spectators sent to the telephone by means of SMS correspondence. The outcomes demonstrate that individual GPS beacon effectively transmit information as IMEI, date satellite, satellite time, organizes longitude, scope facilitates, and the quantity of satellites caught by by device to user's phone cell. Coordinate information from the spectator can screen individual device position following is to help application namely supporting Google Maps. *(DECY NATALIANA,2013).*

2.4.5 GPS TALKING FOR BLIND PEOPLE

Device design to help blind people to navigate the environment without asking anyone. Devices based on gps (global positioning system) location data coordinate where people blind stand is detected by the gps receiver, the processing of this data by the pic microcontroller to coordinate the real in relation to the current position, and then translate it to a particular sound messages pre-sorted in voice recorder, a blind listen to voice messages through the headset. The design is to produce cheaper devices using fewer number of components and easy to use so that the blind to listen to the voice message. The navigation device is shown in figure 2.8 , which consists of a gps receiver, pic microcontroller, voice recorder, lcd, headsets and other additional components. Coordinates which became the calculations by the gps receiver to address the specific voice message previously stored in voice recorder chip associated with the current position. Microcontroller functions, is to receive gps fix data (gpgga) to the gps receiver, where the contents of the time, position and other relevant data set, for details see reference gpgga format, and of gpgga message, microcontroller extracting position latitude and longitudinal components. Then microcontroller send position information to both units, an lcd to display and voice recorder chip to handle and play voice messages related to the current position. *(Ameer H. Morad,2011).*

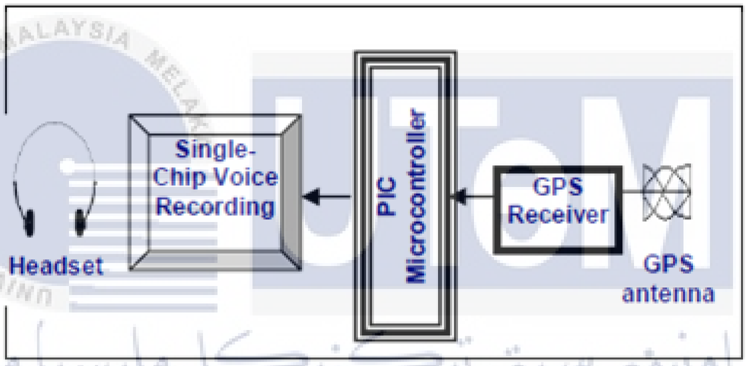


Figure 2.11: Block Diagram for Blind Device.

2.4.6 NAVIGATION SYSTEM FOR BLIND PEOPLE USING GPS & GSM TECHNIQUES

This system makes it easy for GPS and GSM technology which helps in navigating the victim of an unknown area to any place desired. The navigation will be monitored by the MEMS compass. Also enhanced by the system detects obstacles that prevent victims from colliding with any person or walls. This detection will imagine the carrier through vibrating motor attached to the system as input voice telling the distance from obstacles. All inputs will be provided through the Braille capacitive touch screen that also allows users to add notes. Required operating system for embedded open source Linux system. Developed a special program is used to receive information form other subsystems for embedded system configuration process consists of the 32-bit ARM Cortex-M3 (LPC1000), controls all operations in the device. The system has a power switch and reset switch for power management. When the system is ON it will begin to receive information from the GPS via a GPS receiver. Information received from the input used via the I / O port. Embedded system will collect data from their GIS database via an SD card. Information will be processed and the data output sound will be sent through the port I / O.

(K. Ramarethinam, Mrs K. Thenkumari, [Assist.Prof], P.Kalaiselvan ,2014).

CHAPTER 3
METHODOLOGY

3.0

This chapter will cover the details explanation of methodology that is being used to make this project complete and working well. In order to achieve the objective of this project, there are lot thing needs to be considered and concentrated. Basically, the success of the project is based on the planning. If the planning is planned efficiently, the progress of the project automatically becomes smooth. To ensure the projects planning is efficiently planes. This project used three major steps to implement project starting from planning, implementing and testing. The method is use to achieve the objective of the project that will accomplish a perfect result.

3.1 SYSTEM ARCHITECTURE

As appeared in Figure. 3.1, block diagram design comprises of five segments: Arduino, GPS module with GPS receiving wire, ultrasonic, vibration and GSM. Arduino is connected with controlled force supply. At the point when a visually impaired individual with an associated GPS module constantly it demonstrates the longitude and scope where the visually impaired man. In this way, Arduino is modified to demonstrate the position of the visually impaired man, in the same time Arduino additionally be customized with the goal that it can tell about the impediments that are around the leader of the visually impaired man. at the point when there is an obstruction inside 0.8 meters there will be vibration will happen at the right glasses the visually impaired. By listening to this sort of steady vibration of the visually impaired will see that there are obstructions that are around the head.

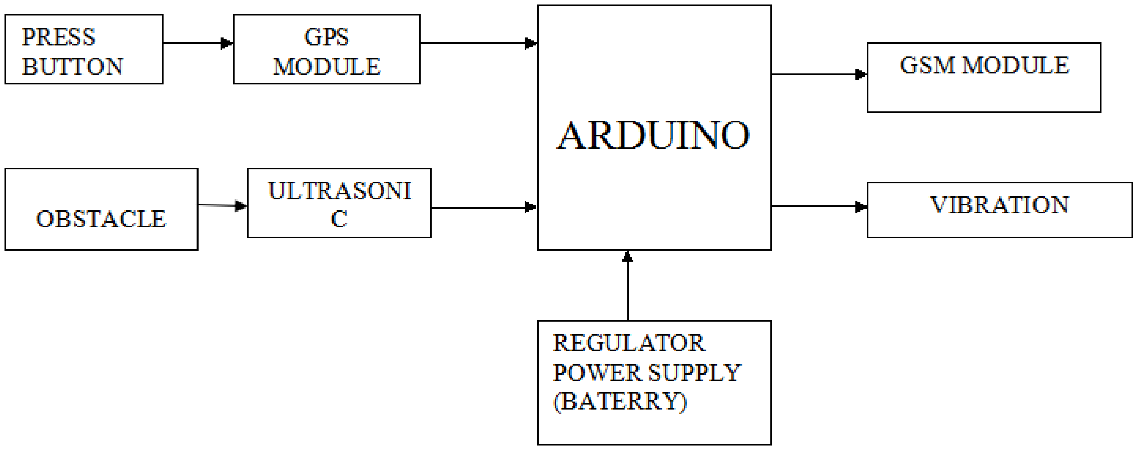


Figure 3.1: Block Diagram of The System

3.2 HARDWARE DEVELOPMENT (CIRCUIT BUILDING)

Hardware parts are the physical view of the design and the circuit for the device. The design of the physical view has four parts; sunglasses, vibration,GSM,GPS and a box. The sunglasses consisted of the ultrasonic sensors and the vibrator. Whereby, the box is used to place the device's circuit. The main characteristic of the sunglasses must be light. This is because the sunglasses are going to be placed on the component. The sensors and the pager motor (vibrator) were put in the casing of the sunglasses for the user responded once the obstacle has been detected. The circuit utilized an Arduino to control the info and the yield of the circuit. Then again, once the obstacles have been detected, the pager motor responded due to the signal produced. The Arduino performed the calculation the calculation of the distance of the object and sent a signal to the pager motor. The pager motor was activated and vibrated to inform the user the location of the obstacle.

Arduino is a microcontroller board based on the mega 2560 (strands). It has 54digital pin input / output (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, ICSP header, and a reset button. GPS module, GSM module and all connected with vibration. Vibration is used to create three types of pulses. When electric current is applied, it generates pulses. To detect obstacles, ultrasonic use. send ultrasonic signals and signal the presence of any object that is reflected back from the object's surface. The signals received by the ultrasonic. Three ultrasonic take a 3.5 volt power.

GPS module that figures the customer's position by totally timing the signs sent by the GPS satellites high over the Earth. Each satellite reliably transmits messages including; and time the message was sent, and the position of the satellites in the midst of the transmission of messages. This module uses the messages it gets the opportunity to choose the travel time of each message and registers the partition to each satellite with the rate of light. Each partition and satellite zone 'portrays a circle. This module is in every roundabout surface when the partition and territory of the satellite is correct. This area is then shown with longitude and scope. The GPS receiving wire to enhance signal gathering GPS module. GPS signals starting from the satellite are extraordinarily weak.

3.2.1 HARDWARE BLOCK DIAGRAM

In Figure 3.2 shows the block diagram of the circuit design. The path of the processes were shown through the block diagram. A 12 V battery supplied for the DC (Direct Current) motor and the Arduino microcontroller. Once the obstacle has been detected by the ultrasonic sensor, the vibrator vibrated to alert user. An Arduino received a signal from sensor and sent to pager motor to respond. If the obstacle was detected at the left side, the vibrator vibrated once at left side . If the obstacle was detected at the right side, the vibrator vibrated once at right side Lastly, if the obstacle was detected in front of user, the vibrator vibrated in once at the in front . When all sensors detected an obstacle, the vibrator kept vibrating continuously and the buzzer will function .

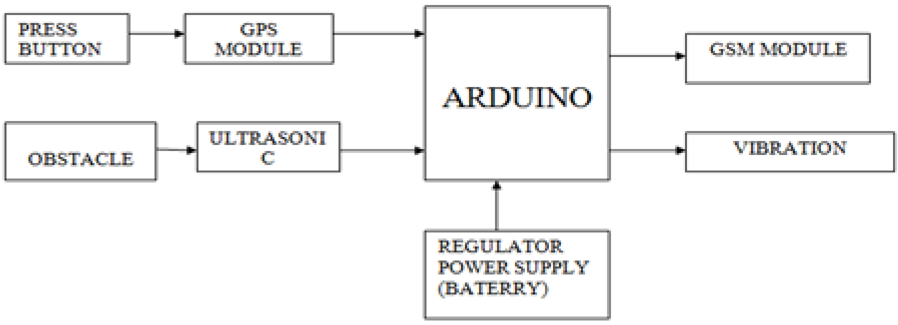


Figure 3.2 : Shows The Block Diagram df the Circuit Design

3.3 COMPONENT DESCRIPTION

3.3.1 POWER SUPPLY

Control supply circuit is worked to supply +12 V to the circuit and +5 V to drive the Arduino microcontroller. Substituting Current (AC) to Direct Current (DC) connector will be stopped by a connector. The voltage controller is delivering 5 volts yield. Since the principle control source is 9 V battery, so with a specific end goal to obtain a 5 V supply, the controller was utilized. The capacitor in the circuit was utilized to balance out the information and the yield of the controller. This circuit could supply a steady 5 V DC voltage to the ultrasonic shades framework.

3.3.2 ULTRASONIC SENSOR

In this project ultrasonic finder sensor, high performance sonar range finder as in Figure 3.3, has been chosen to be used as the sensor. This type of sensor offers very short to long-range detection and ranging with it small package as well as low power consumption. . Lastly, the interface output formats included are pulse width output, analogue voltage output, and serial digital output. The advantage of using this sensors are :

- Low cost
- The size is little contrast with other sensor
- No focal blind side
- Most minimal power officer, incredible for numerous sensor or battery based
- Sensor reports the range perusing straightforwardly, arranges for client processor

Ultrasonic Sensor is the arrangement that is minimal effort and well known for non-contact remove estimation work. It can quantify the separation of 2cm to 400cm with an exactness of around 5mm. This module incorporates a ultrasonic transmitter, a ultrasonic recipient and control circuit. it can be utilized with all the small scale controller. HC-SR04/5 has a 4-stick module:

- VCC – 5V of the power supply
- TRIG – Trigger Pin
- ECHO – Echo Pin
- GND – to ground
- TRIG and ECHO pins can be used to interface this module with a microcontroller unit

Figure 3.3: Ultrasonic HC-SR04

3.3.2.1 AIR ULTRASONIC CERAMICS TRANSDUCER

This type of sensor has one Transmitter (TX) and one Receiver (RX) in its specifications. The centre frequency is 40 kHz, with bandwidth in between 2.0 kHz and 2.5 kHz or - 6 dB. Ultrasonic transducers are built around piezoelectric ceramics that vibrate at ultrasonic frequencies when a voltage is applied and generate voltages when vibrated. Ultrasonic transducers perform according to two main parameters which are resolution and sensitivity. The resolution of a particular transducer is denoted by its ability to discern between two discontinuities that are on top of one another. A transducer with sufficient resolution will stop ringing, or vibrate, from the first discontinuity before receiving the echo from the second discontinuity. The sensitivity of an ultrasonic transducer refers to the ability to detect small discontinuities. The frequency of the transducer is chosen based on the required sensitivity and depth of penetration. Figure 3.4 shows an air ultrasonic ceramics transducer.

Figure 3.4: Air Ultrasonic Ceramics Transducer

3.3.2.2 SMALL INDUSTRIAL ULTRASONIC SENSOR

This type of sensor provides a very short to long-range detection and ranging, in a compact, robust PVC housing and matches standard electrical ¾” PVC (Polyvinyl chloride) pipe fittings. This sensor has a new high power output along with real-time auto calibration for changing conditions (temperature, voltage or acoustic or electrical noise) that ensure it receives the most reliable ranking data every reading was taken. The low power 3.3 V (Volts) to 5.0 V operation detects objects from 0 cm to 765 cm (25.1 feet) and provides sonar range information from 25 cm out to 765 cm with 1 cm resolution. Objects from 0 cm to 25 cm range as 25 cm.

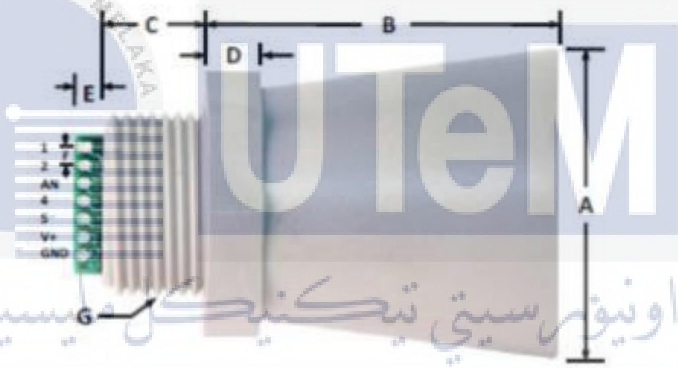


Figure 3.5: Small Industrial Ultrasonic Sensor

3.3.3 PAGER MOTOR (VIBRATOR)

In order to give an alert to user, a vibrator has been used as shown in Figure 3.6. One common vibrator used in the market is tiny pager motor. It is a small motor which is suitable to be applied in a project for example sensors. A vibration motor is a motor that vibrates when given enough power. It is the motor that really shocks. It is very good for vibrating objects. It can be used in several devices for a very practical purpose. To make vibrate vibration motor is very simple. to add the required voltage for 2 terminal. A vibration motor has a 2 terminal, usually the red wire and the blue wire. polarity is not important for the motor. For vibration motor, we will use motor vibration by Precision Microdrive. This motor has an operating voltage range of 2.5-3.8V power.

Figure 3.6: Pager Motor (Vibrator)

3.3.4 GSM (GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS)

In order to connect with the user, a GSM has been used as shown in Figure 3.7. GSM/GPRS Modem-RS232 is worked with Dual Band GSM/GPRS motor SIM900A, chips away at frequencies 900 - 1800 MHz. The Modem is going with RS232 interface, which licenses interface PC and Arduino with RS232 Chip(MAX232). The baud rate is configurable from 9600-115200 through AT request. The GSM/GPRS Modem is having inside TCP/IP stack to engage you to interface with web by method for GPRS. It is sensible for SMS, Voice and what's more DATA move application in M2M interface. The locally accessible Regulated Power supply grants to interface wide range unregulated compel supply. Using this modem, can make sound calls, SMS, Read SMS, go to the moving toward calls and web through fundamental AT summons.

Figure 3.7: GSM Module 900 a Modem

The features of the GSM module 900A are:

- Dual-Band GSM/GPRS 900/ 1800 MHz
- RS232 interface for direct communication with computer or MCU kit.
- Configurable baud rate.
- Power controlled using 29302WU IC.
- ESD Compliance.
- Enable with MIC and Speaker socket.
- With slid in SIM card tray.
- With Stub antenna and SMA connector.
- Input Voltage: 12V DC.

This is a minimal effort and basic Arduino GSM and GPRS module. We utilize the module Secom SIM900A . It's the less expensive module now available in the market. This post will permit to make Arduino controlled calls furthermore send instant messages. Figure 3.8 show about the structure diagram at module GSM900A.

3.3.5 GPS RECEIVER

GPS route tool is the right tool to get the number of topographic data from GPS satellites. At first it was used by the US military, but now most of the recipients are in autos and mobile phones.

GPS devices may have the ability to demonstrate:

- Roads or easy ways.
- Blockage of activities and course options.
- Streets or ways that can be taken to reach the destination.
- If some of the streets occupied (now or really) the best course to take.
- Area properties, banks, accommodation, fuel, terminal plane or a different premium.
- The shortest course between the two areas.
- Various alternative to driving on the highways or byways.

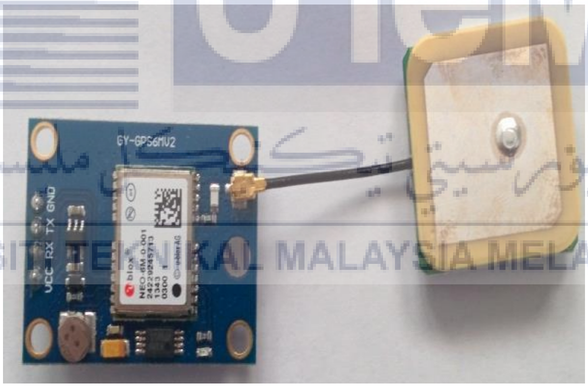


Figure 3.8: GPS gadget NEO 06

NEO-6M GPS module, 3V-5V is Universal Power Supply. It is Active antenna module with ceramic With data backup battery and LED signal indicators. The antenna size: 11 x 11mm. The Module size: 23 x 30mm. Mounting holes is 3 mm . It baud rate is 9600.In accordance with various flight controller module. The EEPROM stores configuration data when power-down parameters -

3.3.6 ARDUINO

Arduino is the 'brain' main and circuit diagram in Figure 3.9shows the input and output. Arduino microcontroller 328 is used to process the data and control input and output circuits. Arduino sensor and can serve different mechanisms implementing the principle of proximity to the object of control. Input signal coming from the hurdle that has been detected by the ultrasonic sensor. A Arduino will process the data provided by the sensor and convert to digital signals for motor control to respond.

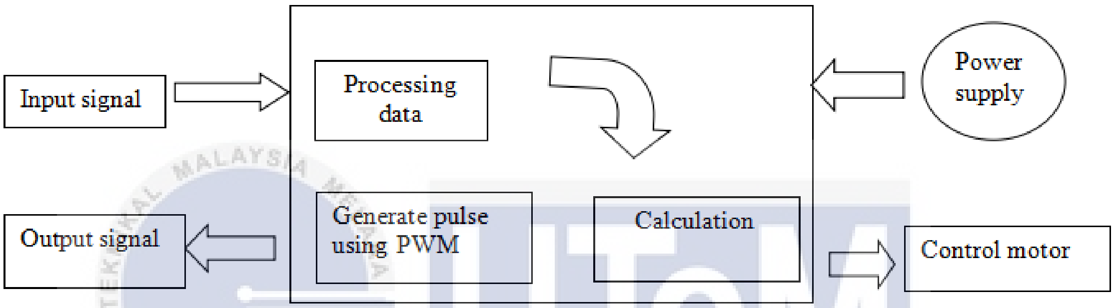


Figure 3.9: Block Diagram Of Microcontroller

The MEGA is a microcontroller board in view of the mega 2560. It has 54 computerized information/yield pins (of which 6 can be utilized as PWM yields), 6 simple inputs, a 16 MHz quartz gem, a USB association, a force jack, an ICSP header and a reset catch. It contains everything expected to bolster the microcontroller essentially interface it to a PC with a USB link or power it with an AC-to-DC connector or battery to begin. "Mega" implies one in Italian and was denoted the arrival of Arduino Software (IDE) 1.0. The Uno board and form 1.0 of Arduino Software (IDE) were the reference renditions of Arduino, now developed to more current discharges. The Uno board is the first in a progression of USB Arduino sheets, and the reference model for the Arduino stage for a boards of present, past or obsolete sheets see the Arduino record of sheets.

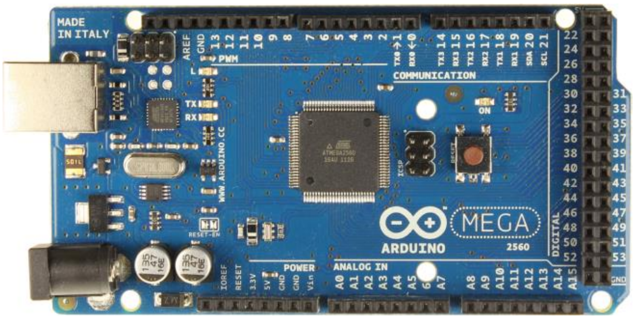


Figure 3.11: Arduino MEGA hardware

Table 3.1 : Summary Of Pin

Subject	Specification
Microcontroller	MEGA 2560
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	54
Analog Input Pins	6
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	256 KB (ATmega328) of which 8 KB used by bootloader
SRAM	8 KB
EEPROM	4 KB (ATmega328)
Clock Speed	16 MHz

3.4 SOFTWARE ARCHITECTURE

In this part, software designing process consists of a programming for Arduino to operate the whole sensors detection and stopping system. This programming are written using the assembly language technique.

The objective of this system is to detect the obstacle around user and alert the user by vibrating if obstacle is nearer to them. Once the obstacle is near to the user, if the obstacle is at the right side of the user, the vibrator vibrates one time, if the obstacle is at the left side of the user, the vibrator vibrates two times and if the obstacles is detected in front of the user, the vibrator vibrated three times as well as buzzer ringing to alert user. If the obstacles at both sides or any obstacle around them is nearer, the vibrator kept vibrated until user avoided it. The product for the framework has been created in the C dialect. Flowchart for showing current longitude and scope of any position on phone screen utilizing GPS module is appeared as a part of figure 3.10.

3.5 PROJECT FLOWCHART

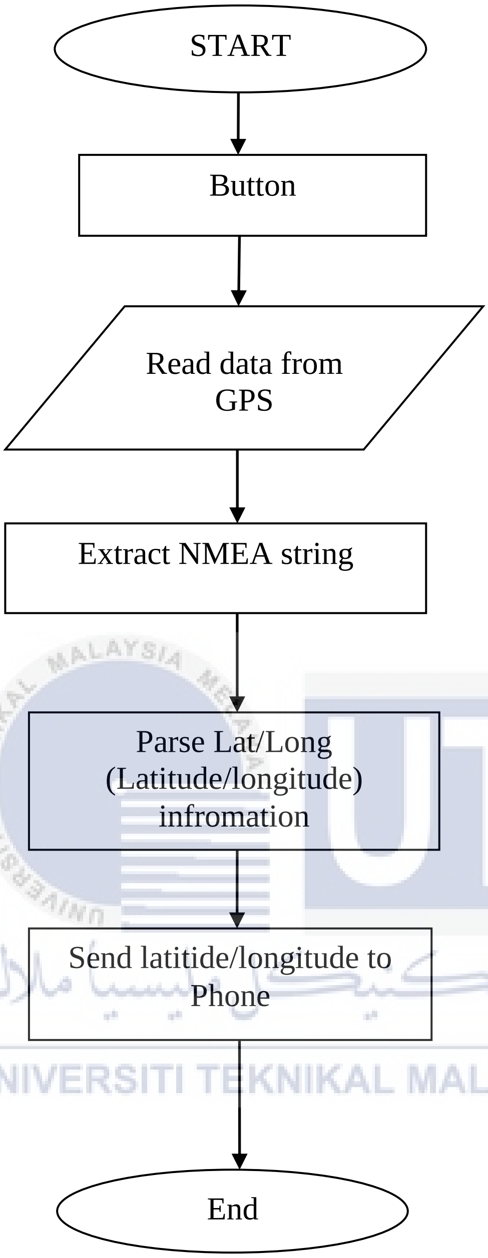


Figure 3.10: Flowchart for Displaying Current Longitude and Latitude Of Any Position

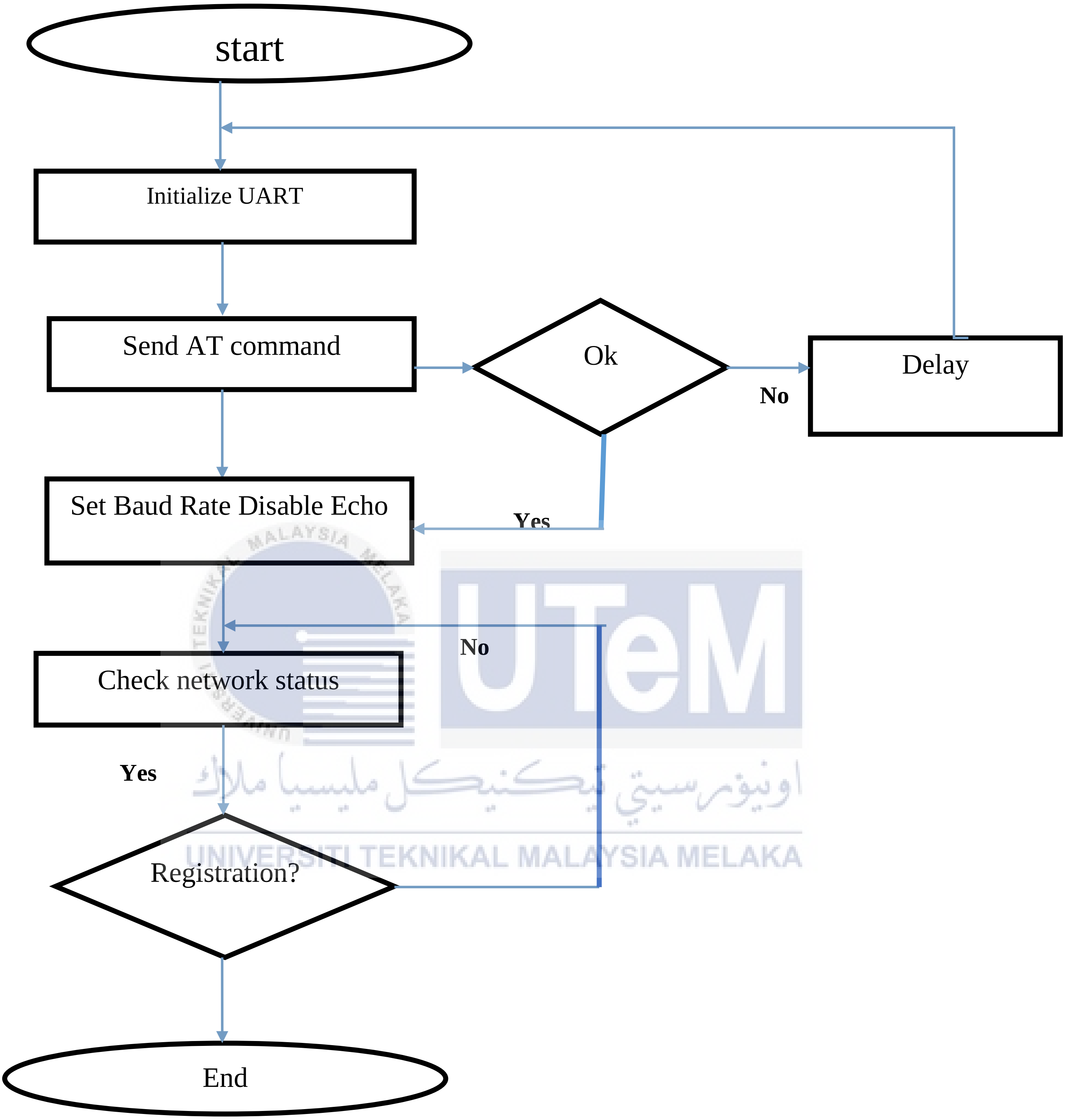


Figure 3.11 : Flow Chart For Module Startup

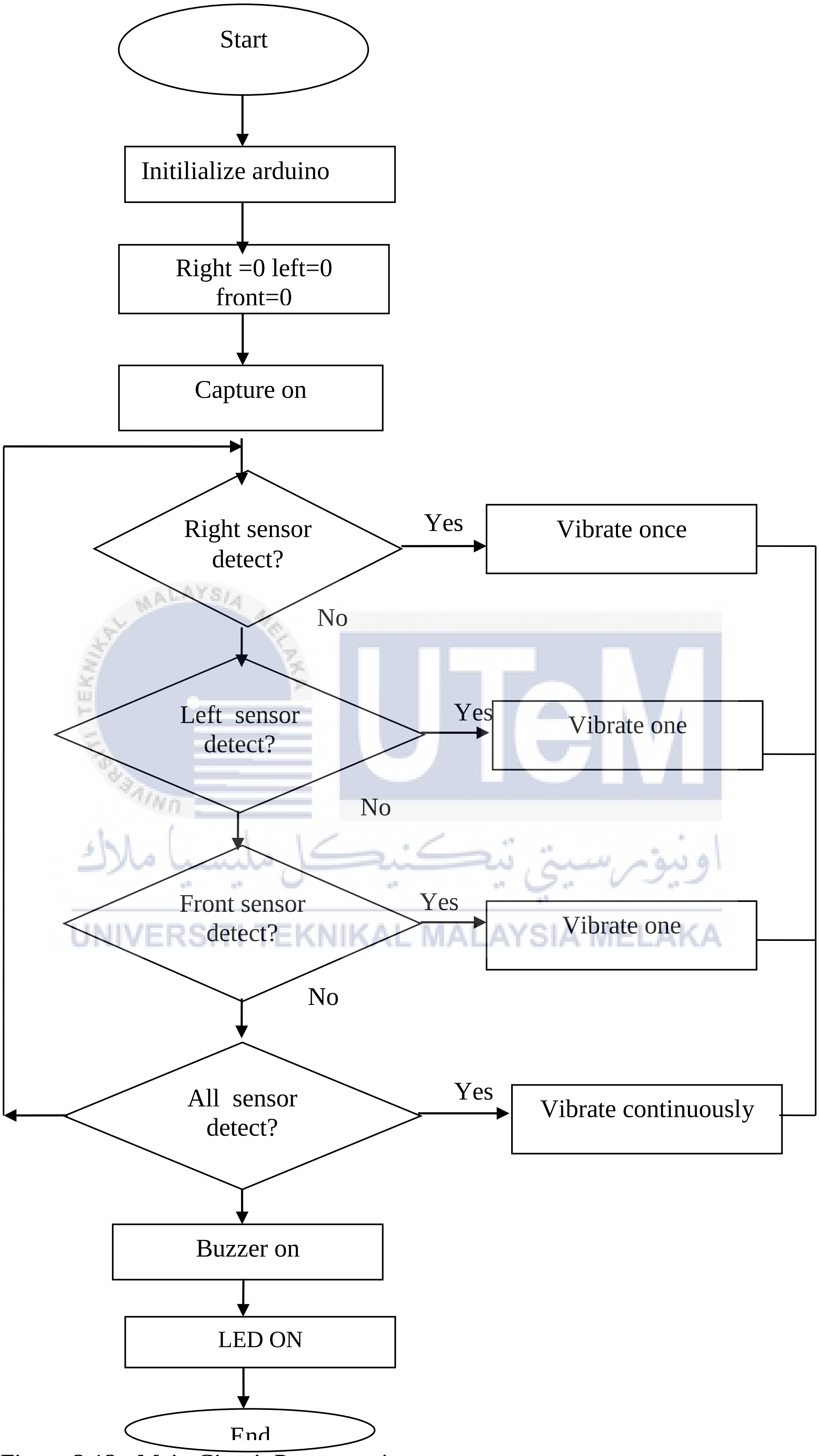


Figure 3.12: Main Circuit Programming

3.6 DESIGN PROJECT

3.6.1 FLOWCHART OF PROJECT METHODOLOGY

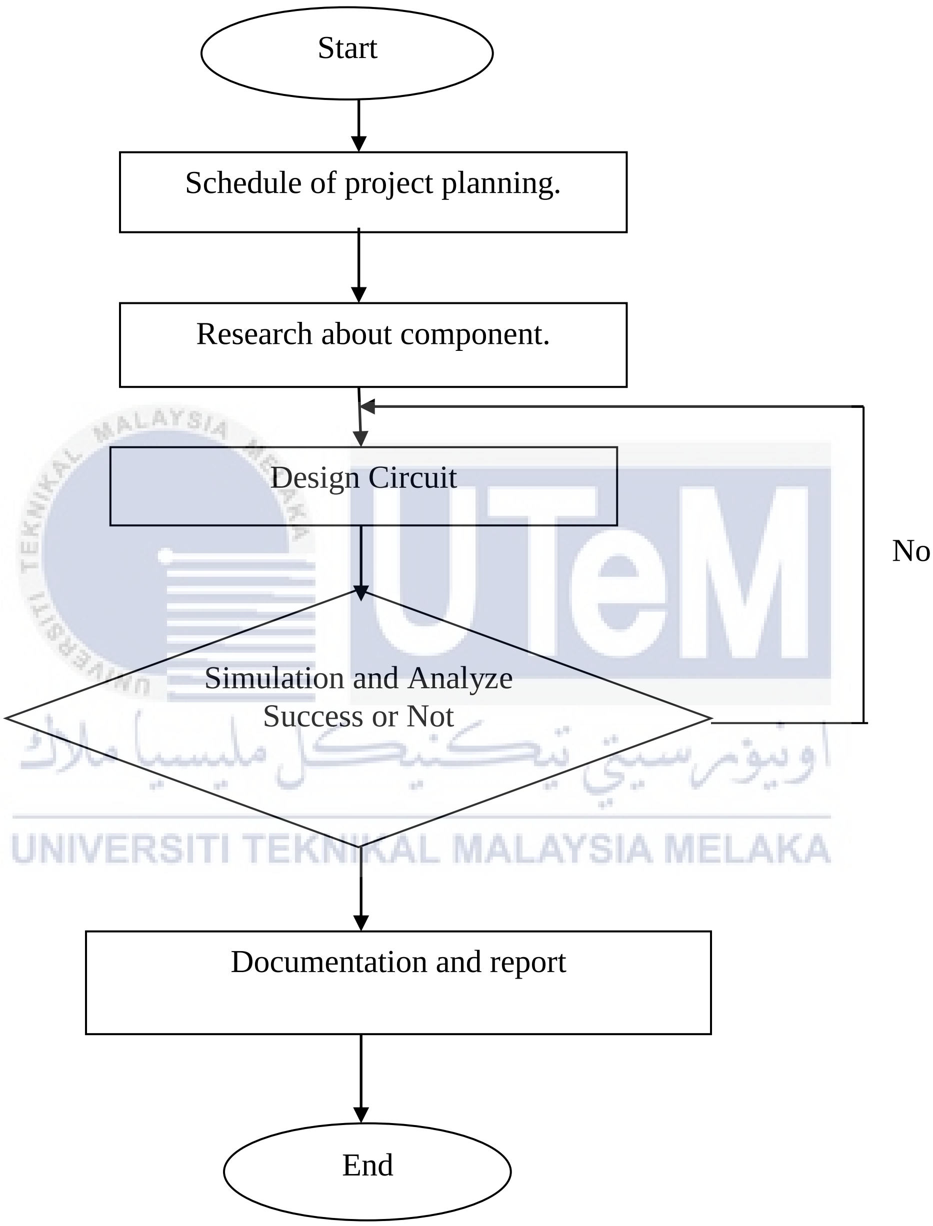


Figure 3.13 : Flowchart Of Project Methodology.

CHAPTER 4
RESULT AND ANALYSIS

4.1 SOFTWARE

Figure 4.1 shows a schematic circuit in proteus . The designed circuit is different from the actual circuit because the software is not available Proteus vibrator sensor.

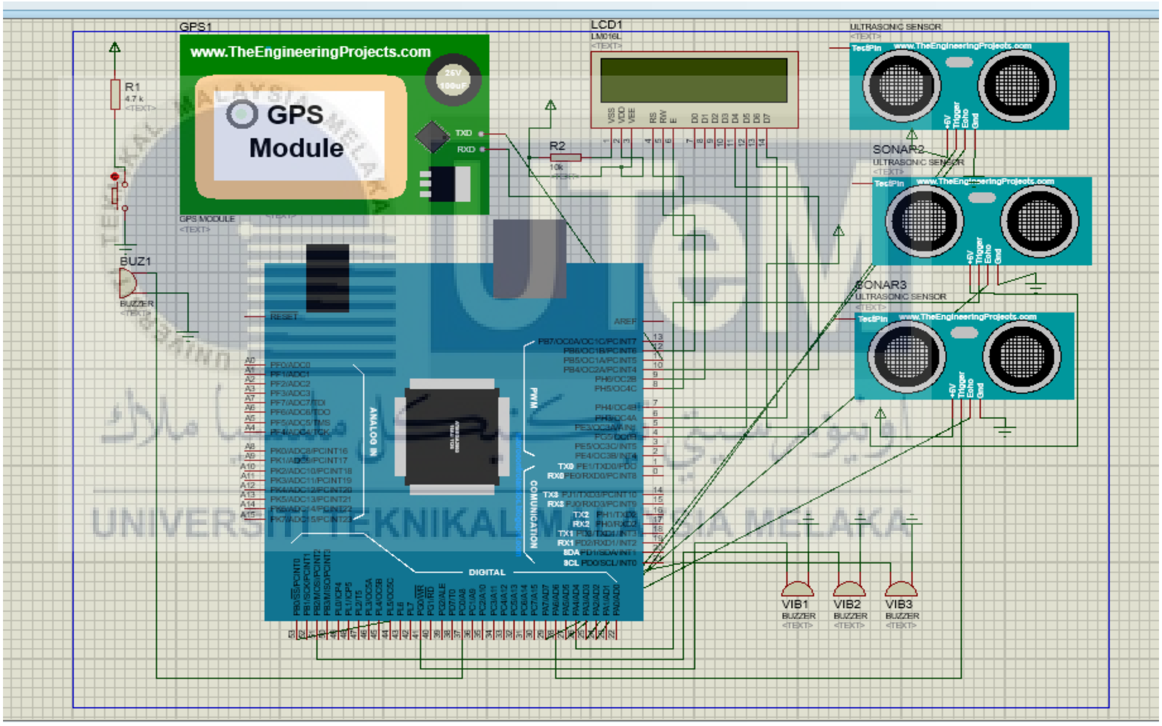


Figure 4.1: Schematic circuit in Proteus

Figure 4.2 shematic circuit in propel software. This designed circuit from the actual circuit .

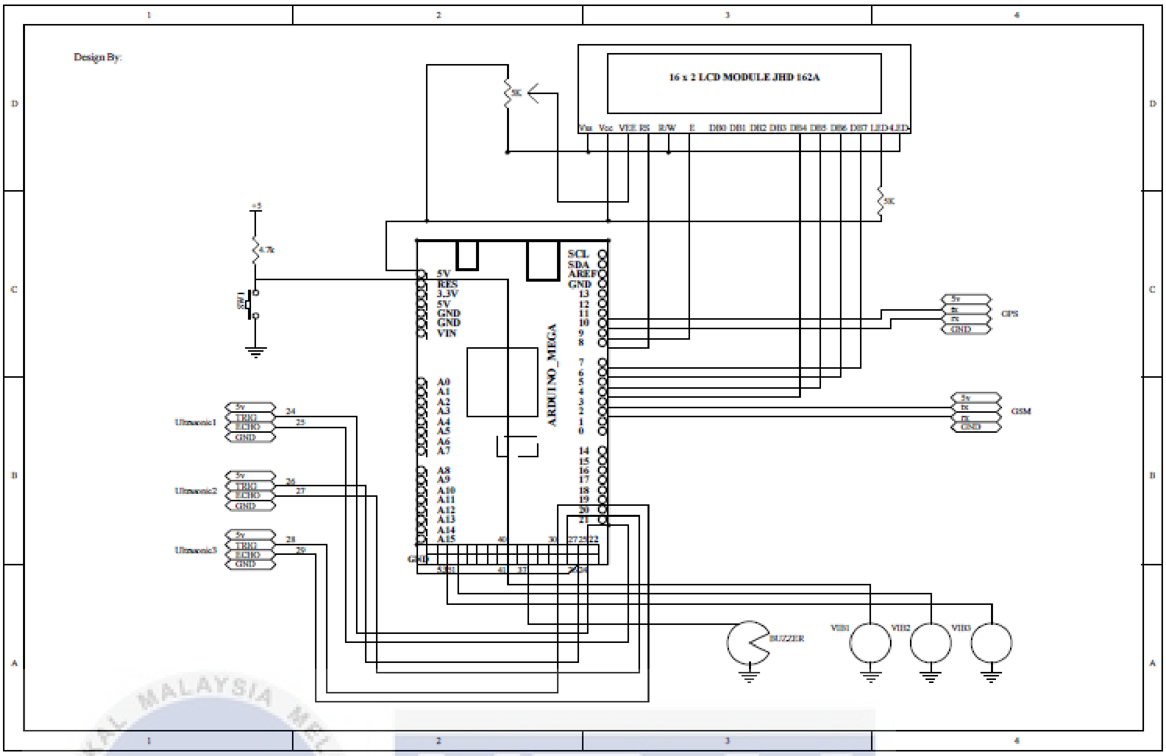


Figure 4.2: Shematic circuit in Propel software

4.2 SOFTWARE DEVELOPMENT RESULT

In this project there are five parts to test and maintain the system in the success of this project. The system, namely:

I. The interface between Arduino and GSM.
II. The interface between the ultrasonic modules and Arduino.
III. The interface between vibration and Arduino.
IV. Interface between GPS module with Arduino.
V. The interface between the GSM with mobile telephone.

4.2.1 SOFTWARE INTERFACE

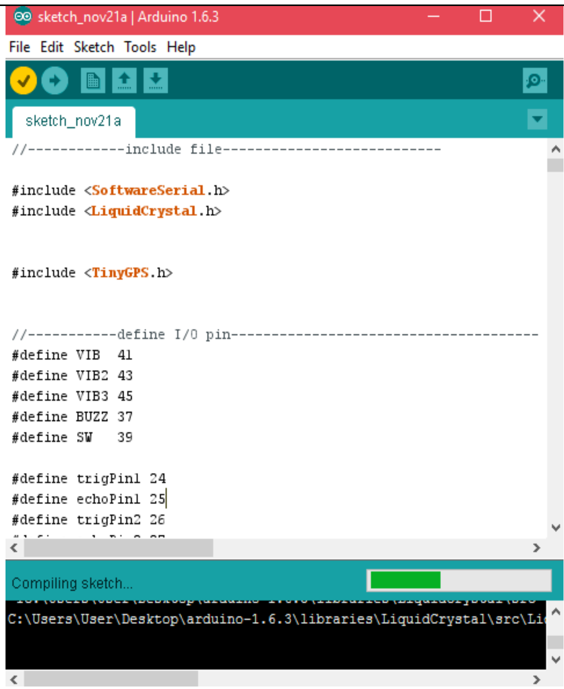
In this section, the software design process consists of programming for Arduino mega detection sensor for controlling the overall system stopping. This programming using assembly language written with sketches Arduino IDE.

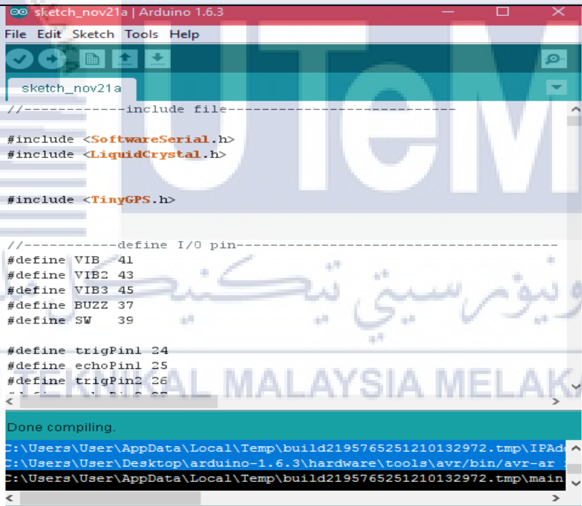
The objective of this system is to detect obstacles around the user and warn users with vibrating if the obstacle is closer to them. Once the barriers are close to the consumer, if the barrier is on the right side of the user, the vibrator vibrates one time, if obstacles are to the left of the user, the vibrator vibrates one time and he left and if an obstacle is detected in front of the user, the vibrator is vibrated also one on the front side. The bell rang to warn the user if the sensor three dectect obstacles. If the barriers on both sides and any obstacles around them is closer, the vibrator vibrates stored until the user avoid it. The guard blind people can detect the blind by sending SMS to GSM. SMS command is sent in GSM * TRACK *. After that the caregiver get the location of the blind people.

There are several steps to upload the program to use the Arduino IDE Arduino sketch. The serial port has been checked on COM4. Here is the procedure for preparing and uploading the program.

Table 4:1: Procedure for compiling and upload the program

Step	Figure description
1	 Open Arduino sketch
2	 Write the source code

<table>
<tr><td>3</td><td>

Verify the program</td></tr>
<tr><td>4</td><td>

Done compling</td></tr>
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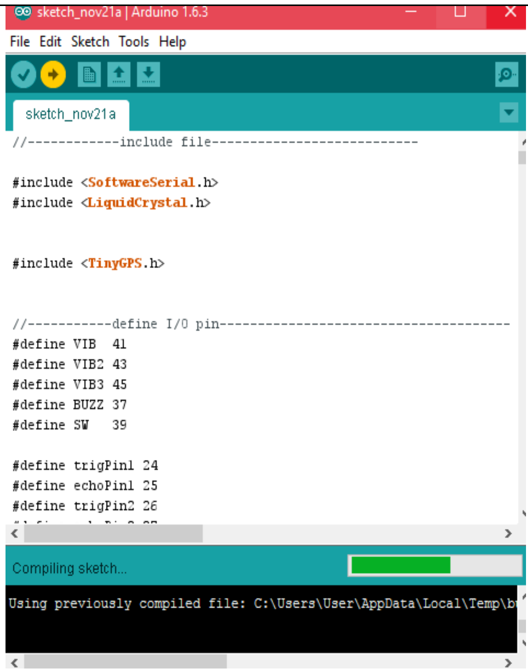
<tr><td></td><td>

Upload the program using serial com</td></tr>
<tr><td>6</td><td>Done upload at board Arduino Mega 2560</td></tr>
</table>

4.3 MEASUREMENT RESULT

Main circuit for this project consists of combination power supply circuit, Arduino circuit, ultrasonic sensor, GSM, GPS, vibrator , switch and buzzer. The input voltage from 12V battery has been converted into 5 V DC voltage. As in Figure 4.3 shows the 5 V DC output voltage given by power supply circuit.

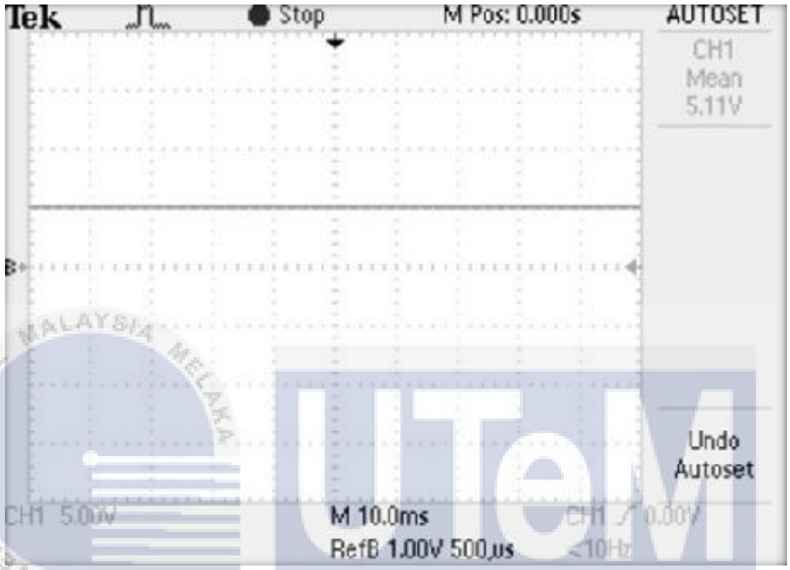


Figure 4.3: Result for 5 V DC power supply

4.3.1 SIGNAL GENERATED

Positive probe has been connected to 5 V power supply and negative probe has been connected to pin AN (output) of sensor. Figure 4.4 shows output waveform from distance 80 cm.

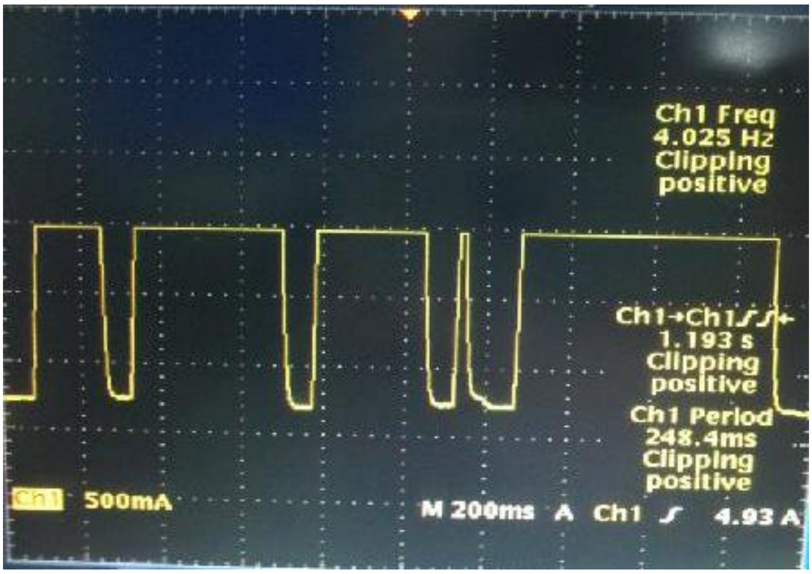


Figure 4.4: Output waveform from distance 80cm

$$\text{Periodic time} = \frac{1}{4.025\ \text{Hz}} = 0.2484\ \text{sec} \tag{4.1}$$

As a conclusion, when the distance is far, the periodic time for signal received is high from obstacle to the sensor.

4.3.2 THE ANGLE ELEVATED BY THE ULTRASONIC SENSOR

An analysis has been done to check the angle of the ultrasonic sensor. First analysis is to detect the obstacle at the distance of 1 m in order to prove that this sensor can detect obstacle from different height. The result for the calculation has been put in Table 4.2. The angle was 0° because the height is perpendicular to the distance to detect the obstacle.

From Table 4.2, ultrasonic sensors were placed at 0.8 m height from the floor. This position is fixed. A barrier is placed at 0.4 m from the floor to test whether a sensor that can detect obstacles or not. No detection of this height. Barrier height was increased to 0.6 m. At this height, positive results have been obtained. The sensor can detect obstacles at this level and gives a beep output for a time. Then, the height of the sensor has been changed to 0.8m and 1.0m. The sensor can detect the presence of obstacles in two heights. To a height of 1.2 m, there is no accepted detection of the sensor. Calculations were performed to check the angle of the sensor. Equation (4.2) has been used to get a different angle height.

Table 4.2 : Data received for distance of 1 m

Height of sensor (m)	Height of obstacle (m)	Angle (°)	Detect/ Not detect
0.8	0.4	21.80	no
	0.6	30.96	yes
	0.8	36.66	yes
	1.0	45	yes
	1.2	50.19	No

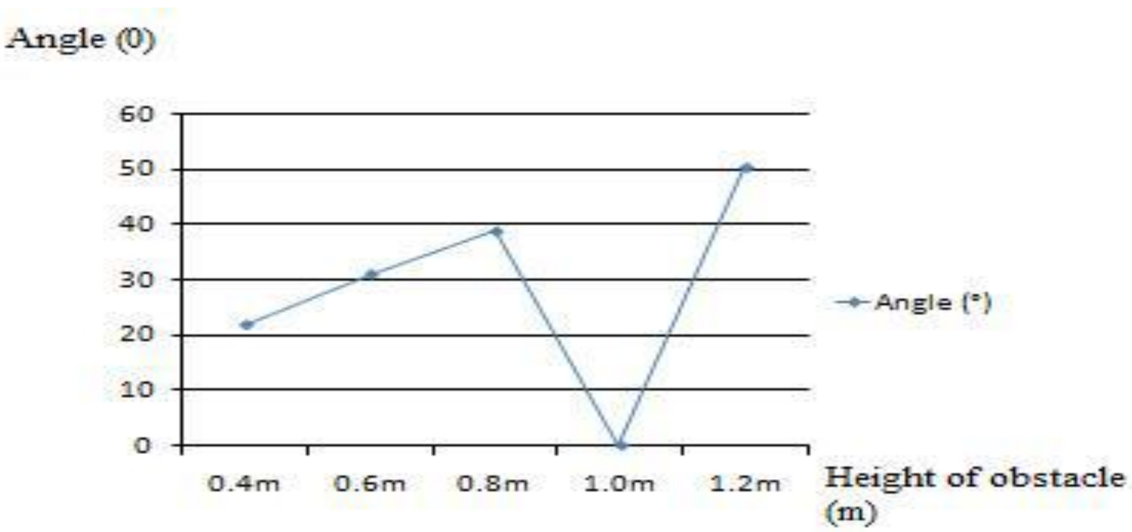


Figure 4.5 : Graph of Angle vs Height of obstacle for distance of 1 m

$$\tan\theta = \frac{\text{Opposite}}{\text{Adjacent}} \tag{4.2}$$

From Table 4.3, it shows the data received for distance at 3 m. For this experiment, the sensor has been placed at the same height from previous experiment which at the 0.8 m height from the floor. For this experiment, when the height of obstacle is 0.4 m and 1.2 m, there is no detection. The sensor could not detect any obstacle at this height. It has a different result when the obstacle is placed at 0.6 m where vibrator gives output beep for one time. The result is the same as for 0.8 m and 1.0 m height.

By comparing the two results of these two graphs, when a distance of 1 m, the sensor can detect obstacles at various angles from 30 ° to 40 ° to a small range of angles. When the distance of 3 m, the sensor can detect obstacles at various angles between 10 ° and 20 °. Both results show that this sensor can detect obstacles at an angle of 10 °.

Table 4.3: Data received for distance of 3 m

Height of Sensor (m)	Height of Obstacle (m)	Angle (°)	Detect/ Not detect
0.8	0.4	7.6	No
	0.6	11.30	Yes
	0.8	15	Yes
	1.0	18.43	Yes
	1.2	21.8	No

Figure 4.6 : Graph of Angle versus Height for distance of 3 m

It was important to know how far this sensor can detect the obstacle. Another experiment has been done to check the distance. The sensor has been placed at a constant height. The height of the sensor from the floor is 1.0 m. . When the obstacle is at distance of 1 m from the sensor, the output given from the vibrator is one beep. It means, the obstacle has been detected. The vibrator responds by vibrating one beep. It means the sensor can detected the obstacle at 2 m. The result for this experiment as in Table 4.4.

Table 4.4: Data received in detecting the distance

Height of sensor (m)	Distance (m)	Detect / not detect
1.0	1	Yes
	2	Yes
	3	Yes
	4	Yes
	5	Yes
	6	No

As a conclusion, the sensor can detects the obstacle from distance less than 5 m. Based on these analysis, the ultrasonic sunglasses is suitable to be used by blind person to detect an obstacle at the head level.

4.4 Hardware Development Result

As in Figure 4.7, it is the design of this project. A sensor has been placed at the left side of sunglasses, one sensor at the right side of the sunglasses and one sensor at the back side of the sunglasses. Due to the less function of sensor at the back side of the sunglasses, the sensor has been moved to front side of the sunglasses. The vibrator also placed at left ,right and in front of the sunglasses.

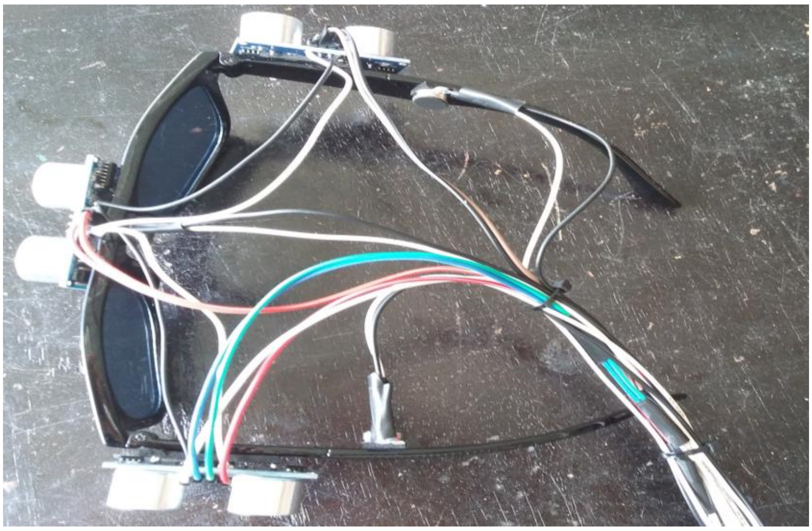


Figure 4.7: Design of the project

Figure 4.8 shows the design of the circuit used in this project. The pager motor (vibrator) is located at the right side near the ear of the user to give a comfortable for the user to respond when it vibrates. This design is more user friendly more practical to be used. Sensor in front of the sunglasses is very helpful for user to detect obstacle in front of them when moving. User can avoid crash when an obstacle has been detected from any side either left, right or in front of them.

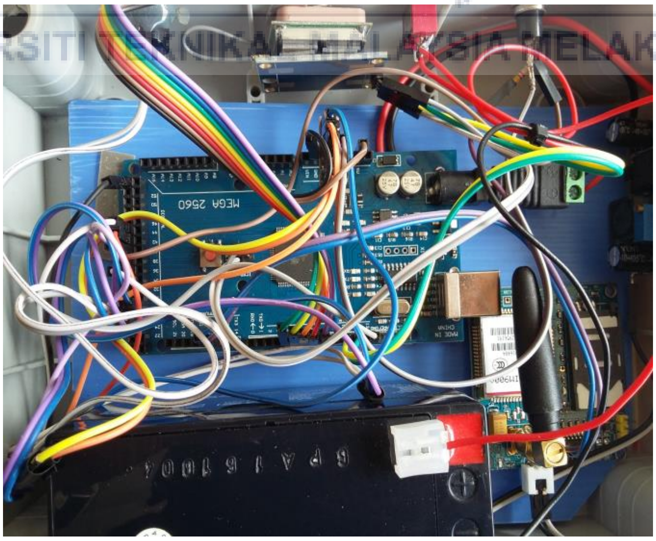


Figure 4.8: The design of the project

This project operates when an obstacle is detected, the sensor sent the signal to Arduino . Arduino was then converted an analogue signal received from the sensor into digital signal and sent the signal to pager motor to vibrate it and alert the user. Once the obstacle has been detected ,vibrator is ON as with single beep. When the caregiver track the blind people with send the message. And get the location.. Figure 4.9 show the location and message send at mobile phone using GSM. Figure 4.10 show open url using mobile phone . Figure 4.11 show the location using google maps.

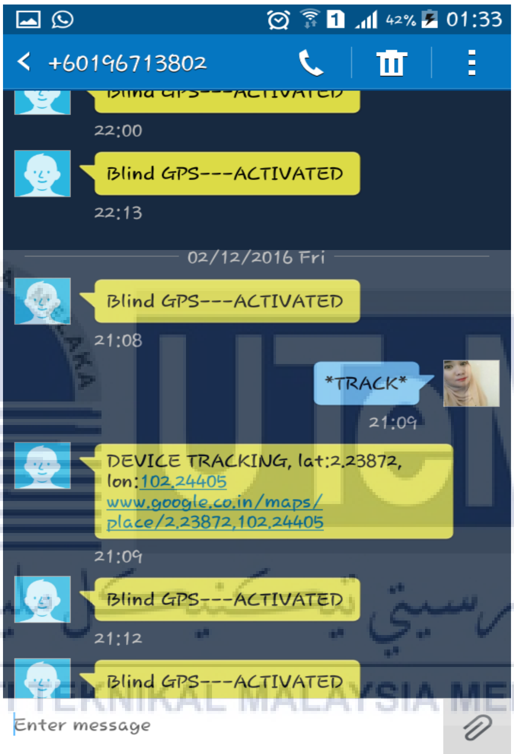
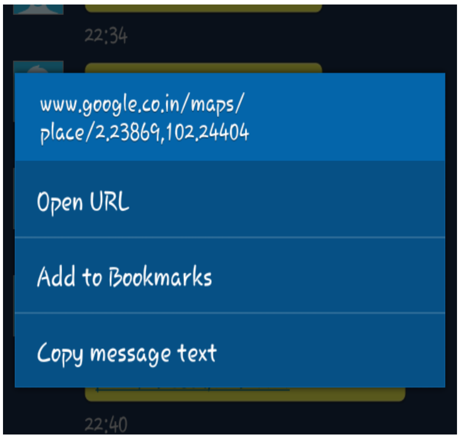


Figure 4.9: Message send at mobile phone



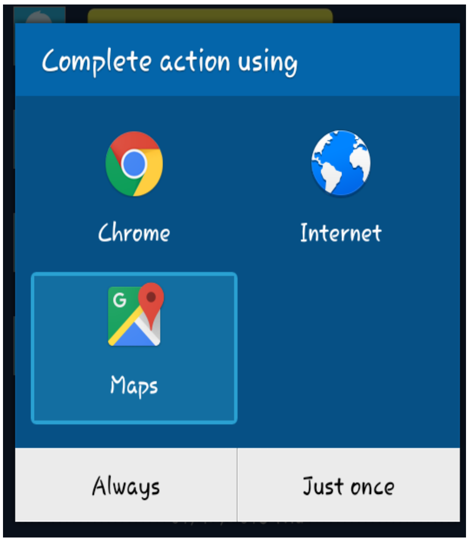


Figure 4.10: Open URL using mobile phone

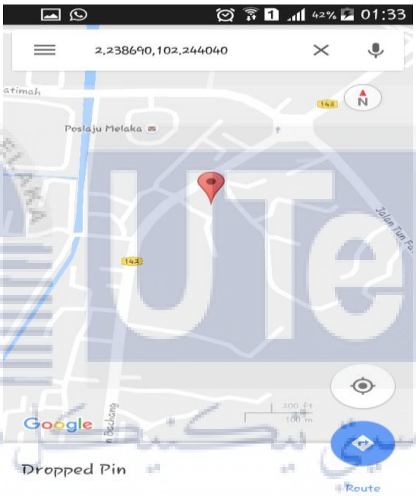


Figure 4.11: Location using google maps.

4.4.1 DATA OF INPUT SENSOR AND OUTPUT RESULT

Detection > 80 cm

Table 4.5: detection > 80 cm

Ultrasonic			**vibration**			**Buzzer**
Sensor (right)	**Sensor (in front)**	**Sensor (left)**	**Right**	**In front**	**Left**	
0	0	0	Off	Off	Off	Off
0	0	1	Off	Off	Off	Off
0	1	0	Off	Off	Off	Off
0	1	1	Off	Off	Off	Off
1	0	0	Off	Off	Off	Off
1	0	1	Off	Off	Off	Off
1	1	0	Off	Off	Off	Off
1	1	1	Off	Off	Off	Off

Detection > 80 cm

Table 4.6: Detection < 80 cm

Ultrasonic			**vibration**			**Buzzer**
Sensor (right)	**Sensor (in front)**	**Sensor (left)**	**Right**	**In front**	**Left**	
0	0	0	Off	Off	Off	Off
0	0	1	Off	Off	On	Off
0	1	0	Off	On	Off	Off
0	1	1	Off	On	On	Off
1	0	0	On	Off	Off	Off
1	0	1	On	Off	On	Off
1	1	0	On	On	Off	Off
1	1	1	On	On	Om	On

4.4.2 DATA COLLECTION

Collecting test data obtained through the software IDE serial print, vibration indicator, and how the distance barriers that can be detected and input SMS by using the C programming language, all data can be interpreted directly if sensors detect obstacles at a distance of about 80 cm vibration function. There were three and three ultrasonic vibration in sunglasses. Where three ultrasonic and vibration on the right, the left and the front of sunglasses. In table 4.5 and 4.6 shows the input and output data. Caregiver will send a message * TRACK * to detect the location of the blind.

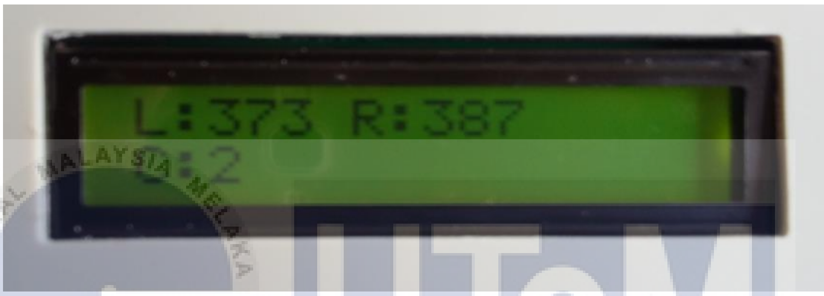


Figure 4.12 : Data display on the LCD prototype

Figure 4.13: Location via GSM using SMS

All data can be interpreted directly if sensors detect obstacles. Figure 4.12 shows the data that the LCD display on the LCD prototype program into Arduino controller. While Figure 4.13 is proof indicator location via GSM using the medium of SMS to mobile phones. It will immediately send information from the GPS input data to the caregiver about the location of the blind.

4.5 DATA OF THE SURVEY

In this study a total of 113 secondary school children aged between 14 and 20 years of Sekolah Menengah Pendidikan Khas . The instrument involves the interview. Interviews were conducted with visibility status of all students who participated in this study. During the interview, questions about the use of low vision aids shall be submitted to all students. Information about the cause of low vision among sweet obtained through medical records obtained from the school and an eye examination.

The average age of the children involved secondary school is 14.2 ± 3.6 years. Their age range is between 14 and 20 years. Analysis shows that 59.3% are women and the rest are men. Results are shown in table 4.7. 29% of the 113 secondary school children are classified as having limited vision problems (6/18 to 6/120), while 69% were classified as blind with visual acuity worse than 6/120 so that no light perception , of the 69% who are registered as blind, 25% . Their condition is totally blind and has no light perception, 15% can only see light only and 8% can only see hand movements only. 2% of these students have better visibility of 6/18 and did not go to regular school because they have only one eye which functions only.

Table 4.7: Result of Survey

	Category	No	%
Gender			
Male		54	47.7
Female		67	59.3
	Distant visual acuity		
Normal	> 6/18	2	2
Low vision	6/18 to 6/ 120	33	29
	6/120 to 6/300	24	21
Blind	Hand movements (HM)	9	8
	Light perception (LP)	17	15
Stone-blind	No perception of light (NPL)	28	25

In this study, only 26.6% of children have low school does not understand these tools help detect obstacles. While the rest of 73.4% understand the function aids detect obstacles head. Whole school children have low agrees with this application. This case proves that this application will be able to reduce the accident or loss among school children have low vision. But it is also a child caregiver agree upon the application of this. It is caused when the children leave the house in a state of self-caregiver will be able to detect the location where these children are. This application can also facilitate the caregiver to know the situation of these children. Besides, there are several types of aids for the blind or vision aids. But such aids may not detect obstacles and can not detect the location.

Table 4.8: Results of device

Category	No of child	%
Not understand of device	30	26.6
Understand of device	83	73.4

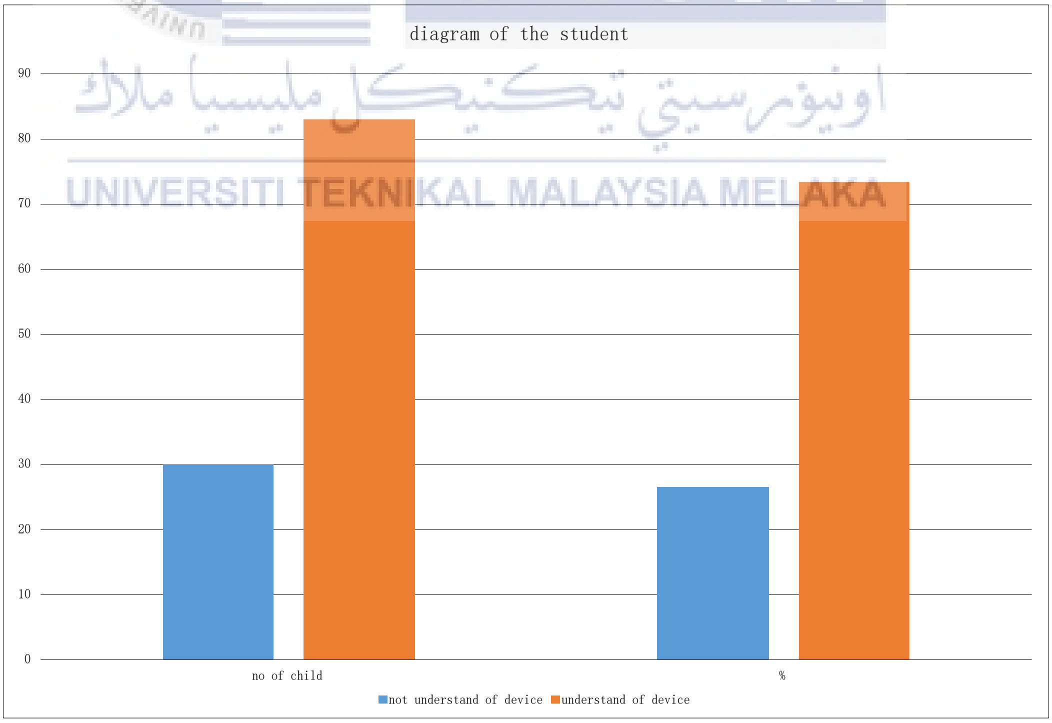


Figure 4.14: Graph of the Survey.

4.6 DISCUSSION

After going through several phases of design, development and testing eventually to find an emergency ultrasonic blind people by using GSM and Arduino has been successfully constructed and completed. This system can be moved using the Arduino system, GSM, GPS and an ultrasonic. All the project objectives have been achieved as a software implementation works well as expected. It has been proven that when people give commands using SMS to track the blind and GPS location using SMS will be sent to the caregiver blind people. in this system it uses ultrasonic to detect obstacles in the head. when an obstacle can be detected vibrator will serve as a marker no obstacle less than 80 cm.

There are five interface must be taken into account before the user is encouraged to use this tool based on the desired input. The interface used is the interface between arduino and GSM.the interface between the ultrasonic modules and arduino.the interface between vibration and arduino. Interface between GPS module with arduino. The interface between the GSM mobile telephone with. After the arduino IDE should be used in a sketch with compiling and uploading programs to the arduino. C and C ++ language has been used in the arduino IDE sketch. When ready to install all of these applications, the interface can be tested. Tests were carried out in the presence of several analyzes. This analysis was conducted to prove that the application is very suitable for the blind people and caregiver.

CHAPTER 5
CONCLUSION

5.1 CONCLUSION

As a conclusion, this low cost mobility aid is very useful to be used by user as one of their needed to every movement they take. This project detected the obstacle from left, right and in front of user using their sunglasses, so user now have been alerted the positions and locations of the obstacle to avoid from crash.

5.2 RECOMMENDATIONS

This project can be upgraded or modified for more effective performance. In future, this alert system should give better performance and more function rather than now. A few recommendations for upgrading this project are:

- Using small industrial ultrasonic sensor. It provides very short to long-range detection and ranging. This sensor has a new high power output along with real-time auto calibration for changing conditions (temperature, voltage or acoustic or electrical noise) that ensure it receive the most reliable ranging data every reading taken.
- The power supply can be changed into rechargeable battery which can use solar to recharge power. So that, it will lower the cost to replace the battery once after they used it.

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APPENDICES

GANTT CHART_PROJECT PLANNING

Project Activity	_2016_																				_2016_																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Data Research and Collection	BP Briefing							Mid Term Break								Study Week	Final Semester Examination		Semester Break									Mid Term Break							Study Week	Final Semester Examination		
Implement The Project																																						
Analyze Performance Of The Project																																						
Project Log Book and Reports																																						
Project Presentation 1																																						
Project Presentation 2																																						
Writing Chapter 1																																						
Writing Chapter 2																																						
Writing Chapter 3																																						
Writing Chapter 4																																						
Writing Chapter 5																																						
Preparation Hardware																																						
Simulation Software																																						
Test Project																																						
Writing Proposal																																						