

OBSVOID

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POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH

OBSVOID

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A project submitted in partial fulfillment of requirements for the award of
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TITLE : OBSVOID

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2. We verify that ‘Obsvoid’ and its intellectual properties are our original work without plagiarism from any other sources.

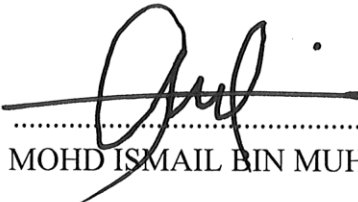
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Assalamualaikum dan salam sejahtera;

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ABSTRACT

The advance development to the innovation in the technology industries nowadays tends to evolve from a simple products to a sophisticated projects for the improvement society. In the beginning ,the visually impaired person uses a stick to guide their way everytime when their travelling. The stick has been always contribute the visually impaired person in improving their mobility but unfortunately the stick has its own limitation. One of the issue that visually impaired person for using the stick is that, it could only detect the obstacles that are within the contact the contact ranges of the stick. This problem situation could cause the visually impaired person to be in trouble because of insufficient time to detect and information about their surrounding for them to react a new obstacles in front of the visually impaired person. The main aim of “OBSVOID” is to innovate a cap to emphasize the safety of visually impaired person when using the blind stick. From research that had been done, the visually impaired person can only detect the the ground and the lower level obstacle. Despite that, there are many overhead obstacle that cant be detected by the blind stick. The existing of blind stick these days solely designed to aid the blind moving or travel by not having any safety being emphasized while using the blind stick. The “OBSVOID” ultimate aim is to designed a prototye of the smart cap to aid the visually impaired folks safely and emphasizing the importance safety of the visually impaired person. The “OBSVOID” will use three ultrasonic sensors for the detection of obstacle height in different direction and three servo motor to notify the user by slight vibration. Therefore , we have a tendency to innovate a cap for the safety of the visually impaired and reducing accidents involving them as well as to increase their confidence to do their daily activities

Keywords: sonar sensor, servo motor, Arduino Uno , Obsvoid

ABSTRAK

Kajian projek ini memfokuskan kepada mengesan halangan seperti dinding atau halangan yang berada dihadapan orang buta. Antara kelemahan orang yang mengalami masalah penglihatan adalah mereka hanya dapat mengesan rintangan ketinggian badan yang lebih rendah dengan menggunakan tongkat buta. Selain itu, orang buta tidak dapat mengesan apa-apa halangan ketinggian badan atas seperti papan tanda atau siling rendah. Topi pintar ini menggunakan teknologi yang dapat mengesan keadaan sekeliling dan memberi amaran(alert) kepada pengguna sebelum mereka menghadapi sebarang halangan. Topi pintar ini diciptakan dan dikenali sebagai OBSVOID yang bermaksud "penghalang halangan ". OBSVOID dapat mengesan halangan pada ketinggian badan bahagian atas dengan sensor sonarnya yang dapat mengesan jarak maksimum 5 meter yang telah diprogramkan dan memberi amaran (alert) kepada pengguna dengan menggunakan servo yang menghasilkan getaran kepada pengguna. Komponen yang digunakan dalam projek ini adalah Arduino Uno, sensor Sonar dan motor servo. Oleh itu, orang yang cacat penglihatan dapat mengelak halangan dengan mudah dengan kombinasi blindstick dan OBSVOID. Justeru itu, dengan adanya inovasi topi pintar ini diharapkan dapat membantu orang yang cacat penglihatan untuk mengatasi masalah ini dan menjadikan mereka berasa seperti golongan yang normal.

Kata kunci : Arduino Uno , Sensor Sonar , Motor Servo , Obsvoid

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This 1 billion people includes those with moderate or severe distance vision impairment or blindness due to unaddressed refractive error (123.7 million), cataract (65.2 million), glaucoma (6.9 million), corneal opacities (4.2 million), diabetic retinopathy (3 million), and trachoma (2 million), as well as near vision impairment caused by unaddressed presbyopia (826 million). [1]

Virtually all these people could restore normal vision with eyeglasses or contact lenses. More than 90% of the world's visually impaired people live in low- and middle-income countries. Blindness is a condition of lacking visual perception and it is always described as severe visual impairment with residual vision.

The blind people's life and activities are greatly restricted by loss of eyesight. They can only walk in fixed routes that are significant in their lives, with blind navigation equipment's and the accumulated memories in their long-term exploration.

This situation has resulted in many difficulties to them in their normal work, lives, activities, and so on. Based on the investigation about daily activity characteristics and modes of the blind, the study found that the main difficulties encountered in a trip of the blind included walking on the road, finding way, taking a bus and looking for usual life-arena. Several devices have been developed for mobility and navigation assistance of the blind and are typically known as travel aids or blind mobility aids.

An obstacle avoider is a device that avoids obstacle in front of them with utilizing the sensor to detect the obstacle and notify the entity to avoid it. The distance of the sensor can be adjusted by the programmed of the device with a software that is compatible with the device. The obstacle avoider is powered by dry cell.

1.2 BACKGROUND RESEARCH

In the present studies, visually impaired people are difficult to recognize the smallest details with healthy eyes. Blind stick is a tool to help visually impaired person to move around so easily. It is also a guide for the visually impaired person and a tool for detecting obstacles in front of them. [2]

The project aims to help visually impaired people to move around more easily without assistance and to help detecting obstacles in front of them precisely and accurately. It also will provide them navigation. It is because the existing Blind Stick have been innovated with advanced technology like electronics components and sensors. Besides, it allowed visually impaired people feel more confident to move around and feel safer.

This project will not only help the visually impaired people but it also helps their family to easily monitor their movements.

1.3 PROBLEM STATEMENT

Physical movement is a challenge for visually impaired person. The conventional walking stick used by them is very limited in its range of detection and it is only used to detect the object which is near to the user. The disadvantage of the conventional cane, however, is its failure to detect obstacles outside of its reach. That is the user has to tap the ground or the object to detect the obstacle.

The blind stick is also not ergonomic enough.

1.4 OBJECTIVES OF THE PROJECT

The objective of this project is to design and develop a prototype of obstacle avoider for the people unable to see. It is also to improve blind's people confidence with the casualty of an attire. Lastly, the objective of this project is also to test the effectiveness of the project in helping and solving the problem.

1.5 RESEARCH QUESTIONS

This study will answer the following research questions:

-Does the innovation of the blind stick is effective in solving the problem in reducing accident involving visually impaired people and does it will give benefit to everyone?

Hypothesis will be studied in this research area:

H0: the difference between the original blind stick at the market with the smart blind stick that we develop.

H1: Is there any difference between the original blind stick with smart blind stick?

1.6 SCOPE OF THE PROJECT

- i. Design and build up for blind people
- ii. Obstacle avoider cap can avoid solid surface only
- iii. Not rechargeable battery (48 months battery lifetime).

1.7 CONTRIBUTION

There are many blind stick now is use in this era but the current blind stick is dont have improvement on it and many blind people in this era are not confidence in self because they are impaired person. This project will improve the blind people confidence with the casuality an attire.This project also to replace the conventional walking cane with smart cap that detect obstacle and make the blind people safe while they are walking.

1.8 SUMMARY OF CHAPTER

In conclusion, through the research done to produce this project, this project can overcome the problems faced by blind people to make it easier to use. Although the main purpose of this project is to improve blind people confidence with the casuality of an attire, this project will also to test the effectiveness of the project in helping and solving the problem.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

At the initial stage of the project, the literature review is the previous study including information gathering from sources such as the internet and resources that are relevant to our tests. Collection information from literature studies is especially important as a first step research. It also identifies the major issues associated with research done.

This chapter discusses the concepts thoroughly. Based on the internet, reference books and observations. The purpose of this discussion is to describe the existing design and to see how far the project can be implemented. Our group is innovating a project that call obstacle avoider.

The purpose of this discussion is to describe the method used in designing project models. Uses of equipment and components that have a relationship with the design chosen to meet the criteria as a student Diploma in Mechanical Engineering.

General issues of issues or areas of focus should be identified thus providing the appropriate context for literature review. Term "Literature" means a review article referenced to understand and study research problems. Literature study is used to provide a study with to see the research done in the field of study and not just summarizes the studies conducted by other researchers. Overall trend suggestive titles in theory, methodology, evidence and conclusions

2.2 HISTORY

Figure 2.2.1 shows the most used by blind people which is the white cane.



Figure 2.2.1 : *White cane*

Figure 2.0 shows the most used cane which is the white cane. Blind people have used canes as mobility tools for centuries, but it was not until after World War I that the white cane was introduced.

In 1921 James Biggs, a photographer from Bristol who became blind after an accident and was uncomfortable with the amount of traffic around his home, painted his walking stick white to be more easily visible

Ten years later , Guilly d'Herbemont from France launched a national white stick movement for blind people. On February 7, 1931, Guilly d'Herbemont symbolically gave the first two white canes to blind people, in the presence of several French ministers. 5,000 more white canes were later sent to blind French veterans from World War I and blind civilians.

In north America, the introduction of the white cane might be different than another continent. Lions clubs international in 1930s decided to paint the black cane to white colour. The reason why they want to change the colour is to increase the visibility to oncoming motorists. In early 1930s, the Lions Club international began national program the use of white canes for persons who are blind.

The first special white cane ordinance was passed in December 1930 in Peoria, Illinois granting blind pedestrians protections and the right-of-way while carrying a white cane.

The long cane was improved upon by World War II veterans rehabilitation specialist, Richard E. Hoover, at Valley Forge Army Hospital. In 1944, he took the Lions Club white cane (originally made of wood) and went around the hospital blindfolded for a week. During this time he developed what is now the standard

method of "long cane" training or the Hoover Method. He is now called the "Father of the Lightweight Long Cane Technique." The basic technique is to swing the cane from the center of the body back and forth before the feet. The cane should be swept before the rear foot as the person steps. Before he taught other rehabilitators, or "orientors," his new technique he had a special commission to have light weight, long white canes made for the veterans of the European fronts.







On October 6, 1964, a joint resolution of the Congress, HR 753, was signed into law authorizing the President of the United States to proclaim October 15 of each year as "White Cane Safety Day". President Lyndon Johnson was the first to make this proclamation.

2.3 WHITE CANE MATERIAL ANALYSIS

White cane or blind stick is a mobility device which aid the visually impaired walking. White cane is not only a tool in mobility, but also can be a defensive weapon and may conceal a knife for protection reason. From past to the nowadays, white cane came in many shapes, sizes and weight but constantly white cane is being innovated to improve its usability. Firstly, white cane was invented by James Biggs after he lost his sight in 1920s after had an accident. He invented the first blind stick by painting his cane which made of wood, because he wants to readjust to his house environment which are full of motorists. Then, he painted his cane to the white to make the cane is more visible to the motorists around his home. Now, white canes are being made of other material that suits the user and depend on the usability. One of the materials that are usually used in White cane is aluminium. The reason why the aluminium had chosen is very to get and easy to form. Other than that, it also has high durability, efficient and cheap also offer beauty and utility. Aluminium white cane had been designed with an optimum balanced weighting system with the precision joint to reduce noise and vibration when use it (3). The white cane that made from aluminium also has light weight, high rigidity and most important durable. There is also white cane that made from the plastic but it does not have high rigidity and easily broken. Even though plastic white cane is cheap and easy to carry because it is light but that make the user feel insecure while using it. A part of that, white cane that are made from carbon fiber also one of the cane that have high rigidity and light but it is too expensive compare to other white cane. Mostly all of this type of white cane is designed to ease the blind people to carry and keep easily by their own and use so that it will reduce less vibration.

Table 2.3.1 shows the type of wooden cane. These wooden cane is the original white cane which is made of wood. Some of the wooden cane is use as walking stick which is use as a defensive or offensive weapon.

Table 2.3.1 : Wooden canes

	<p>Ashplant is Irish walking stick that made from the ash tree</p>
	<p>Blackthorn is an Irish walking stick that made from the blackthorn (Prunus Spinose)</p>
	<p>Makila (or Makhila) is a Basque walking stick or staff usually made from medlar wood.</p>
	<p>Kebbie is arough Scottish walking stick, similar to an irish shillelagh with hooked head.</p>
	<p>Whangee Asian is made from bamboo, also a riding cop. Such as stick was owned by Charlie Chaplin's</p>
	<p>Malacca Malay stick made from rattan palms. Used as walking stick.</p>









	<p>Scout staff tall stick traditionally carried by Boy scouts</p>
	<p>Ziegenhainer knotty German stick made from European cornel, also used as melee weapon by duellist's second.</p>

Table 2.3.2 shows the various type of modern cane which used in nowadays. These white is commonly accepted as a “symbol of blindness”, different countries still have different rules concerning what constitutes a “cane for the blind”

Table 2.3.2 : Type of modern cane

	<p>A white cane is a device used by many people who are blind or visually impaired. A white cane primarily allows its user to scan their surroundings for obstacles or orientation marks, but is also helpful for onlookers in identifying the user as blind or visually impaired and taking appropriate care</p>
	<p>Folding stick has several joints that make it easy to fold and keep it safely. Folding stick was made from strong and lightweight aluminium. Rubber ferulle foot was added for stability</p>
	<p>Forearm stick a regular or offset cane with additional forearm support. This will increase stability and load shifted from the wrist to the forearm.</p>

	<p>Quad stick has ferrules at the best, enabling them to stand freely, and offering a firmer base for standing. This quad stick usually made from aluminium and its height adjustable. For the design, it has a curved neck.</p>
	<p>Tripod cane available with an attached seat. This tripod stick is made from aluminium with steel base.</p>
	<p>Adjustable cane is constructed of strong anodized aluminium it can support up to 250 pounds . the handle is made of black polished wood which will feel comfortable in user hand.</p>

2.4 CONCEPT / THEORY

2.4.1 Blind stick

Usually blind stick is a device that used by many people who are blind people or visually impaired. The function of this blind stick is to allow them to scan their surrounding from obstacles or orientation marks, and lastly to taking appropriate care. There are six type of Blind Stick:

- 1) Long stick: Designed primarily as a mobility tool used to detect objects in the path of a user. Stick length depends height of user. It's the most well-known variant, though some organization favour the use of much longer stick.

- 2) Guided stick: A shorter stick, generally extending from the floor to the users waist, with more limited potential as a mobility device. It is used to scan for verbs and steps. This stick also can warning the user of obstacles immediately ahead.
- 3) Identification stick: Used primarily to alert others that the user is visually impaired, but not to the extent where they require a long stick or other variant. It is often lighter and shorter than the long stick, and has no use a mobility tool.
- 4) Support stick: Designed for physical stability to a visually impaired user and this stick also means identification. It has very limited potential as a mobility device.
- 5) Kiddie stick: Same function with adult's long stick but its made for the childer. So, it more lighter and smaller
- 6) Green stick: Used in some countries like Argentina. Drignrd for user has low vision, while the white stick designates that user is completely blind

2.5 PROBLEM WITH BLIND STICK

Early 1940s blind stick was invented and most common device that have been used as mobility for the visually impaired person to walk daily routines. Statistics by Leonard on 2003 , in the united states shows that 130,000 blind people used blind stick and it indicates the importance of this Blind stick to the visually impaired people. While in Malaysia, PPOBM or Pertubuhan Orang Buta Malaysia recorded 50,000 blind people are registered under this association and statistically 50,000 of the visually impaired use blind stick in their daily life.(4)

Study shows that detection range is limited and this proved by a research that had been done by Dowling in 2007 (5). Dowling stated that detection range is limited to less than two paces. Next, research by Jacquet , Belik Bourda in 2006 (6) also stated that the detection of obstacle detection is limited to a distance that equal to the length of blind stick.

A part from that, a study by Levasque in 2005, lack of preview information and lack of method in giving warning on obstacle ahead. This will be leads to blind people in danger situation. Then, blind people will be fall that shows blind people not confident. This will be exposed the blind people of involving in accident cases.

2.6 OBSVOID (OBSTACLE AVOIDER)

Obsvoid or also known as obstacle avoider has been innovated by adding Ultrasonic Sensor and Arduino Uno. Mini servo had been choose for notify the user obstacle infront of them. Arduino uno was an important component to control movement every sensor that have been programmed in system. Cap had been choose for mainframe design is because more fashionable. This will lead for our objective that to increase confident for blind people. Table 2.6.1 shows the comparison between Blind stick and Obsvoid:

Table 2.6.1 : *The comparison between blind stick and obsvoid*

Blind stick	Obsvoid
Responds slowly when obstacle infront	Warns quickly when sensor detect obstacle
No ergonomic enough	Fashionable and safe to use
No vibrate if obstacles infront of them	Give vibrate if obstacle infront of them

2.7 EQUIPMENT AND COMPONENT ON OBSVOID

1. Cap

Figure 2.1 shows the cap.



Figure 2.7.1 : *Cap*

A cap is a form of headgear. Caps have crowns that fit very close to the head.

2. Servo

Figure 2.2 shows the servo that we use.



Figure 2.7.2 : *Servo*

This servo will make the vibration and then notify to the blind people that in front has obstacle.

3. Sonar sensor

Figure 2.3 shows the sonar sensor.



Figure 2.7.3 : *Sonar Sensor*

Sonar sensor will detect the obstacle in front , left and right. The distance of the sensor can be adjust by the programmed of the device with a software that is compatible with the device.(7)

4. Type of Power Supplies (dry cell battery 9v)

Figure 2.4 shows the dry cell



Figure 2.7.4 : *Dry cell*

A dry cell is a type of electric battery, commonly used for portable electrical devices.

5. Arduino

Figure 2.5 shows the type of arduino that we use which is Arduino UNO.



Figure 2.7.5 : *Arduino*

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts

The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware which called a programmer in order to load new code onto the board

Figure 2.6 shows the Arduino UNO that has been labelled with number.

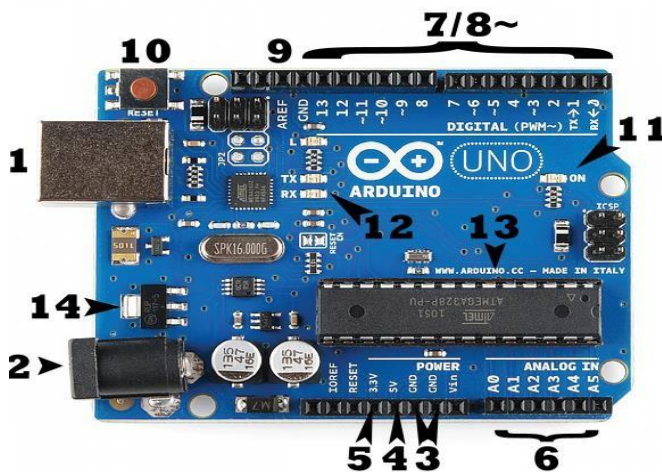


Figure 2.7.6 : *Arduino with label*

Component of Arduino :

1.USB Connection

Serves as a place to supply power by using a USB cable from wall power supply.

2. Ground

There are several ground pins on the arduino and any of it can be used to the circuit.

3. 5 Volts

Supply 5 volts of power.

4. 3 Volts

Supply 3 volt of power.

5. Analog

The area of pins under the 'Analog In' label (A0 through A5 on the UNO) are Analog In pins.It obtain the value of an analog signal. This function convert the value of of the voltage on an analog input pin and returns a digital value.

6. Digital

used for both digital input like telling if a button is pushed and digital output

8. Pulse-width Modulation(PWM)

Drive a motor at various speed. The frequency of the signal on most pins is approximately 490Hz.

9. Reset Button

Pushing it will temporarily connect the reset pin to ground and restart any code that is loaded on the Arduino. This can be very useful if the code does not repeat, but you want to test it multiple times.

10. Power LED Indicator

This LED light up whenever the plug of Arduino into a power sources.

11. TX RX LEDs

TX is short for transmit and RX is short for receive. there are two places on the Arduino where TX and RX appear,once by digital pins 0 and 1. These LEDs will give us some nice visual indications whenever our Arduino is receiving or transmitting data

12. Main Integrated Circuit

As the brain of the Arduino. This can be important, as you may need to know the IC type (along with your board type) before loading up a new program from the Arduino software.

13. Voltage Regulator

Controls the amount of voltage that is let into the Arduino board. Act as a kind of gatekeeper. It will turn away an extra voltage that might harm the circuit. It has its limits, cannot hook up the Arduino to anything greater than 20 volts.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This chapter gives an outline of research methods that were followed in the study. It provides information on the participants, that is, the criteria for inclusion in the study, who the participants were and how they were sampled. The researcher describes the research design that was chosen for the purpose of this study and the reasons for this choice. The instrument that was used for data collection is also described and the procedures that were followed to carry out this study are included. The researcher also discusses the methods used to analyze the data. Lastly, the ethical issues that were followed in the process are also discussed.

This is final project flow chart. First of all is gathering fellow group members to study user requirements for design cap with the component. Then create a list design problems encountered. Next, design the project again and conducting an assessment and selection of concepts and estimating the cost is required to turn on this tool. Lastly, the test runs and performs final repair when there are some mistakes and shortcomings that cannot be detected before the test was done in a project produced before is presented to the panel of assessors appointed by the department for assess the results of this project.

3.2 FLOWCHART

Figure 3.1 shows the final project flowchart that assist us to complete the project.

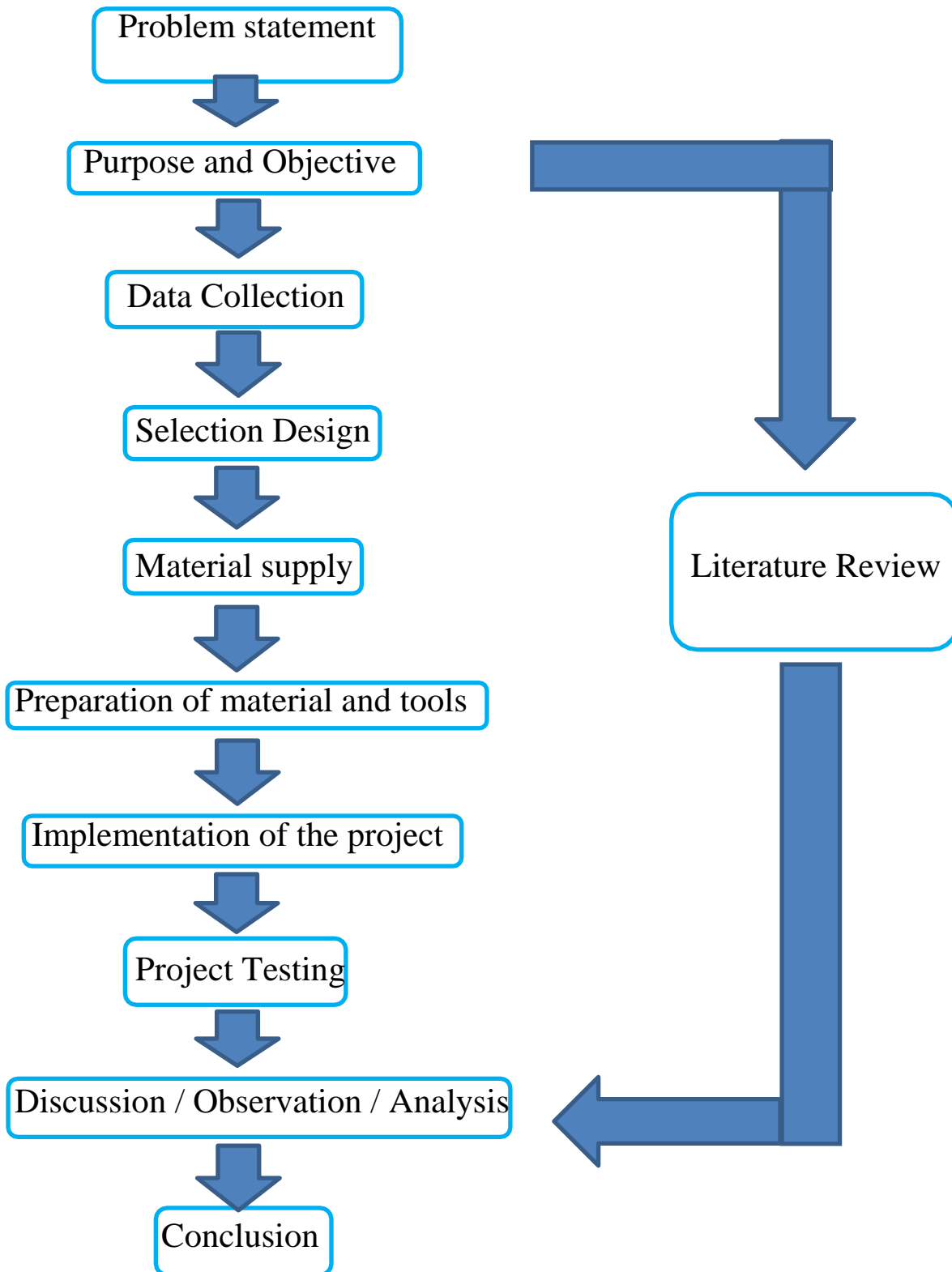


Figure 3.2.1 : Flowchart

3.3 METHODOLOGY PHASES

In order to evaluate this project, the methodology based on System Development Life Cycle (SDLC), generally three major step, which is planning, implementing and analysis. This final year project used three major steps to implement project starting from planning, implementing and analysis. All the methods used for finding and analyzing data regarding the project related.

i. Planning

To identify all the information and requirement such as hardware and software, planning must be done in the proper manner. The planning phase have two main elements namely data collection and the requirements of hardware and software.

ii. Data Collection

Data collection is a stage in any area of study. At this stage I planned about the projects resources and requirements, literature studies and schedule to get more information in this study. All the materials are collected from journal, texts book and research papers gathered from libraries and Internet.

iii. Implementing

Next step is implementing phase where in this part we did the appointment with Malaysian Association for the Blind (MAB) for explaining and implementing our project. We also prepare the project feedback form for the MAB to give some feedback and comment. By testing this project at MAB , we can find out our project defects and we also can improve our project. The process of checking and testing are followed due to complete a part of implementing

iv. Analysis

Finally, in analysis phase, the project is using arduino uno which is need the coding and programming so the sonar sensor and servo fully functional . The functions and the operations of the arduino, sonar sensor and servo are very important to be analyzed. With appropriate steps and methodology, any process of completing the project can be managed wisely and will be make a good result.

3.4 PROJECT OPERATIONAL

Programming and coding for Arduino because it must be perfect to ensure the sonar sensor and servo will work efficiently. We also focus how to design the cap, to install the electrical component in the cap is not easy. The hole was punched in the cap so that the sonar sensor could detect the solid object in front of them. The cap that we use is adjustable.

Figure 3.2 shows the inside of obsvoid with arrangement of component.

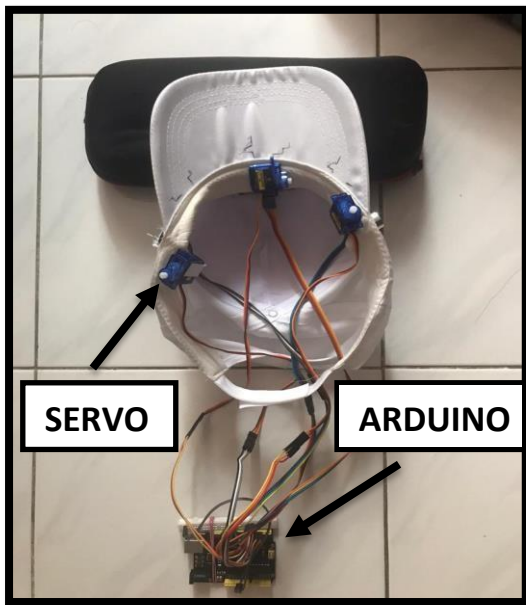


Figure 3.4.1 : *Obsvoid with components label*

The sonar will transmit waves to the surrounding in front of them and if there is an obstacle, the waves are gonna reflect and the sonar sensor will receive the signal and send the signal to the arduino board and by using the programme that is uploaded. The servo motor will receive a command by the programme and move accordingly which gives a slow vibration to the each direction. Such as, if the sonar sensor on the right detect an obstacle to the right. The servo motor on the right will vibrate and so as the other sonar sensor and servo motor which is located in the middle and on the left.

The project operate via 12V battery that last till 8-10 hours and can also replace by a rechargeable battery lipo

Figure 3.3 shows project which is the obsvoid that has been labelled with component name.

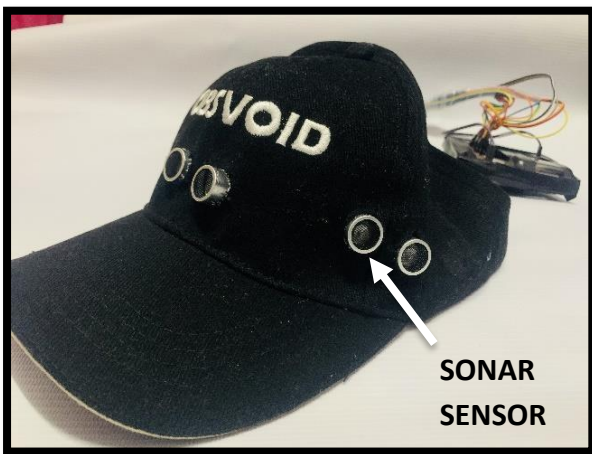


Figure 3.4.2 : *Obsvoid with components label*

1. The main component for this project is Arduino UNO
2. The sonar sensor is to detect an obstacle in front
3. The servo motor is to vibrate slowly to notify the users.

3.5 PROJECT TESTING

This project has been tested in terms of :

- I. The effectiveness on blind people
- II. The maximum distance that can be reach by 5 meter
- III. The time taken to move the servo is 10 microsecond delay
- IV. The quality of the component
- V. Life time of the component

The result of this project testing will be explain in the next chapter.

3.6 OBSVOID COMPONENTS

1. Unisex Cap

Figure 3.4 shows the universal sex cap with adjustable clip



Figure 3.6.1 : *Universal Sex cap*

There are many types of headgear. The main reason why cap has been chosen because its more fashionable and comfortable. After that, cap also can be used by with various genders.

2. Micro size Servo Motor SG90

Figure 3.5 shows the servo.



Figure 3.6.2 : *Servo*

This servo is used to give the vibrator for notify the users.

3. Arduino UNO R3 compatible

Figure 3.6 shows the type of arduino that is Arduino UNO for the main component for this project.



Figure 3.6.3 : *Arduino Uno*

Arduino UNO was used in this project because it is simple and easy to programme. It also does not require complicated coding to execute desire task.

4. Types of sensor that has been used

Figure 3.7 shows the sensor that is the ultrasonic sensor.



Figure 3.6.4 : *Ultrasonic Sensor*

This sensor is for obstacle detection via ultrasonic waves and detection of floor.

5. Casing box

Figure 3.8 shows the casing box.



Figure 3.6.5 : *Casing box*

Casing boxes are usually made from rigid plastics, metals particularly stainless steel, carbon steel, and aluminium. Mass-produced equipment will generally have a customized enclosure, but standardized enclosures are made for custom built or small production runs of equipment. Furthermore, casing boxes with plastic type have been chosen because they are easy to customize and lightweight.

6. Power supply

Figure 3.9 shows the battery.



Figure 3.6.6 : *Batteries*

This 2000mAh battery has been used because it can last up to eight to nine hours depending on its usage.

7. Components inside the casing box

Figure 3.9.1 shows there is Arduino UNO in the casing box.



Figure 3.6.7 : *Component in casing box*

The reason why the component must put in the casing box is to prevent the component from getting wet which is causing damages.

3.7 THE FINISHING PROJECT

i. Front Look

Figure 3.7.1 shows the front look of the obsvoid with sonar sensor on it.



Figure 3.7.1 : *Obsvoid front look*

ii. Left Side Look

Figure 3.7.2 shows the left side of Obsvoid with sonar sensor on it



Figure 3.7.2 : *Obsvoid left side*

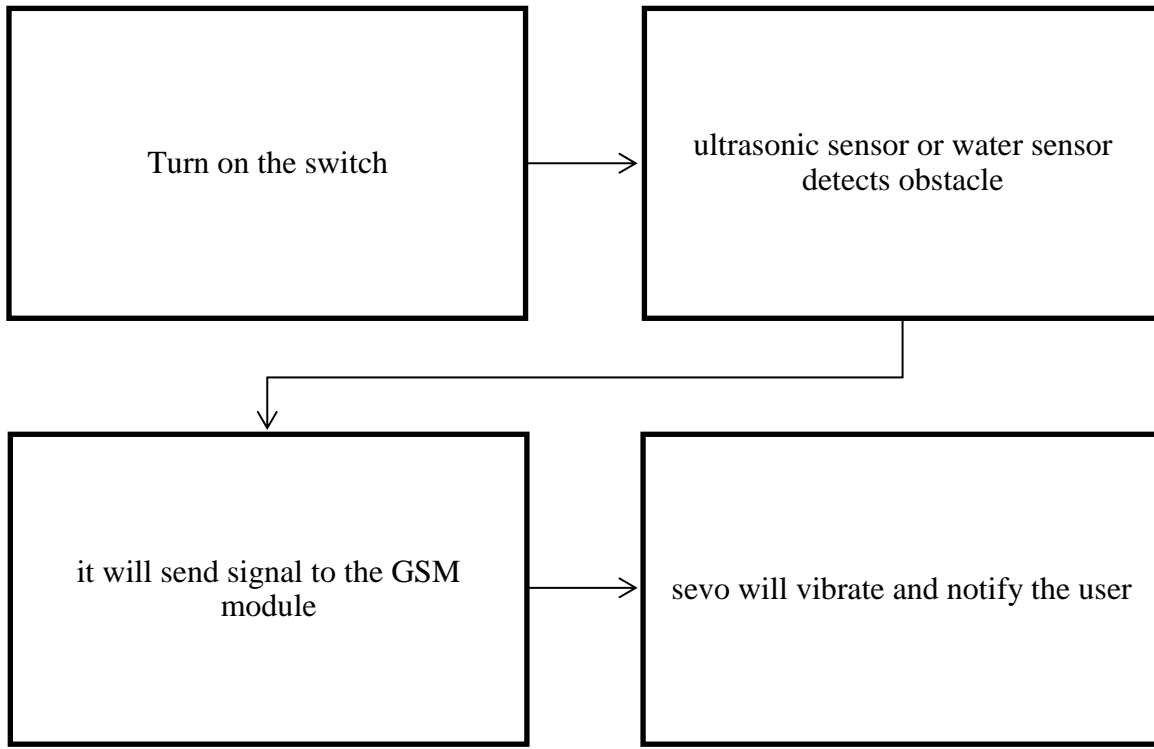
iii. Right Side Look

Figure 3.7.3 shows the right side of Obsvoid with sonar sensor on it



Figure 3.7.3 : *Obsvoid right side*

a. Working Procedure



b. Coding And Programming

Coding is basically the process of creating codes from one language to another one. It can also be called as a subset of programming since it actually implements the initial steps of programming. It involves writing codes in different language as instructed.(8)

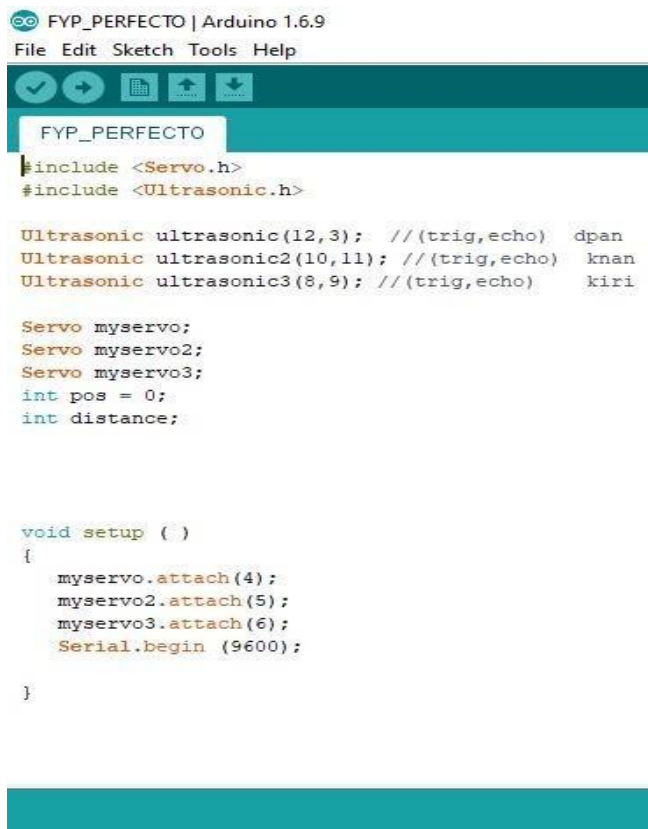
Programming is the process of developing an executable machine level program which can be implanted without any error. It is the process of formally writing codes so that the human inputs and corresponding machine outputs remain in sync.

Creating code is the beginning steps and then programming is used to analyzed and implement the same and produce the proper machine level output. Programmers use to analyze and conceptualize the different aspects of the communication and produce the correct machine outputs.

c. Programming Application

Arduino Intergrated Development Environment (IDE) is a special software running on your system that allows you to write sketches (synonym for program in arduino language) for different Arduino boards. The arduino programming language called processing, which is similar to the language. After the sketch is written in the Arduino, it should be uploaded on the board for execution.

Figure 3.7.4 shows the code of ultrasonic sensor that we installed in the arduino software.



```
FYP_PERFECTO | Arduino 1.6.9
File Edit Sketch Tools Help
FYP_PERFECTO
#include <Servo.h>
#include <Ultrasonic.h>

Ultrasonic ultrasonic(12,3); // (trig,echo) dpan
Ultrasonic ultrasonic2(10,11); // (trig,echo) knan
Ultrasonic ultrasonic3(8,9); // (trig,echo) kiri

Servo myservo;
Servo myservo2;
Servo myservo3;
int pos = 0;
int distance;

void setup ( )
{
  myservo.attach(4);
  myservo2.attach(5);
  myservo3.attach(6);
  Serial.begin (9600);
}
```

Figure 3.7.4 : *Ultrasonic sensor coding*

3.8 PROJECT BUDGET

Table 3.8.1 shows the project budget table. This is some item and component that we've been purchased. This project have been spent almost RM150.

Table 3.8.1 : Project budget

No.	Description	unit	Price(MYR)	Amount(MYR)
1	Arduino UNO R3 Compatible	1	48.00	48.00
2	Micro size Servo Motor SG90	3	15.00	45.00
3	Jumper wire	3	5.00	15.00
4	Cap	1	10.32	10.32
5.	'OBSVOID' embroidery on cap	1	30.00	30.00
			Total	148.32

3.8.1 MARKETING PLAN

1- Customer Segments

Figure 3.8.1 shows the customer segments.

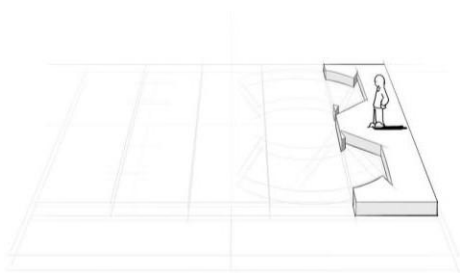


Figure 3.8.1 : Customer Segments

Target market :

- Visually impaired and blindness people
- Senior citizen
- Any ages
- Middle range income

2- Value Proposition

Figure 3.8.2 shows the value proposition.

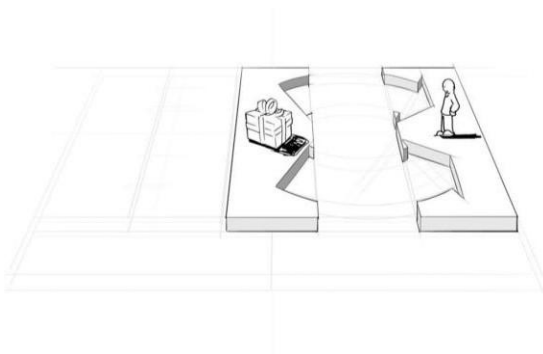


Figure 3.8.2 : *Value Proposition*

Introduce Obsvoid fashionable and smart cap that can detect obstacle and avoid it. Using Arduino hardwares and softwares system it can detects all obstacles infront, up, right, and left. Vibration give a signal to the users. IOT integration in wearable products.

3- Channel

Figure 3.8.3 shows the channel.

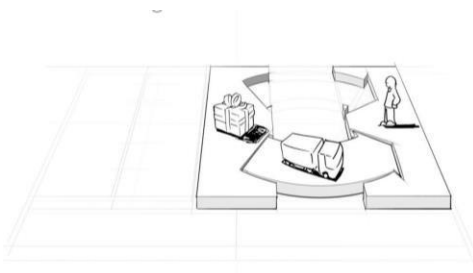


Figure 3.8.3 : *Channel*

For the store location, we can put and market our product to the clinic, pharmacy and Blind Association. Other than that, we also make a online marketing where we can market to the social media side such as in Facebook, Instagram and Twitter. We also make a eCommerce marketplace such as Lazada and Shopee.

4 Customer Relationships

Figure 3.8.4 shows the customer relationships.

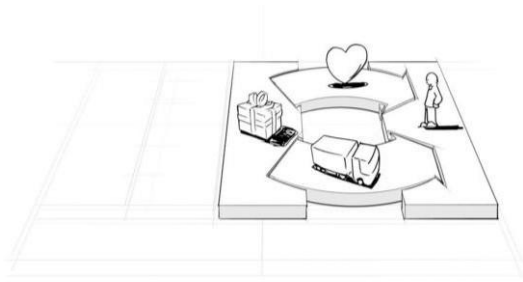


Figure 3.8.4 : *Customer Relationships*

For the customer relationship, we can make a customer service face to face and we also make a delivery service to the direct buyer.

5- Revenue Stream

Figure 3.8.5 shows the revenue stream.

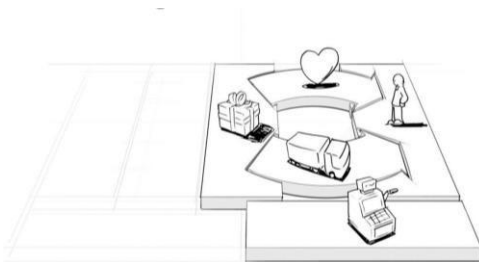


Figure 3.8.5 : *Revenue Stream*

For the revenue stream, we can make money on our product by selling the Obsvoid. Beside that, we also take a charges on delivery and also we can make money on dropship membership.

6- Key resources

Figure 3.8.6 shows the key resources.

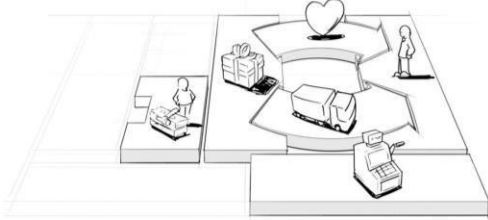


Figure 3.8.6 : Key Resources

Manpower Planning which is also called as Human Resource Planning consists of putting right number of people, right kind of people at the right place, right time, doing the right things for which they are suited for the achievement of goals of the organization.

7- Key Activities

Figure 3.8.7 shows the key activities.

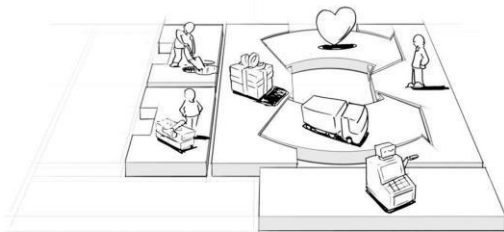


Figure 3.8.7 : Key Activities

For the marketing activities, of course we are selling and marketing our product. Other than that, we also join the event and exhibition to introduce and market our product. Research and development also need to do to improve our product. Lastly, we make a collaboration with the big company so the product sales increase.

8- Key Partner

Figure 3.9.8 shows the key partner

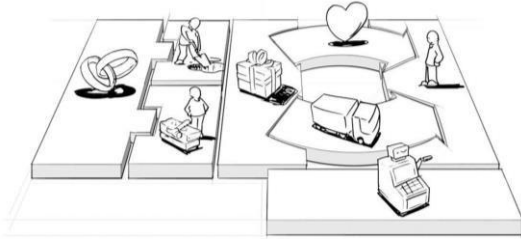


Figure 3.8.8 : Key Partner

To make this product successful, make a marketing partner so the product can be marketed widely. Firstly, make a partner through agent and dropshipper for our product. Secondly, make a partner with courier company such as DHL Express, City Link Express and Poslaju. Next, make a partner with Malaysia Blind Association which is our main objective which is to help the blind people. Lastly, make a partner with eCommerce marketplace such as Lazada and Shopee

9- Cost Structure

Figure 3.8.9 shows the cost structure plan.

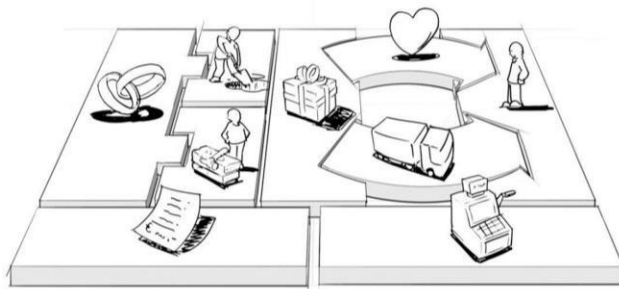


Figure 3.8.9 : Cost Structure

For this marketing, there are some cost that we need to handle. Firstly, logistics cost which is the transportation of the products stock. Secondly, the cost of store location online and offline. Other than that, the salary of marketing staff and the advertising cost.

3.9 PROJECT PLANNING (GANTT CHART)

PROJECT 2 GANTT CHART

Table 3.9.1 shows the gantt chart of project planning from week 1 to week 15.

Table 3.9.1 : Project planning gantt chart

Week/activities project		status	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15
Introduction and planning Gantt Chart	P		■	■													
	C		■	■													
Component survey	P			■	■	■											
	C			■	■	■											
Component selection	P				■	■	■	■									
	C				■	■	■	■									
Fabrication process	P							■	■	■							
	C							■	■	■							
Testing	P									■	■	■	■				
	C									■	■	■	■				
Modification/ improvement	P												■	■			
	C												■	■			
Writing report	P													■	■		
	C													■	■		
Preparing for banner and presentation skill	P														■		
	C														■		
Final project presentation	P															■	
	C															■	
Correction and submission report	P															■	■
	C															■	■
P	Planning																
C	Complete																

3.9.1 SUMMARY OF CHAPTER

As a conclusion, every project will have different methodologies that is being used to make the project successful and working well. Generally, the methodologies are divided into three parts, there are planning, implementing and analysis. In planning phase there are including with reading activity and some job of requirements of hardware and software to be used.

CHAPTER 4

RESULT AND ANALYSIS DATA

4.1 INTRODUCTION

After completing all the process the project will be build and run. From the complete project, result and analyze the result can be done. This chapter will explain about the result of the project testing on our project which is Obsvoid and the tools that has been used in this project.

4.2 TOOLS USED

The tools that need to be used in this project will involve several hardware and software. These are the hardware:

1. Diagonal Plier

Figure 4.2.1 shows the diagonal plier



Figure 4.2.1 : *Diagonal plier*

Diagonal pliers or wire cutters are pliers intended for the cutting of wire. The plane defined by the cutting edges of the jaws intersects the joint rivet at an angle or "on a diagonal", hence the name.

2. Wire Tape

Figure 4.2.2 shows the wire tape that we used



Figure 4.2.2 : *Wire tape*

Electrical tape (or insulating tape) is a type of pressure-sensitive tape used to insulate electrical wires and other materials that conduct electricity. It can be made of many plastics, but vinyl is most popular, as it stretches well and gives an effective and long lasting insulation. Electrical tape for class H insulation is made of fiberglass cloth.

3. Wire Spiral

Figure 4.2.3 shows the wire spiral



Figure 4.2.3 : *Wire spiral*

The wire spiral is used so that the wire looks neat.

4. Arduino Software

Figure 4.4 shows the arduino software that is for coding and programming

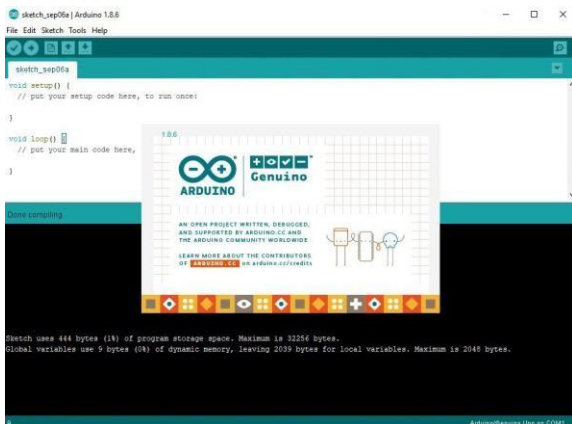


Figure 4.2.4 : *Arduino software*

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board.

4.3 RESULT

A total of 20 questioners were given to the Malaysia Association of Blind Malaysia (MAB) to get the feedback on our project Obsvoid . The questioner were answer by management of MAB, Staff of MAB and blind people that have been registered in MAB. 20 questioners were returned and it represent 100% of the response rate.

4.4 DEMOGRAPHIC PROFILE

Basic information for 20 respondent from the questionnaire shows that the respondent consist of 16 Male and 4 female. Which respond to the feedback had been given to the respondents.

Respondent that respond are from, 4 of them are Management for MAB, 5 of them staff of MAB and lastly 11 of them are from blind people. To wrap the feedback from result, all of the respondent agree and on developing Obsvoid which emphasive safety features and help them in daily routine. They also give comment and feedback

4.5 LIST OF FEEDBACK AND COMMENT

Table 4.5.1 shows some feedbacks and comments that wa fill up in the feedback form. This feed back and comments is from Malaysia Association for the Blind (MAB).

Table 4.5.1 : List of feedback and comment

No.	Feedback and Comment
1.	So as to use rechargeable battery
2.	make some modifications in terms of component arrangement
3.	add more style variations of headgear
4.	add fabric in cap to get more comfortable
5.	Make some modifications in wire management

4.6 FINAL RESULT

After the final testing has been run. The vibration and the servo that notify the blind person will be excellent, the servo will be vibrate as soon as the sonar sensor detect the obstacles(9). The distance of the sonar sensor detect the obstacle is tested. Based on the test, the maximum distance that can be reach is 5 meter(10). The time taken to move the servo is 10 microsecond delay(11). The quality of the component is better than the cheap component. The life time of the component will depends on how long and often you used it. If you used it 2 times per month, we have calculate the life-time of the mower is about 6 to 5 month.

CHAPTER 5

DISCUSSION, CONCLUSION AND UPGRADE PLAN

5.1 INTRODUCTION

For this chapter, decisions are made based on all decisions obtained from experiments conducted and discussions in chapters the previous one. In this chapter as well, the relevant matters are relevant objectives of the study as well as recommendations on the study conducted. Besides, conclusions have been made for this experiment.

5.2 DISCUSSION

For this project first objective is to boost up the confidence in blind people in the attire of our project. The use of the cap as the main medium for the blind people's attire have been received a good comment from the blind people organization. Thus, the cap can be used by all gender. Observation of the attire has been made at Malaysian Associations Blinds.

Besides that, the level effectiveness of this project for detecting obstacle at the head height level has been confirmed by the Malaysian Association Blinds. The detection test has been made by each distance that has been chose by the sonar sensor. The maximum distance is 400cm.

For the cost of the making this project is more affordable and reasonable than Mygo stick in the market. The budget to complete this project are below rm200. The budget is not been included with embroidery cost. With this reasonable cost, the blinds association can buy this project for it is affordable and make their everyday life more easy.

5.3 CONCLUSION

In conclusion, Obsvoid can overcome the problems that faced by blind people to make it easier to use. Although the main purpose of this project is to improve blind people confidence with the casualty of an attire. Obsvoid also to replace the conventional walking cane with smart cap that detect obstacle and make the blind people safe while they are walking. This smart cap Obsvoid also helps the blind people in moving and allowing them to perform their daily work easily and comfortably.

5.4 UPGRADE PLAN

For the upgrade plan, one of the plan that Obsvoid want to upgrade is the type of headgear. Redesign and make more type of headgear such as a beanie, headband and more so the blind people can wear what headgear they like to wear. This also can improve the blind people confidence. The second one is to make the component more waterproof than before. Lastly, upgrade our project which is Obsvoid by adding a GPS system to the project. By adding the GPS system, netizen can track where the blind person at and then safety for the blind people will be upgraded

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2018-04-01
- [8] asas elektrik dan elektronik (Catherine shamich , GordonMccomb) (2011)

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NASA Astrophysics Data System (ADS)

Lu, Linli; Ying, Jie

2014-11-01

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[11]research by Jacquet , Belik and Bourda (2006)- limited distance equal length of blind stick

APPENDIX

APPENDIX A	The Comparison Between Our Project And Other Product
APPENDIX B	Product Effectiveness Feedback Form
APPENDIX C	Survey Form
APPENDIX D	The Code And Programme Of Arduino Software
APPENDIX E	Pitex 2020 Poster

**APPENDIX A - THE COMPARISON BETWEEN OUR PROJECT AND OTHER
PRODUCT**

CHARACTERISTIC	OUR PROTOTYPE	OTHER PRODUCT
NAME	OBSVOID	<u>Tongkat Mygo</u>
MAIN COMPONENT	<u>Arduino UNO</u>	Camera sensor
PRICE	RM200	RM837
EFFECT	No side effect	No side effect
ACCURACY	medium	High
WEIGHT	174g	521g
CONTINUOUS RUN TIME	10 hours	6 hours
BATTERY USED	12v Battery	Rechargeable Lithium ion battery

APPENDIX B - PRODUCT EFFECTIVENESS FEEDBACK FORM

BORANG MAKLUMBALAS KEBERKESANAN PRODUK - PROTOTYPE

NAMA PRODUK	OBSVOID
DESKRIPSI PRODUK	<p>OBSVOID adalah sebuah Smart Cap peranti yang memberitahu pengguna bahawa terdapat halangan di hadapan mereka dengan menggunakan sensor untuk mengesan halangan dan memberitahu entiti untuk mengelakkannya. Jarak sensor boleh dilaraskan dengan yang telah diprogramkan oleh peranti. Menggunapakai teknologi Arduino Uno R3, Micro Servo dan Ultrasonic Sensor</p>
MAKLUMBALAS / CADANGAN PENAMBAHBAIKAN	<p>① Wajar menyedikan option jarak ② Baik untuk orang yang bersinar-sinar/besindah atau di kegunaan luar ③ Dapat menyelesaikan sebarang masalah orientasi dan mobiliti misalnya pengesanan halangan atau ④ Perlu melabikan sedikit pengubahsuaian agar kedudukan perkakas di dalam lebih sesuai & membantu pengguna memanta sekiranya ⑤ sangat baik jika alat ini juga dapat dipadatkan dan ukurannya menjadi dll.</p>
TANDATANGAN/NAMA/ ORANISASI/ COP RASMI	<p>FADILIN bin HEZRIE BIN ABDUL RAHMAN .</p> <p><i>[Signature]</i></p>

TERIMA KASIH

[Signature]
hs

SUMITHARAMASAMY
Senior Manager
Research & Development
Malaysian Association for the Blind



**APPENDIX C - SURVEY FORM FOR MALAYSIAN ASSOCIATION FOR THE BLIND
(MAB) AND THE RESULT**

Can detect an obstacle on upper body height.

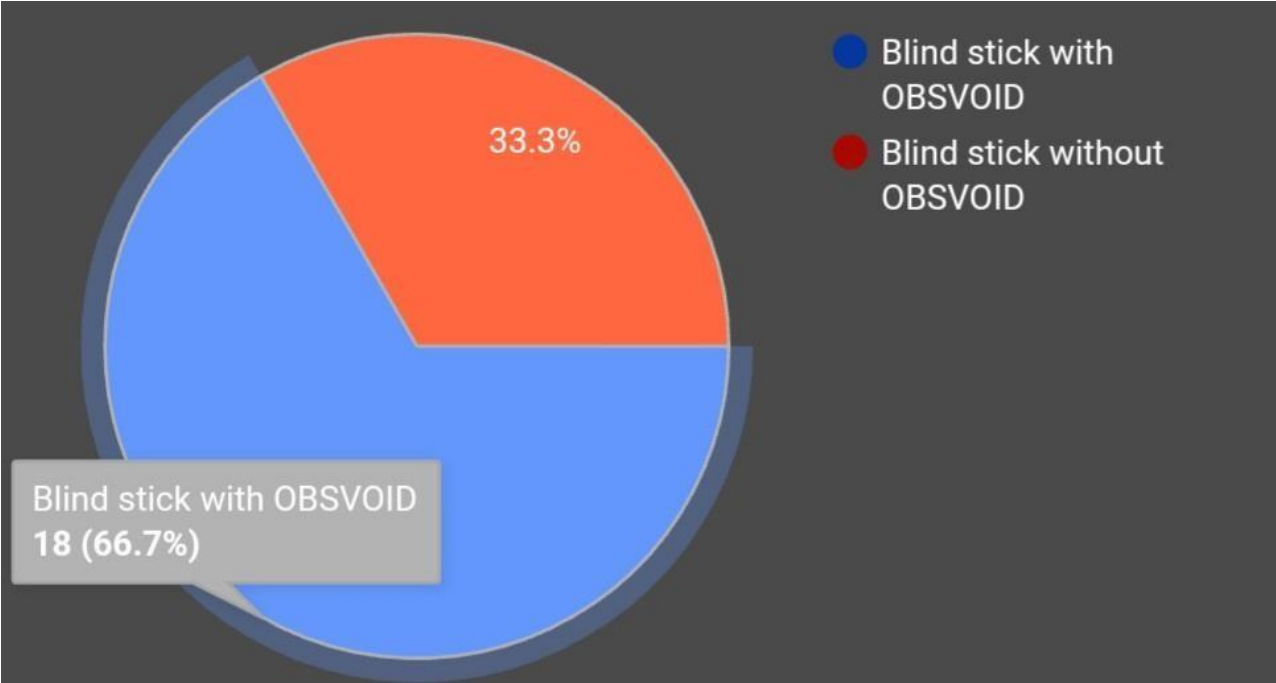
- Blind stick with OBSVOID
- Blind stick without OBSVOID

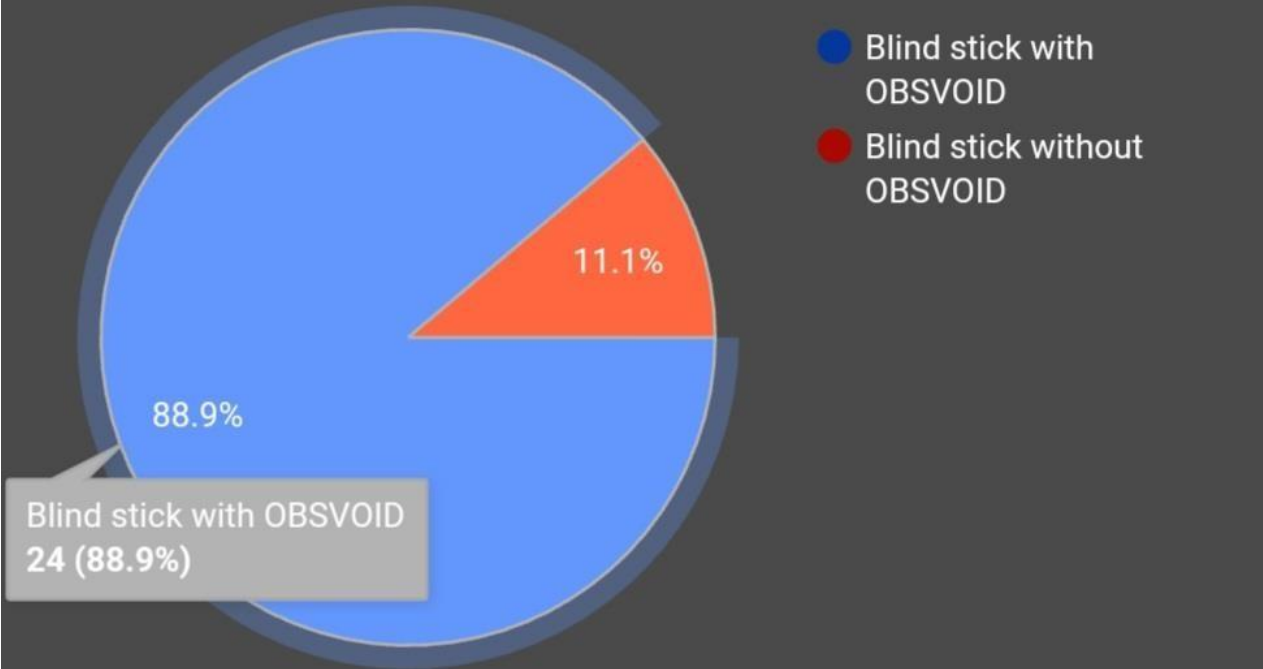
Fully aware of a new surrounding.

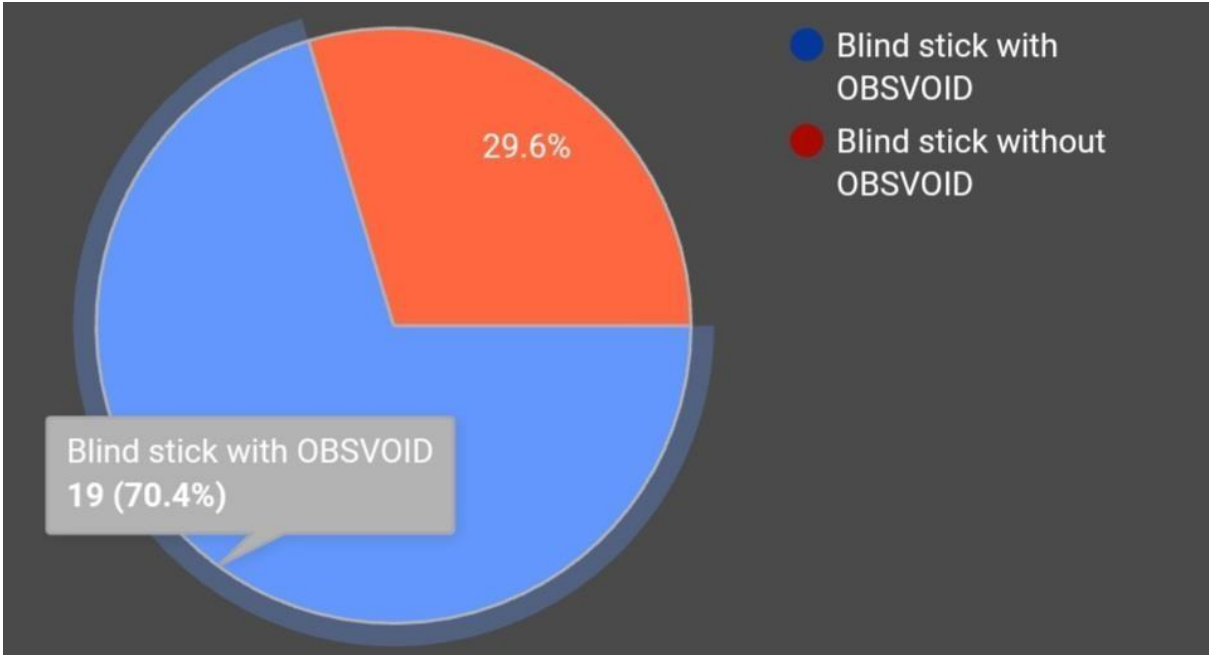
- Blind stick with OBSVOID
- Blind stick without OBSVOID

Easily to move when hiking

- Blind stick with OBSVOID
- Blind stick without OBSVOID







APPENDIX D - CODE AND PROGRAMME OF ARDUINO SOFTWARE

```

#include <Servo.h>
#include <Ultrasonic.h>

Ultrasonic ultrasonic(12,3); //(trig,echo) dpan
Ultrasonic ultrasonic2(10,11); //(trig,echo) knan
Ultrasonic ultrasonic3(8,9); //(trig,echo) kiri

Servo myservo;
Servo myservo2;
Servo myservo3;
int pos = 0;
int distance;

void setup ( )
{
  myservo.attach(4);
  myservo2.attach(5);
  myservo3.attach(6);
  Serial.begin (9600);
}

```



FYP_PERFECTO

```
void loop ( ) {  
  
    distance = ultrasonic.read();           // sensor 1  
    while (distance < 40 )  
    {  
        Serial.println (" obstacle infront ");  
        for (pos = 0; pos <= 180; pos += 1)  
        {  
            myservo.write(pos);  
            delay(15);  
        }  
  
        distance = ultrasonic.read();  
    }  
  
  
    distance = ultrasonic2.read();         // sensor 2  
    while (distance < 40 )  
    {  
        Serial.println (" right obs ");  
        for (pos = 0; pos <= 180; pos += 1)  
        {  
            mvservo2.write(pos):
```

```

    for (pos = 0; pos <= 180; pos += 1)
    {
        myservo2.write(pos);
        delay(15);
    }

    distance = ultrasonic.read();
}

distance = ultrasonic3.read(); // sensor 3
while (distance < 40 )
{
    Serial.println (" left obs ");
    for (pos = 0; pos <= 180; pos += 1)
    {
        myservo3.write(pos);
        delay(15);
    }

    distance = ultrasonic.read();
}
}

```

APPENDIX E – PITEX 2020 POSTER



OBSVOID

ZETTY ROHAIZA BINTI MOHD SAHAK@ISHAK

(PENYELIA PROJEK)

AHMAD IMRAN BIN DULLAH
MIRZA AIMAN BIN MOKHTAR
MOHD ISMAIL BIN MUHAMAD



PENERANGAN INOVASI

Pergerakan fizikal adalah cabaran bagi orang yang cacat penglihatan. Tongkat konvensional yang digunakan oleh mereka sangat terhad jaraknya dalam mengesan objek dan hanya digunakan untuk mengesan objek yang dekat dengan pengguna. Kelemahan tongkat konvensional ini ialah sukar untuk mengesan halangan yang berada di paras kepala mereka seperti pohon kayu yang menghalang laluan mereka. Pengguna juga harus mengetuk tanah atau objek untuk mengesan halangan. Tongkat buta juga tidak cukup ergonomik.

Kami memperkenalkan sistem yang mengesan halangan untuk orang yang cacat penglihatan bagi meningkatkan keupayaan pergerakan mereka dalam kehidupan seharian dengan bantuan sensor pengesan halangan yang di pasang pada topi.

KEPUTUSAN

GAMBAR/BAHU	DAFTAR PROTOTYP	OTAK/PRODUK
1	1.000	Tongkat kayu
2	2.000	Conduktor
3	3.000	Arduino
4	4.000	Arduino Uno
5	5.000	Arduino Uno
6	6.000	Arduino Uno
7	7.000	Arduino Uno
8	8.000	Arduino Uno
9	9.000	Arduino Uno
10	10.000	Arduino Uno

IMPAK INOVASI

1. Dapat membantu orang cacat penglihatan mengesan halangan pada bahagian atas paras kepala.
2. Lebih fleksibel dari sedi penggunaan kerana hanya perlu memakai dan menyoal sensor ultrasonik memberi isyarat.
3. Lebih menamatkan kos pembelian berbanding tongkat 'MyGo' yang dijual di pasaran.
4. Mampu menarik minat orang cacat penglihatan untuk memakainya kerana berasa lebih bergaya.
5. Memberi impak terhadap kualiti hidup, industri dan ekonomi Negara.

OBJEKTIF

1. Merakembentuk prototaip Obsvoid ini untuk orang yang kurang daya penglihatan.
2. Memfabrikasi prototaip dengan memasukkan elemen arduino uno.
3. Meningkatkan keyakinan diri orang yang kurang daya penglihatan.
4. Menguji keberkesanan projek ini dalam membantu orang buta.

SKOP

1. Orang buta
2. Mampu mengesan permukaan padat (cth: dinding konkrit)
3. Jangka hayat bateri mampu bertahan 48 bulan

GAMBAR INOVASI

