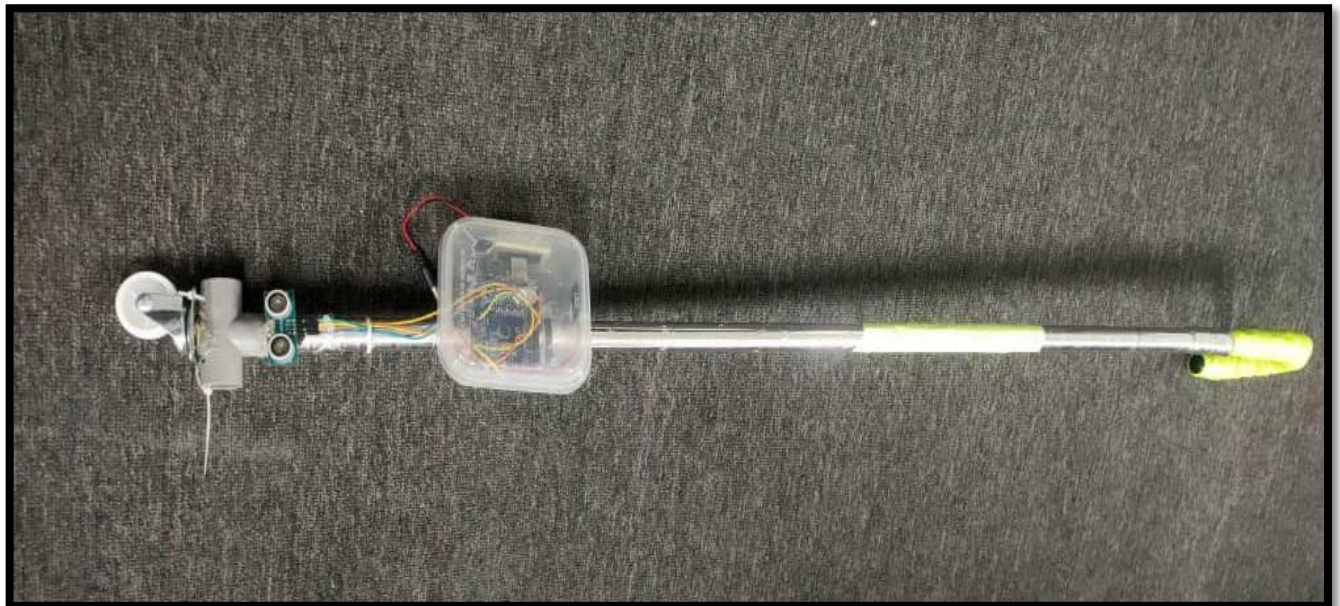




# **SJKT RRI SUNGAI BULOH**

## **SMART WALKING STICK**



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## **1.0 INTRODUCTION**

Vision is the most important part of human physiology as 83% of information human being gets from the environment is via sight. The 2011 statistics by the World Health Organization (WHO) estimates that there are 285 billion people in world with visual impairment, 39 billion of which are blind and 246 with low vision. Here, we develop a tool which can serve as a blind stick being more efficient and helpful than the conventional one. A smart walking stick, also known as a smart cane, is an innovative assistive device designed to help individuals, especially those with visual impairments, navigate their surroundings safely and independently.

## **2.0 EXPLANATION ABOUT THE INNOVATION**

### **2.1 SMART WALKING STICK**

Visually impaired persons have difficulty to interact and feel their environment. They have little contact with surroundings. Physical movement is a challenge for visually impaired persons, because it can become tricky to distinguish obstacles appearing in front of them, and they are not able to move from one place to another. They depend on their families for mobility. Their mobility opposes them from interacting with people and social activities. In the past, different systems are designed with limitations without a solid understanding of the non-visual perception.

Creating a smart walking stick is crucial for several reasons, particularly for enhancing the quality of life for individuals with visual impairments. Here are the key reasons why developing and implementing smart walking sticks is important. Traditional canes can only detect obstacles at ground level. Smart walking sticks, equipped with ultrasonic sensors, can detect obstacles at various heights and alert users to potential hazards.

The Stick measures the distance (30cm) between the objects and smart walking stick by using an ultrasonic sensor. This device is light in weight and portable. It provides the best travel aid for the person. The blind person can move from one place to another independently without the others help.

With this users can move around unfamiliar places without relying on others. This independence is vital for daily activities such as commuting, shopping, and socializing.

## **2.2 DURATION**

It took us 3 months to prepare to complete this innovation. Starting from generating ideas until the testing part.

## **2.3 AIM**

The main aim of the system is to provide an efficient navigation aid for the blind persons which gives a sense of vision by providing the information about their surroundings and objects around them.

## **2.4 OBJECTIVE**

The objectives of a smart walking stick encompass enhancing mobility, safety, and independence for individuals with visual impairments. By integrating advanced technologies, smart walking sticks provide essential support that helps users navigate their environments more confidently and efficiently. These devices contribute to improved quality of life, greater social inclusion, and overall well-being for visually impaired individuals.

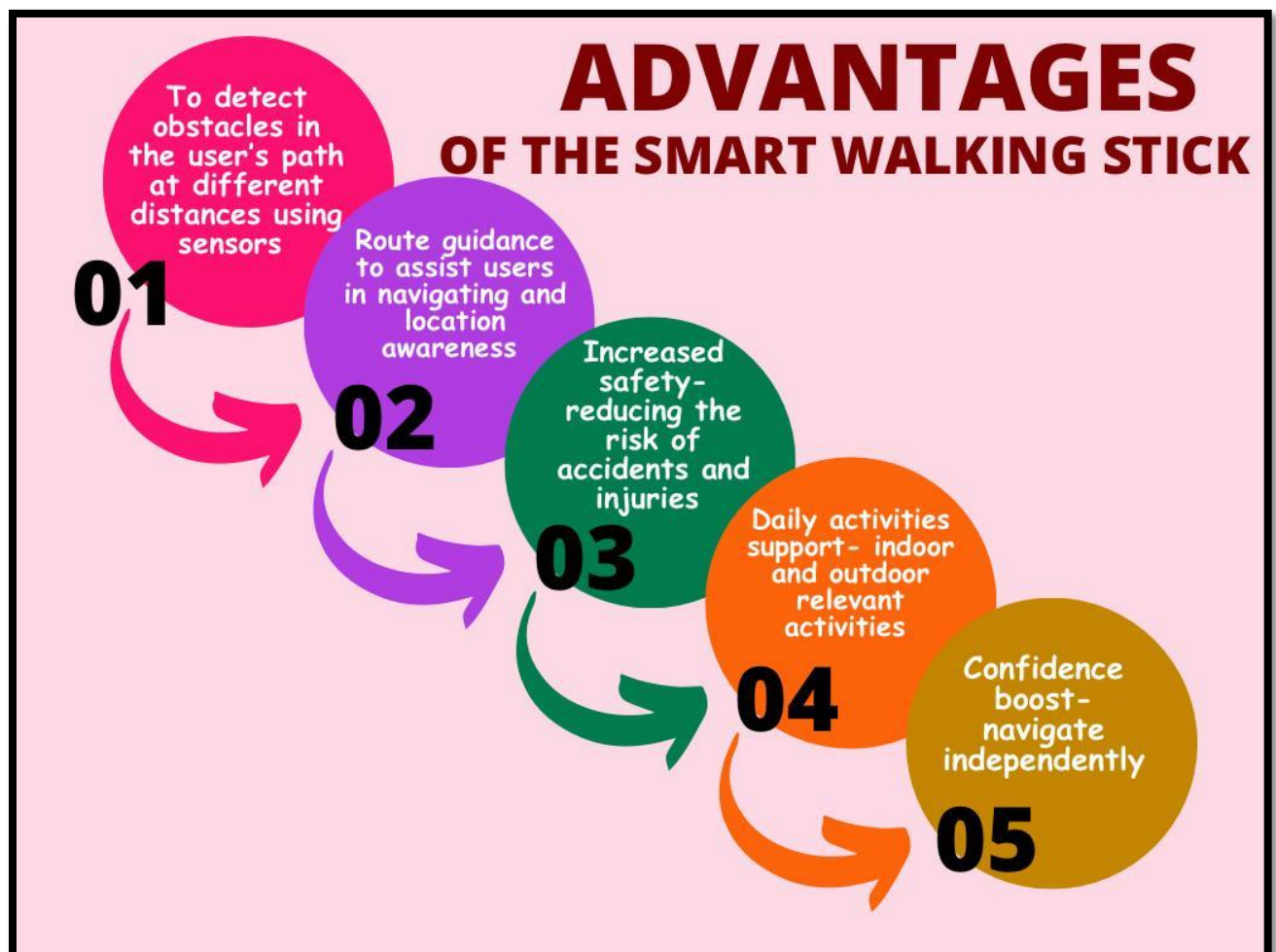
Smart Blind Stick is an interactive device which mainly aims at helping the blind to navigate easily and in a safer manner. The smart blind stick aims at giving the blind person a better understanding of the path he is moving in.

The data of the ultrasonic sensors are manipulated using an Arduino UNO. With the help of the data processed using these technologies, we aim at providing a

better and more convenient method of navigation for the blind person. This stick helps them achieve a higher rate of self-dependency.

The system gives a priority to safety and comfort and is also cost effective. In a normal day to day situation a blind person waves the blind stick ahead of them in order to check for any objects or obstacles. The smart stick helps them in this by detecting if any obstacle is blocking the path being taken by the subject.

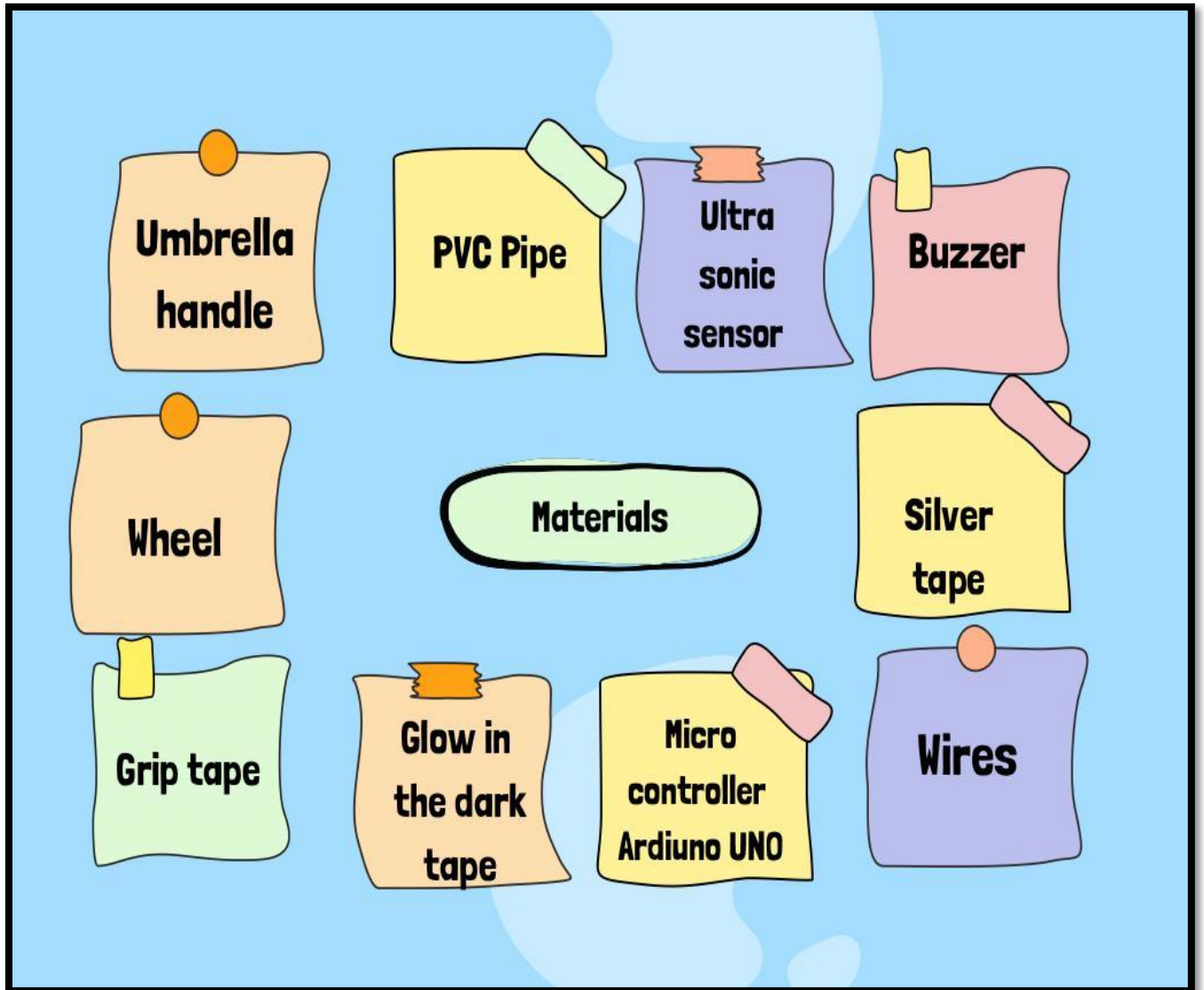
## 2.5 ADVANTAGE OF SMART WALKING STICK







The advantages of the smart walking stick are

1. To detect obstacles in the user's path at different heights and distances using sensors, and provide timely alerts to avoid collisions.
2. Route guidance to assist users in navigating unfamiliar environments through GPS and navigation features, offering turn-by-turn directions and location awareness.
3. Increased safety -To provide immediate feedback on obstacles and potential hazards, reducing the risk of accidents and injuries.
4. Daily activities support - To facilitate the safe and efficient completion of daily activities, both indoors and outdoors, by providing relevant environmental information.
5. Facilitating Participation - To encourage users to participate in social and community activities by making it easier to navigate public spaces and events.
6. Reducing Isolation - To help reduce feelings of isolation by enabling greater mobility and interaction with the community.
7. Confidence Boost -To increase users' confidence in their ability to navigate independently, thereby improving their overall mental and emotional well-being.

## 2.6 MATERIALS



| Materials   | Usage   |
|---|---|
|    | <p>BUZZER- Connect the short pin of the buzzer to the Arduino's ground pin (GND) and the other end to digital pin 9 to hear beep sound.</p>   |
|    | <p>PVC PAIP- Easy to carry and cheap</p>  |
|    | <p>ULTRA SENSOR- Ultrasonic sensors are used primarily as proximity sensors. They can be found in automobile self-parking technology and anti-collision safety systems. Ultrasonic sensors are also used in robotic obstacle detection systems, as well as manufacturing technology</p> |
|  | <p>SILVER TAPE- To cover the PVC pipe.</p>  |
|  | <p>UMBRELLA HANDLE – Reuse material to hold the walking stick</p>   |
|  | <p>WHEEL- Easy to move.</p>   |

|  |  |
|--|--|
|   | <p>GRIP TAPE- Easy to grip, sweat-absorbent properties ensure your mouse will never slip out of your hand even as it gets clammy</p>   |
|   | <p>GLOW IN THE DARK TAPE - One of the most common applications of Glow in the Dark Tape is in safety signage.</p>                      |
|   | <p>MICRO CONTROLLER ARDIUNO - Arduino microcontroller can provide a quick tool for developing small projects that involve sensors.</p> |
|  | <p>WIRES- Wires are pieces of metal that transport electricity. They are usually flexible which makes them easier to use.</p>          |

## 2.7 METHODOLOGY (STEPS)

1. Firstly, we prepare PVC pipe. Cover the PVC pipe with silver tape.



2. Secondly, fix the wheel on the bottom of the PVC pipe.



3. Thirdly, fix the umbrella handle on top of the PVC pipe as a handle of stick and cover it with grip tape.



4. Then, cover the middle part of the PVC pipe with glow in dark tape.



5. Next, create the coding and upload it into Arduino UNO.



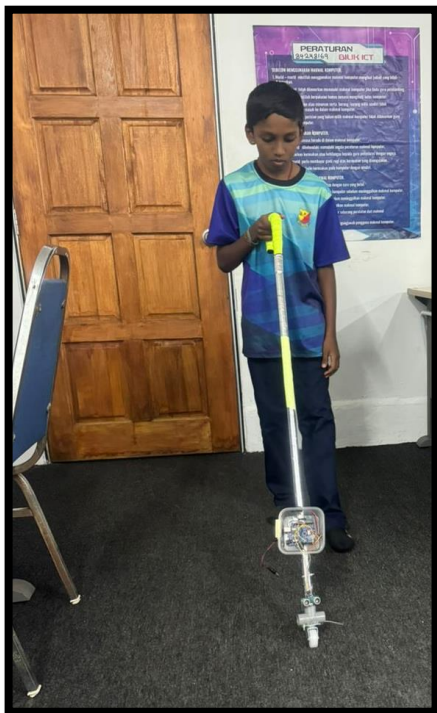
6. Connect jumper wires to the ultra-sonic and buzzer and to the Arduino-UNO.



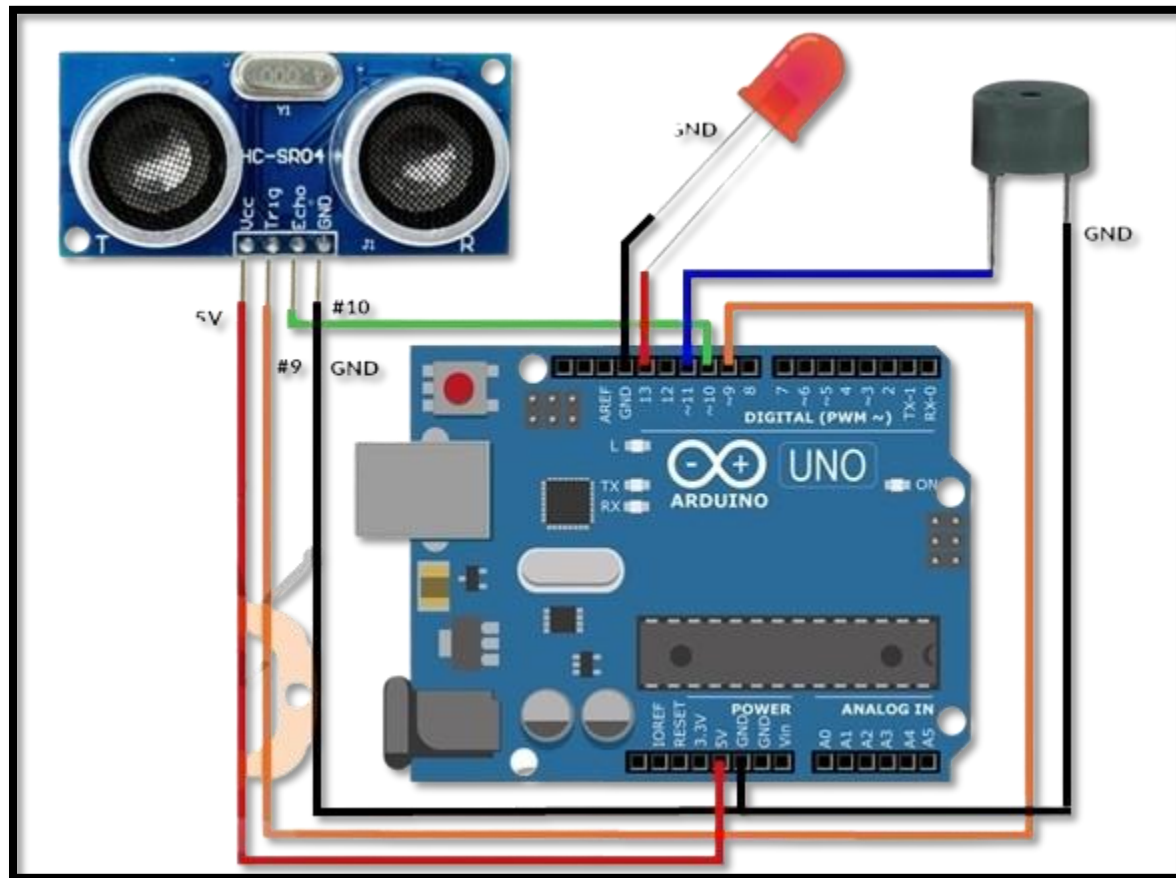
7. Fix all the components into the plastic container. Later, place the plastic container on top of PVC pipe.



8. Lastly, “test it out” the smart walking stick.



## Circuit diagram for the project



## Code of project – Arduino UNO

```
const int trigPin = 9; const int echoPin = 10;
long duration; int distanceCm, distanceInch; void
setup() { Serial.begin(9600); pinMode(trigPin,
OUTPUT); pinMode(echoPin, INPUT); pinMode(6,
OUTPUT); // Connect LED Pin D6 pinMode(5, OUTPUT);
// Connect Buzzer Pin D5 } void loop() {
digitalWrite(trigPin, LOW); delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10); digitalWrite(trigPin, LOW);
duration = pulseIn(echoPin, HIGH); distanceCm=
duration*0.034/2; distanceInch =
duration*0.0133/2; Serial.println("Distance: ");
Serial.println(distanceCm); delay (100); // See
the Ultrasonic Sensor Value in Serial Monitor
if(distanceCm < 30) // You can Change the value {
digitalWrite(5, HIGH); // Buzzer ON
digitalWrite(6, HIGH); // LED ON } else {
digitalWrite(5,LOW); // Buzzer OFF
digitalWrite(6,LOW); // LED OFF } }
```

## 2.8 TARGET GROUP

The target audience for a smart blind stick, which typically incorporates advanced technologies like sensors, and obstacle detection to aid visually impaired individuals, includes:

**Visually impaired Individuals** - The primary users who would directly benefit from the enhanced mobility and independence provided by the smart stick.

**Elderly people with Visual Impairment**- Older adults who may have age-related vision loss can find smart blind sticks particularly useful for maintaining their independence.

**Visually impaired Individuals**

**Elderly people with Visual Impairment**

## 2.9 POSITIVE IMPACT / RECOGNITION

The smart walking stick is lightweight and cost-effective, and has a price not exceeding RM60. The smart walking stick has the obstacle detection alerts through beep sound. The smart walking stick has Glow in the Dark Tape as a safety signage. Its ability to glow in the dark makes it an ideal choice for guiding visually impaired individuals. In our innovation we adding extra grip to avoid them falling from the hand.

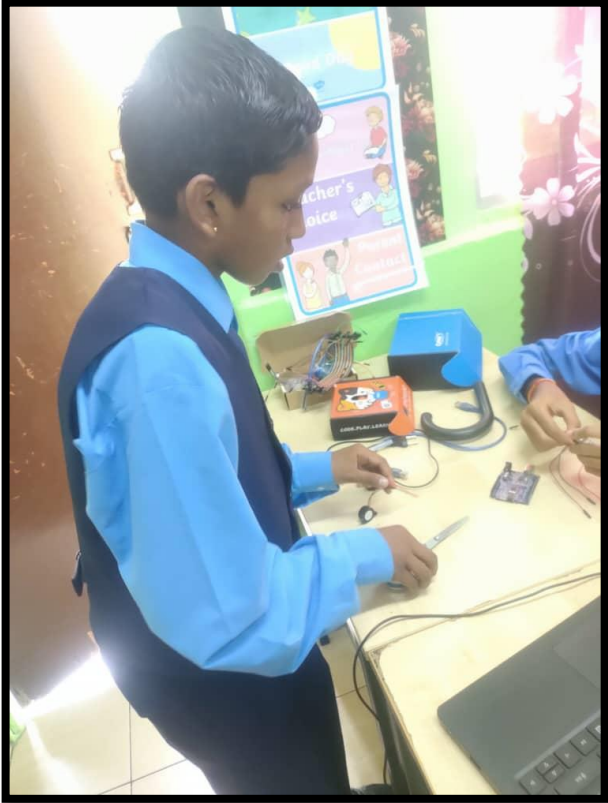


A survey done on blind person (Mr.Aramugam). He able to walk with this smart walking stick. The Smart Walking Stick allows him to walk without any obstacles.

The buzzer sounded “beep” and alert him when he nearer to the objects. Hence, he felt safe and confident to walk independently.

## 2.10 EVIDENCE





### **3.0 CONCLUSIONS**

Smart walking stick for blind people helps the blind people when the obstacle occurs at in fronts the person. The stick gives signal to the person by buzzer sound or vibration when it detects the obstacle. The ultrasonic sensors can detect objects from 50cm and on the detection of an obstacle, the buzzer alerts the blind person and as the smart stick get closer to the obstacle the sound from the buzzer gets more and more louder. Without the help of any other person the blind people can walk easily.