Scientific Journal of Impact Factor (SJIF): 5.71

e-ISSN (O): 2348-4470
p-ISSN (P): 2348-6406

International Journal of Advance Engineering and Research Development

Volume 5, Issue 07, July -2018

SMART STICK FOR DISABLED

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ABSTRACT:- *The main objective is to provide ability for the blind people to self navigate outside in new environments and walking down the crowded street. Physical movement is one of the big challenges of the blindness.*
To overcome the problem of visually challenged people, Smart Stick is introduced. The normal stick of the blind people is added with the sensor which acts like the artificial vision. Sensors placed in the stick senses the external world and guide the blind people to move forward quickly. Vibration through haptics helps the person from obstacle in the path. The automatic detection and warning helps to move further with greater potential.

Keywords: *Artificial vision, Automatic detection, Obstacle, Sensor*

INTRODUCTION

Visually impaired people are those who can't identify smallest detail with healthy eyes, they need some aid while moving. There are many guidance systems for visually impared travellers to navigate safely and quickly against obstacles. Generally the blind carries the white cane as the tool for direction when they move or walk. Here the stick is advanced using modern technologies.
Smart stick for blind man is self-operating device.The system can be used both indoor and outdoor navigation. The electronic aiding cane which is designed to solve this issue helps to record information about the obstacles presence in the road with active or passive sensors. The active sensor helps in sensing and detecting far and near obstacles. The Ultrasonic sensor is to sense distance from any object, infrared sensor is to detect stair-cases, LDR to sense lighting conditions and vibrator motor is activated when any obstacle is detected, another sensor is placed at the bottom of the stick for the sake of avoiding puddles. A Water sensor is used in the detection of wet surfaces.
This project aims to design and implement of an intelligent and cheap stick for visually impaired people, which guides them to move in the right path and hurdles if any.

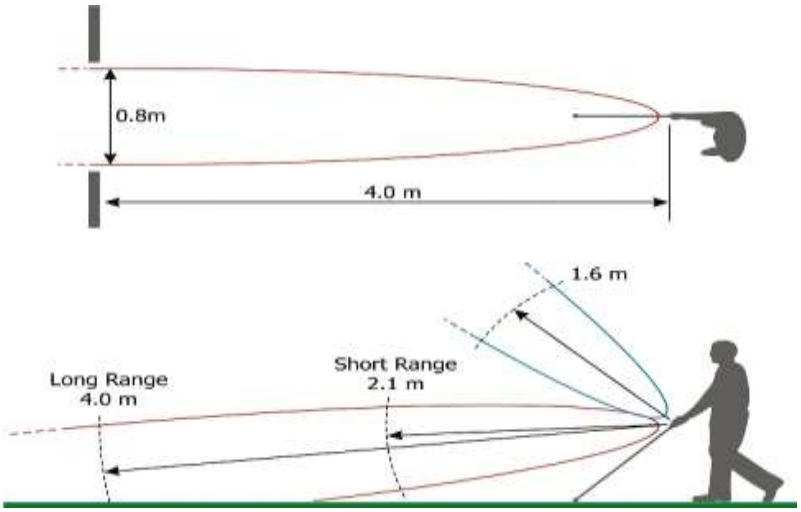

Fig 1: Distance covered by the smart stick

The proposed design of the vibrating stick covers the short range distance of about 2.1metres and the long range distance of about 4 metres in earth's surface and about 1.6metres in the air to detect the obstacle.

METHODOLOGY
SYSTEM ARCHITECTURE
The proposed design of the smart stick, as shown in fig.2 is composed of the following units:

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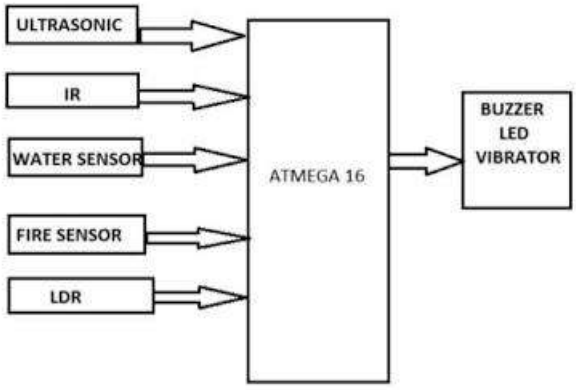

Fig 2: Proposed system design of the smart stick

INPUTS

LDR :

Light dependent sensors are frequently used as light sensors. These sensors are majorly used when there is a need to sense the presence and absence of the light is necessary. These are also called as photo resistors which is made of high resistance semiconductor material.

Water sensor :

This sensor is used to detect the detect the presence of water. The water sensor is located at the base of the stick to detect the water in the path. When the water sensor comes in contact with the wet surface, it produces an electrical signal which trigger the arduino controller.

Ultrasonic sensor :

The ultrasonic sensor can measure the distance of an object by using sound waves. It measures the distance by sending out a sound wave at a specific frequency and listening for the sound wave to bounce back.

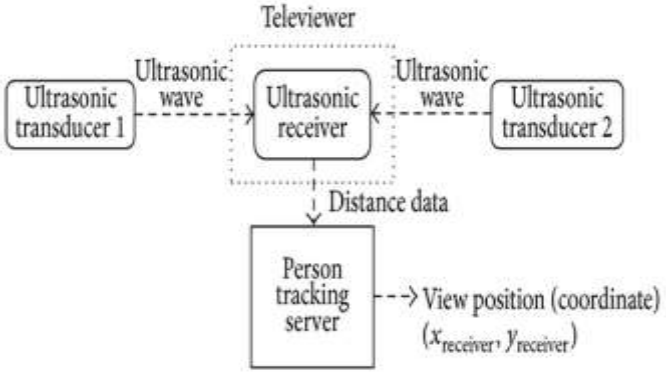

Fig 3: Block diagram of Ultrasonic sensor

IR :

An infrared sensor is to sense certain characteristics of its surroundings by emitting or detecting infrared radiations. These are also capable of measuring the heat being emitted by an object and detecting motion. The output from the detector is usually very small and hence pre-amplifiers coupled with circuitry to further process the received signals.

OPERATING UNIT

The Microcontroller is the operating unit in the smart stick. Microcontrollers are used in automatically controlled products. The arduino is connected with the Ultrasonic sensor, LDR, IR, Water sensor and the haptics. The microcontroller reads the distance of the obstacle using sensor and also commands the buzzer. The buzzer beeps once for left side obstacle, twice for front obstacles and thrice for right obstacles. The vibrator is also connected in parallel with the buzzer for vibration sensation. The light sensor is

OUTPUT:

The vibrating motor gives the output of the smart cane that communicates with the blind. This plays an interface between the human and the circuit. The vibrating motor and the buzzer play a major role in detecting the obstacle.

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VIBRATING MOTOR:
The sample code for the vibrating motor working according to the distance of the obstacle:

```
#define trigPin 13
#define echoPin 12
#define motor 7
#define buzzer 6

void setup()
{ pinMode(trigPin, OUTPUT);
pinMode(echoPin, INPUT);
pinMode(motor, OUTPUT);
pinMode(buzzer,OUTPUT);
}

void loop()
{ long duration, distance;
digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);

duration = pulseIn(echoPin, HIGH);
distance = (duration/2) / 29.1;

if (distance < 70) // Checking the distance, value can be changed
{
digitalWrite(motor,HIGH); // When the the distance below 100cm
digitalWrite(buzzer,HIGH);
} else
{
digitalWrite(motor,LOW);// when greater than 100cm
digitalWrite(buzzer,LOW);
} delay(500);
}
```

FEATURES:
1. Smartest than the other mainstream white canes.
2. Entirely automated.
3. Can be maintained & operated easily.
4. Very comfy to function.
5. Authentic & Durable.
6. Low power consumption.
7. The Microcontroller can be code protected.
8. Simplicity of the design makes it effective navigation assistant .
9. Obstacle & hole can be determined easily by sensors readings.
10. Wet or muddy or potentially slippery terrain can be detected by a pair of electrodes.

CONCLUSION:

The smart cane is effective and affordable. Its helps the blind to the greater extend and act as a major support to them.
The system offers low-cost, reliable, portable, low-power consumption and robust solution for navigation with obvious short response time.

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