# ANDROID BASED SMART BLIND STICK USING ULTRASONIC SENSOR IOT

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***Abstract*- Using this smart blind sticks, blind individuals can communicate with their surrounding environment with ease. That's the objective of this article. 285 million individuals, roughly there are 246 million people with limited eyesight and 39 million individuals who are blind globally. If people pay attention to them, it's extremely likely that you'll see they need assistance from others to walk. To get where one wants to go, one must ask for directions. The use of this blind stick allows for more certain walking. The hc - sr04 ultrasonic on this stick alerts the user by buzzing when it detects an object standing in front of them. The individual can now move around fearlessly. Further LDR sensors are employed in the stick to help the blind distinguish between day and night. The microcontroller (Arduino Uno R3) receives sensor signals, processes them, and outputs brief pulses to Arduino pins attached to buzzers. The only way to help them get through their problems and lead better lives will be through this device.**

***Keywords*- smart blind stick, Arduino uno, microcontroller, Buzzer, visually impaired people.**

## I. INTRODUCTION

People who desire to travel the world safely and independently may find it difficult to do so if they are blind or have other vision impairments. Technology development has made it feasible to develop creative solutions that can assist those who are blind in overcoming these difficulties. The Android-based smart blind stick is one such remedy that employs ultrasonic sensors to identify obstacles and facilitate navigation. Individuals who are blind or visually challenged may use this technology to travel independently and with confidence. The Android-based smart blind stick is intended to be an affordable, dependable, and simple-to-use option for those who are visually impaired. The tool uses ultrasonic sensors to identify obstructions in the user's path and gives feedback using a variety of techniques, such as sound and vibration. For extra features like route planning and position tracking, the stick can also be connected to an Android smartphone.

In this report, we'll delve more into the Android-based smart blind stick's design, capabilities, and advantages. Additionally, we'll go over the value of using ultrasonic sensors for obstacle detection, the benefits of pairing the gadget with an Android smartphone, and the possible effects of this technology on the lives of those who are blind. We want to provide a thorough knowledge of the Android-based smart blind stick and its potential to significantly improve the lives of its users by looking at these elements. A stateof-the-art tool that uses ultrasonic sensors and runs on Android is the smart blind stick, which is intended to help people with vision impairments safely and freely navigate their surroundings. Users may immediately identify potential hazards in their way thanks to the device's ultrasonic sensors, which detect impediments and provide feedback through sound and vibration. With an emphasis on the following subtopics, this project entails designing and creating an Android-based smart blind stick.

## II. LITERATURE SURVEY

We collected the previous articles from google scholar and the the Literature survey.[1] Sameer Grover, Aeysha Hassan, Kumar Yashaswi, Prof. Namita Kalyan Shinde et al[1] Presented the Smart Blind Stick automatically detects the obstacle in front of the person by use of sensors present in the systems, it also incorporates moisture detection at its bottom in order to detect the moisture of the soil or ground so that the person will be aware if it’s feasible to walk on that particular ground. [2]T. Tirupal, B. Venkata Murali, M. Sandeep, K. Sunil Kumar et al[2] Proposed voice direction and location indication for the blind using GSM, GPS, and an optical device indicator Finding the user's location and any obstacles in their path is required for this strategy. The main problem is that they produced a new model that was heavy and difficult to grip. Ultrasonic Eye Electrical Guide Cane for Visually Impaired.[3]Shubham Belea, Swapnil Ghuleb, Akshay Gunjalc, N.D. Anwatd et al [3] Proposed the novel Intelligent White-Cane design that can provide tracking and signal receptor functions is discussed. In our company, we have developed a smart white cane model with extra special features like a navigation system to help blind people's families find them more easily. [4]Ihab A. Satam,Mokhaled N.A. Al Hamadani,Alaa H. Ahmed et al [4] Created for those who are visually impaired, the Global Positioning System (GPS) and Global System for Mobile Communication (GSM) modules are pictured as a stick guide model. They are also connected to sensors such ultrasonic and infrared sensors. Blind people will find it easier to navigate with the help of this smart stick.

## III. METHODOLOGY

This paper works with the Internet of Things (IOT) to make the Android Based Smart Blind Stick .This module is developed with the following requirements

### A. Ultrasonic sensor module:

An ultrasonic sensor, a transmitter, a receiver, and related circuitry are all included in this module. An obstacle causes an ultrasonic sensor to emit a sound wave that returns to the sensor after bouncing off it. The distance to the barrier can be determined using the time it takes for the sound wave to go there and back.

### B. Microcontroller module:

A microcontroller board (like an Arduino board) and related circuits are included in this module. The ultrasonic sensor sends distance data to the microcontroller board, which analyses them to see if an obstruction is nearby. In order to send and receive user orders, it also uses Bluetooth to interface with the Android app

### C. Bluetooth:

This module has a Bluetooth component that makes it possible for the microcontroller board and the Android app to communicate. The microcontroller board and the Bluetooth module can be linked directly or through a serial interface

### D. Android app module:

This module has a Bluetooth component that makes it possible for the microcontroller board and the Android app to communicate. The microcontroller board and the Bluetooth module can be linked directly or through a serial interface.

### E. Buzzer:

The buzzer is used to make alarms and warn blind people, and it is connected to the Arduino using jumper wires.

### G. Arduino UNO:

Arduino is a tool for building computers that are more capable than desktop computers of sensing and controlling the physical world. It consists of a development environment for building software for the board's basic microcontroller and is an open-source physical computing platform. The boards are available for purchase or self-assembly, and an opensource IDE can be downloaded without charge.

## IV. Working Procedure:

A device that helps visually impaired people navigate their environment safely and autonomously is an Android-based smart blind stick with ultrasonic sensors. Ultrasonic sensors, an Android handset, a vibration motor, and a rechargeable battery make up the smart blind stick. High-frequency sound waves are emitted by the ultrasonic sensors, which are then reflected back to them by surrounding objects. The length of time it takes for the sound waves to return to the sensors is measured, and using this data, the separation between the sensors and the objects is determined. This distance information is sent to the Android device via the sensors, and it is used to identify obstructions in the user's route.

The circuit connections are made as per the block diagram shown below.

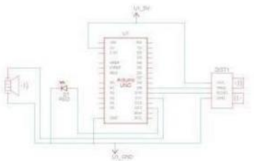

**Fig 1: Block diagram for circuit**

V. **Working Model**

A small prototype is designed such a way that to test the module in real time. This is a small prototype with module installed.

**Fig 2: Prototype of Android Based Smart Blind Stick**

## VI. RESULT AND ANALYSIS

- Ultrasonic sensor sends high frequency pulses, these pulses reflects from object and takes as Echo, time between echo and Trig is measured by the microcontroller or Arduino which is directly proportional to distance.
- The speed of sound is 341 meter per second in the air, and the distance between sensor and object is equal to time multiplied by speed of sound divided by two.
- Distance = (Time * Speed Of Sound) ÷ 2
- After the distance measurement, Arduino makes a data format using Bluetooth.
- When distance is high, general safety voice announcement will be initiated.
- If the distance is low, high voice alert will be initiated.

By this the blind person can hear the voice clearly even in noisy environment

## VII. CONCLUSION

An Android-based smart blind stick with ultrasonic sensors is a useful tool for people who are blind or visually impaired, to sum up. The user can more easily and safely navigate their environment with the help of ultrasonic sensors, text-to-speech alerts, vibration alerts, and GPS navigation. The item is useful and convenient for daily use because of the rechargeable battery and lightweight construction. Overall, the Android-based smart blind stick with ultrasonic sensors is a useful device for those who are blind or visually impaired, as it can increase their level of freedom, safety, and confidence in their everyday activities. The Android-based smart blind stick with ultrasonic sensors provides various benefits over conventional blind sticks in addition to the previously listed functionalities. Traditional blind sticks only use touch and sound to identify obstacles, which can make it challenging for users to find obstacles that are out of their reach or in dimly lit locations. The smart blind stick's ultrasonic sensors can identify obstacles that are out of the user's line of sight and send appropriate alerts.

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