Intelligent Walking Stick for Blind People

Mr. Arun Kumar.P[1], Ms. Arockia Rexi Nishaliya.S[2], Ms. Priyadarshini. N[3]
[1]*Professor, Department of Department of Biomedical engineering, SNS College of Technology Coimbatore, India*
[2,3]*Department of Department of Biomedical engineering, SNS college of Technology, Coimbatore, India*

***Abstract*- Primarily, a cane alleviate its user to scan their environ for orientation marks or obstacles. If an unsighted person were to swing his or her cane high enough to find an overhang, someone might get smack with it which is really a lousy one. So conniving a smart blind stick with the present enhanced technology creates a life-changing jounce on the blind people. We have accomplished this goal by setting forth a smart blind stick that will abet the visually impaired with obstacle detection. This also has a wireless Bluetooth system, that wary the blind one with messages via earphones. We have also protracted this enterprise with a RF module, that guide the blind person when the stick is mislaid and a CMP compass module is embedded for identifying directions for surpassing navigation.**

INTRODUCTION

According to 2018 survey of world health organization, globally it's estimated that, approximately 36 million people survive with blindness. Researchers in a study have warned that global blind population will triple by 2050 due to a growing population of ageing individuals.

Now a day, visually impaired persons are bestowed with several types of canes and walking aids. These walking aids not only empower them to travel independently and extensively, but also provide SA measure of protection and travel safety.

Some of the prototype has been turned over to the companies for evaluations and recommendations and even there have been grants for further research and development.

The cane or use of the cane-like objects for support has been used since the dawn of civilizations. It is the most likely of all the mobility tools to underestimate and granted and here we have propose a smart blind stick with add on technology that will benefit the blinds.

LITERATURE REVIEW

In this paper, they have proposed a smart blind stick .that can detect obstacles, holes and give information about eight wind direction using Arduino. For obstacle detection, ING sensors and for wind information CMP compass sensors have been used. Also a buzzer will be active for warning them about the information oh hitch, obstacles, and hole. This paper has aimed to make an UID design of extension module as smart guide extension.[1]

Here the smart stick is based on infrared technology for obstacle detection. The output is connecting ted to oscilloscope and variation in received signal is observed for upward and downward stairs. Multiple message recording and playback device has been used to give six different speech warning. The warning messages are spoken via earphones. Additionally MCU are used to detect how far the obstacles are from the blind. They have implemented foldable smart stick composed of all this technology with good accuracy.[2]

In this paper, they have designed a smart blind stick, which will be useful in unstructured environment. This paper they have made the setup, like, the location and the distance of the obstacle is conveyed to the blind through vibration I hand and audio in the ear of a person. Irrational strength depends on the distance of the obstacle. This stick is equipped with a wireless connection using Bluetooth between earphone and the stick. Real-time experiments with the observation of good accuracy has been proven.[3]

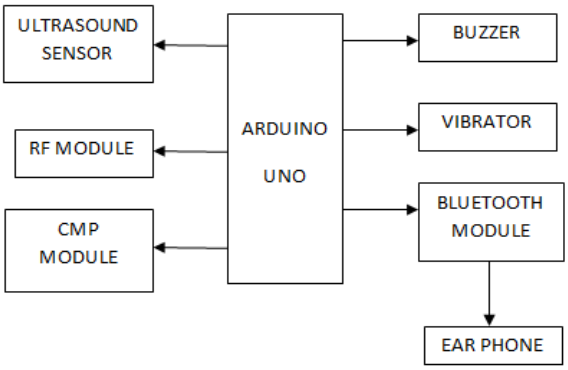
This paper has proposed a smart electronic traveling aid which is equipped with internet if things. Ultrasound sensors have been used to detect the obstacles and potholes. GPS and ESP8266 WIFI-module has been used for sharing the location with the cloud. This also has fire detection and RF module for finding the stick when misplaced. This paper has assured a promising technique that will be the most

suitable alternative to white canes ant another ETA's.[4]

This paper has implemented an intelligent ultrasonic walking aid for improved and ease navigation of blind people. This design guide visually impaired peoe from road obstacles, water around. Additionally, it has a remote control that is used to track and locate the misplaced stick. This proposed project had proven 90% of accuracy using confusion matrix.[5]

METHODOLOGY

The main aim of this project is to facilitate blind people to move safely and detect obstacles in their path.



OBSTACLE DETECTION

HC-SR 04 ultrasound module is interfaced with the Arduino UNO, for obstacle detection. Once triggered, the ranger produces a frequency of 40KHZ, sent out through the terminal that are reflected from obstacle and received at echo terminal, as the obstacle advent the user and get into the range, the power of vibration goes high.

The cane is designed in a way that the motor vibrator, when there is an obstacle within the threshold range. The intensity of vibration varies according to the distance of obstacle.

Fig 1: ultrasound sensor

CMP COMPASS SENSOR MODULE

It is an electronic compass sensor. The module is equipped with 3 axis magnetometer, 3 axis gyroscopes and 3 axis accelerometer. A data output in the range 0-3599 is produced from CMPS.

The weakness of compass sensor is deflection. Due to the rotation of the earth, there is deflection due to the deviation of wind direction. The compass sensor is embedded with arduino as an input sensor. Button ON/OFF is functioned to activate the system and trigger the compass sensor.

RF MODULE

RF 433MHZ RX/TX module interfaced with ARDUINO UNO is operated at radio frequency level. It varies from 30KHZ to 300KHZ. This module has a RF receiver (RX) and a RF transmitter (TX),that is operated at a frequency of 434MHZ.a key is on the wrist band .on pressing it will activate the buzzer on the stick which helps the person to locate the stick when misplaced depending on the intensity of sound.

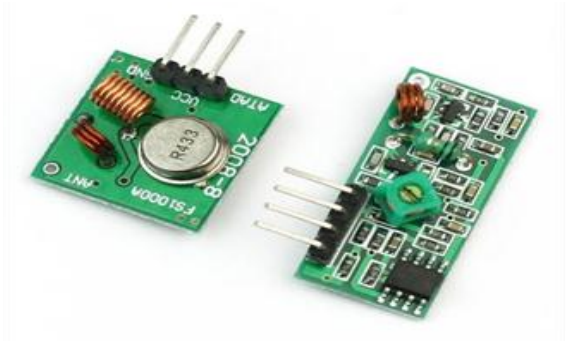


Fig 2 : RF Module

WIRELESS COMMUNICATION

BLUETOOTH FEEDBACK

Bluetooth is a wireless technology for exchanging data over short distances less than 30 feet. The ultrasonic range finder connected to Arduino board which detects the distance of obstacles and passes through Bluetooth shield to the user. Bluetooth module gives the connection between Arduino board and earphone. The user is received by the distance value once it is obtained through Bluetooth. Over 2.4GHz radio frequencies are used by Bluetooth to send signals.

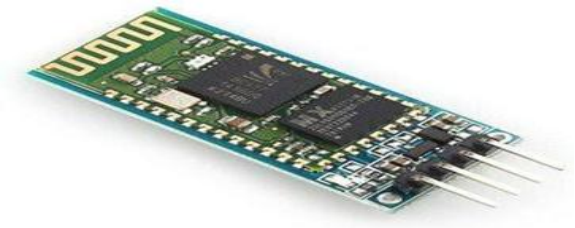


Fig 3 : Bluetooth module

CONCLUSION

This system was designed based on visually impaired people, which is sufficient for effective walking. The arduino based system is constructed to detect the object. As it is capable of detecting obstacle of nearer distance, it is very safe and comfortable for the user. On account, it also informs the direction to the user. The algorithm used combines the Bluetooth interfacing which warns the user of respective dangers. The vibrator motor fixed at the handle alerts the user with vibration.

RESULT ANALYSIS

The experiment was carried out with different persons who had good practice with walking stick and also for other peoples. It is done with different zones of obstacles and range of distance where obstacle identified was noted.

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