IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 2, July 2022
Impact Factor: 6.252

Smart Blind Stick Using Arduino

Mr. Channaveerana Gouda[1], Mr. Shiva Prajwal C[2], Ms. Shaik Shaguftha[3], Ms. Meghana J A[4], Ms. Syeda Nuzha[5]
Assistant Professor, Department of E&CE [1]
Students, Department of E&CE[2,3,4,5]
Rao Bahadur Y Mahabaleswarappa Engineering College, Bellary, Karnataka, India

Abstract: *The World Health Organization(WHO) reported that there are 285 million visually impaired people worldwide. Hence, the product developed is light in weight, compact and does not cause fatigue to the user. So, this helps the blind people to be self dependant till particular extent by giving info of surrounding objects, person, and help in keeping the track of current location. A Life of a Visually impaired is a bit difficult when compared to a normal person. This project plays a major role in making their lives independent and enjoy the beauty of world on their own without any involvement of new technologies like artificial intelligence and voice assistance. Therefore, making automation more feasible..*

Keywords: Blind Stick

I. INTRODUCTION

Visually impaired people are the people who finds it difficult to recognize the smallest detail with healthy eyes. Those who have the visual acuteness of 6/60 or the horizontal range of the visual field with both eyes open have less than or equal to 20 degrees. These people are regarded as blind. A survey by WHO (World Health Organization) carried out in 2011 estimates that in the world, about 1% of the human population is visually impaired (about 70 million people) and amongst them, about 10% are fully blind (about 7 million people) and 90% (about 63 million people) with low vision. The main problem with blind people is how to navigate their way to wherever they want to go. Such people need assistance from others with good eyesight. As described by WHO, 10% of the visually impaired have no functional eyesight at all to help them move around without assistance and safely. This study proposes a new technique for designing a smart stick to help visually impaired people that will provide them navigation. The conventional and archaic navigation aids for persons with visual impairments are the walking cane (also called white cane or stick) and guide dogs which are characterized by a many imperfections.

The most critical shortcomings of these aids include: essential skills and training phase, range of motion, and very insignificant information communicated been communicated. Our approach modified this cane with some electronics components and sensors, the electronic aiding devices are designed to solve such issues. The ultrasonic sensors, water sensor, buzzer, and RF transmitter/Receiver are used to record information about the presence of obstacles on the road. Ultrasonic sensor have the capacity to detect any obstacle within the distance range of 2cm-450cm. Therefore whenever there is an obstacle in this range it will alert the user. Water sensor is used to detect if there is water in path of the user. Most blind guidance systems use ultrasound because of its immunity to the environmental noise. With the rapid advances of modern technology both in hardware and software it has become easier to provide intelligent navigation system to the visually impaired. Recently, much research effort have been focused on the design of Electronic Travel Aids (ETA) to aid the successful and free navigation of the blind. Also, high-end technological solutions have been introduced recently to help blind persons navigate independently. Another reason why ultrasonic is prevalent is that the technology is reasonably cheap. Moreover, ultrasound emitters and detectors are portable components that can be carried without the need for complex circuit. RF module will help the person to find the stick wherever it is placed.

Eye sight plays a major role in collecting most of the information from the real world and that information will be processed by brain, visually impaired people suffer inconveniences in their daily life and social life. Blindness or visual impairment is condition that affects many people around the world. This condition leads to the loss of the valuable senses of vision. Worldwide there are millions of people who are visually impaired, where many of them are blind. The need for assistive devices was and will be continuous. There is a wide range of navigation systems and tools existing for visually impaired individuals. The blind person truly requires an identifying object.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 2, July 2022
Impact Factor: 6.252

II. BLOCK DIAGRAM

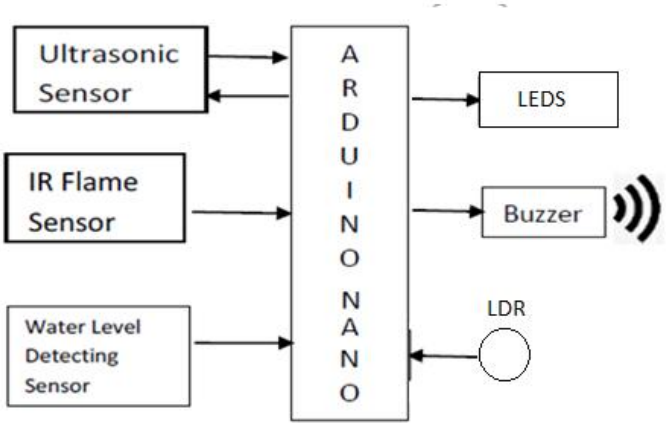

Fig 1: Block Diagram

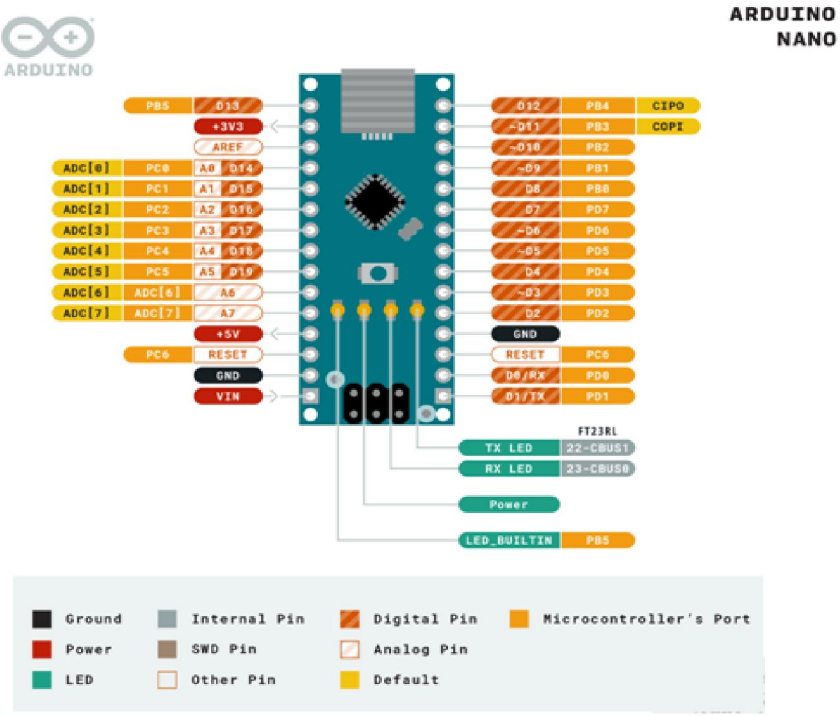

Fig 2: Pin Diagram

III. METHODOLOGY

Blind stick is an innovative stick designed for visually disabled people for improved navigation. we here propose an advanced blind stick that allows visually challenged people to navigate with ease using advanced technology. the blind stick is integrated with ultrasonic sensor along with light, fire and water sensing. our proposed project first uses ultrasonic sensors to detect obstacles ahead using ultrasonic waves. on sensing obstacles the sensor passes this data to the microcontroller. the microcontroller then processes this data and calculates if the obstacle is close enough. if the obstacle is not that close the circuit does nothing. if the obstacle is close the microcontroller sends a signal to sound a buzzer. it also detects water and fire alert the blind person with a different buzzer sounds. it is embedded as part of a complete device often including hardware and mechanical parts. embedded systems control many devices in common

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 2, July 2022
Impact Factor: 6.252

use today. 98 percent of all microprocessors are manufactured as components of embedded systems. with general-purpose counterparts are low power consumption, small size, rugged operating ranges, and low per-unit cost. this comes at the price of limited processing resources, which make them significantly more difficult to program and to interface with. however, by building intelligence mechanisms on the top of the hardware, taking advantage of possible existing sensors and the existence of a network of embedded units, one can both optimally manage available resources at the unit and network levels as well as provide augmented functionalities, well beyond those available.

The smart stick, as shown in Fig. 3.1, is basically an embedded system integrating the ultrasonic sensor to detect obstacles in front of the blind from ground level height to head level height in the range of 400 cm a head, infrared flame sensor to fire near the blind person. Ultrasonic sensors, water level sensor and infrared flame sensor collect real time data and send it to microcontroller. After processing this data, the microcontroller actives the buzzer to buzz and invokes a warning message to the user. The water sensor to detect water spreads and puddles. A rechargeable battery is used to power the circuits with 9V (DC).

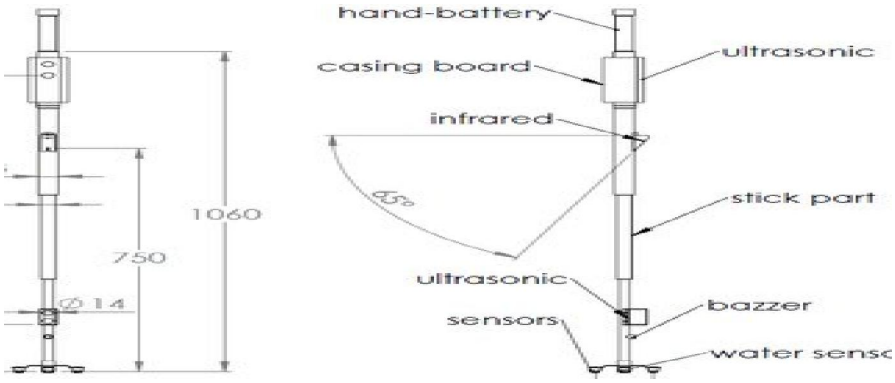

Fig: Design of Smart Stick

IV. ADVANTAGES

- Auto detection
- Obstacle detection with indication support
- Simple to use and low cost

V. DISADVANTAGES

- They cant detect obstructions that are hidden but very dangerous for the blind such as downward stairs, holes etc.
- We cant use blind stick in monsoon seasons because of moisture sensor used in project.

VI. CONCLUSION

The project proposed the design and architecture of a new concept of Smart Electronic Guiding Stickblind people. The blind stick proposed in this paper can aid the visually impaired user by helping him/her navigate through different terrains and obstacles. The advantage of the system lies in the fact that it can prove to be very low cost solution to millions of blind person worldwide. the proposed combination of various working units makes a real-time system that monitors position of the user and provide dual feedback making navigation more safe and secure. It can be further improved to have more decision taking capabilities by employing varied types of sensors and thus could be used for different applications. It aims to solve the problems faced by the blind people in their daily life. the system also takes measures to ensure their safety.

REFERENCES

[1]. Sung Jae Kang, et al." Development of an Intelligent Guide-Stick for the Blind", Proceeding of the IEEE international Conference on Robotics & Automation, 2001

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 2, July 2022
Impact Factor: 6.252

[2]. Y. Kawai and F. Tomita, "A support system for visually impaired persons to understand three-dimensional visual information using acoustic interface", IEEE Conference on Pattern Recognitio-Vol.3, pp.974-977, 2002.

[3]. J. M. Suez, F. Escolano, and A. Peñalver, "First steps towards stereo- based 6DOF SLAM for the visually impaired," in IEEE Conf. on Computer Vision and Pattern Recognition (CVPR), SanDiego,USA,2005.

[4]. Alberto Rodriguez, et al., "Obstacle avoidance system for assisting visually impaired people", in proceeding IEEE Intelligent Vehicles Symposium Workshop, 2012.

[5]. ShrutiDambhare, et al., "Smart stick for Blind: Obstacle Detection, Artificial vision and Real-time assistance via GPS", 2nd National Conference on Information and Communication Technology (NCICT), 2011.

[6]. Mohammad Hazes, et al., "Smart Walking Stick- an electronic approach to assist visually disable persons", International Journal of Scientific & Engineering Research vol. 4, No. 10, 2013.