

**EXPLOITING SENSOR BASED BLIND AID FOR THE VISUALLY
IMPAIRED**¹ Tejashwini Gaikwad, ² Ashwini Gaikwad, ³ Damayanti Daule, ⁴ Prof. Shital P. Jade¹ U.G. Student, Department of Information & Technology, D Y Patil Institute of Engineering & Technology, Ambi, Pune, Maharashtra, India² U.G. Student, Department of Information & Technology, D Y Patil Institute of Engineering & Technology, Ambi, Pune, Maharashtra, India³ U.G. Student, Department of Information & Technology, D Y Patil Institute of Engineering & Technology, Ambi, Pune, Maharashtra, India⁴ Assistant Professor, Department of Information & Technology, D Y Patil Institute of Engineering & Technology, Ambi, Pune, Maharashtra, India

Abstract — For finding the way blind individuals or visually impaired person (VIP) mostly use white canes or guide dogs for obstacle detection and avoidance, however these 2 ancient systems have some limitation. White stick with the ultrasonic sensor, IR sensor and ultrasonic sensor model (Arduino IC, sensors etc.) is that the boon for blind individuals. Visually impaired individuals use their senses like bit or sound for walking in a very explicit space, that isn't doable for out of doors walking. To beat these issues of blind individuals, got to develop a project by using simple available technologies. This walking stick for blind individuals that have multiple sensors, (Ultrasonic and IR) with the assistance of sensors it's doable to reinforce a lot of options to the walking stick. At the side of this feature the system can able to navigate the location and in case of emergency the alert notification can send to their relatives. The aim of this paper is to research the development of a navigation aid for blind and visually impaired individuals. It's based on a sensor with synthetic speech output. This aid is portable and provides info to the user about urban walking routes to suggest what decisions to make. On the other hand, and so as to reduce navigation difficulties of the blind, an obstacle detection system using ultrasounds and vibrators is added to this device. The proposed system detects the nearest obstacle via IR sensor and sends back vibration as a feedback to tell the blind concerning its localization. Ultrasonic sensor is most fitted for obstacle detection and it's of low cost and has high ranging capability.

Keywords- Blind person guidance, Collision avoidance, GPS, Arduino IC, Ultrasonic Sensor, IR sensor

INTRODUCTION

Visual impairment, conjointly referred to as vision impairment or vision loss, may be a decreased ability to see to a degree that causes issues not fixable by usual means, like glasses. Some also include those who have a decreased ability to visualize as a result of they are doing not have access to glasses or contact lenses. Visual impairment is usually outlined as a best corrected visual acuity of worse than either 20/40 or 20/60. The term visual impairment is employed for complete or nearly complete vision loss. Disablement might cause individuals difficulties with traditional daily activities like driving, reading, socialization, and walking. The foremost common causes of disablement globally are uncorrected refractive errors (43%), Cataracts (33%), and eye disease (2%). India is currently home to the world's largest variety of blind individuals. Of the thirty seven million individuals across the world who are blind, over fifteen million are from Asian country. Whereas Asian country wants a pair of 5 hundred thousand given eyes per annum, the country's 109 eye banks manage to collect a maximum of just 25,000 eyes, half-hour of that cannot be used. A system that guide or assist individuals with vision loss, starting from partially sight to completely blind, by means of sound commands is referred as Navigation assistance for visually impaired and to discover obstacles.

II. LITERATURE SURVEY

1. In Robotic assistant for visually impaired mistreatment sensor fusion, Gaurao Chaudhari; Asmita Deshpande paper studied that Disabled folks are in a dire want of electronic assistance. There are a couple of electronic assisting devices that bring their life to an easier flip. During this paper, they tend to describe the design and implementation of a personal assistant mechanism for blind folks. Visually impaired folks want such personal assistant devices for they supply a real-time help concerning any necessary problem that blind people face. A number of those main issues are navigation within the inside, distinctive objects around unless obtaining a physical sense of those objects and sensing the surrounding with the gap of multiple objects. Our paper discusses the various application targeting features like using the lidar for local mapping, employing a 3D camera for understanding the depth of the encircling so the person understands the gap and alternative data of the objects around. This style has been experimentally valid and needed observations are posted during this paper.

2. In ultrasonic navigation based blind aid for the visually impaired Reshma Vijay Jawale; Madhavi Vijay Kadam; Ravina Shantaram Gaikawad; lakshmi Sudha Kondaka paper studied that ultrasonic navigation primarily based blind aid is made to guide the visually impaired and blind to walk simply in urban areas. The planned system operates in 2 modes particularly hurdle detection mode and fixed mode. within the hurdle detection mode, they've got used ultrasonic device and water sensor to avoid obstacles using arduino. during this mode, the system detects solid and liquid obstacle causing various instruction to the blind man through voice message via Bluetooth. The fastened mode provides the data and steering to maneuver from one place to a different safely by setting a hard and fast route in blind stick from supply to destination location. additionally to the on top of features, the system provides directions to the blind to migrate to numerous places mistreatment the GPS system. an android device application is employed to send messages via Bluetooth. The proposed system provides complete guidance and protection to a blind man under various circumstances.

3. In design and implementation of microcontroller based assistive robot for person with blind autism and visual impairment , Abu Tayab Noman; M A Mahmud Chowdhury; Humayun Rashid; S. M. Saifur Rahman Faisal; Iftexhar Uddin Ahmed; S M Taslim Reza paper studied that blindness is a more severe problem among the disabilities of Human. it's tough to guide a standard life for blind sort of a clear-sighted person. as a result of they can not feel their surroundings. So, most of the blind peoples need travel aids to travel freely in associate unknown atmosphere. Researchers theyre fabricated many devices to form freelance navigation for blinds. hotheyver most of them are invented for a particular task or the devices don't cost friendly. to realize independent navigation, a tool with a lot of options is needed. For this purpose, "Design and Implementation of a Blind assistive Robot" is intended to satisfy the goal. The device eliminates the need of human help for blind whereas traveling outside. it's made of reliable elements and incorporates a comparatively low value compared to industrial bots. Each a part of the device are simulated and tested. The device will run by any operator and needs low potheyr. Arduino Mega (ATMega2560) used as the processor, ultrasonic sensors used to detect obstacles, stair, and hole, IR sensors wont to sense line. 2 dc motors area unit connected through a full bridge motor driver L98 module to navigate. A buzzer and a vibration motor used to give notification to the user. The device can follow a predefined line and will follow the wall, will discover associate obstacle, hole and stair and offers sound notification to the user. The device can act as an assistant to the blind peoples.

4. In Blind navigation system for visually impaired using windowing-based mean on Microsoft Kinect camera Ali Ali; Mohammed Abou Ali ,paper studied that Obstacle avoidance and navigation are major issues for blind individuals. They require aid to pass safely. This paper presents an obstacle avoidance system for blind individuals exploitation Kinect depth camera. This helpful technology acknowledges the medium in front of the user victimization Kinect depth camera. The system receives the depth pictures from the Kinect camera and processes it employing a windowing-based mean or average technique to acknowledge obstacles within the scanned environment. once the system acknowledges an obstacle, it sends a voice feedback to the user through earphones. The testing is finished with blind persons. It shows that this device might successfully guide them to bypass obstacles safely.

5. In Blind Guardian: A Sonar-Based solution for Avoiding Collisions with the real World marina Rey; Inatan Hertzog; Nicolas Kagami; Luciana Nedel, paper studied that blind navigation is an present issue that affects a great a part of the population. The affected include permanent or temporarily blind people, persons walking within the dark, and users of immersive virtual environments using real walking for navigation. This paper presents an alternative resolution to the current problem, that depends on an easy wearable device supported ultrasonic waves to detect obstacles and on vibrotactile feedback to warn the user of nearby obstacles. within the following pages, we tend to describe the look and implementation of this equipment, referred to as the Blind Guardian. we tend to conducted user tests with twenty nine subjects in a controlled environment. Results demonstrated the potential of Blind Guardian for future use in real life things, further as for immersive virtual reality applications supported the utilization of head-mounted displays.

III. PROPOSED SYSTEM

Proposed system is especially aiming at novel approach towards coming up with and developing a Stick and android application so as to help visually handicapped person to move on different surface and in different path. By the means that of making fusion between visual sensing technologies and object finding technology. Transmit the IR signal (radiation) in a direction and a signal is received at the IR receiver once the IR radiation bounces back from a surface of the item. Sensing unit IR based system can be used to find the obstacle specially direction even the distance of the item. proposed system consists of range of IR sensors to alert visually impaired person from obstacles in path. These IR sensors are connected on Stick at its front, left and right aspect to accurately find the position of obstacle. There are totally different obstacle devices available in market like sonar sensor, ultrasonic sensor and IR sensor. however proposed system uses IR sensor as IR sensors are extremely directional and cheaper compared to others. thus it will simply differentiate the direction of obstacle.

For visually impaired users having less hearing capability, vibration alert could be a good indicator. it's accustomed alert the user betting on present encompassing. once object detects microcontroller gives alert through vibration assist unit that could be a wearable device at hand of user as hand is sensitive part.

This walking stick for blind folks that have multiple sensors, (Ultrasonic and IR) with the assistance of sensors it's potential to boost additional options to the walking stick. The options are to detect the obstacle for collision avoidance; it detects the item in all the potential direction from the subject. The outputs of those sensors are taken as vibration; respond for different sensors to provide the message to the visually handicapped person by to alert. The navigation feature is additionally proposed in our system which can facilitate the blind folks to move from one location to another.the system can navigate the user to specific location. And if any emergency is needed the system will send the alert message to his relative.

IV .SYSTEM DESIGN

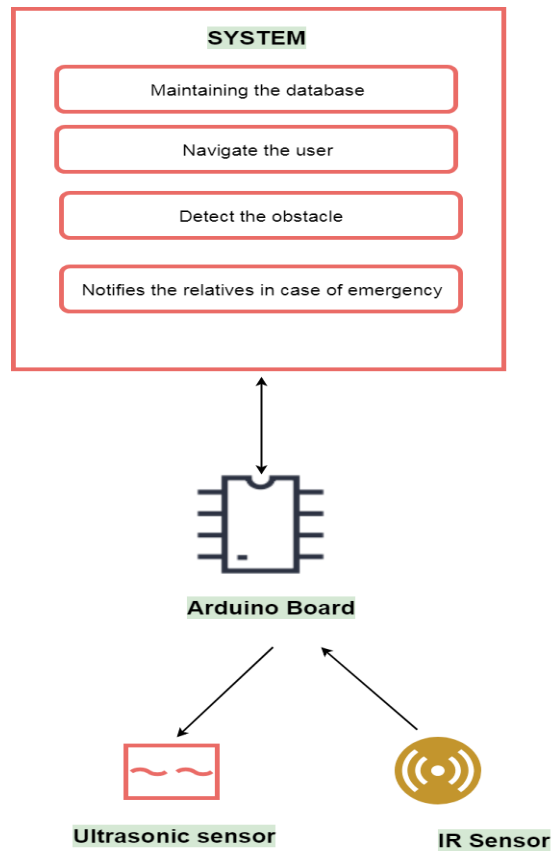


Fig.Proposed System Architecture

IV. ADVANTAGES

- User friendly system.
- It helps for obstacle detection.
- Guides and navigates the visually impaired person .
- Emergency facilitate request to relatives.

V. CONCLUSION

As we've mentioned that india is currently home to the world's largest variety of blind folks. we tend to tried to develop a low cost and user friendly system for blind folks. therefore conclusion is that propose system provides overview on the obstacle detection for blind people or Visually Impaired Person (VIP).

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