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ROBOTIC HOODIE FOR BLIND PERSON WITH NAVIGATION

Prof. Rupak V. Lonare[*1], Prof. Karishma A. Hadke[*2], Tanmay D. Lanjewar[*3], Sushant P. Gawai[*4], Ankit N. Ramteke[*5], Sapna N. Gondule[*6], Prof. Amit M. Dodke[*7], Prof. Harshal T. Ghatole[*8]

[*1,2,7,8]Assistant Professor, Nagpur Institute Of Technology Mahurzari, Katol Road Nagpur-441501, Maharashtra, India.

[*3,4,5,6]UG Students, Nagpur Institute Of Technology Mahurzari, Katol Road Nagpur-441501, Maharashtra, India.

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ABSTRACT

Even though technology is advancing more these days, there is still no affordable equipment available for those who are blind or visually Disabled. A visually impaired person finds it impossible to carry out daily tasks; for this reason, this article details the implementation of a face recognition system and distance tracking system in Hoodie, as well as the usage of Arduino with ultrasonic sensor blind walking stick.

According to the WHO, 30 million people are irrevocably blind, and 285 billion people are visually impaired. The device includes a GPS module as well, enabling the disabled person to use an Earpiece and microphone to navigate the location. In the event of an emergency, the disabled user of this system can also utilize a feature that allows them to contact a designated individual whose number is saved in a micro-controller.

Keywords: Smart Hoodie, Smart Stick, RasberryPI, Ultrasonic Sensor, Arduino, GPS Navigation.

I. INTRODUCTION

Currently, canes are used by blind people to assist with walking. The Ultrasonic device is attached to the bottom of the cane so that it will sound an alert if an opaque is sensed or identified. In our paper, we employ an ultrasonic approach for measuring distance in an air medium. It is predicated on the idea that an object maintained at a certain distance reflects an ultrasonic wave burst that is transmitted by the transmitter. The pulse's transit time from emitter to receiver is dependent on the item's distance. Using this approach, the distance between user and barrier is determined mathematically. Additionally, we offer the user's vibratory sensor such that when the object is extremely It vibrates to let the user know when it's close. The person can be able to hear a speech as well, and how near the thing is about feet. In essence, blind individuals are informed about foot distance, hence this is another benefit of the gadget.

It has several potential uses in smart cards, access control, information security, and other areas.

- The studied solution is to Introduce a second ultrasonic sensor implemented which can detect the distance between blind person and obstacle or an actual person and gives information about his distance. Also, for navigation purposes the GPS module with Wi-Fi will be used.
- There will be an Earpiece that helps the blind person to provide the name of person if data of that person available which stands with him and for navigate and obstacle detection as well.
- Also vibrating motor which will vibrate the shoulders and area for any obstacle or pit hole detection.
- This vibrating motor will be beneficial for anyone who is blind as well as have some level of deafness too.

II. LITERATURE REVIEW

S.N.	Name of Journal	Name Of Author / Co-author	Title of Paper	Survey research	Observational study	Outcome
1	Journal of Emerging Technologiesand Innovative	Anita Gehlot, Rajesh Singh, Amit Kumar, and Thakur.	Smart blind stick for obstacle detection and navigation	Secondary data, taken from 14 CDM projects under India's	The device utilizes Arduino technology	The research suggests an Arduino-powered

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	Research 5.10 (2018). pp216-221		system	agricultural sectors by using EBCR (Emission from reside) Model, Econometric Model, Correlation and Regression.	and incorporates features such asobstacle detection, GPS navigation, andaudio feedback.	smart blind walking stick to help people with visual impairments. The stick contains features like aural feedback, GPS navigation, and obstacle detection. It aims to improve the Independence and safety of blind people by providing real-time support and avoiding obstacles.
2	Br. J. Ophthalmol. (2012), vol.96, pp614–618	Mariotti, S.P.; Pascolini, D.	Global estimates of visual impairment: (2010)	a studied systemthat uses an ultrasonic sensor to measure distances in robotics. Experimental data could be collected to test the effectiveness of this system.	Technical specifications for different ultrasonic sensors could be analyzed to compare their performance.	This study presents global estimates of visual impairment and its causes in 2010. There are about 285 million visually impaired people in the globe, including 39 million blind people. The majority of thoseaffected are over the age of 50. Uncorrected refractive errors and cataracts are the primary causes of

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						visual impairment.
3	International Journal of Computer Applications, National Conference on Growth of Technologies in Dept. Of Electrical Engineering 2 Nagpur Institute of Technology, Nagpur Electronics January (2016): pp24-26.	S.M. Kalaivanan, K. Bala Subramanian, and V. Diana Earshia	A Wearable Ultrasonic Obstacle Sensor for Aiding Visually Impaired and Blind Individuals.	Primary data by questionnaires. Test face photos are taken by the device and sent to the memory, where face recognition algorithms are run by the controller.	Things that partially obscure the face. low-resolution pictures. Expressions on the face. dynamic back drop. differences in skin tone.	Sound waves are usedto measure distance through a process called echo location. By measuring the time, it takes for a sound waveto travel to an object and return, the distance can be calculated.
4	IEEE Computer Vision Survey, vol. 4, no. 12, March (2006).	Fuyan Zhang, Zhi-Hu, Z., Songcan, C., and Xiaoyang, T.	Face Recognition from a Single Image perPerson	Summary statistics of the device's performance metrics, such asaccuracy and distance measurement range.	Accuracy: 91% (improved from 78% in the existing device) Distance measuremen t range:1m to 1.5m	This study explores the potential applications and challenges of face recognition technology (FRT). While FRT hasgained significant attention due to its accuracy and non-intrusive nature, a common issue in face databases is the limited availability of sample images per individual. This limitation can significantly impact the performance of traditional FRT algorithms.

						The study highlights the need for further research to address this challenge
5	International Journal for Advance Research and Development 4.8 (2019): pp 11-15.	Thin Thin, Kyaw Kyaw Hlaing, and Htwe.	Arduino based tracking system using GPS and GSM.	The paper presentsa system that uses a combination of GPS (Global Positioning System) and GSM (Global System for Mobile communication) technologies to track the locationof vehicles or objects.	The authors tested the system by comparing the location data received from the Arduino-based GPS system with data from Samsung and Huawei mobile phones. The results showed that theArduino-based system provided accurate location data, with aslight variation in latitude and longitude values.	This paper presents a system that utilizes an Arduino UNO, GPS receiver, and GSM module to track and transmit location data. The system receives satellite data from the GPS receiver, processes it using Arduino, and sends the information via SMS to a designated mobile phone. This enables users to receive real time updates on the location of vehicles or other moving objects. The system leverages the capabilities of GPS technology to provide accurate position, time, and speed information.

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6	2018 International Conference on Computing, Power and Communication Technologies (GUCON), Greater Noida, India, 2018, pp. 1203-1208.	M. A. Qadeer and T. Agrawal	Tracing Path withArduino Uno using GPS andGPRS/GSM,	Primary method.The subsequent analysis traces the discussion within and between organization ongoing through six stages without overlaps	Projects listed under funding (n o n - N D C crediting, NDC crediting, NDC support units)	This paper presents a real-time path tracking system using GPS and GSM. It offers location tracking for safety and peace of mind.
7	Journal of Physics: Conference Series. Vol. 1015. No. 3. IOP Publishing, (2018)	Zhmud, V.A., et al.	Application of ultrasonic sensorfor measuring distances in robotics	A survey could beconducted to gather data on theneeds and preferences of blind individuals,as well as their experiences with existing assistive technologies.	T-tests, ANOVA, and regression analysis could be used to compare the effectiveness of different assistive technologies and to identify factors that influence navigation performance.	Sound waves are used to measure distance through a process called echo location. By timing the duration of a sound wave's journey to and from an object, the distance can be calculated.
8	International Journal of Intelligent Systems and Applications 6.8 (2014): pp 53-59.	Oladayo, Olakanmi O.	A multidimensiona lwalking aid for visually impairedusing ultrasonic sensors network with voice guidance.	Secondary data	The paper concludes that the studied multi dimensional walking aid is a low cost and effective solution for assisting visually impaired individuals in navigating their surroundings . The authors recommend that the system be further	The paper provides an overview of the current statistics on visual impairment, citing that 285 million people worldwide are estimated to be visually impaired, with 39 million being blind and 246 million having low vision. The authors alsomention

					developed andtested to improve its accuracy and reliability.	that 90% of the world's visually impaired population lives in low-income settings, and People over 50 make up 82% of the blind population.
9	IJRET 5 (2016): 350-352.	S. P. Tondare, Gagan Pratap Singh, Bunnan, and Shraddha.	Ultrasonic Blind Walking Stick for theVisually Impaired	Secondary data designed to assist them in navigatingtheir surroundings.	The Ultrasonic Blind Walking Stick is an innovative solution that aims to improve the mobility and independenc e ofvisually impaired individuals.	An ultrasonic blind walking stick for the visually impaired is a device that employs ultrasonic sensors to identify obstructions and give the user feedback. People with vision impairments can navigate their surroundings more safely and confidently with the use of this kind of stick.
10	Asian Journalof Applied Science and Technology (AJAST) Volume 1 (2017): Pp 274-276.	Jothi, R., and M. Kayalvizhi.	Smart walking stick for visually challenged people.	Secondary data	The research paper concludes that the smart walkingstick is a low-cost andeffective solution to assist a person with navigating	A smart walking stick for visually challenged people is a gadget that helps those with vision impairments navigate their environment. It typically

					their surroundings . Thesystem is designed to be user-friendly and provides accurate feedback to the user.	combines Traditional cane functionality withadvanced technologies such as sensors, GPS, and artificial intelligence to provideusers with a more comprehensiv e andaccurate understanding of their environment.
11	In 2008 5th international conference on electrical engineering/ele ctronics, computer, telecommunicate -tions and information technology (Vol. 2, pp. 765-768). IEEE.	Chumkamon, S., Tuvaphantha phiphat, P., & Keeratiwinta korn, P.	A blind navigation system using RFID for indoor environment	Secondary methodvirtual navigation system is used to teach users navigation skills, including route planning andobstacle avoidance	The RFID reader provides auditory feedback to the user, including the locationof the tag and any relevant navigation instructions.	Radio Frequency Identification (RFID) technology offers a promising solution for indoor navigation, providing a tactile and auditory interface for users to navigate through buildings.
12	International Journal of Human Computer Studies, vol 135,102-369.	Ohn-Bar, E., Kitani, K. M., Guerreiro, J., Sato, D., Ahmetovic, D., & Asakawa, C.	Virtual navigationfor blind people: Transferring routeknowledge to the real World	Virtual navigation system is used to teach users navigation skills, including route planning and obstacle avoidance.	The RFID reader provides auditory feedback to the user, including the location of the tag and any relevant navigation instructions.	The Radio Frequency Identification (RFID) technology provides a promising solution for indoor navigation, providing a tactile and auditory interface for users to

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						navigate through buildings.
13	In Proceedings of the 19th International ACM SIGACCESS Conference on computers and accessibility (pp. 280-289)	Ahmetovic, D., Kitani, K. M., Guerreiro, J., and Asakawa, C.	Virtual navigation for blind people: Building sequential representations of the real-world.	Secondary data		A potentially useful technology that can enhance the lives of those who are blind or visually impaired is virtual navigation. The system can boost mobility, safety, and independence by offering a sequential depiction of the real environment, improving the entire experience of moving through the surroundings.

III. METHODOLOGY

The following approach is intended to be used to complete the work:

1) Overall basic understanding of microcontrollers and sensors.
2) Identifying the issues with the current system through a literature review.
3) Analysis of the studied solution.
4) Study of the control strategies.
5) Comparison of studied solution with existing solution.

The figure below shows the block diagram of the working of obstacles detection system of the hoodie.

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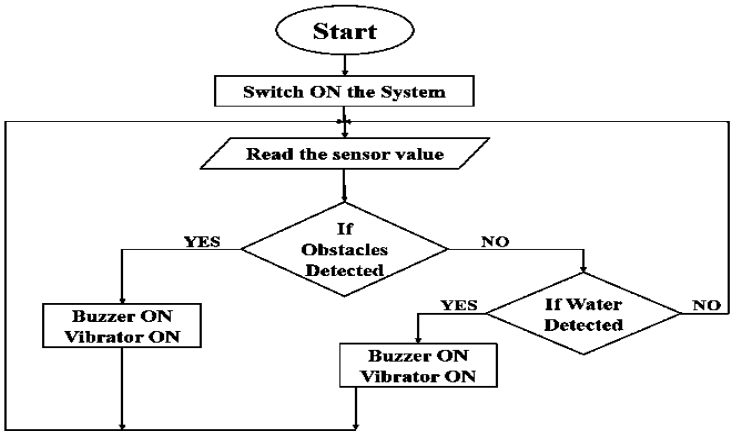

Figure 3.1. Obstacles detection system flowchart

The figure below shows the block diagram for the embedded system with GPS in it for real time monitoring.

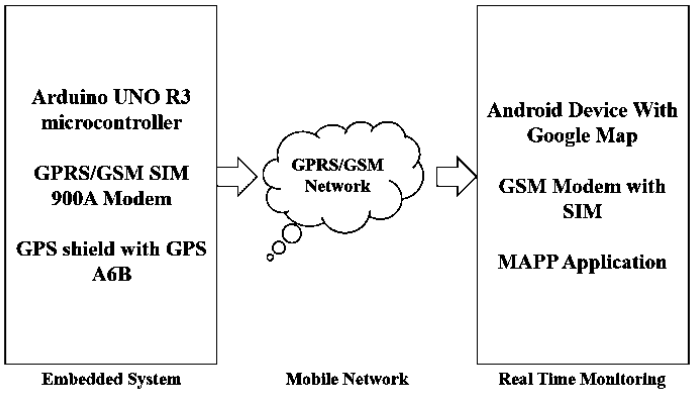

Figure 3.2. Real time monitoring with GPS

IV. OUTCOME OF THE RESEARCH

The system includes a wearable device that uses ultrasonic sensors for obstacle detection and a GPS module to give information about the location. The device also includes a vibrating motor to alert the user of obstacles and a voice output to provide navigation instructions.

The paper also discusses the use of face recognition technology (FRT) to identify people and objects. They propose a system that uses a database of stored faces to identify individuals and provide information about their name and distance.

It also presents a block diagram of the system, which includes an Arduino UNO microcontroller, ultrasonic sensors, a GPS shield, and a GSM modem. The system uses a MAPP or Google map application on an Android device to display the user's location in real-time on a map.

It also presents a plan of research, which includes a detailed study of existing papers, problem formulation, study of tools, hardware model design, paper publication, and thesis writing.

It concludes by highlighting the potential benefits of the studied system, including increased independence, mobility, and quality of life for blind individuals.

The key features of the studied system are:

1) The studied system combines several ultrasonic sensors, GPS, GSM, and face recognition technology to provide navigation, obstacle detection, and identification of people and objects.
2) The device has the potential to greatly enhance blind people's mobility, freedom, and quality of life.
3) The system is cost-effective and user-friendly, making it available to a larger group of people.
4) The studied system can be a significant addition to the field of assistive technology.

The paper also includes a list of references, which includes papers on ultrasonic sensors, GPS, GSM, and face recognition technology. Overall, the paper proposes a comprehensive system that aims to deliver blind individuals with accessible and affordable assistive technology that can improve their daily lives.

V. CONCLUSION

The studied system aims to provide a comprehensive and operator-friendly assistive technology for the blind individuals. The system combines GPS, GSM, ultrasonic sensors, and facial recognition technologies to enable obstacle detection, navigation, and object and person identification. The device has the potential to greatly enhance blind people's mobility, freedom, and quality of life. The use of ultrasonic sensors and GPS technology can provide accurate and reliable navigation, while face recognition technology can help identify people and objects. To help the user navigate their environment, the voice output and vibrating motor can give them instructions and alarms. The studied system is also cost-effective and user-friendly, making it accessible to a wider range of people. The use of wearable technology and a mobile app can make it easy for users to access and use the system.

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