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SURVEY ON SMART ASSISTIVE TECHNOLOGY FOR PEOPLE WITH VISION IMPAIRMENT

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Abstract: **The smart vision archetype is a small, inexpensive, compact and wearable voyaging aid for visionless people. This paper presents a Smart setup for visually impaired, that make use of ultrasonic sensor and CCTV. The main point of this work is to design a voice based alerting system for the blind people.Visually impaired individuals find voyaging difficult as they struggle every day in performing actions for bypassing barrier and hurdles in their path. In order to help blind people voyage safely and quickly this system is proposed. The ultrasonic sensorappliance is spot on the spectacle which is used for barrier detection with distance indication. The CCTV is used to detect the object in front of the blind people and notify them using the APR voice module system.This system prevents the blind people from catastrophic situations.**

Keywords: **APR voice module, Embedded system, Microcontroller, Ultrasonic sensor, Succor devices, Image processing.**

I. INTRODUCTION

Visionless mobility is one of the main challenges encountered by vision impaired persons. Those peoples' lives and activities are restricted by the loss of eyesight. While Passover at urban intersection is a difficult and very dangerous activity for the blind. SuccorTechnologies researches are working on the project for more years.From the research, done by the World Health Organization (WHO) the official statistics show that approximately about 285 million, visually impaired person is there in the world up to the year of 2011.For blind people, walk freely is a challenge due to lack of information about the destination addresses, barrier, etc. For them, there are plenty of new technologies that could be employed to decrease the difficulties caused by this impairment, making the relationship between man and environment more harmonious as possible.There are some voyaging systems or tools available for the visually impaired persons. Traditionally, most of them rely on white cane for local navigation, it works by constantly swaying it in front for obstacle detection by the visually impaired people.This paper was created with the main aspiration to fulfill the needs of visually impaired people with affordable cost, reliability, portability etc..

II. LITERATURE SURVEY

Mohamed Lamine mekhalfi [1] designed a camera based model for blind people to detect an object in front of them. This model detects only an indoor objects. This device can store multiple object and analysis at the same time and give instruction to the blind people. When the similarity of two objects is found, then this device instruct the blind people. This model also calculates the Euclidean distance. This device can work in offline also is the main advantage of this device and it will detect the object in a short time. There is a major issue in this model that is it won't detect the outdoor object and raise implementation issue due to time constraint.

Chug Hyuk park and Eun Seok Ryu [2] developed a haptic Telepresence system to observe the object in 3-dimension structure and also direct the location for blind people. The people with low vision can also use these devices. This device detects museums and art galleries by using a teleprescene robot. This model uses RGB sensor for color and depth camera. All objects are represented in RGB colors. Improve RGB-D sensor enables real-time access to 3 dimension spatial information. Multimedia technology used for video encoding. This reference investigates two scenarios, one is mobile navigation and another is object exploration environment. This device is tested by both blind and without blind people. This device also accesses in public place. Voice or feedback in the device.

This device, developed a framework for teelpresence robotic systems with haptic and auditory feedback for visual impaired people.

Joselin Villanueva and Rene farcy [3] designed a model for pathfinder using an LED and photodiode. This model as electronic travel to improve the mobility of blind people. The detected path is analysis and calculate the distance measurement using radio metric. This device is mainly used for direct the blind people in traffic and no traffic road. This device as GPS locator to direct the blind people. It also detects indoor and outdoor objects. It detects the obstacle before 4 to 6 meters. There is no color combination in this model and this device does not detect any small parts.

Yoshiku Seki and Tetsuji Sato [4] designed a model using the auditory orientation training system. Any object is found in front of the device, it will sense the object and sends a voice message through the head related transfer function. In every analysis of sound it will reproduce the sound source. This model as to learn the sound location and obstacle perception skills. This is tested based on features of the system. It finds object using sound. If there is a wall with no sound, then it as a sound reflection.This device as to train the blind people to detect the object.

Brund and and Salvator [5] as introduced a model that provides a rough analysis based on an electronic sensing device the information to the user is provide a multi user strategy and adopt smart signal processing the user who use this particular device will be fully processed by a signal the human body should be practised and the issue must be known to the user. It is quite non adaptable technologies.

B. Ando [6] designed a model of a multisensory system this says that visual impairment people happily can be self motivated by a sensor device like multisensory architecture and quit complex but the drawback faced in this research is only a five alert message will be given who use this device. This is still in the demonstration.

Jamie Sanhez and Tiago Hassler [7] as designed a paper based on biological concepts for visual challenged people for reading the newspaper. It is fixed in the human origin, which is used to sense the temperature and organ present in the body they use audio mud (multiple user domain). It is interacting with people while learning. It will cause many health issues to the user while using the device when it is fixed within the human body.

Mohammad shorifuddin and Tadayoshi Shioyama [8] as designed a model to predict a road crossing facility for the blind people by the approach for detecting pedestrian crossing. It helps to cross only the roads for blind people. All the countries of road breath, width varies according to that they are used with white – block, block – white. It doesn't solve the actual problem of blind people. It's not a solution just a precaution for the user.

Azizuddi Khan and Gyan Prakash [9] as developed a concept of wearable device using a specs concept people. It is a wearable with a powerful microcontroller it is used to the normal people understand their voice request, but it can't provide a secure life to the blind people. The damage to the camera and practices leads to difficulties.

SijieXiong, SujieZhu [10] as designed a model of smart implementation it's based on GPS module in the system with a MATlab process. If there is a problem with the camera the detection of the material is difficult. If the network is it in connection work the GPS mode of work will be slowly processed in the GPS implementation.

Hartono Siswono and Antony Wicakso [11] have implied the voyaging device for the people who with the vision impairment. They used the appliances like microcontroller, ultrasonic sensor, buzzer, and power supply. They drafted these components in the following way, the ultrasonic sensor is used to sense the barrier in front of the people who have vision impairment, and then it transmitted to the microcontroller to process in what distance the barrier is away from the particular person, then it starts to beep by using the buzzer component to alert the person. These beep sound is received only within the particular distance like 180 centimeters and below that, but after that mentioned distance it won't give any alert sound like beep. This voyager helps the vision impaired people to sense the different objects in front of them, but when the barrier is away the 180 centimeters,

means it won't give the beep sound this was the major drawback they faced during this implementation.

Rama Murthy. N and P. N. Sudha [12] has drafted the guiding device for the visionless people. They make use of the some sensors, microcontroller, and some audio output devices to get the information in terms of voice module, they implemented these components in waist belt and shoes, this helps the people to detect the pits, and head to ground level. But it as the downside that the shoe can't be a water resistant, so the circuit may get damaged.

R. Mohanapriya, U. Nirmala, C. PearlinPriscilla [13] says about the device with the sensor and some controllers to detect and sense the barrier, gives it in the form of the speech format and also the moving conveyance and signals are also detected, but it does not give the correct accuracy of moving transport.

B. Amutha and M. Ponnavaikko [14] have examined the accurate location by using the some algorithms and Zigbee with the GPS system to track the barrier free way, these accuracies can be achieved by the Markov chain algorithm, it's able to give the correct accuracy for outdoors, but it is not fully possible to detect the indoor barrier.

G. Gayathri, M.Vishnupriya, R.Nandhini, Ms.M.Banupriya [15] have implemented the voyaging system in walking stick, in this they used two types of sensor one is to detect the pit and, another to detect the barrier or hurdles and also water related barrier. Thesesignals are processed in embedded system to give the notify via buzzer module and vibration. It has the drawback of sometime it does not give the buzzer sound in rare time while detecting the hurdles and barrier.

III. CONSOLIDATION TABLE

S.NO	TITLE	DEVICE OR METHOD	IMPROVEMENTS
1	A Compressive Sensing Approach to Describe Indoor Scenes for Blind People	camera based system method	This device can work in offline also is the main advantage of this device and it will detect the barrier in a short time.
2	Telerobotic Haptic Exploration in Art Galleries and Museums for Individuals with Visual Impairments	A haptic telepresence system method	This device detects museums and art galleries by using a teleprescene robot.
3	Optical Device Indicating a Safe, Free Path to Blind People	LED and photodiode device and electronic travel method	It also detects indoor and outdoor objects.
4	A Training System of Orientation and Mobility for Blind People Using Acoustic Virtual Reality	auditory orientation training system method	It finds object using sound.
5	Multisensor Strategies to Assist, Blind People	A rough analysis based on electronic sensing device	This provides a rough analysis based on an electronic sensing device the information to the user.
6	A Smart Multisensor Approach to Assist, Blind People in Specific Urban Navigation Tasks	multisensory system method	This leads to the self motivated by a sensor device like multisensory architecture.
7	AudioMUD: A Multi-user Virtual Environment for Blind People	Temperature and Aud mud devices	It is interacting with people while learning.

8	Detection of Pedestrian Crossing Using Bipolarity Feature—An Image-Based Technique	detecting pedestrian crossing system	Its just a precaution for the user.
9	The Smart Vision Local Navigation Aid for Blind and Visually Impaired Persons	GPS module in the system	It is used to the normal people understand their voice request.
10	Design and Implementation of Smart Glass with Voice Detection Capability to Help Visually Impaired People	Microcontroller device	It detects the barrier with the help of camera based.
11	Device for Helping The Blind	Voyaging device and microcontroller ,ultrasonic sensor are used	It starts to beep by using the buzzer component to alert the person.
12	Smart navigation system for visually challenged people	Guiding with audio output device	This helps the people to detect the pits, and head to ground level.
13	Smart Vision for the blind people	Sensor and controller device	The moving conveyance and signals are also detected
14	Object Detection System for Blind People	GPS system	It gives the correct accuracy for outdoors.
15	Smart Eye Implementation using Smart Glass and Bio Chip	Voyaging system and sensors	These signals are processed in embedded system to give the notify via buzzer module and vibration.

IV. CONCLUSION

The proposed system uses Ultrasonic sensor based spectacles, APR voice feedback module, and Image processing for identifying the images. The main objective of this system is to provide the user-friendly, cheap, and portable to the vision impaired people. Also, it is lightweight wearable devices, which makes the system easy to carry. This system improves the visually impaired person's sight quality. This needs a practice for a short time to increase the speed of walking for the new-user. Through this, the vision impaired people as the ability to gain the confidence and control over the system, and then the walking speed is increased. This system helps the visually impaired to know the type of barrier and prevents the accidents. Visually impaired peoples can navigate easily in indoor and outdoor conditions.

V. REFERENCES

[1] Mohamed LamineMekhalfi, FaridMelgani,YakoubBazi and NaifAlajlan,"A Compressive Sensing Approach to Describe Indoor Scenes for Blind People",*IEEE transactions on circuits and system for video technology*, Vol. 25,no.7,July 2015,DOI: 10.1109/TCSVT.2014.2372371.

[2] Chung Hyuk Park, Eun-SeokRyu,Ayanna M. Howard,"Telerobotic Haptic Exploration in Art Galleries and Museums for Individuals with Visual Impairments,"*IEEE transactions on haptics*, Vol. 8, no. 3, July-September 2015, DOI: 10.1109/TOH.2015.2460253.

[3] Joselin Villanueva and Rene Farcy,"Optical Device Indicating a Safe, Free Path to Blind People,"*IEEE transaction on instrumentation and measurement*, Vol. 61, no. 1, January 2012, DOI: 10.1109/TIM.2011.2160910.

[4] Yoshikazu Seki and TetsujiSato,"A Training System of Orientation and Mobility for Blind People Using Acoustic Virtual Reality," *IEEE transactions on intelligent transportation engineering*, Vol. 19, no. 1, February 2011, DOI: 10.1109/TNSRE.2010.2064791.

[5] Bruno Ando and Salvatore Graziani,"Multisensor Strategies to Assist, Blind People: A Clear-Path Indicator,"*IEEE transaction on instrumentation and measurement*, vol. 58, No. 8, August 2009, DOI: 10.1109/TIM.2009.2014616.

[6] B. Andò, Member and IEEE, "A Smart Multisensor Approach to Assist, Blind People in Specific Urban Navigation Tasks," *IEEE transaction on neural system and rehabilitation engineering*, Vol. 16, no.6, December 2008.

[7] Jaime Sanchez and Tiago Hassler, "AudioMUD: A Multi-user Virtual Environment for Blind People," *IEEE transaction on neural system and rehabilitation engineering*,Vol. 15, no. 1, march 2007, DOI: 10.1109/TNSRE.2007.891404.

[8] Mohammad ShorifUddin and TadayoshiShioyama, "Detection of Pedestrian Crossing Using Bipolarity Feature—An Image-Based Technique," *IEEE transactions on intelligent transportation systems*, Vol. 6, no. 4,December 2005,DOI: 10.1109/TITS.2005.858787.

[9] Azizuddin Khan, GyanPrakash,"Design and Implementation of Smart Glass with Voice Detection Capability to Help Visually Impaired People,"*International Journal of MC Square Scientific Research*, Vol.9, No.3, July 2017.

[10] SijieXiong, SujieZhu,"Smart Glasses for Facial Paralysis Patients,"*ACM*.,June 17,DOI:10.1145/3081333.3081343.

[11] Hartono Siswono and Antony Wicaksono,"Device for Helping The Blind,"*International Journal of Electrical Engineering and Informatics*, Vol 9, no 2, June 2017, DOI 10.15676/ijeei.2017.9.2.8v.

[12] Rama Murthy. N and P. N. Sudha, "Smart navigation system for visually challenged people," *International Journal of Industrial Electronics and Electrical Engineering*, Special Issue, Sep.-2016.

[13] R. Mohanapriya, U. Nirmala, C. PearlinPriscilla,"SmartVision for the blind people,"*International Journal of Advanced Research in Electronics and Communication Engineering*,vol 5,Issue 7,July 2016.

[14] B.Amutha and M.Ponnavaikko.,"Location Update Accuracy in Human Tracking system using Zigbee modules", International Journal of Computer Science and Information Security, Vol. 6, 2009.

[15] G.Gayathri, M.Vishnupriya, R.Nandhini, Ms.M.Banupriya. "SMART WALKING STICK FOR VISUALLY IMPAIRED", International Journal Of Engineering And Computer Science ISSN: 2319-7242 Volume 3 Issue 3 March, 2014.