Object Recognition Using Smartphone Application For Partially Impaired People

Niveditha B, Maheshwari S, Syed Shabbir Hussain

Students, Department of Computer Science and Engineering,

Vidyavardhaka College of Engineering,

P.B No 206, Kannada Sahithya Prashanth Road,

III Stage, Gokulam,

Mysuru, Karnataka-570 002.

Dr. Ravi Kumar V

Head of Department Of Computer Science and Engineering,

Vidyavardhaka College of Engineering,

P.B No 206, Kannada Sahithya Prashanth Road,

III Stage, Gokulam,

Mysuru, Karnataka-570002.

Abstract- In our day-to-day life, people with partial impairments including total blindness, sight conditions or blindness in one eye are facing more difficulties with normal daily activities such as walking on roadways, reading, driving etc. The biggest challenge for a visually impaired peoples, especially the one with the complete loss of vision, or partially impaired is to navigate around places. So we have come up with an idea of using a simple smart phone based system for guiding the partial impaired people in great awareness of the environment.

I. INTRODUCTION

Partially impaired people are facing difficulties in walking and avoiding objects in their daily lives. Even in familiar environments they cannot know what type of objects is coming in front of them. People require a guidance to reduce the collision of objects and to avoid navigation problems. Traditionally in olden days people use with guide canes. Depending upon guide canes, people cannot identify what type of obstacles is coming in front of them in familiar environments. So people cannot entirely depend on guide canes. So some obstacles on road cannot be predicted such as parked bicycle, resting dog or other objects in rest. With respect to recognizing the type of object we have come up with the idea of using smart phone application system is integrated to computer image identification to form a simple guiding system for guiding the partial impaired people based on the TensorFlow technology.

The proposed system involves feature recognition, deep recognition and distance and direction modules. So the smartphone continually captures the images in front of the user and performs image processing and identifying what type of obstacle are there in front of the user to inform the image results to the person and safely moving from the starting point to destination point. Also indicating the distance between the partially impaired people and the object. So the partially impaired people can gain the comphrensive understanding of the environment and this system enables the partially impaired people to get rough direction and also the distance from an obstacle, so that people can get an idea of obstacles that are arriving. And also know what type of obstacle is. Many invested navigations are implemented for the blind people. According to this study, devices and recognition methods are implemented.

II. RELATED WORK

Bor-Shing Lin et.al [1] proposed Simple Smartphone Based guiding system for visually impaired people. The system works on obstacle detection, once the object is detected, it calculates the distance and provides the result. The system works on both online and offline mode. The offline mode cannot provide high reliability and accuracy. The offline mode cannot accomplish the task with the fastest speed because the system depends on server, hence the system in offline mode cannot send the images to the server.

Zeng Fanfeng [2] proposed Application research of Voice control in Reading Assistive device for visually impaired persons. It is based on the analysis of speech recognition, based on the pattern matching technology for the purpose of voice control. The text is converted into sound information, it requires the training and identification phase.

Baljit Kaur et.al [3] proposed Scene perception system for visually impaired based on object detection and classi_cation using multi-modal DCNN. It is a cost effective system for the visually impaired people. The system classi_es the detected objects along with its distance from the user and provides a voice output. It has some certain limitations, multiple objects detection, even if the objects position is not perfectly in front of the camera. It is not possible to detect multiple candidate objects.

Prof. Priya U. Thakare etal [4] proposed Smart assistance system for the visually impaired. The system proposes the technologies like image processing, speech recognition etc. Text to speech conversion is used in the single object. It has the certain limitation, where the system is based on the stability of the glasses and using the android phone. The dataset of the images captured is static. The system may not work efficiently on the shiny surfaces, it may decrease. And also the surveillance is static.

Lars Kaczmirek etal [5] proposed Survey design for visually impaired blind people. The different needs of the target group are fulfilled by offering different modes of participation (paper-based, braille-based, Web-based). To establish with the different channels of communication, several modes has to be considered for the visually impaired people. Where this type of approach for projects where a telephone interview is out of scope.

Kanchan Varpe1 etal [6] proposed Survey of Visually Impaired Assistive System. Will have add-on assistant features based on precedent systems. This is a RFID based System to identify certain paths easily, especially in an environments unknown or not designed with assistive purpose. This system can be provided with basic requirement of way finding and some provisions like identification of objects. This system is expected to test and deployed in the campus for visually impaired. And the expected hardware devices will be within the least range.

P. A. Ahire et.al [7] proposed Survey of Dependency between Visually Impaired Persons and Normal Persons. Presenting research and development trends in this area. We provide a comparison of existing applications and research efforts to eliminate the dependency between visually impaired person and normal person. The requirement of developing a technique. So the application does not provide the effective ultrasonic sensor to solve the problems of detecting small obstacles, and transparent obstacles, e.g. the French door. For totally blind people, three kinds of auditory cues were developed to inform the direction where they can go ahead.

Gopala Krishnan et.al [8] proposed Image recognition for visually impaired people by sound. Developing a system for the visually impaired person to get an shape of an image through voice signal. The method enables the visually impaired people to see with the help of ears. The novelty is to convert the image to sound using the methodology of edge detection. The drawback is the methodology of edge detection consumes more time due to complex computation. The system is difficult to implement to reach the real time response for the visually impaired people.

R.Kasthuri et.al [9] proposed smart device for visually impaired people. to guide unsighted people with smart device using an android phone. this system based on android technology. the application helps the user to open any app as well as to call any contact through voice commands. users can command a mobile device to do something via speech. these commands are then immediately interpreted by the speech recognition engine (sre) that converts speech into text for direct actions. but the drawback is speech recognition engine requires large amount of memory to store voice files. the system needs to be trained for the visually impaired people about the software to recognize voice. And difficult to use due to voice interference.

Jinqiang Bai Shiguo Lian et.al [10] proposed Smart Guiding Glasses for Visually Impaired People in Indoor Environment. To overcome the travelling difficulty for the visually impaired group. It presents a novel ETA (Electronic Travel Aids)-smart guidingdevice in the shape of a pair of eyeglasses for giving these people guidance efficiently and safely. avoiding algorithm is proposed, which utilizes both the depth sensor and ultrasonic sensor to solve the problems of detecting small obstacles.

Laviniu Ţepelea et.al [11] proposed an android application for smartphone. The application uses MEMS sensors from a smartphone and also the information received from a few external sensorial modules. Communication between smartphone and external modules is made via Bluetooth and Wi-Fi. Moreover, the communication between smartphone and its user is made through a text-to-speech software module. The MEMS sensors has the component reliability low. Understanding MEMS properties is not easy.

J.A. Alvarado et.al [12] proposed design of a wearable technology for the visually impaired people that describes the basis of a glove intended to help visually impaired people in their day-a-day activities. It uses wearable technology, such as sensors and actuators, that alert the user in case of an encounter with an obstacle in two directions The first presents the background taking into account similar endeavors. The second presents mechanical, electrical and control requirements. It also represents the details the solution design of the wearable, introducing the sensors and electronic devices that conform it and display the functionality and the tests, including control design.

CONCLUSION

This is a user-friendly design guidance system for partial impaired people. When the system is in use, the system continuously captures the images in the front of the user and sends to the feature recognition module, which it extracts the features of the image and recognize the type of obstacle and it provides the information about obstacles to the user through voice notification. And it also indicates the approximate distance between the user and the objects.Compared to other traditional guidance methods, of using guide cane can help the partial impaired about the obstacles but cannot recognize what type of obstacle is coming in front of the people. The proposed system provides more conventional method of implementing smart phone.

Applications for identifying the type of obstacle and calculating approximate distance between the user and obstacle. The Future is to provide information on more types of obstacles and more accurate recognition in the purpose of helping the partial impaired people from the dangers, that they are unaware of the environment in a perspective manner.

REFERENCES

[1] Bor-Shing Lin, Cheng-Che Lee and Pei-Ying Chiang "Simple Smartphone-Based Guiding System for Visually Impaired People", Department of Computer Science and Information Engineering, National Taipei University, New Taipei City 23741, Taiwan; 13 June 2017.

[2] Zeng Fanfeng North China University of Technology, Beijing "Application research of Voice control in Reading Assistive device for visually impaired persons", 2010 International Conference on Multimedia Information Networking and Security.

[3] Baljit Kaur, Jhilik Bhattacharya "Scene perception system for visually impaired based on object detection and classification using multi-modal DCNN" , Thapar Institute of Engineering and Technology 22 May 2018.

[4] Prof. Priya U. Thakare, Kote Shubham, Pawale Ankit, Rajguru Ajinkya, Shelke Om "Smart assistance system for the visually impaired", International Journal of Scientific and Research Publications, Volume 7, Issue 12, December 2017 ISSN 2250-3153.

[5] Lars Kaczmirek, "Survey design for visually impaired blind people", University of Vienna. Conference Paper · July2007.

[6] Kanchan Varpe, M.P. Wankhade, "Survey of Visually Impaired Assistive System", Computer Engineering Department, Sinhgad College of Engineering, Pune University, Pune, India. ISO 9001:2008 Certified International Journal of Engineering and Innovative Technology (IJEIT) Volume 2, Issue 11, May 2013.

[7] P. A. Ahire, 2S. M. Galande, "Survey of Dependency between Visually Impaired Persons and Normal Persons", Information Technology VIIT, Pune University, India.

[8] K. Gopala Krishnan ; C. M. Porkodi ; K. Kanimozhi, "Image recognition for visually impaired people by sound", 2013 International Conference on Communication and Signal Processing. Melmaruvathur, India.

[9] R. Kasthuri ; B. Nivetha ; S. Shabana ; M. Veluchamy ; S. Sivakumar, "smart device for visually impaired people", 2017 Third International Conference on Science Technology Engineering & Management (ICONSTEM) Chennai, India. 23-24 March 2017.

[10]_Jinqiang Bai Shiguo Lian ; Zhaoxiang Liu ; Kai Wang ; Dijun Liu, "Smart Guiding Glasses for Visually Impaired People in Indoor Environment", IEEE Transactions on Consumer Electronics (Volume: 63 , Issue: 3 , August 2017).

[11] Laviniu Ţepelea ; Ioan Gavriluţ ; Alexandru Gacsádi, "Android application for smartphone", 2017 14th International Conference on Engineering of Modern Electric Systems (EMES) Oradea, Romania. 1-2 June 2017.

[12] J.A. Alvarado ; M.D.P. Chavez ; R.A. Rodriguez, "Design of a wearable technology for the visually impaired people", 2016 IEEE ANDESCON.