

Smart Shoes for Visually Impaired People Using Internet of Things

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Abstract- Independence is the building methodology in achieve dreams, goals, and objectives in individuals life. It is challenging to visually impaired person to go out independently. There are large number of visually impaired peoples who needs to be get helped. For many years the blind stick became a popular attribute to blind person's navigation and later efforts have been made to improve the system by adding a remote sensor. Blind people have a big problem when they walk on the street or stairs using a blind cane, but they have sharp haptic sensitivity. To overcome the disadvantages of blind stick we design the smart shoes. The smart shoes will help the blind person by providing more convenient means of life. The main aim of this system is to provide independence while walking on road and cities without carrying the stick in hands. This system will surely help the blind person to walk in traffic and crowded area and get help in emergency conditions. In this process, we use the k-means clustering algorithm by which we can get the nearest location of the blind person.

Index Terms- Alert, Node MCU, Obstacles, Panic Button, Visually Impaired.

I.INTRODUCTION

Over the past few years, the number of connected objects grew exponentially and, as a consequence, there is an increasing demand for compact power supplies, similar to a battery, to achieve better integration. The ecological impact of batteries and the cost of installation and maintenance [1- 2] make energy harvesting an attractive alternative to supply modern electronic devices as they need less and less energy to work. Finally, supplying electronics for longer times requires larger volume batteries. Energy harvesting could extend the lifetime of small batteries or even replace them. People with visual impairments face unique challenges in the educational environment. they are not must be able to access text information across all in the areas, but they also need to be able to participate fully in instruction that is

often rich with visual content. in that process Assistive Technology supporting to them. Assistive technology refers to a range of tools, devices, and strategies that allow a visually impaired one to accomplish a task that they would otherwise be unable to do, or would have difficulty accomplishing effectively. Assistive technology can be simple or complex. The term visual impairment describes a broad range of visual abilities and their needs. Selection is one of assistive technology should be the result of a team process that takes into consideration feedback from family, educators, paraprofessionals, and the student. It is important to remember that high-technology is not always the best solution for a student. Selected tools should reflect the student's unique strengths and their needs, the activities he needs to be able to accomplish, and the environment in which he will be working. There are a million blind or deaf persons around the world, and Many of these persons use the white cane which the most successful and widely used travel aid for blind but not used from deaf persons. White cane purely mechanical device which is used to detect obstacle son the ground, uneven surfaces, holes, steps, and other hazards and any other areas. The main problem with this device is that users must be trained in its use for more than 100 hours and more than few days; in addition, the white cane requires the user to actively scan the small area ahead of him or her. The white cane is also not suitable for guessing or detecting potentially dangerous obstacles. Guide dogs are very capable guides for a blind, but they require extensive training, and they are only useful for about four or five years. Furthermore, number of blind people and visually impaired people are elderly and find it difficult to care appropriately for another living being. Also the (GPS) based voice alert system for the blind peoples uses the current location and gives the alert to the blind person if it was in his destination

area. The deaf persons which can see the obstacles, but they cannot hear the sounds such as cars horns which will be a real dangerous in their life, also they cannot benefits from (GPS) based voice alert system which alerted with the help of audible messages using a voice synthesizer. The recent case shows that in this century of digitization people are fond of automatic devices which are often referred to as the smart devices. Since 2013 with the development of new technologies And Techniques, the Internet of Things (IOT) has also emerged to make smart devices smarter. With the evolution of the IOT all these manually controlled electrical and electronic devices can be controlled automatically. In 2011 it was predicted that the IOTS application will focus mainly on the smart city construction and digital agriculture construction for making life smarter. Three-layer structure of IoT is given by the China Communication Standards Association: the sensing layer mainly used for collecting information is the first layer; the network layer used for information transmission and processing is the second layer; and the application layer used for storage and decision-making is the third layer. Create a virtual connection between a hub or a network and electronic and electrical objects is the Main Concept of the IOT. This virtual connection helps to us control, locate, and track down these connected objects and devices. development of the smart sensor together with communication technologies and techniques such as Wi-Fi, Bluetooth etc. which is the basis of device-to-device connectivity concept which is very useful concept and supported by cloud computing technologies, IOT has become reality and its goal is to make devices more aware, interactive and efficient for a better and safer life and world. what if this technology is used to make a better world for human beings which are blind, impaired physically or visually. Some of the inventions are helpful for these blind people but the proposed system will make a better world for the visually impaired people or blind people.

II. LITERATURE SURVEY

[1] In 2018 SatethaSiyang, ThirawutNilpanapan, TeerakiatKerdcharoen said that related to the guide cane there was also a smart cane invented with almost same configurations. This cane uses ultrasonic

sensors and the servomotors to detect the obstacles. There is a microcontroller inside the cane which will work on the received instructions like right, left, straight etc. However, this system also has some limitations like it not easy to handle and requires a large area or space to be placed because they cannot be folded. [2] In 2017 JeongKyum Kim, Kang Bok Lee, Sang Gi Hong said Additionally this cane, due to the presence of a large number of ultrasonic sensors and servomotors, is very expensive. So every blind person cannot afford this hardware [3] In 2017 Dae-JeaCho, Ye-Rin Jeong. said As per this paper, it gives importance to the stick used by the blind people. The guide cane is designed to navigate visually impaired ones. This guide cane is somewhat heavier than the white cane. [4] In 2016 TriwutNilpanapan, TeerakiatKerdcharoen said Social Data Shoes For Gait Monitoring Of Elderly People in Smart Home. [5] In 2014 ShahrzadSheibani, Meisam Roshan, HaiyingHaung, Bhaskar Banerjee, RashaundaHenderson. Single Chip Interrogation System For A Smart Shoe Wireless Transponder.

Bhaskar Banerjee said that technology can remove the barriers between the humans and their illness. There are various methods to measure the distance between the obstacles and overcome the problem of blind people. One of the methods is the use of ultrasonic sensors in the shoe implemented in the form of an array around the sole. M. Nassih, quoted that the smart stick for the blind people can also use the technique of RFID (Radio Frequency Identification) to detect the objects or the obstacles in front of the user. This invention is just like a simple stick used by blind people but equipped with a bag also. This bag provides electricity supply and indicates the user by the speaker. However, there were some limitations. Muhsin Asaad H., et al, under this paper, the technology upgraded to one step more. The cane is able to detect above the knee level up to the 2 or 3 feet. When an obstacle is detected, this stick vibrates or makes a sound. Mohd Helmy and Abd Wahab proposed, The technology can help in reducing many barriers that people with disabilities face. These kinds of technologies are referred to as assistive technology (AT). Different kind of disabilities can be cured by an AT such as hearing aid or blindness however their major limitation is their highly expensive rates. The main problem with blind

people is the loss of their physical integrity. They do not have confidence in themselves. This statement has been proven in which an experiment name Project Prakash has been carried out. It was intended to attest the visually-impaired to utilize their brain to identify the set of objects. This can also be applied to a different situation. From the above survey it was depicted that following were the loopholes in the conventional technologies invented for the blind persons:1 There are many models that already have been made and have been implemented for helping the visually impaired people that help them in walking on the roads approximately equal to that of the norm alone.

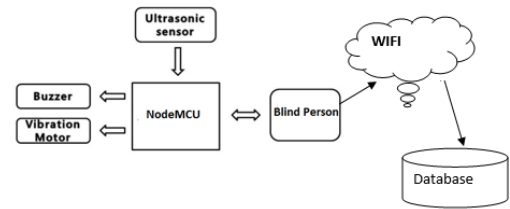
III. PROBLEM DEFINITION

To design and implement the smart shoes for a blind person using the internet of things and cloud storage to assist them while walking on the streets or cities. The user can also get locate using GoogleAPI's if the blind person get lost in the city or he or she may not understand the route. The blind person can also send the SOS message to his friends and relatives using the panic button. The user can also view the location history of the blind person where he was traveled in a whole day using a web-based application or in mobile too.

IV. SYSTEM ARCHITECTURE

The system is get developed by using the internet of things and cloud computing. The system is used for the visually impaired people or blind people for those who can't walk freely on the street. They get stucked due to obstacles of road like vehicles, pits and other things. In this proposed system we used ultrasonic sensor, NodeMCU, Panic button. The proposed system detects the obstacle and generates an alert by beeps. The ultrasonic sensor will detect the obstacle while walking and generate a buzz which will alert the user and the collision will be avoided. When the user is lost in an unfamiliar area or is in danger, he can press the panic button which will consider that emergency mode is activated and location of the user will be sent as an alert notification to the family of user. so that the nearby family member will approach to the user. We developed the website for storing the travelling records of the visually impaired people or

blind people. We can trace out the location of the visually impaired people by only authenticate person or guardian of the visually impaired people.



V. CONCLUSION

Hence we conclude that our system is a fully functional autonomous device integrated into a shoe. The performances of the device are promising for future applications like human activity recognition or walking analysis. Indeed, the proposed system can already increase the sampling rate or measure more than one axis due to the excess of energy produced at average speed. The proposed system also includes other sensors to record more data as the temperature or the humidity. Future work will comprise optimizing some parameters to further increase the energy available to power the device and to achieve a sampling rate of 20 Hz for a three axes measurement, required for accurate activity recognition. The system will also work on the volume to decrease it as much as possible for future integration in smaller objects.

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