Navigation aid for blind and visually impaired People with obstacle detection

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Abstract— Blind people face several problems in their life, one of these problems that is the most important one is detection the obstacles when they are walking Visual impairment and blindness caused by various diseases has been hugely reduced, but there are many people who are at risk of age-related visual impairment. Visual information is the basis for most navigational tasks, so visually impaired people are at disadvantage because necessary information about the surrounding environment is not available. To overcome the travelling difficulty for the visually impaired group, this paper presents a novel ETA (Electronic Travel Aids)-smart guiding device in the shape of an advanced jacket for giving these people guidance efficiently and safely. Here, we are proposing a new technique using which we can detection obstacle using ultrasonic sensor, blind person temperature, sweat, water level send the nodemcu esp8266 and alerting via mobile phone, vibrator and webpage to particular blind person and their family member.

Index Terms— ETA, Nodemcu esp8266, Temperature and water sensor, Ultrasonic Sensor

I. INTRODUCTION

The work going to introduce depends on the utilization of new innovations to improve outwardly weaken individuals versatility. Concentrating on deterrent recognition so as to lessen route troubles for outwardly debilitated individuals. Traveling through an obscure situation turns into a genuine test when we can't depend on our own eyes.

Since dynamic hindrances normally produce clamor while moving, dazzle individuals build up their feeling of hearing to confine them. Anyway they are decreased to their feeling of touch when the issue is to figure out where a lifeless thing precisely is.

The regular route for exploring of visionless individual is utilizing a white stick or strolling stick. The strolling stick is a straightforward and absolutely mechanical gadget committed to identify static obstructions on the ground, lopsided surfaces, gaps and steps through basic material power input. The remainder of the article is sorted out as follows: next area reviews related works concerning blind individuals route helps. We examine the advances done by new innovations in the region of impediment decrease for outwardly hindered.

Many people with significant visual impairment benefit from vision rehabilitation, changes in their environment, and assistive devices. Blindness or visual impairment is a condition that affects many people around the world. This condition leads to the loss of the valuable sense of vision. Worldwide more than 160 million people are visually impaired with 37 million to be blind. The need for assistive device was and will be continuous. There is a wide range of navigation systems and tools existing for visually impaired individuals. The blind person's truly requirements and identifying objects. This paper proposes the design and develops a portable unit (stick) for the blind people for easy use and navigation in public places. The most widely used stick is the long cane because it can feel the nature of the path and detect obstacles in the path of the blind person. About 90% of the world's visually impaired live in developing countries. For the indigents blindness is a curse. They need help to walk outside and do all other daily essential works. So the project glows a system that tries to remove the curse of blindness and make them self-dependent to do their daily activities.

II. LITERATURE SURVEY

Mounir Bousbia-Salah et al., An electronic travel help is a type of assistive innovation having the motivation behind improving versatility for the visually impaired. This paper depicts the improvement of a microcontroller based route framework for dazzle people on foot. It is a convenient, independent versatile electronic framework that will permit outwardly hindered people to go through recognizable and new conditions without the help of aides. Also, this framework can flexibly the visually impaired individual with help about strolling courses by utilizing coded sounds to bring up what choices to make[1].

Nadia Kanwal et al. Clark, for various years, researchers have been attempting to create helps that can make outwardly hindered individuals progressively free and mindful of their environmental factors. PC based programmed route devices are one case of this, propelled by the expanding scaling down of hardware and the improvement in preparing force and detecting capacities. This paper presents a total route framework dependent on ease and genuinely unpretentious sensors, for example, a camera and an infrared sensor. The blend is both proficient and powerful. The framework recognizes leaps as well as recommends a sheltered way (if accessible) to one side or right side and advises the client to stop, move left, or move right. The framework has been tried progressively by both

blindfolded and visually impaired individuals at various indoor and open air areas, exhibiting that it works adequately[2].

Abdelghani Redjati et al. Bettayeb The point of this paper is to explore the advancement of a route help for dazzle and outwardly disabled People. It depends on a microcontroller with manufactured discourse yield. This guide is versatile and offers data to the client about urban strolling courses to bring up what choices to make. Then again, and so as to lessen route challenges of the visually impaired, an impediment identification framework utilizing ultrasounds and vibrators is added to this gadget. The proposed framework recognizes the closest obstruction by means of stereoscopic sonar framework and sends back vibro-material criticism to educate the visually impaired about its localization[3].

K. Ito and M. Okamoto, J. Akita, One of the fundamental interests here comprises in the interpretation of the 3D visual data into pertinent stereoscopic sound boosts. The sound created on ear telephones recreates an inaccessible clamor source as per the situation of the deterrent. Utilizing sound signs may annoy the client's hearing, which is the fundamental sense that let outwardly impeded individuals to see the dynamic far off condition. As a Camera vision based framework, it can recoup more data than just separation to the impediment. With fitting calculation they can likewise register data about the nature and specificities of the earth. The issue with vision calculations is their need of tremendous calculation power and their sensitivities to light work.

The CyARM application offers an intriguing arrangement. By utilizing sonar detecting and material input it makes another versatile interface for route. In any case, it is still not hand free and needs the client to continually move the gadget to detect nature. These days, some new plug gadgets show up available, similar to the UltraCane [8] which utilizes a form in sonar framework and sends back vibrations through the handle as indicated by the nearness of hindrances.

It is significant for a usable electronic travel help to let the client hand free so as to permit the utilization of conventional route instruments. By letting the client hand free, the entire framework must be inserted in the garments.

III. PROPOSED SYSTEM

Blind person jacket is an innovative jacket designed for visually disabled people for improved navigation. We here propose an advanced blind person jacket that allows visually challenged people to navigate with ease using advanced technology. The blind stick is integrated with ultrasonic sensor along with light and water, sweat, temperature sensing. Our proposed project first uses ultrasonic sensors to detect obstacles ahead using ultrasonic waves. On sensing obstacles the sensor passes this data to the microcontroller. The microcontroller then processes this data and calculates if the obstacle is close enough. If the obstacle is not that close the circuit does nothing. If the obstacle is close the microcontroller sends a signal to server. It also detects and sounds a different message (left, right, front and back side) if it detects water and alerts the blind. One more feature is user body temperature, sweat, water level send the nodemcu esp8266 and alerting via mobile phone, vibrator and webpage to particular blind person and their family member. Thus this system allows for obstacle detection as well as finding stick if misplaced by visually disabled people.

The proposed method of of blind person monitoring system is monitor patients body temperature, and sweat level body using Node MCU. After connecting internet to the Node MCU it act as a server. Then the server is automatically sends data to the website. Using IP address anybody can monitor the blind person health status anywhere in the world using laptops, tablets and smart phones. Then MIT app inventor software is used for transfer these parameters (Patients body temperature, blind person) from Node MCU to Android App.

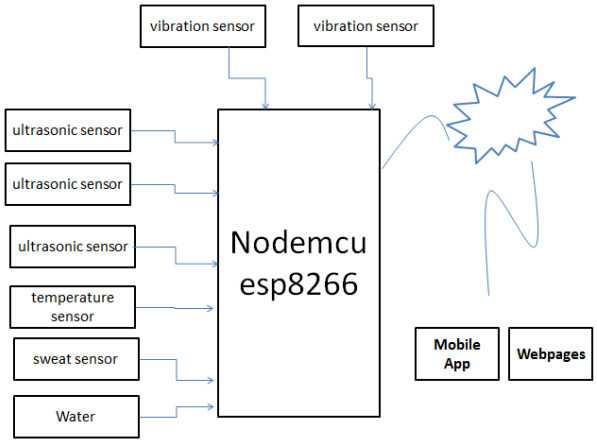

Fig. 1 Block Diagram of Proposed System

The 3 ultrasonic sensors are used for obstacle detection placed one at right side, left side and another is at front side of shoulder. This detects the obstacle from left side, right side and front side of the person, and gives the signal to the microcontroller. According to received signal from respective ultrasonic sensor, microcontroller activates the particular vibrator and user get to know the obstacle is in particular side so and user body temperature, sweat, water level send the nodemcu esp8266 and alerting via mobile phone, vibrator and webpage to particular blind person and their family member.

IV. RESULT

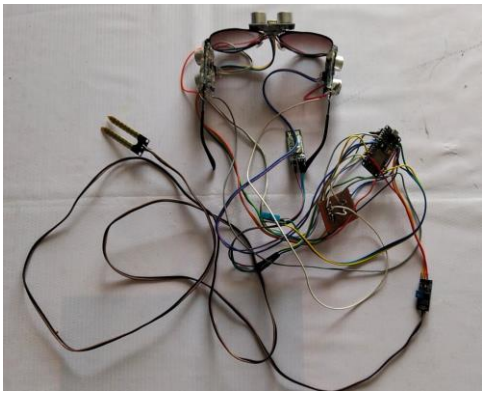

Fig. 2 Hardware Module

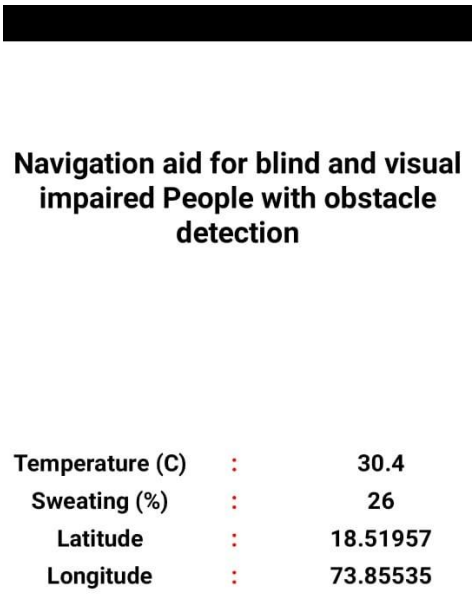

Fig. 3 Mobile app Results

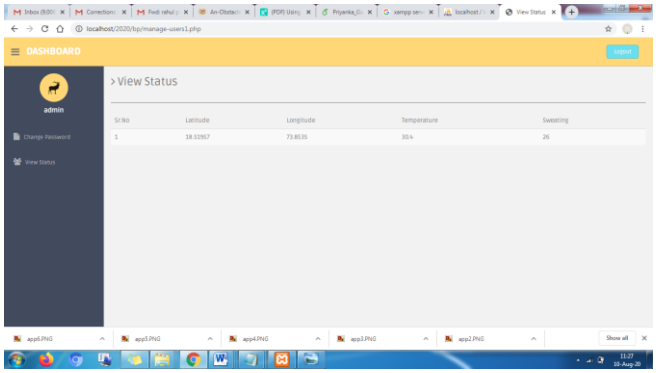

Fig. 3 Web app Results

V. CONCLUSION

The technologies behind blind person jacket are upgrading day by day. And our model ensures one thing that is making the task of moving of a blind person easy and comfortable. The jacket is also very light and handy to carry. And the components or parts that we used in the jacket are also easily available and less in cost. And besides all that the manufacturing cost is also quite low, that makes the jacket affordable for people of all class and age. In future, if further improvement and investment is carried out with the jacket then it will be an even more effective device for the future world. Some of the techniques in which this device can be modified are given below:

a. The Braille input device gives the blind person an uncomplicated method to provide the destination address for navigation.

b. The programmable wheels would steer the stick away from the obstacles and also leading the blind person towards the destination.

c. In order to run this integrated set of hardware we can use solar panels as an alternative to the battery.

The use of solar panel occurs to be more advantageous as it uses sunlight, the easily available renewable resource of energy, to get recharged.

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