A Review on Obstacle Detection System for Visually Impaired Person

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***Abstract*: Independence is very important for achieving dreams, goals and objectives in life however to realize this independence for impaired persons is incredibly difficult. It's terribly tough task for visually impaired persons to steer safely and with confidence while not serving to hands in urban or unknown environments. To boost the cane by adding outside navigation exploitation GPS, associate degree inaudible detector is placed in cane that detects the obstacle within the ground level and detective work hollow it'll facilitate the visually handicapped person by providing additional convenient means that of life. The most aim of this method is employed to change visually impaired persons to maneuver freely with constant ease and confidence as a quick-sighted individuals.**

***Keywords*: Obstacle Detection, Pothole Detection, GPS Tracking, Ultrasonic Sensor, Visually Users.**

I. INTRODUCTION

Vision plays a significant role in gaining data of the encircling world. However, loss of vision makes it troublesome to measure a traditional way of life per the WHO i.e. World Health Organization, there square measure 285 million individuals within the world with visual defect, thirty-nine million of whom measure square blind, and 246 million with low vision regarding ninetieth of the world's visually impaired individuals board low-income settings. The amount of blind individuals has been projected to double by 2020. Historically, a white cane is employed as a walking aid for visually impaired individuals. White canes square measure cheap, light-weight, and might find obstacles on the bottom. However, a white cane suffers from the subsequent 3 elementary shortcomings.

1.It needs the user's constant activity and acutely aware efforts to actively scan the encircling atmosphere.

2.The stick will solely find obstacles up to the knee level. Hence, the user cannot find raised obstacles, like scaffoldings and transportable ladders. This poses a collision danger.

3.The stick will solely find the obstacles that square measure at a distance of one from the user giving very little time to require any preventive actions.

Guide dogs might also assist visually impaired people to avoid obstacles in their travel path. However, guide dogs need coaching and absolutely trained guide dogs square measure terribly expensive. Additionally, it's difficult task for a visually impaired person to worry befittingly for an additional physical object. Moreover, special coaching is needed for visually impaired individuals to handle and lookout after the guide dogs, that is troublesome. To improve the quality and speed of someone with visual impairments, many researchers introduced electronic travel aids (ETAs). These ETAs square measure out this in numerous forms, like hand-held devices, good canes, and wearable systems. However, acceptance of obtainable ETAs is kind of low among visually impaired individuals. This doesn't imply that visually impaired individuals square measure resistive to technological aids; rather it asserts the necessity of additional analysis to boost on the usability and satisfactoriness of ETAs. Safe and freelance quality continues to be a challenge for visually impaired individuals.

II.LITERATURE REVIEW

Mohammad Hazzaz Mahmud, Rana Saha, Sayemul Islam [1] proposed a wise Walking Stick that is Associate in Nursing Electronic Approach to help Visually Disabled Persons. Their device may be a microcontroller based mostly machine-driven hardware which will assist a blind to discover obstacles ahead of him/her promptly. The hardware consists of a microcontroller PIC16F690 incorporated with ping echo sounder device, proximity device, wet detector, a GH311 supersonic obstacle device, a small beeper motor and extra instrumentality. The simplicity of the planned style makes it straightforward to use by a person and at identical time the price of producing such sticks is unbroken low. The facility consumption of the planned stick is low and may be operated simply. It's additionally the bottom compared to the traditional ones. Obstacle and hole is determined simply by device readings. The look has another vibrating feedback mechanism necessary for making vibrating signal for multiple disable persons to induce precise data from the output. Also, the microcontroller is code-protected in order that its security can't be overridden except by the user or seller. Wet, muddy or probably slippery tract is detected by a combine of electrodes. Except for others blind steerage systems; it's a nail controller. This provides ratio on the far side anyone's imagination. Running this integrated set of hardware needs another to the battery. The utilization of star panels as an example, are going to be additional advantageous so as to induce recharged. The planned stick isn't flexile thus keeping it would be difficult. This price effective and light-weight weight device is

designed to require the pattern of a plastic and moveable device which might be utterly mounted on the acquainted white cane or blind stick.

O. O. Olakanmi [2] proposed a flat walking aid for visually impaired exploitation unhearable sensors network with voice steering. The projected methodology enforced a network of unhearable sensors capable of police investigation the direction and position of obstacle(s). The performance and practicality square measure improved by the addition of alert lightweight, and voice steering signal that is relayed to a miniature telephone receiver. Hardware employed in the implementation of the system square measure ISD 2590 voice record/playback chip, PIC16F887 microcontroller, unhearable sensors, transformer, and speakers (headset and loudspeaker). The recorded voice informs the user of the direction and presence of the obstacle(s). The model of the visually impaired aid is ready to notice obstacles altogether directions of the user. The performance of his projected stick in police investigation obstacles is low, that is, one meter most vary of detection. The walking stick cannot verify the space of the obstacle to the flat. The model of the flat walking aid was ready to notice obstacles at intervals the vary of 0m to 1m at the left, right and front of the stick follow an applicable voice alert.

R. Sheth, S. Rajandekar, S. Laddha and R. Chaudhari [3] proposed sensible White Cane that could be a subtle and Economic Walking Aid. Their planned stick is intended to find obstacles which can facilitate the blind to navigate carefree. Their device is formed of parts like ATMega328PU microcontroller, four HC-SR04 supersonic sensing element Modules, Sound IC-APR33a3, Vibration Motor, headphones and battery. Audio feedback. Their technique alerts users by pre-recorded sound messages and a tactual feedback in kind of vibrations. The stick will find pits, potholes, downfalls, stairs (up and down), low lying and knee level obstacles and even those on top of the waist. Their system could be a moderate budget steering aid for the visually impaired. The whole electronic equipment in conjunction with the battery cubicle is hidden at intervals the stick thereby decreasing the chance of injury to the circuit and creating the device less large. The system provides ON/OFF switch, vibration feedback and also the audio jack on the handle itself. The system doesn't have a worldwide positioning technique to search out the position of' the user victimization the GPS and steering to their destination given to the user by voice navigation. The stick doesn't have the power to find oncoming vehicle, slippery floor, and there's no fireplace or warning device. The concept behind the planning of the stick was to stay it structurally similar i.e. thin, light-weight and simple to handle, nevertheless offer a lively feedback to the user concerning hazards in his walking path.

E. J. Chukwunazo and G. M. Onengiye [4] the authors designed and enforced a microcontroller primarily based quality aid for visually impaired folks. Their planned stick consists of special detection sensors integrated to AT89C52 microcontroller for receiving, process and causation signals to the device. The system was designed, programmed with programming language and tested for accuracy and checked by the visually impaired person. The hardware used consists of AT89C52 microcontroller, sensors (Ultrasonic, water, and light-weight dependent resistance, LDR), and alarm. Their quality aid designed for blind folks is cheap, reliable and simple to control. It reduces stress for folks aiding the blind and provides comfort to blind throughout walking. The system consists of associate degree supersonic sensing element for obstacle detection, a water sensing element for water detection in slippery areas and a lightweight dependent resistance for dark detection. Every sensing element is differentiated from each other through pattern of sounds. The value effectiveness of the planned resolution ends up in compromises in performance. The planned technique could be a low price and light-weight weight system designed with a microcontroller that processes signal and alerts the visually impaired person over any obstacle, water or dark areas through beeping sounds. Their analysis work focuses on obstacle detection, light-weight detection and water detection so as to cut back navigation difficulties for visually impaired folks.

G. Prasanthi and P. Tejaswitha [5] proposed the detector assisted stick for the blind individuals. The most objective of this style is to develop associate degree application for blind individuals to observe the objects in numerous directions, detection pits and manholes on the bottom to create liberated to walk. Their projected methodology utilizes multiple sensors with options to observe the obstacle for collision shunning, and to observe objects all told direction. Another detector is placed close to the lowest tip of the walking follow observe pits on the bottom. It integrated these sensors to the play chip and voice record. The model was modelled mistreatment Pro/E creo 5.0 Software. The hardware parts utilized in the planning area unit ATmega8 microcontroller, sensors, power offer unit, Servomotor, Buzzer, Voice record and reproduce device, and speaker. It’s straightforward, cheap, configurable, and straightforward to handle intelligent guidance device. The results of the check on the system indicates that it's economical in its capability to specify the supply and distance of the obstacle. The model of the visually impaired aid is ready to observe obstacles all told directions of the user. The projected system has advanced options that detects front and high facet of obstacles, pits and water stagnated/manholes on the bottom. The implementation is kind of costly. It’s not an economical approach. Also, running this integrated set of hardware needs another to the battery. The utilization of star panels as an example, are a lot of advantageous so as to urge recharged.

Muriel Pinto, Rose Denzil Stanley, Sheetal Malagi, Veena Parvathi K., Ajithanjaya Kumar M. K [6] proposed a sensible Walking Stick for Visually Impaired. The projected technique may be a easy walking stick equipped with sensors to grant info concerning the setting. GPS technology integrated with pre-programmed locations permits the user to settle on the best route to be taken. Within the system, unhearable device, pit sensor, water device, GPS receiver, level device, driver, vibrator, voice synthesizer, keypad, speaker or phone, PIC16F877A microcontroller and battery were used. The ASCII text file for the PIC microcontroller was developed with MPLAB code. The projected system meant to supply low value and economical navigation aid for the blind which provides a way of artificial vision by providing info concerning the environmental state of affairs of objects around them while providing period help via GPS. The performance of the example developed was evaluated with four obstacle-scenario that are: Concrete wall, Human body, Cardboard box, and Plastic. The projected answer may be a moderate budget guidance aid for the visually impaired. As so much as localization is bothered, it'll be able to give correct details of the situation of the blind just in case they stray via the GPS. The developed example gave sensible leads to detection obstacles placed at a distance ahead of the user. Obstacles and pit is determined simply by device readings. The value effectiveness of the projected answer results in compromises in performance. One in all the drawbacks of their projected technique is that the potential of the example is proscribed as a visually impaired person will travel solely to four locations mistreatment the stick. Also, the navigation system can got to convey info aside from that required for steerage, and it's not possible to supply steerage info at high intermittencies. It didn't give the practicality for voice management mistreatment speech recognition. Alternative enhancements that might have improved the projected system include: Increasing the vary of the unhearable device and implementing a technology for deciding the speed of approaching obstacles. Synchronization with external memory to extend the quantity of routes hold on. Synchronization with numerous navigation code applications offered on the web so new, un-programmed destinations may be chosen. Integration of a GSM module for safety functions.

Radhika R , Payal G Pai , Rakshitha S, Rampur Srinath [7] designed and enforced a wise Stick for Obstacle Detection and Navigation. Their projected system utilised infrared, inaudible and water sensors. It additionally used GPS and GSM module. GPS to allow positioning and navigation to the stick. GSM module helps to allow notifications once the blind man is two-faced with threats. The system is hopped-up by a chargeable battery. The hardware enforced on their projected system consists of the combine of inaudible sensors, Infrared sensing element, Water sensing element, GPS module, GSM/GPRS module, and Arduino Uno microcontroller board (ATmega328P). The good stick facilitates the blind man to create calls every now and then of emergency via the GSM/GPRS module. The GPS module additionally helps to trace the blind man through the info collected by it. It warns the blind man through beep sound whose intensity will increase because the person nears the obstacle that aid him to maneuver aside of the obstacle. Also, once obstacles area unit detected, it invokes the proper speech warning message through a Bluetooth phone. The employment of a chargeable battery within the system additionally ensures longer time usage. Their projected system may also find obstructions that area unit hidden like downward stairs, holes etc. the downside of this projected stick is that it is tough to stay as a result of it absolutely was not designed to be collapsable. Modification to the projected system would be: A Braille data input device to allow the blind man associate uncomplicated technique to produce the destination address for navigation. Programmable wheels to steer the stick far from the obstacles and additionally lead the blind man towards his/her destination. Using IoT to allow the advantages of inter-communication between good sticks (or mobile, PCs) close to utilize the practicality of the opposite stick once one stick's practicality breaks down. Also, running this integrated set of hardware needs another to the battery. the employment of star panels for example, are going to be additional advantageous so as to induce recharged. Obstacles among the space of regarding 3m is detected with the assistance of those sensors.

D.Sekar, S.Sivakumar, P.Thiyagarajan, R. Premkumar, M. Vivek kumar [8] the Voice Enabled sensible Walking Stick for Visually Impaired persons was planned. Their planned system consists of a straightforward walking stick equipped with unhearable sensors to provide info regarding the setting like object detection, pit sensing and water sensing. GPS technology is integrated with preprogrammed locations to work out the best route that the blind ought to navigate. Also, a voice enabled instrumentality change is provided to assist the blind man privately domain. The planned system used to unhearable detectors that sensing element and Water sensor; GPS receiver, GSM module, Voice synthesizer, ATmega328/P microcontroller, relay, speaker and battery. The GSM module and relay for the aim of change on the instrumentality. It helps in transferring the data regarding the required operation to be performed on the instrumentality and generates the resultant change action. The central advantage of this technique is that it helps the blind folks in each within and out of doors, care-free navigation. The GPS based mostly blind device with user input interface signals the blind man once he/she reaches the destination by voice. The mixing of space instrumentality change along side this technique makes it even a lot of helpful, therefore creating it appropriate for each indoor and out of doors setting. The sensible stick not solely aids in police investigation obstructions placed at a distance before of the user, however conjointly provides real time help via GPS. The data relating to barriers is given through voice alerts that eradicate the matter of understanding vibration patterns that was utilized in previous systems. Their system could be a cheap budget steering aid for the visually impaired. The price effectiveness of the planned resolution results in compromises in performance. Some enhancements that might be created are as follows: Increasing the vary of the unhearable sensing element, and implementing a technology to work out the speed of the

approaching obstacle. Also, running this integrated set of hardware needs another to the battery. It ought to conjointly accommodate wide variable grips for versatile handling. Their planned combination of varied operating units makes a period of time system that monitors position of the user and provides twin feedback creating navigation a lot of safe and secure

III.CONCLUSIONS

The aim of this study, the design and implementation of a smart walking stick for the blind has been accomplished. The Smart Stick acts as a basic platform that's helpful for the visually impaired to navigate securely both indoor and outdoor**.** It is efficient and affordable. It leads to good quality results in detecting the obstacles on the path of the user in a range of three meters. This system offers a reliable, low-cost, low power and portable consumption and vigorous solution for navigation with short response time. It's light in weight even though the system is hard-wired with sensors and few other components. In further, this system can be enhanced via wireless connectivity between the system components, thus, growing the range of the ultrasonic sensor and implementing a technology for determining the speed of approaching obstacles. Visually impaired blind people in all developing countries were on top of priorities. The device constructed is only capable of detecting moisture and obstacles. Neither the nature of the obstacle be detected using device nor the holes. As a result, a better device can be constructed using Ardunio Uno, ultrasonic sensors and other devices that make use of audio commands to alert the user of what is in the path of movement. A vibrator may also be added for ease of use and handiness. Further modifications in future can be added to improve the performance of the system.

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