

Special Navigation Cane for Supporting Blind People in Outdoor Usage

Maharshi. D¹, Mohammed Naveed T.K², Keder Sreenivas.K³, Pranav Sai. G⁴

^{1,2,3,4}UG Student

Department of Computer Science and Engineering,
Madanapalle Institute of Technology & Science,
Angallu (V), Madanapalle-517325,
Chittoor District, Andhra Pradesh, India.

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ABSTRACT: The Survey made by “World Health Organization” shows that there is approximately 285 million, of whom 39 million are blind and remaining are of not enough vision. By using today’s technology, we came up with a solution called “SPECIAL NAVIGATION CANE FOR SUPPORTING BLIND PEOPLE IN OUTDOOR USAGE”. Keeping them from encompassing things that may cause risk. Preventing from danger like the obstacles passes before them during walking, things that they can’t identify, distance from the obstacles which they cause them to fall. The Ultrasonic sensors, Buzzers, LDR, LED, IR sensors are used to make them alert before they met with the danger. The cane is also modelled to consider real-time movements of person walking or their different style of walking by counting each step they are heading to and how much they travelled. An edge level is set for speed increase esteem when individual strolls. Mix of ultrasonic sensor and power sensor set in the tip of shoe which will assist with estimating the distance among stick and leg. If a person tends to fall his hand’s pressure will be more than usual one and pressure sensor will sense that pressure and force will be exerted to the shoe. At the point when yield will be more than limit esteem then, at that point caution is initiated.

Keywords - Internet of Things, Sensors

I. INTRODUCTION

As should be obvious and judge every one of the parts of the climate it very well may be obstacles, deterrents, opening or pit. In any case, it isn’t in the event that with Visually Impaired individuals/Physically crippled individuals, yet they gifted by God with detecting capacity. In view of Technology we are making another IoT based stick called Smart Cane/Smart Stick, which will assist with blinding individuals to get think about

obstacles, hindrances and openings or any moving items other than them. It was extremely useful to them as it will alarm them for every single viewpoint which they will look in their everyday existence with the assistance of ringer and sound. This get-together may in actuality have great issues when endeavoring to investigate through another spot (for example, a college, a shopping center, or public structures like town halls).

The sum expanded to 13.7% in 2009 where 35,368 individuals with disabilities were enlisted with the Department of Social Welfare. Hence, advancements are viewed as the best answer for help this local area to perform undertakings as the typical individuals. The goal of the paper is to examine the improvement work of a stick that could speak with the clients through voice caution and vibration, which is named Smart Cane which includes coding and actual making.

1.1 Objective

The main objective of this project is to provide a technology-oriented, low cost, easily scalable, and rugged system for the blind person. In order provide a feasible solution, the blind persons are provided with a smartstick checking framework which helps them for hindrances, pits Infront of them while going through it. Through the smart stick device blind person can recognize the any danger, and he/she can judge an obstacle.

II. LITERATURE SURVEY

From recent years we having a Smart stick that planned by nerds by innovation we having today for dazzle. To help the visually impaired from obstacles, perspectives, openings and pits, snags which made them to fall while strolling. Keen stick was planned with segments like Time Distance of

Arrival (TDOA) it is a sort of part used to gauge the time that the obstacle or hindrance that shows up in front before individual pass. By one way or another were utilized ultrasonic sensors as information and headphones as yield, Ultrasonic sensors are utilized to gauge distance between the snags. One was utilized that pedometer which will be utilized to quantify the distance among snags and it will tell that the number of steps between the impediment and in which bearing he needs to move like (left, right, straight). A wearable ultrasonic obstruction sensor for outwardly weakened. This framework two or three ultrasound sensor on one or the other side over the lash of the goggles. This undertaking can identify the gatecrasher before the visually impaired individual who is wearing the goggles. This framework isn't strong as the sensor implanted with the goggles makes it heavier and furthermore it can't recognize complex items like water, vehicle and so forth

2.1 Existing System

Proposing the product with huge size which having more components that used to detect the danger and alert the user. Maintenance and cost are high for users to buy and use who are having financially less. The device detects the obstacle or hurdle in a small set of distance. Old network sensor device.

We used advanced network sensor like Arduino UNO R3. It is a clone model with high quality. Microcontroller. IR sensor to detect hurdle from 200cm distance from user. LDR sensor for day and night detection. LED it helps the people with light vision problem/ Low vision. By adjusting the intensity of light, i.e., the contrast it creates and the blue component of the light spectrum which is often perceived as irritating, visual performance can be improved.

III. SYSTEM DEVELOPMENT

3.1 Hardware Requirements

NODE MCU:

The Arduino Micro Controller is an extremely easy to utilize and installed on an unmarried chip. It is an In-System-Programmable Device this infers the client haven't any need to use the discard the IC, we can without a moment's delay join the Node MCU to the PC and picking the best possible COMM port. The Node MCU has many sorts like UNO, MEGA and numerous others; here we utilize Node MCU UNO board. The UNO board will appear this way.



Fig.1 Node MCU

ULTRASONIC SENSOR:

A ultrasonic sensor is an electronic device that activities the distance of a target thing by releasing ultrasonic sound waves and converts the reflected sound into an electrical sign. • Ultrasonic waves travel faster than the speed of sound that people can hear). Ultrasonic sensors have two principle parts: the transmitter (which discharges the sound utilizing piezoelectric precious stones) furthermore, the beneficiary (which encounters the sound after it has wandered out to and from the goal). To compute the distance between the sensor and the article, the sensor estimates the time it takes between the discharge of the sound by the transmitter to its contact with the property. The equation for this estimation is $T \times C$ (where D, is the distance, T is the time, and C, is the speed of sound.



Fig. 2 Ultrasonic Sensor

BATTERY:

Whenever the battery voltage level is above 6 Vdc and pin 3 is above 5.1 Vdc then the comparator output becomes high. It can turn ON the FET, Q1 a BS170 which can supply the ground for the output, in turn, going to the Arduino. The positive voltage is passed directly from the batteries into the Arduino board.



Fig. 3 Battery

BUZZER:

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric.

Run of the mill employments of ringers in the business are as a caution gadget, which makes a humming or blaring clamor while need humming. The signal comprises of an external case with two pins to connect it to power and ground. At the point when current is applied to the signal it makes the fired circle contract or extend. Changing the This then, at that point causes the encompassing plate to vibrate. That is the sound that you hear.



Fig.4 Buzzer

JUMPING WIRES:

Jumper wires are basically wires that have connector pins at each end, permitting them to be utilized to relate two fixations to one another without welding. utilized with breadboards and other prototyping instruments to simplify it to change a circuit dependent upon the situation. However jumper wires arrive in an assortment of shadings, the tones don't mean anything. This implies that a red jumper wire is in fact equivalent to a dark one. However, the tones can be utilized for your potential benefit to separate between kinds of associations, like ground or force.



Fig. 5 Jumper wires

IR SENSOR:

IR Sensors is an electronic gadget. It can quantify the warmth of an object and furthermore recognize the movement. For the most part infrared range, all the article radiate structure warm radiations, these sorts of radiations are undetectable to our own eyes. They comprise various sorts of infrared transmitters relying upon the frequency. While estimating the temperature of each shade of light (isolated by a crystal), he saw that the temperature just past the red light was most elevated. IR is undetectable to the natural eye, as its frequency is longer than that of apparent light (however it is as yet on a similar electromagnetic range). Whatever produces heat (all that has a temperature above are casesund five degrees Kelvin) emits infrared radiation. Dynamic infrared sensors both emanate and distinguish infrared radiation. Dynamic IR sensors have two sections: a light radiating diode (LED) and a beneficiary. At the point when an article approaches the sensor, the infrared light from the LED reflects off of the item and is identified by the recipient.



Fig. 6 IR Sensor

LED (Light-Emitting Diode):

The Light-discharging diode is a two-lead semiconductor light source; Hence the LED permits the progression of current the forward way and squares the current the suitable road. The LED possesses a little region which is under 1mm. The use of LEDs used to make different electrical and electronic ventures. The material utilized in LEDs is essentially aluminum-gallium-arsenide. In its unique express, the particles of this material are emphatically fortified. Without free electrons, conduction of power becomes outlandish here. By

adding a pollution, which is known as doping, additional ions are presented, adequately upsetting the equilibrium of the material. These contaminations as extra particles are capable either to give free electrons into the framework or suck out a portion of the all around existing electrons from the molecules (P-Type) making "openings" in the nuclear rounds. In both manners the material is delivered more conductive.



Figure 7-LED

IV. WORKING PRINCIPLE:

The fundamental part in the framework is the microcontroller that controls different parts in the framework. When the ultrasonic sensors distinguish any items or hindrance in 180-degree way it will actuate the signal and the vibration engine. Furthermore, when the GSM modem get a message, it will be shipped off the microcontroller which will get the area of the stick from the GPS modem and communicate the area to the GSM modem because of the sender. In the spaces with low signals cameras can be use, this framework works by fitting a camera on the people head, it will utilize certain calculation to recognize the highs and hindrances in front the visually impaired individual. In the event of a crisis, the client of the stick will press the crisis button and the sign from the catch will go to the microcontroller which will get the area from the GPS modem and communicate the area to the GSM modem which will send a SMS messages to the all saved numbers in the framework. The Arduino is opensource, which implies equipment is sensibly estimated and advancement programming is free. This aide is for understudies in ME2011, or understudies anyplace who are facing the Arduino interestingly. For cutting edge Arduino clients, slink the web there are bunches of assets. The Arduino project was begun in Italy to foster minimal expense equipment for communication plan. An outline is on the Wikipedia passage for Arduino.

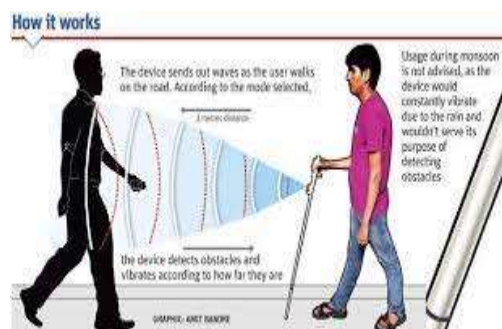


Fig. 8 Working Principle

V. IMPLEMENTATION METHODOLOGY:

This framework the ultrasonic sensors are utilized to detect the impediment. The sensors are drawn an edge line if any obstruction is found inside that range it gives signal discourse through speaker. Hindrances found in various ways are demonstrated with various example signal and discourse (Top, Middle, Pit and Water) to recognize them without any problem. The ultrasonic sensors discharge sound degrees with recurrence lying in ultrasonic range (>20kHz), which is unintelligible to human ears. The sound waves hit the deterrent and skips back to locators. The ultrasonic sensor is utilized for distinguishing objects/snags which are in front while the two IR sensors are utilized to recognize the obstructions on the sides. After the assortment of information, the estimations are finished by the equation: $\mu S/58 = \text{centimeters}$ or $\mu S/148 = \text{inch}$. When the distance of the obstruction is determined then the conditions are checked. The sign is then shipped off microcontroller to work a ringer. The microcontroller peruses the distance of the impediment utilizing sensor and furthermore orders the signal. The ringer blares once for left side obstruction, twice for front deterrents and threefold for right snags. The vibrator is likewise associated in corresponding with the signal for vibration sensation. The light sensor is giving a criticism about the Environment. That is, it advises the client in case it's day or night or then again if a specific spot is dull or splendid. The dampness sensor is utilized to distinguish water pits or any puddles if present. This load of signs are then shipped off the microcontroller, which thus conveys message to the ringer in this way cautioning the client. This segment clarifies how the proposed framework is carried out in useful climate to examine execution through the improvement of an application. The framework execution is finished by interfacing gear with one another for making the keen stick framework.

VI. BLOCK DIAGRAM:

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 sound a buzzer. It also detects and sounds a different buzzer if it where detects water and alerts the blind. Block diagram totally describes about the complete architecture of the smart cane project. Different sensors how they are arranged and how they implemented can be described in the block diagram. Usually block diagram is a step-by-step process with project requirements.



Fig. 9 Block diagram

VII. CONCLUSION:

To summarize, this brilliant stick is finished and wonderful to direct the client to stroll with the assistance of stick by getting to the signs of stick with no intricacies. This is utilized to distinguish the impediments from a good way and caution the client and guide him/her to move toward a path where there is no any obstacles. It additionally advises in case there is any fire or water by IR sensors and furthermore it is utilized to distinguish steps and deterrents from 200cm. It is worth focusing on now that the point of this investigation which is the plan and execution of a keen strolling stick for the visually impaired has been completely accomplished. The Smart Stick goes about as an essential stage for the coming age of additional supporting gadgets to help the outwardly impeded to explore securely both indoor and open air. It is compelling and reasonable. It prompts great outcomes in distinguishing the obstructions on the way of the client in a scope of three meters. This framework offers a minimal expense, dependable, compact, low force utilization and strong answer for route with clear short reaction time. However the framework is hard-set up with sensors and different parts, it's light in weight. Further parts of this framework can be improved by means of remote availability between the framework

segments, subsequently, expanding the scope of the ultrasonic sensor and carrying out an innovation for deciding the speed of moving toward obstructions. While growing such an engaging arrangement, outwardly impeded and daze individuals in all agricultural nations were on top of our needs. The gadget built in this work is just fit for recognizing obstructions and dampness. Openings can't be distinguished utilizing this gadget nor the idea of hindrance. Accordingly, a superior gadget can be built utilizing ultrasonic sensors, Arduino Uno and different gadgets that utilize sound orders to alarm the client of what is in his way of development. A vibrator may likewise be added for usability and comfort. Later on, further alterations to improve the presentation of the framework will be added. These include: A worldwide situating technique to discover the situation of the client utilizing the GPS, and GSM modules to convey the area to a family member or parental figure. It ought to likewise oblige wide changing grasps for adaptable taking care of. the Arduino sheets. Wi-Fi module identifies with the Arduino board. The workforce passage is checked by Node MCU signals is taken from which the Node MCU Receiver gathers the information and host the information in the cloud. Examination should be possible in the cloud.

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