Smart Blind Stick For Obstacle Detection and Navigation System

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Abstract
This paper describes the use of Arduino on ultrasonic blind walking stick. 30 million people are permanently blind and 285 billion are visually impaired, according to the WHO. When you consider them, you will realize very well that without the aid of others they can't walk. To reach your destination one has to ask for directions. During their daily lives, they have to face more challenges. The blind handle is safer for a person to walk. The bar senses the item before the individual and provides the consumer with a vibrational answer or on demand. And, the human being can travel without anxiety. This app is the best solution to solve the problems

Introduction
The main aim of this initiative is to enable the blind navigate with confidence and to be alert if their walking route becomes obstructed with other things, people or related odds. In the circuit, a buzzer is attached as a warning signal, whose beep frequency changes depending on the distance of the target. The smaller the obstacle gap, the more frequent the beep buzzer is. We can say the length of the beep is inversely proportional to the size. The ultrasonic sensor is the main feature of this device. The ultrasonic sensor transmits a sound pulse at high frequency, and then measures the period to obtain the sound echo signal to mirror back. There are 2 circles inside the sensor. One of them transmits the ultrasonic waves and serves as the transmitter. The other each serves as a receiver and collects the repeated sound signal (mostly a small microphone). The sensor is adjusted according to air velocity of the echo. With that measured information, the time difference between sound pulse propagation and detection is determined by calculation of the distance to the target. This circuit is powered through a switch by a 9 volt battery.

Review of literature
Approach suggested for use of a blind smart stick without eyes: danger identification, artificial vision and GPS real time support. With GPS, an artificial intelligence tool, danger recognition and an audio circuit this system works. The reference stick is used for the indoor and outdoor use of the blind person. In addition to a GPS navigation system, it has an obstacle detection system. The GPS navigation system is ready to help people on their way. The hazard identification programs and GPS navigation programs are processed using a raspberry pi. Audio feedbacks are provided to the consumer for navigation and obstacle detection [1]. The camera in this project is on the individual's head; an algorithm is used to spot obstacles. The platform actually uses ultra-sonic sensors to detect obstacles. The GPS device allows you to hit the correct location. Once an obstacle is reached or we hit the speech circuit of destination should trigger supplying a sort of expression.
Subsystems are connected to a microcontroller which executes the operations and schedules them. The machine is inexpensive. The accuracy is big. Nevertheless, the difficulty of the concept is high [2]. A similar study for the unsightly utilizes bursts echoes methodology to provide a warning sound when the hazards are found. The United States Military uses this technique to monitor the submarines. The signals hit a hard surface and vary from 21 KHz to 50 KHz. Nevertheless, a strong demand is met [3]. A further review took into account the efficiency and flexibility of our low-cost design. A user friendly android platform has been created. Blind people still keep alert at the buzzer duration and listen to noises. The sound search on Google Maps is extremely accurate and confidential, not for finding places such as shutdown houses, but for the detection of barriers. Thus, the software is affordable, quick to use and features a simple design capable of integrating new technologies [4]. This research requires an ultra-sonic stick powered with GPS. The stick has GPS which has a SD memory card and holds different locations The person sets the path by means of GPS to guide the individual to his / her destination [5]. To visually impaired people, a smart stick has been built to help identify obstacles using infrarot, ultrasonic and water sensors. With the assistance of these sensors, obstacles within the distance of around 3 m can be observed [6]. The main purpose of this research paper is to provide a simple, economical and effective solution for the visually impaired. The concept behind the stick's nature was to make it structurally identical, i.e. compact, lightweight and easy to handle, yet provide the consumer with a constructive perspective on the hazards along their walking path. The smart white cane is fitted with ultrasonic sensors that detect holes, bumpers, downfalls, ramps, lying low and knee-level threats and even those above the tail [7]. God endowed the human being with sense of vision is an important aspect of our universe. Yet poor people who lack the capacity to imagine situations are aresome. The mentally impaired have to meet other daily challenges. If they travel to an unknown place, the problem gets worse. Only a few current search programs can provide immersive interaction via speech output for people with visually impaired conditions. For both indoor and outdoor uses, none of these systems work correctly [8]. In this function, the Blind stick is a revolutionary stick designed to improve mobility for visually disabled people. This is an innovative, blind brace, which helps people with visual disabilities move effectively using state-of-the-art technologies [9]. The use of engineering practices in medicine in all areas of biomedical research has significantly added results. The creation of advanced supports to mentally disabled persons is one of the results of this program. This paper describes, integrating and detecting the position and distance of the barrier through a network of ultrasound sensors. Through incorporating warning light, the efficiency and reliability are also enhanced [10]. This article presents the adaptive handlebar for visually impaired individuals, focused on Arduino and ultrasonic sensors. According to the World Health Organization, there are around 37 million blind people worldwide. Those with visual impairments also rely on external assistance, which can be provided as decision-making support systems by those, trained dogs or special electronic instruments. We were therefore inspired to create an elegant white cane that would transcend these constraints. In certain locations, we attached ultrasound sensors to the cane that fitted users with ambient information via a buzzer toning system.
Block diagram

Fig. 1. Block diagram of the system

Arduino microcontroller is the key feature of this computer. The specific blocks connected to this device include an ULS, water sensor, buzzer, vibrator, IR screen. An ultrasonic sensor for (if any) barriers is used in this system. The ultrasonic sensor can provide an extremely cost-efficient remote measuring device. Vibrator and buzzer run using the sensor data. Water sensor module for the identification of water and for the warning against water damage. On discovery of the stream, buzzer is triggered. Even supplying vibrator to show obstacles. The system has one more benefit. The blind person may sometimes lose his stone, or forget where he was put. To this end, it includes an IR board. The IR module is an electronic device that transmits and/or records two radio transmissions.

Circuit diagram

Flow chart

This is the conceptual device pattern. This consists of a circuit with an ultrasonic sensors and a water detector interfaced by Arduino Uno. The stick is designed to detect obstacles within 100 cm and increase the frequency of buzzing when the object reaches the stage.
Hardware implementation

Arduino Uno

The Ultrasonic sensor interfacing with the microcontroller, the Arduino programming codes and the real sensor is installed on the microcontroller was part of our system. The Arduino UNO is an ATmega328p (data sheet)-centered microcontroller device. It has fourteen physical outputs and ports, six of them PMW output. It is possible to use 6 analog inputs and 16 MHz quartz crystal. The moisture sensor consists of two samples of wire that rely on the particular water resistance to sensing the water in contact. The RF transmitter was interfaced with the Arduino design codes on the microscope and the RF transmitter was attached to the microscope.

Ultrasonic Sensor

Ultrasonic sensors and water sensors collect the data and send it in real time to the microcontroller. The microcontroller triggers the buzzer after processing certain details. The water sensor detects water on the earth, and the circuits are operated by batteries.
RF Transmitter and Receiver
The blind stick is fitted with RF transmitter and receiver. Transmitter sends the signal to the receiver and, using this, we will put a buzzer that helps the blind person to easily detect their stick by tracking the echo from where it comes from.

Result and discussion
Move the Ultra Sonic sensor near to the target and you will note the beeping of the Buzzer and that beeping volume rises as the stick hits the object. If the LDR is covered in dark or the buzzer will beep when there is too much light. If all is fine then the buzzer won't beep.

Conclusion and future scope
It should be noted at this stage that this work has been thoroughly carried out in order to design and implement an articulate walking bolt for the blind. The Smart Stick acts as a versatile interface for easy and comfortable internal and external mobility for visually impaired people in the next phase of more supportive apps. It's safe and affordable. This results in effective obstacle detection within three meters of the user's direction. It offers low cost, reliable, lightweight, low power and efficient navigation with fast, quick response times. The computer is hardwired, but light weight, with sensors and other features. Wireless connectivity between components of the device will enhance the additional features of this instrument and increase the range of ultrasound sensors and incorporate technologies to measure the intensity of obstacles approaching. With this approach, our targets in all of the developing countries were particularly addressed towards visually impaired and blind people. In this analysis the machine built can only sense obstacles and humidity. No holes can be identified with this device or with the form of barrier. Thus, ultrasonic sensor systems, arduino Uno and other tools can be designed for an approach to warn users about the direction of movement by using audio commands. For easy use and flexibility, a vibrator can also be attached. Further enhancements to boost system performance will be made in future. These include: an international system for locating the individual via the GPS and GSM systems in order to reach the parent or caregiver venue. It should be flexible and wide range of handling.

REFERENCES


