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SMART BLIND WALKING STICK

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ABSTRACT

According to WHO, 30 million peoples are permanently blind and billion peoples with vision impairment. If u notice them, you can very well know about it they can't walk without the help of other. One has to ask guidance to reach their destination. They have to face more struggles in their life daily life. Using this blind stick, a person can walk more confidently. This stick detects the object in front of the person and give response to the user either by vibrating and through command.

Keywords: Stick, Ultrasonic sensor & walking stick

1.INTRODUCTION

Visually impaired persons have difficulty to interact and feel their environment. They have little contact with surroundings. Physical movement is a challenge for visually impaired persons, because it can become tricky to distinguish obstacles appearing in front of them, and they are not able to move from one place to another. They depend on their families for mobility and financial support. Their mobility opposes them from interacting with people and social activities. In the past, different systems are designed with limitations without a solid understanding of the non-visual perception. Researchers have spent the decades to develop an intelligent and smart stick to assist and alert visually impaired persons from obstacles and give information about their location. Over the last decades, research has been conducted for new devices to design a good and reliable system for visually impaired persons to detect obstacles and warn them at danger places. Smart walking stick is specially designed to detect obstacles which may help the blind to navigate care-free. the audio messages will keep the user alert and considerably reduce accidents. A voice enabled automatic switching is also incorporated to help them in private space as well. This system presents a concept to provide a smart electronic aid for blind people, both in public and private space The proposed system contains the ultrasonic sensor, water sensor, voice play back board, raspberry pi and speaker. The proposed system detects the obstacle images which are present in outdoor and indoor with the help of a camera. The Stick measures the distance between the objects and smart walking stick by using an ultrasonic sensor. When any objects or obstacles come in range of an ultrasonic sensor then the head phone tell the name of obstacle which is in front of the stick. The smart walking stick is a simple and purely mechanical device to detect the obstacles on the ground. This device is light in weight and portable. But its range is limited due to its own size. It provides the best travel aid for the person. The blind person can move from one place to another independently without the others help. The main aim of the system is to provide an efficient navigation aid for the blind persons which gives a sense of vision by providing the information about their surroundings and objects around them.

1.1 PROPOSED SYSTEM

In the proposed system, the ultrasonic sensor is used to sense the obstacle distance from the user. This reference distance can be used to decide whether the user can move or not. The ultrasonic sensors work on the basis of sound. The sound waves are transmitted ahead from the sensors towards the obstacle which can sense the distance up to a distance of 12 feet with a resolution of 0.3cm. The sensors are placed in five locations in order to cover maximum sides possible with minimum usage of the sensors. The sensors are placed in left, right, middle left, middle right and bottom respectively. Generally, the blind person cannot see the objects present on the ground. So the bottom sensor keeps track of the ground clearance providing necessary security measures.

2. LITERATURE REVIEW

THE THIRD EYE FOR THE BLIND USING ARDU+INO AND ULTRASONIC SENSOR

M Narendran, SarmisthaPadhi, Aashita Tiwari was made a technology for the blinds. One of the main feature of this device is that it will be affordable. The Arduino Pro Mini 328- 15/16 MHz board is worn like a device. This was equipped with ultrasonic sensors, consisting of module. Using the sensor, visually impaired can detect the objects around them and can travel easily. When the sensor detects any object it will notify the user by beep or vibration. Arduino, wearable band, buzzer, blind, people, ultrasonic.

SMART WALKING STICK FOR BLIND PERSON

Sathya, S. Nithyaroopa, P. Betty, G. Santhoshni, S. Sabharinath, M.J. Ahanaa has proposed system contains the ultrasonic sensor, water sensor, voice play back board, raspberry pi and speaker. The proposed system detects the obstacle images which are present in outdoor and indoor with the help of a camera. The Stick measures the distance between the objects and smart walking stick by using an ultrasonic sensor. To provide vision to the user so we need to consider and process the image ahead as well. The image is detected using image sensors (camera walking stick including a USB camera, RF module, Rain sensor, Ultrasonic sensor, Raspberry pi and a head phone attached to it. The raspberry pi is the central controller of the system. The images which were sent from the camera are compared with the images stored in the dataset using the image processing. For as image processing, morphology segmentation is used.

SMART WALKING STICK FOR VISUALLY IMPAIRED PEOPLE

Jayakumar, S. Magesh, K. Prasanth, P. Umamaheswari, R. Senthilkumar has developed, the different sensors like object sensors (ultrasonic sensors), humidity sensor, temperature sensor and light sensor are used. Speaker and volume control is used in the form the status to the blind people. GPS is used to track the blind people path and emergency conditions are transmitted to the neighbour through GSM based alarm system. This project is implemented by using the DSPIC30F2010 controller, ARM Processor, DISPIC30F 2010.

SMART WALKING STICK FOR VISUALLY IMPAIRED PEOPLE USING ULTRASONIC SENSOR AND ARDUINO

Dada Emmanuel, Gbenga, Arhyel, Ibrahim Shani, Adebimpe Lateef, Adekunle (March 2016). This paper presents the smart walking stick based on ultrasonic sensors and Arduino for visually impaired people the system was designed, programmed using c language and tested for accuracy and checked by the visually impaired person. Our device can detect obstacles within the distance of about 2m from the user. Ultrasonic sensor, Arduino atmega328 microcontroller, mobility aid, visually impaired person, alarm.

ULTRASONIC AND VOICE BASED SMART STICK

D.Sekar, S. Sivakumar, P. Thiagarajan, R. Premkumar, Vivekkumar (March 2016). In this paper GPS technology is integrated with pre-programmed locations to determine the optimal route to be taken. The user can choose the location from the set of destinations stored in the memory and will lead in the correct direction of the stick. In this system, ultrasonic sensor, temperature sensor, humidity sensor, GPS receiver, vibrator,

voice synthesizer, speaker or headphone, PIC controller and battery are used in this system, ultrasonic sensor, temperature sensor, humidity sensor, GPS receiver, vibrator, voice synthesizer, speaker or headphone, PIC controller and battery are used.

3. PROBLEM IDENTIFICATION

People who are blind and suffering from cataracts, glaucoma, albinism, night blindness.

The biggest challenge for a blind person, especially the one with the complete loss of vision, is to navigate around places.

Obviously, blind people roam easily around their house without any help because they know the position of everything in the house.

People living with and visiting blind people must make sure not to move things around without informing or asking the blind person.

4. SMART STICK

The working behind this blind stick is that it is used for special purpose as a sensing device for the blind people. The circuit provides 9V power supply for the circuit and maintains its output of the power supply at constant level.

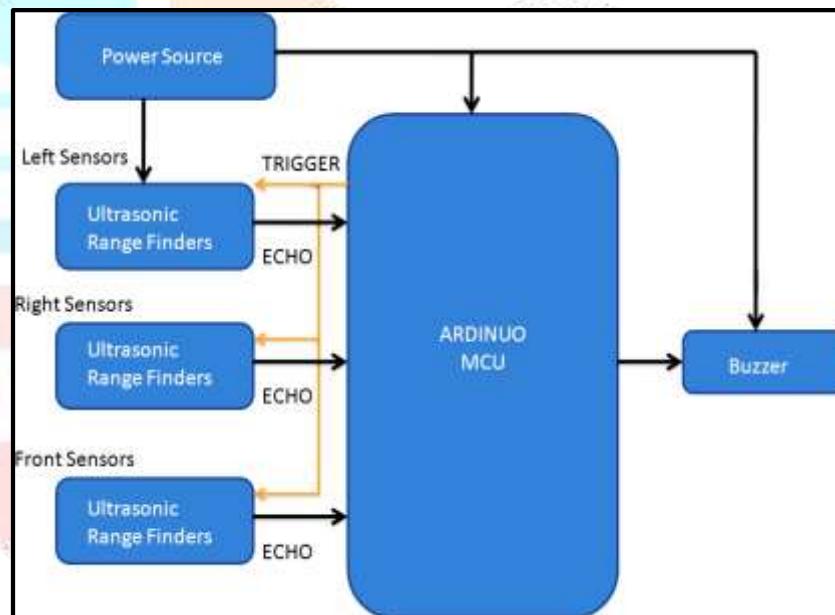


Fig :1 Block Diagram

It is used widely to detect objects using ultrasonic sensor, if any object is present, the ultrasonic sensor detects the object by measuring the distance between the object and the user and sends the data to the Arduino UNO. Also, we Need to Set a Threshold Value for an Ultrasonic Sensor. For Example, if we set a value of 10cm then a Blind Person Goes Behind the 10cm, automatically that Blind Person Receive a signal of any obstacles is on Infront of him. To determine the distance of an object, calculate the distance between sending the signal and receiving back the signal.

5.1. INTERNET OF THINGS(IOT)

The Internet of things (IoT) describes the network of physical objects things or objects that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the Internet. Things have evolved due to the convergence a multiple technologies, machine learning, commodity sensors, and embedded systems. Traditional fields of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), and others all contribute to enabling the Internet of things. In the consumer market, IoT technology is most synonymous with products pertaining to the concept of the "smart home", including devices and appliances (such as lighting fixtures, thermostats, home security systems and cameras, and other home appliances) that support one or more common ecosystems, and can be controlled via devices associated with that ecosystem, such as smartphones and smart speakers. IoT can also be used in healthcare systems. There are a number of serious concerns about dangers in the growth of IoT, especially in the areas of privacy and security, and consequently industry and governmental moves to address these concerns have begun including the development of international standards. IoT devices are a part of the larger concept of home automation, which can include lighting, heating and air conditioning, media and security systems and camera systems. Long-term benefits could include energy savings by automatically ensuring lights and electronics are turned off or by making the residents in the home aware of usage.

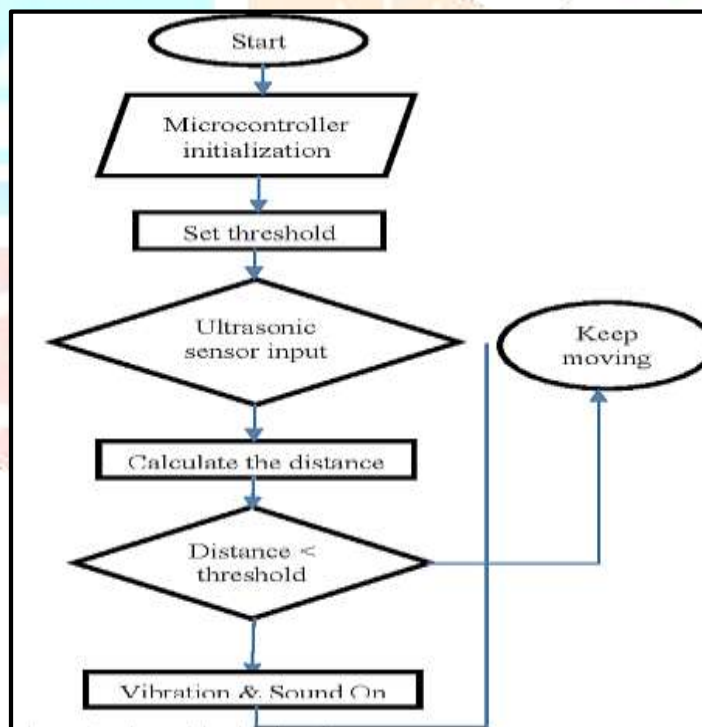


Fig 2 Process of IOT

For example, a user might want to check the video feeds in their house via a phone app or a web browser. Depending on the IoT application, the user may also be able to perform an action and affect the system. For example, the user might remotely adjust the temperature in the cold storage via an app on their phone.

5.2 VOICE PLAYBACK MODULE

Voice Record Module is based on ISD1820, which a multiple-message record/playback device. It can offer true single-chip voice recording, no-volatile storage, and playback capability around 10 seconds. A sound module is an electronic musical instrument without a human-playable interface such as a piano-style musical keyboard. Sound modules have to be operated using an externally connected device, which is often a MIDI controller, of which the most common type is the musical keyboard (although wind controllers, guitar controllers and electronic drum pads are also used). Controllers are devices that provide the human-playable

interface and which may or may not produce sounds of their own. Another common way of controlling a sound module is through a sequencer, which is computer hardware or software designed to record and playback control information for sound-generating hardware (e.g., a DJ may program a bass line and use the sound module to produce the sound). Connections between sound modules, controllers, and sequencers are generally made with MIDI (Musical Instrument Digital Interface), which is a standardized protocol designed for this purpose, which includes special ports (jacks) and cables.

Sound modules are often rack-mountable, but might also have a table-top form factor, particularly when the intended user is a DJ or record producer. The height of a sound module is often described in rack units ("U") or unit. Small sound modules are mostly 1U in height, the larger models a multiplication e.g. 2U or 3U. Despite their name, most sound modules do not produce any audible sound until their output is plugged into a keyboard amplifier. There are a wide variety of sound modules, ranging from more generalist modules that can be used for a number of controllers or instruments (e.g., a rack mount synthesizer with hundreds of commonly used presents of instrument sounds, from piano and organ to synth brass and string pads) to specialized modules designed for use with wind controllers, electronic drum pads, digital accordions, or to produce clone wheel organ sounds. Hardware sound modules have largely been replaced by software synthesizers, due to the increased speed and processing power of computers and their decrease in price. Nevertheless, some DJs, EDM musicians and record producers continue to use vintage 1980s sound modules like the Yamaha TX16W (1988) for their unique, retro sound.

5.3 BUZZER

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

5.4 GPRS+GPS MODULE

This shield integrates the **SIM 908 module**, and counts with GPRS and GPS technologies that enables you to perform real time tracking applications. The idea is simple: read the GPS coordinates (longitude and latitude) and send them by using a HTTP request to a web server. Then use a browser to load the PHP web page which uses Google maps to show the location in real time.

5.5 JUMPER WIRES

It is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

5.6 BATTERY

It is a device that stores a chemical energy and converts into electrical energy. The chemical reaction in a battery involved the flow of electrons from one material to another through an external circuit. The flow of electrons provides an electrical current that can be used to do work.

SPECIFICATION

Nominal voltage: 12v
Cell type: Lithium ion 18650
Nominal capacity: 2.5Ah
Discharge Capability: 2A
Battery Pack dimensions: 20*60*70MM
Approved certifications: MSDS, UN38.3, CE

5.7 VIBRATORS MOTOR

An eccentric rotating mass vibration motor (ERM) uses a small unbalanced mass on a DC motor when it rotates it creates a force that translates to vibrations. A linear resonant actuator (LRA) contains a small internal mass attached to a spring, which creates a force when driven.

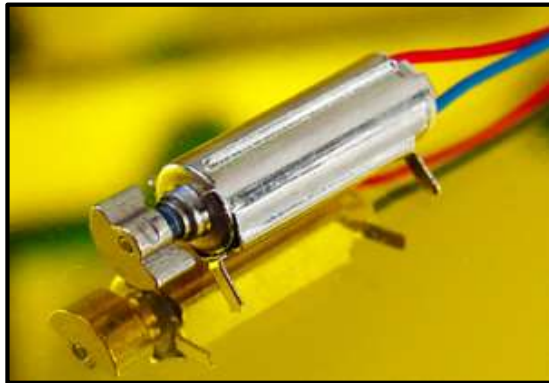


Fig 3 Vibration Motor

6. CONCLUSION

The Blind Walking Stick has been finally made, which can be used to guide the blind. Its aims to solve the problems faced by the blind people in their daily life. It is sufficiently able to perform its function of helping a visually impaired person to be able to walk independently as the stick helps him to sense the obstacles. The system also takes the measure to ensure safety. Low-cost ultrasonic range finders along with a microcontroller is used to measure the distance to obstacles and if they are close enough provide a feedback to the user in form of beeps or vibrations. This project will operate to help all the blind people in the world to make them easier to walk everywhere they want. It was done to help the blind to move Infront very well. It is used to help the people with disabilities that are blind to facilitate the movement and increase safety. The project can be modified by installing more sensors and vibrators so that stick vibrates on sensing and obstacle. Vibrations can be much easily sensed as compared to number of beeps which would require the user to be always alert.

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