

Safety guard for blind

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Abstract-Blindness is a old phenomenon in the society. It is the condition of visual lacking perception. Blind people are those who have visual impairment of about 20/200 or (6/60). the people who are legally blind has trouble seeing things which other people can see like road signals, traffic lights, and so forth. They may face the falls and other accidents because they cannot clearly see their surrounding environment. The visually challenged people are always trying their best to be normal and comfortable in surroundings. Due to their visual impairment their life and activities are greatly restricted by eyesight loss.

Many people with serious visual impairments can travel independently, by using a large range of tools

I.INTRODUCTION

For the blind it is difficult to step out without someone's help. To make their life simpler, our electronic safety guard system will alert them of any obstacle in the path. The Safety Guard for Blind, it comprises of Ultrasonic Sensor as Proximity sensor and Voice processor. The Transmitter sends the rays which fall on the object and upon reflection is sensed by receiver. The event is being processed through Micro controller which intimates the blind person of the obstacle There are more than 161 millions people worldwide are blind. Among them, 124 millions are having low vision and 37 million are blind. The other 153 million people suffer from visual impairment because of the uncorrected refractive errors such as near-sightedness, far-sightedness . Virtually all these people could have normal vision with eyeglasses or the contact lenses.

Blindness is a the condition of lacking visual perception and it is always described as severe visual impairment with residual vision. The blind people's activities and life are greatly restricted due to eyesight loss. Blind people can walk only in specified or known routes that are significant in their daily routines, with the blind navigation equipments and the accumulated memories in their long-journey exploration. The situation has being resulted in many difficulties to them in their normal work, activities, lives and so on. Based on the investigation about the daily activity characteristics and modes of blind people, study is being found the main difficulty and are encountered in a life of the blind included walking on road, way finding, taking the bus and looking towards the normal life.

Several devices have been developed for navigation

and techniques. They are taught how to travel confidently, and safely and independently at the home and outside world so they can find the way very easily and fast if they know and are familiar with the surroundings. The most popular and important mobility device or aid utilized by them is a walking stick. The conventional walking stick used by the blind people is actually not efficient to detect the objects in front of them. They can only detect the object that is being around the walking stick.

Index Terms-Microcontroller 8051, Proximity sensor, Audio record and play.

and mobility assistance of the blind and are typically known as travel aids and aids for blind movement. The most widely and successfully travel aid used is the walking cane. The walking cane that is being used by the visually challenged people is a white cane along with a red tip which is the international 2 symbol of blind community. Stick is used to detect the obstacles on land, uneven surfaces, holes, steps. Blind people usually tap their stick on the ground, and the coming or resulting vibrations indicate the nature of the surface. Tapping produces the sound, which is reflected from nearby obstacles. The only very perfect travellers are able to detect these echoes and their direction of origins through the headphones. Ultrasonic Proximity Sensors are being used to detect the presence of objects which come in the range of their oscillating field. And in addition a separate voice message is played back through ear phone to intimate the blind about the obstacle.

II.LITERATURE REVIEW

The most commonly used and famous travel aid for blind is the Walking cane. It can detect obstacles like potholes, stones, uneven surfaces etc. There have been many new technologies being introduced to serve the blind.

This project is focusing on the detection of object that is in front of the user within the specific distance range which is depending on the type of distance sensor used. In this project, an ultrasonic distance sensor is going to be used. As the object is closer to the sensor, the signal produced is increased as well.

III. WORKING OF THE SYSTEM:

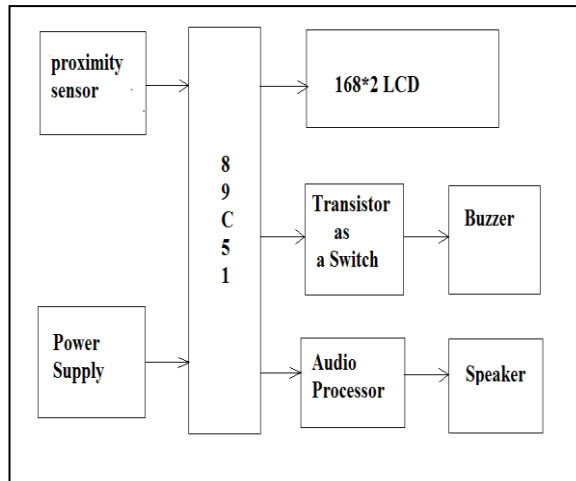


Fig. Block diagram of Hardware.

IV. HARDWARE DESCRIPTION

The different contents of the electronic blind stick is discussed.

A) Proximity Sensor

A proximity sensor is a sensor able to detect the presence of nearby objects without any physical connection. The proximity sensors which emits the field that is electromagnetic or a beam of electromagnetic radiation, and looks forth for the field changes. The object is being sensed and usually referred to as the target of the proximity sensors. The various proximity sensors target to demand different sensors. Maximum distance that this sensor can detect is defined "nominal range". Some sensors have adjustments of the nominal range or means to report a graduated detection distance.

Proximity sensors can have a high reliability and long functional life because of the absence of mechanical parts and lack of physical contact between the sensed objects and the sensors. These sensors are mostly used in smart phones for the detection of accident touch tabs screen. Also they can be used for vibration in machines monitoring to measure the variation in distance between a shaft and support bearing. It is common in steam that have large turbines, compressors, motors that used sleeve type bearings.

B) Micro-controller 89C51 :

It is a low-power, high-performance CMOS 8-bit microcomputer with 4K bytes of Flash Programmable and Erasable Read Only Memory (PEROM). The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with

the MCS-51™ instruction pin-out and set. The program memory allows on chip flash memory to be reprogrammed in-system or by a conventional nonvolatile programmer memory. By the combination of a versatile 8-bit memory CPU along the Flash on the monolithic chip and the powerful microcomputer is Atmel AT89C51, which provides a high flexibility and cost efficiency solution so many embedded control applications.

C) LCD display :

It is a device whose display contains two internal byte wise registers. One for the commands (RS=0) and second for character to be displayed (RS=1). It mainly also contains a user programmed RAM area (the character RAM). Which can be programmed to generate any desired character that can form using a dot matrix for distinguishing between the two different

data areas, the hex command byte 80H will be used to signify that display RAM address 00H is being choose and Port 1 is being used for furnishing purpose of the command or data byte, and the ports 3.2 to 3.4 furnish register select and read or write levels. The LCD display takes different amount of time to accomplish the functions. LCD bit number 7 is monitored for logic high (Busy) to ensure the display is not overwritten.

D) Transistor as Switch:

When obstacle is being detected we have to turn the buzzer on, but the micro-controller output is not sufficient to drive the buzzer directly. Therefore to drive the buzzer we have used the transistor as switch.

E) BUZZER:

It is the output device. Whenever the obstacle is detected after that Buzzer is turned ON. Or else buzzer will be in the turned off condition.

F) Power supply:

In this project, we require +12Vdc, and +5Vdc supply respectively. The +5 volts supply is required for Micro-controller 89C51 board, the sensors and signal conditioning etc.

The + 12 Volts supply is required for Buzzer. The project is moving so we cannot use 230Vac supply. Therefore 12VDC battery is used in our project.

G) Audio Processor:

Audio processor is the device which gives good quality recording and playback with 11 minutes audio at 8 Khz Sampling rate along with 16 bit resolution. By using

the board jumpers, the total duration is divided into the individual triggers of 1,2,4 & 8 segments respectively which can be triggered by onboard switches or external low trigger that are like microcontroller pins.

Features of audio processor:

- 11 minutes of recording duration in selectable total 1,2,4,8 segments.
- High quality and single chip voice recording and playback solution.
- Easy to use operation which is user friendly.
- No battery backup required, Non - Volatile - flash memory technology.
- Audio output is given to drive a speaker or audio out for public address system.
- Recording voice is easily possible with the help of on-board microphone or by any means of audio input like PC.

a). Record and Play:

It Offers true solid state storage capability and also requires no software or microcontroller supporting. It also gives good quality recording and playback with 11 minutes audio at 8Khz Sampling rate along with 16 bit resolution.

By the use of on board jumpers, total duration can be divided in individual triggers of 1, 2, 4 & 8 segments which can be triggered by onboard switches or external low trigger like microcontroller pins.

Features of Record and play

- 11 minutes of recording is possible.
- It is good quality solution User friendly.
- Easy to use operation.
- Non volatile memory is used.
- Battery backup is not required.
- Audio output to drive a speaker.
- With the help of on-board microphone it is possible to record the audio.

b).Getting Started:

To start using the board, we need to provide regulated +3V to 6V DC to the board and connect a

speaker to board. +5V ideally will be just fine as we use with our controllers .Before power on the board select a message mode through jumpers. Below image it is possible to see the jumper is being set at message mode 8. It simplifies that there will be eight message of each of 1.3 minutes length.

If there is no external audio connected to line in the stereo pin, the onboard MIC will automatically be used for recording. Power on the board now. Let us assume that message mode 8 was selected above. It will give us 8 messages of about 1.3 minutes per.

Put the Switch (REC mode switch) to Record Mode. The record mode is thus indicated by a RED LED D1 next the switch. If the LED is in off condition that means the board is in Play mode.

Move it to the either side to switch between PLAY and RECORD mode. When it is in record mode RED LED will glow indicating it is in record mode. The Record mode here does not mean recording has started. It only decides what happens if you press SW1 to SW8.

c).Setting Message Modes

- 1.Total duration of 11 minutes of this chip is divided into 8 messages each of 1.3 minutes.
- 2.Total duration of 11 minutes of this chip is divided into 4 messages each of 2.75 minutes.
- 3.Total duration of 11 minutes of chip is then divided into 2 messages each of 5.5 minutes.
- 4.Total duration is only of 1 message with the max 11 minutes of duration.

d).Fixed Message Mode

- 1.If the message mode 1 is selected then only switch SW1 is for recording or playback.
- 2.If the message mode 2 is selected then only the switches SW1 and SW2 are used for recording or playback.
- 3.If the message mode 4 is selected then only switches SW1 to SW4 are used for recording or playback.
- 4.If the message mode 8 is selected then only switches SW1 to SW8 are used for recording or playback.

e).Trigger message from external microcontroller

Thus we have brought all eight switch connections to this header to allow you only to use it as

trigger from external microcontroller instead of using the onboard switch to play message.

V.WORKING OF ELECTRONIC BLIND STICK

The Walking stick for visually challenged people using proximity sensors ,microcontroller ,speakers, audio record and play and vibrators is implemented on a long stick.

The first step is to detect the distance as well as the speed of an obstacle from the blind user and this is done efficiently done by the sensors. The sensors used are the proximity sensors.

An proximity sensor- is the converter that measures a physical quantity and then converts it into a signal which can be observed and read by an electronic instrument.

Also it measures the difference of the transmitted and the received signals and then it send the resulting information to the microcontroller.

A microcontroller- It is a small computer on a single integrated circuit that contains a core processor, the memory, and the programmable input/output peripherals.

The Microcontroller receives input value from the three proximity sensors that are mounted in three different directions on the walking stick, and according to these values from sensor, it informs the user through the speech IC that is the audio signal and is played through the speaker.

The main purpose of microcontroller utilized is to compare the set values that are the set point values with the detected values from the sensor and send the signals to the devices respectively.

The microcontroller is being programmed in a manner that it will automatically vary the output of the system if there is any or sudden change in the input quantity.

The coding is been done in appropriate manner and the respective components are interfaced with the microcontroller.

In the record and the play circuit it is possible to record about 8 voice signals in such a way that on the spot audio signal can be recorded and it is played on the distance being detected.

VI.RESULT

Sr.no	Left	Right	Front	Output
1.	0	0	0	Left ,Right ,Front Detected
2.	0	0	1	Left and Right Detected
3.	0	1	0	Front and Right Detected
4.	0	1	1	Right Detected
5.	1	0	0	Front and Left

				Detected
6.	1	0	1	Left Detected
7.	1	1	0	Front Detected
8.	1	1	1	No Sensor is Detected

Table: Result Analysis

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VIII.CONCLUSION

Safety Guard is the device that has an electronic system in built in it which helps a visual impair person to be a normal person in this world. The stick consist of sensors that are the proximity sensors which has particular distance range for sensing the object also the audio record and play circuit plays an important role in the stick which records the message and play section helps to play the message as audio, this will make the person aware of the obstacle and avoid the accident. This stick is more advantageous than normal stick as it comprises of all advance features in it that will help visual impair or the blind person to walk and move safely around or anywhere in the world in all conditions.

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