WAY FINDING ELECRONIC BRACELET FOR VISUALLY IMPAIRED PEOPLE

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ABSTRACT:
This paper represents hardware implementation of finding way using bracelet or cane. Way finding is depending upon movement of the user. God gifted sense of vision to the human being is an important aspect of our life. But there are some unfortunate people who lack the ability of visualizing things. The visually impaired have to face many challenges in their daily life. The problem gets worse when there is an obstacle in front of them. Blind stick is an innovative stick designed for visually disabled people for improved navigation. The project presents a practical system to provide a smart ultrasonic aid for blind people. The system is intended to provide overall measures – Artificial vision and object detection. The aim of the overall system is to provide a low cost and efficient navigation aid for a visually impaired person who gets a sense of artificial vision by providing information about the environmental scenario of static and dynamic objects around them. Ultrasonic sensors are used to calculate distance of the obstacles around the blind person to guide the user towards the available path.
KEYWORDS: Ultrasonic sensors, visually impaired person, Microcontroller, Buzzer, RF module, Water detection sensor.

INTRODUCTION:

Number of people across the globe who are blind, over 15 million are from India. Even for the non-visually impaired the congestion of obstacles is sometimes problematic, it's even worse for the visually impaired. People with visual disabilities are often dependent on external assistance which can be provided by humans, trained dogs, or special electronic devices as support systems for decision making. Existing devices are able to detect and recognize objects that emerge on the floor, but a considerable risk is also includes the objects that are at a sudden depth, or obstacles above waist level or stairs. Thus we were motivated to develop a smart white cane to overcome these limitations. The most common tool that the blind currently use to navigate is the standard white cane. We decided to modify and enhance the walking cane, since blind are only able to detect objects by touch or by cane. The user sweeps the cane back and forth in front of them. When the cane hits an object or falls off of the edge of a stair, the user then becomes aware of the obstacle –sometimes too late. We accomplished this goal by adding ultrasonic sensors at specific positions to the cane that provided information about the environment to the user through audio feedback. The main component of this system is the Radio-Frequency module which is used to find the stick if it is misplaced around.

Our main objective was to reduce the accidents with the visually impaired peoples.

LITERATURE SURVEY:

Paper	Author	Description
1.Smart cane for the visually impaired: design and controlled field testing of an affordable obstacle detection system(2008-09)	1.SinghVaibhav 2. Paul Rohan	White Cane
2. Ultrasonic Blind Walking Stick(2016)	1.Pratham Kale 2.AmrutaAmberkar	1.Ultrasonic Sensor 2. Walking stick
3. Smart White Cane – An Elegant and Economic Walking Aid(2014)	1.Rohit Sheth 2.Rahul Chaudhari	1.Ultrasonic Sensor 2. White Cane

METHODOLOGY:

This system is divided into two part transmitter and receiver. In transmitter we are using ultrasonic sensor and water detector sensor. At the receiver side we are using RF module, buzzer and relay. This system detect the obstacle in front of visually impaired person.

EQUIPMENT'S:

- Ultrasonic Sensor(HC-SR04)
- Water Detection Sensor(LM393)
- Microcontroller
- Buzzer
- Power supply
- Encoder IC(HT12E)
- Decoder IC (HT12E)
- Relay

ULTRASONIC SENSOR (HC-SR04):

It will measure the distance of obstacle if obstacle is closer to him then it will send signal to microcontroller. This distance will be fixed during programming. Its works like principles of RADAR and SONAR. Which evaluates attributes of target by interpreting the echo's from radio or sound waves respectively. It measure high frequency sound waves and evaluate echo which is received back by sensor. This module provide 2cm to 400cm non-contact measurement function. The ranging accuracy can reach to 3mm.

The basic principles are,

- Using input or output trigger for at least 10μs high level signal.
- The module automatically sends 8-40kHz and detect whether their is a pulse signal back.
  Test distance=(high level time x velocity of sound)/2
- It measure distance of obstacle is closer to him then it sends signal to microcontroller.The distance will be fixed during programming.
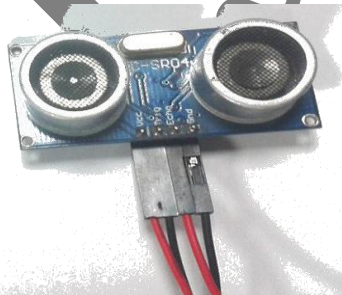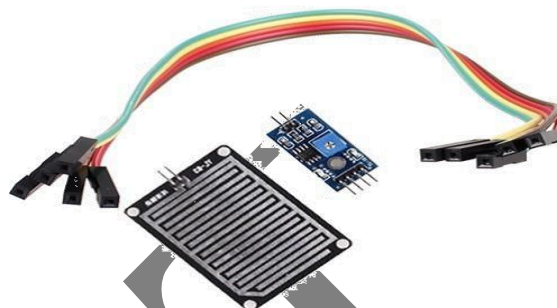

Wire connection with microcontroller

- Vcc
- Trigger
- Echo
- Ground

WATER DETECTION SENSOR(LM393):

Sensor dimension is 5x4cm. There is no water in the sensor digital output is High(1), and signal indicator off. If water is detect digital output is Low(0). signal indicator on. Power required for sensor is 5volt.

MICROCONTROLLER(ATMEGA328):

We use Arduino promini AT Mega 328 microcontroller. It is most suitable because compact in size so that it will fit on the cane. It has 14 i/o pins of which six can be used as PWM o/p and six Analog i/p. It connect simple to computer with USB cable or power with DC adapter or battery to get started.

- Flash memory:32kb
- SRAM:2kb
- EEPROM:1kb
- Voltage:7-12v
- Digital I/O Pins :14 Analog
- Input Pins: 6PWM
- output pins:6
- Clock speed:16MHz
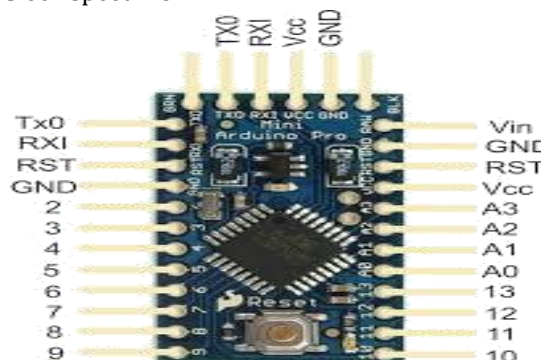
BUZZER:

Buzzer is used to alert him to change the route.
Electro-magnatic sound generator(HCM1205X)
Operating voltage:3-7v
Sound output :>85db
Resonant frequency:2300±300
Responce time:<50ms
Weight :2gm

ENCODER IC(HT12E):

HT12E is an encoder circuit of 212 series of encoder. It encodes the 12 bit parallel data into serial for transmission through an RF transmitter. These 12 bits are divided into 8 address bits and 4 data bits.

RF TRANSMITTER FEATURES:
• Input supply:3-12v
• Frequency range:433MHz
• Output power:4-16dbm

HT12E ENCODER IC: It encodes the 12 bit parallel data into serial for transmission through an RF transmitter.
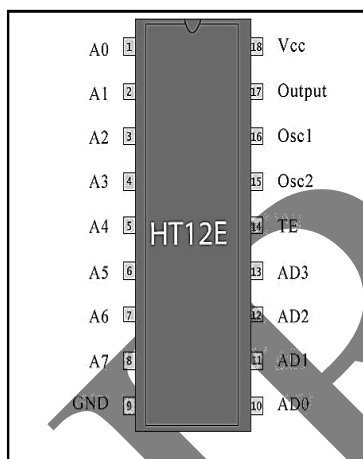

DECODER IC (HT12E):

It is a decoder IC that belongs to 212 series of decoder. It is capable of decoding 12 bits, of which 8 are address bits and 4 are data bits. The data on 4 bit latch type output pins remain unchanged until new is received.

RF RECEIVER FEATURES:
• Input supply:5v
• IF frequency:1MHz
• Sensitivity:105dbm
• Low power consumption

HT12D DECODER IC: It is capable of decoding 12 bits, of which 8 are address bits and 4 are data bits.
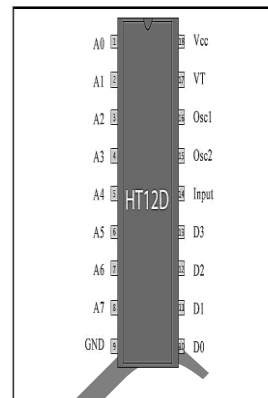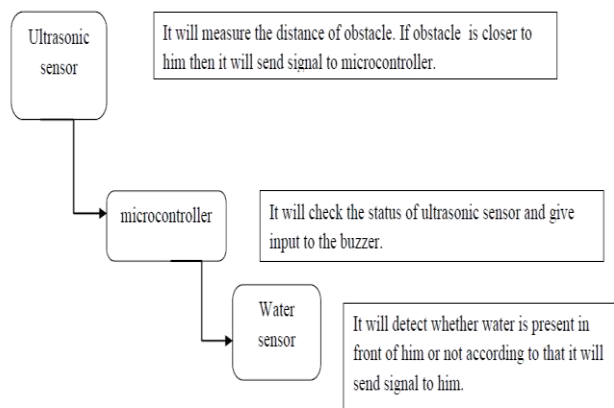

RELAY:

Relay board consists of SPDT relay and a relay driver ULN 2803. ULN 2803 is a unipolar relay driver IC with maximum output voltage 50V and output current 500mA. It contains eight Darlington pair transistors, each having a peak rating of 600mA and can withstand 50V in off-state. Outputs may be paralleled for higher current capability.
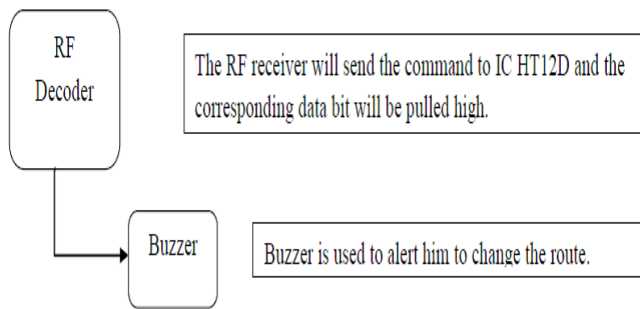
WORKING PRINCIPLES:

For detecting the obstacle and water on the road two sensors are used i.e., ultrasonic sensor and water sensor. Ultrasonic sensor measure the distance of obstacle from blind person and depending upon the threshold value stored in controller. It will turn on the buzzer i.e., if one obstacle is present in front of him/her at 20 meter an if we set threshold value for obstacle as 10 meter then obstacle is at 10 meter then it will turn non buzzer. This value can be changed during programming. So that it will change the route. For water detection ,water detection sensor is attached at the bottom of stick so when he walk on the road and if that stick is in water then that sensor sends signal to controller so it will turn on buzzer. For water buzzer will be continuously on till in water and for obstacle it will beep in zigzag fashion i.e., 1 sec ON and 1 sec OFF. So that he will understand actual problem.

ALGORITHM:
TRANSMITTER SIDE:

RECEIVER SIDE:

RF Decoder

The RF receiver will send the command to IC HT12D and the corresponding data bit will be pulled high.

Buzzer

Buzzer is used to alert him to change the route.

APPLICATIONS:
- It will be used for blind persons.
- It will be used for partially deaf persons.
- It will be used as smart bracelet.

FUTURE SCOPE:
The system can be supplemented with actual GPS MODULE used in cars and we can provide a vibrator for the partially deaf person.

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