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ULTRASONIC BLIND STICK WITH GPS TRACKING

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Abstract - God gifted sense of visions 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 impired have to face many challenges in their daily life. The problem gets worse when they travel to an unfamiliar location. The old system is not work properly in outdoor applications. In this paper, we propose a navigation device for the visually impaired which is focused on providing obstacle prevention and navigation using the ultrasonic sensor, Moisture sensor, LDR, RF434 , smoke sensor. Ultrasonic sensor is used to detect obstacles, moisture sensor is used to detect water deposited in rainy days. LDR is used to detect whether day or night. Smoke sensor is used to detect whether any fire occurring or not. RF434 is used to detect location of the forgotten stick. We can track the location of the person by using GSM and GPS.

Keywords: Visually Impired, Navigation Device, GSM, GPS

CHAPTER I
INTRODUCTION

There are approximately 85% of information human get being from environment. And there are 330 million people are visual impaired in the world. The smart phones allow those people to listen to voice mails. Another example is the laser or ultrasonic technology. Thus, the distance to the obstacle is calculated according to the time variance between the two signals. This GPS technology used to identify the position and location for the blind person. Ultrasonic sensors are much more efficient than other obstacle detection sensors. There are other several systems related to the aid mobility of visually impaired are existing. Also the author uses GPS location information to provide directions to blind people within a campus environment. A smart cane was aimed to guide the blind people by using of onboard sensors for obstacle avoidance. The system is based on an ultrasonic sensor in which it detect obstacles. The project aims on providing an alternative to the traditional walking stick. The developed stick targets at providing accurate detection of objects and guiding the person accordingly. PIC microcontroller is small and low cost single chip computer that can do calculations

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automatically at high speed with great accuracy. When we combine this power with a pair of ultrasonic wave transmitter and receiver, we can use PIC's accurate time measurement feature to measure the time it takes for the sound waves to reach an obstacle and bounce back to the receiver. By quick and fast calculations we can immediately find out the distance. And if the object is very close then the user can be alerted with a voice playback and vibration on the stick. MP3 audio module is used for voice playback. Our project focuses on obstacle detection, pit detection and finding location in order to reduce navigation difficulties for visually impaired people. The Global Positioning System (GPS) is a U.S. space based radio navigation system that provides reliable positioning, navigation, and timing services to civilian users on a continuous worldwide basis. For anyone with a GPS receiver, the system will provide location and time. GPS provides accurate location and time information for an unlimited number of people in all weather, day and night, anywhere in the world. GPS based blind man device with user input interfacing (voice based) intellectually finds the current location and gives the alert to the blind man if it was his destination area. Microcontroller is the heart of the device.

CHAPTER II
PROPOSED SYSTEM

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 they travel to an unfamiliar location. The old system is not work properly in outdoor applications. In this paper, we propose a navigation device for the visually impaired which is focused on providing obstacle prevention and navigation using the ultrasonic sensor, Moisture sensor, LDR, RF434, Smoke Sensor. Ultrasonic sensor is used to detect obstacles, moisture sensor is used to detect water deposited in rainy days. LDR is used to detect whether day or night. Smoke sensor is used to detect whether any fire occuring or not. RF434 is used to detect location of the forgoten stick.We can track the location of the persion by using GSM and GPS.

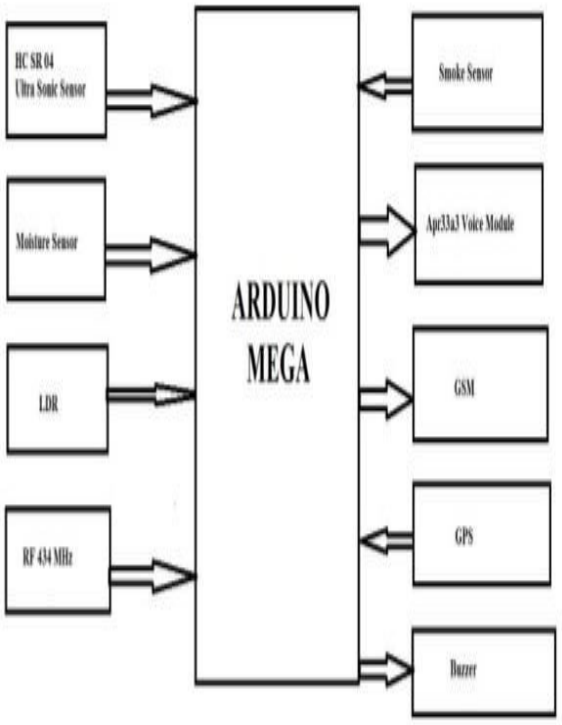

Fig 1: Block diagram of Ultrasonic blind stick with GPS Tracking

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CHAPTER III
HARDWARE AND SOFTWARE ASPECTS

3.1 HARDWARE ASPECTS

3.1.1 ARDUINO

Arduino is open source physical processing which is base on a microcontroller board and an incorporated development environment for the board to be programmed. Arduino gains a few inputs, for example, switches or sensors and control a few multiple outputs, for example, lights, engine and others. Arduino program can run on Windows, Macintosh and Linux operating systems (OS) opposite to most microcontrollers' frameworks which run only on Windows. Arduino programming is easy to learn and apply to beginners and amateurs. Arduino is an instrument used to build a better version of a computer which can control, interact and sense more than a normal desktop computer. It's an opensource physical processing stage focused around a straightforward microcontroller board, and an environment for composing programs for the board. Arduino can be utilized to create interactive items, taking inputs from a diverse collection of switches or sensors, and controlling an assortment of lights, engines, and other physical outputs. Arduino activities can be remaining solitary, or they can be associated with programs running on your machine (e.g. Flash, Processing and Maxmsp.) The board can be amassed by hand or bought preassembled; the open-source IDE can be downloaded free of charge. Focused around the Processing media programming environment, the Arduino programming language is an execution of Wiring, a comparative physical computing platform.

Fig 2: Arduino

3.1.2 HCSR04

Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules includes ultrasonic transmitters, receiver and control circuit. The basic principle of work: (1) Using IO trigger for at least 10us high level signal, (2) The Module automatically sends eight 40 kHz and detect whether there is a pulse signal back. (3) IF the signal back, through high level , time of high output IO duration is the time from sending ultrasonic to returning. Test distance = (high level time×velocity of sound (340M/S) / 2.

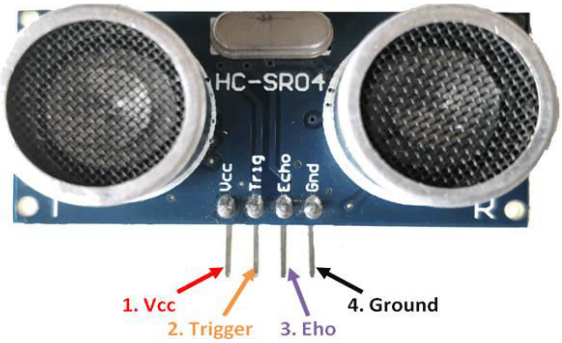

Fig 3: HCSR04

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3.1.3 Moisture sensor

moisture sensors measure the volumetric water content in soil.[1] Since the direct gravimetric measurement of free soil moisture requires removing, drying, and weighing of a sample, soil moisture sensors measure the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content.

The relation between the measured property and soil moisture must be calibrated and may vary depending on environmental factors such as soil type, temperature, or electric conductivity. Reflected microwave radiation is affected by the soil moisture and is used for remote sensing in hydrology and agriculture. Portable probe instruments can be used by farmers or gardeners.

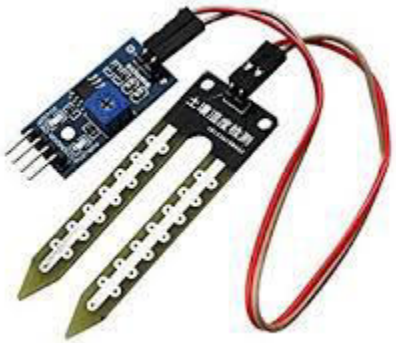

Fig 4: Moisture Sensor

3.2 PROGRAMMING THE ARDUINO

STEP 1

Arduino microcontrollers come in a variety of types. The most common is the Arduino UNO, but there are specialized variations. Before you begin building, do a little research to figure out which version will be the most appropriate for your project.

STEP 2

To begin, you'll need to install the Arduino Programmer, aka the integrated development environment (IDE).

STEP 3

Connect your Arduino to the USB port of your computer. This may require a specific USB cable. Every Arduino has a different virtual serial-port address, so you 'll need to reconfigure the port if you're using different Arduinos.

STEP 4

Set the board type and the serial port in the Arduino Programmer.

STEP5

Test the microcontroller by using one of the preloaded programs, called sketches, in the Arduino Programmer. Open one of the example sketches, and press the upload button to load it. The Arduino should begin responding to the program: If you've set it to blink an LED light, for example, the light should start blinking.

STEP6

To upload new code to the Arduino, either you'll need to have access to code you can paste into the programmer, or you'll have to write it yourself, using the Arduino programming language to create your own sketch. An Arduino sketch usually has five parts: a header describing the sketch and its author; a section defining variables; a setup routine that sets the initial conditions of variables and runs preliminary code; a loop routine, which is where you add the main

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code that will execute repeatedly until you stop running the sketch; and a section where you can list other functions that activate during the setup and loop routines. All sketches must include the setup and loop routines.

STEP7

Once you've uploaded the new sketch to your Arduino, disconnect it from your computer and integrate it into your project as directed.

CHAPTER IV
RESULTS

Fig 5: Hardware setup of Blind Stick

CHAPTER V
CONCLUSION

A navigation device for the visually impaired which is focused on providing obstacle prevention and navigation using the ultrasonic sensor, Moisture sensor, LDR, RF434, Smoke Sensor was successfully designed and implemented. Ultrasonic sensor is used to detect obstacles, moisture sensor is used to detect water deposited in rainy days. LDR is used to detect whether day or night. Smoke sensor is used to detect whether any fire occuring or not. RF434 is used to detect location of the forgoten stick. We can track the location of the persion by using GSM and GPS.

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