Effective Fast Response Smart Stick for Blind People

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Abstract: Visually disabled people find difficulties detecting obstacles in front of them, during walking in the road, which makes it dangerous. The smart stick comes as a proposed result to enable them to identify the world around. In this paper we propose a result, represented in a smart stick with infrared detector to descry stair- cases and brace of ultrasonic detector to descry any other obstacles in front of the stoner, within a range of four measures. Also, another detector is placed at the bottom of the stick for the sake of avoiding billabongs. Speech advising dispatches and the vibration motor are actuated when any handicap is detected. This proposed system uses the microcontroller bedded system; vibration motor and ISD1932 flash memory. The stick is able of detecting all obstacles in the range 4 cadence during 39 mins and gives a suitable respect communication empowering eyeless to move doubly his normal speed because she/ he feels safe. The smart stick is of low cost, fast response, low power consumption, light weight and capability to fold.

Keywords: Smart Stick, Sensors, Buzzer, Blind, IR sensors, Water sensor, GSM.

I. INTRODUCTION

There are about 253 million people live with vision impairment, 36 million are eyeless and 217 million have moderate to severe vision impairment. 81 of people who are eyeless are aged 50 times and over (WHO estimation). The number of visually disabled people is anticipated to grow in the future due to colorful reasons. As a result, there's a need for a cost-effective system that can be used by eyeless people to walk fluently and comfortably. A smart result is proposed for eyeless people so that they can use this in their diurnal life. This paper proposes the design and development of a smart stick to help visually disabled people. For achieving dreams, pretensions, and objects in life, independence plays an important part. Visually bloodied individualities find themselves hard to go out singly. There are thousands of visually disabled people in this world who are generally in need of helping triumphs. For decades, the white club has come a well- known trait to eyeless people's navigation and after sweats have been made to enhance the club by adding a different detector. Eyeless people face the problem when they walk on the road or stairs using a white club, but they've sharp hap tic perceptivity. The digital walking stick will help eyeless people by supporting an redundant handy manner of actuality. There are multitudinous steering Structures for visually bloodied trippers to navigate snappily and completely against boundaries and different troubles faced. Generally, a eyeless stoner has a white club or a steerage canine as their mobility resource. With the advances of ultramodern technology, numerous distinctive kinds of bias are support mobility of eyeless, known as Electronic Travel Aids (ETAs). Out-of-door navigation depends on the Global positioning system (GPS) and mapssupport.GPS provides the current position of the stoner. The destination that a stoner wishes to reach is given as a voice input to the voice recognizer. By the information on the current position and destination, the charts give the route to reach the destination in the form of audio affair that can be entered by a Bluetooth receiver. Therefore this system will be important useful for the visually challenged people for easy navigation in strange surroundings. Eyeless stick is a special device used by visually impaired people for centuries. But in recent times Electronic Trip Aid (ETAs) with detectors and sound systems are designed for bettered navigation of eyeless people. The advantage of our design is that it can descry any handicap with the help of ultrasonic detectors and it can give correct position of handicap by using the GPS System. Therefore it'll help eyeless people when they're walking outdoors from their home.

II. PROPOSED SYSTEM

Vision is the most important thing of human life. Because, 83% of information that human being gets from the environment is via sight. According to World Health Organisation (WHO)s by 2011 estimates that there are 285 billion people in world with visual impairment, 39 billion people of which are blind and 246 with low vision. Presently , blind people use white stick as a tool for directing them when they move or walk. Here we develop a tool which can serve as

a blind stick being more efficient and helpful the conventional one. This will assist the blind persons during the walk and provides an alarm if any hurdle is detected within set of range.

A) Advantages of Proposed System:

- The system enables the blind people to move with the same ease and confidence as sighted people.
- Avoid the obstacle based on ultrasonic sensor.
- Facilates the easier communication in case of emergency.
- Auto detection.
- Simple to use.

III. IMPORTANT COMPONENTS

The different Components involved in our project are:

- Atmega 16
- IR Sensor
- Global System for Mobile Communication (GSM)
- Ultrasonic Sensor
- Soil Moisture Sensor
- Fire Sensor
- Buzzer

A) Atmega 16:

It is a 40 pin microcontroller. There are 32 input / output lines which are divided into four 8 – bit ports designated as PORT A, PORT B, PORT C, PORT D. It also has various in-built peripherals like USART, ADC, Analog Comparator, SPI, JTAG, etc.. Each pin has an alternative task associated with the in-built peripherals.

B) IR Sensor:

The principle of an IR detector working as an Object Discovery Detector can be explained using the following figure. An IR detector consists of an IR LED and an IR Photodiode; together they're called as Print – Coupler or Opto – Coupler. When the IR transmitter emits radiation, some of the radiation reflects back to the IR receiver and some reaches the object. Grounded on the intensity of the event by the IR receiver, the affair of the detector is defined.
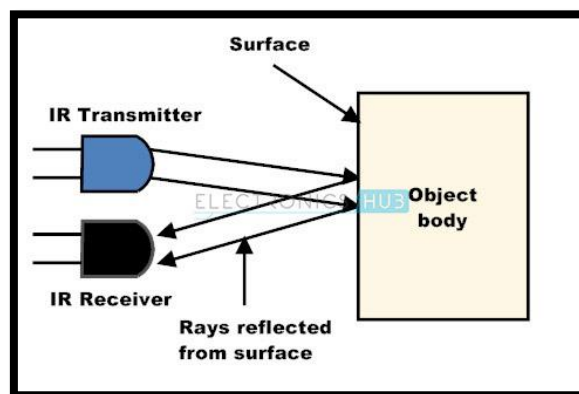

Fig. 1: IR Sensor

C) Global System for Mobile Communication (GSM):

A GSM network comprises of many functional units. These functions and interfaces are explained in this chapter. The GSM network can be broadly divided into:

- The Mobile Station (MS)
- The Base Station Subsystem (BSS)
- The Network Switching Subsystem (NSS)
- The Operation Support Subsystem (OSS) Given below is a simple pictorial view of the GSM architecture.
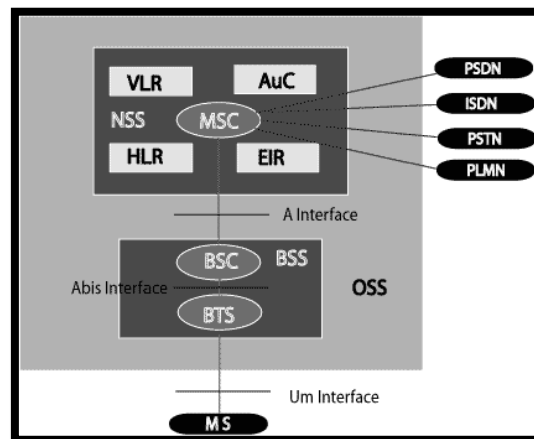
Fig. 2: GSM Architecture

D) Ultrasonic Sensor:

The structure of the LEGO EV3 ultrasonic detector has two main corridors. A transmitter sends out a signal (an ultrasonic surge) that humans can not hear. And a receiver receives the signal after it has reflected off near objects. The detector a time show how long it takes for its signals to come back and relays that information to the LEGO slipup/ computer, which calculates how far down objects are.
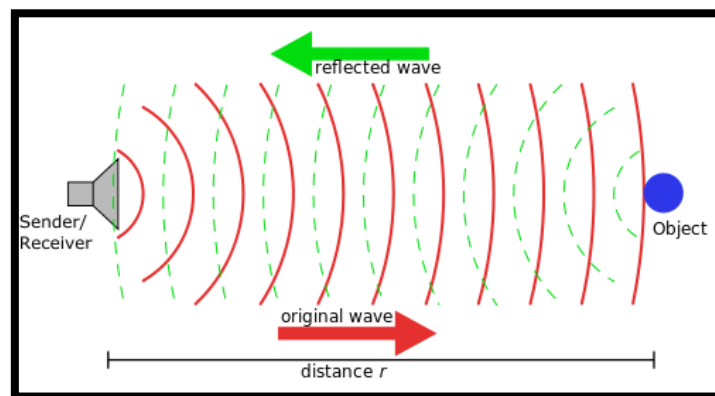

Fig. 3: Ultrasonic Sensor Working

E) Soil Moisture Sensor:

The working of the Soil Moisture Sensor is veritably simple. It works on the principle of voltage comparison. The ensuing circuit will be helpful in understanding the working of a typical soil humidity see, one input of the comparator is connected to a 10KΩ Potentiometer while the other input is connected to a voltage separator network formed by a 10KΩ Resistor and the Soil Moisture Probe. Grounded on the quantum of water in the soil, the conductivity in the inquiryvaries.However, the conductivity through the inquiry is also lower and hence the input to the comparator will be high, If the water content is less. This means that the affair of the comparator is HIGH and as a result, the LED will beOFF.Similarly, when there's acceptable water, the conductivity of the inquiry increases and the affair of the comparator becomes LOW. The LED also starts glowing.

F) Fire Sensor:

A flame sensor is a detector designed to descry and respond to the presence of a flame or fire, allowing flame discovery. Responses to a detected flame depend on the installation, but can include sounding an alarm, killing a energy line(similar as a propane or a natural gas line), and cranking a fire repression system. When used in operations similar as artificial furnaces, their part is to give evidence that the furnace is working duly; it can be used to turn off the ignition system though in numerous cases they take no direct action beyond notifying the driver or control system. A flame sensor can frequently respond briskly and more directly than a bank or heat sensor due to the mechanisms it uses to descry the flame.

G)   Buzzer:

It consists of piezo chargers between two operators. When a eventuality is applied across these chargers they push on one captain and pull on the other this drive and pull action results in a soundwave.
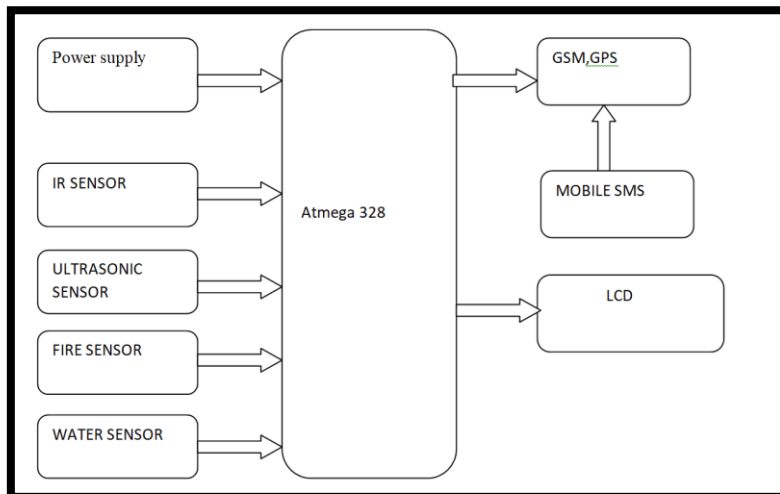

Fig. 4: Buzzer

IV.   Block Diagram

Fig. 5: Architecture of the System
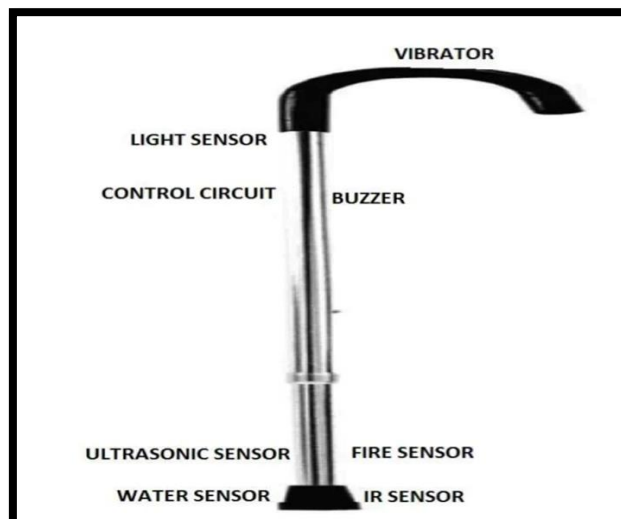
V.   PROTOTYPE OF STICK

Fig. 6: Smart Stick

VI.   CONCLUSION

The inventions behind visually bloodied sticks are redesigning step by step. It identifies wet bottoms to hesitate from slipping mishaps. It recognizes bottom- position and kneelevel deterrents exercisingSensors.GPS shamus can be employed for precipitously precise Position. Palpitation detector and temperature detector employed for clinical reason and sense the heart bit and temperature sense least and most extreme position shoot communication and Call through the neighbor and closest medical clinic exercising GSM. Our model guarantees one thing that's making the errand of moving of a visually bloodied individual simple and agreeable. The stick is also exceptionally light and accessible to convey. What is further, the parts or corridor that we employed in the stick are likewise effectively accessible and less in cost. In future, in the event that further enhancement and enterprise is done with the stick, at that point it'll be a important decreasingly compelling contrivance for the unborn world. Content is separated from the picture and changed over to sound. It perceives both capitals just as little letters. A shopping mate for the outwardly hindered individualities.

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