Asian Journal of Applied Science and Technology (AJAST)
Volume 1, Issue 2, Pages 274-276, March 2017

Smart Walking Stick for Visually Challenged People

R.Jothi[1], M.Kayalvizhi[2] and K.Sagadevan[3]

[1]*UG Scholar, Department of Electronics and Communication Engineering, IFET College of Engineering, Villupuram, India.*
[2]*UG Scholar, Department of Electronics and Communication Engineering, IFET College of Engineering, Villupuram, India.*
[3]*Senior Assistant Professor, Department of Electronics and Communication Engineering, IFET College of Engineering, Villupuram, India.*

Article Received: 13 March 2017 *Article Accepted: 23 March 2017* *Article Published: 26 March 2017*

ABSTRACT

The man has been suffering with diseases and weired. Visually challenged people are blind people who are very common and difficult to deal with in their way. The main aim of this paper is to the visually challenged people with a better navigation tool. This smart walking stick is more sophisticated than a traditional walking stick. It uses a microcontroler to detect an obstacles in front, left, right side of a person. It is based on ultrasonic sensors for distance measurement property. For obstacle indication, there is voice playback which helps to mention a direction of obstacles around a visually challenged person by sensors. Along with this a receiver and buzzer placed on a stick .If the person missing a stick which can be find out by buzzer sound .This sound is induced when switch on a remote controller by visually challenged people .GPS also include in stick to find a visually challenged people.

Keywords: Walking stick, Ultrasonic sensor, Microcontroller, Remote controller, GPS module and Voice playback.

1. INTRODUCTION

Visually impaired or blindness is the inability to see anything. Some are called as visually challenged, even though they can see a little bit. In all the world, blindness is mostly caused by malnutrition and diseases of people. Because of diseases or accidents the people became visually impaired. The World Health Organization (WHO) estimates that 80% of visually impairment is either preventable or curable with treatment.285 million people are estimated to be visually impaired worldwide. Up to 2014, 39 million are visually impaired and 246 have low vision. This is an area of progress over the last 20 years. Blindness may affect a person's ability to perform many jobs, sports and academics in day to day life. In this project we provide a smart electronic travel aid navigation tool for vision loss people .The developed stick provides an accurate detection of obstacle and guiding a person .Microcontroller is a small and low cost single chip computer. It is used to control the other electronic device and an interfacing unit. Ultrasonic sensors are in systems which evaluate targets by interpreting the reflected signals. Measuring the time between sending and receiving an echo the distance of an object can be calculated. The Global Positioning System is a space based radio navigation satellite system owned by USG. The GPS system provides a critical positioning capability to all users around the world. There are 24 satellites in space developed by United States. A remote controller is component of an electronic device used to operate the device wirelessly from the distance. In existing system, there is some missing feature for vision loss people. The buzzer is ON when an obstacle is detected by an ultrasonic sensor. In this system, buzzer is used for varies environment.

2. PROPOSED SYSTEM

In propose system, we propose a voice based ultrasonic walking stick for visually challenged people. The ultrasonic sensor gather a data about the environment and extract the visual information from the data. This visual information is then transformed into an audio signal to recognize the environment information through the voice based audio. The voice playback module is used to record a voice along with this headphone also included for visually impaired people. The user can detect an obstacles by connecting a stepper motor. A motor rotates the ultrasonic sensor in two types with steep angle 90 degree. The sensor can detect front side, left side, right side obstacles. The remote is carried by vision loss people on their pockets. The buzzer is ON when remote controller is pressed by vision loss people if they missed a stick. Along with this GPS also included to track a visually challenged person .This tracker provides an accurate position of people.

3. METHODOLOGY

A switch is turned on when microcontroller Check its status pin. The sensor start to work and collect the data about the environment. The ultrasonic sensor is used to detect the obstacle in front and two IR sensor are used to detect the obstacles on other sides.

After the collection of data, the calculation is,

Formula:

uS/58=centimeters (or)

uS/148=inch.

Once the distance of the object is detected then the below condition are checked.

Condition:

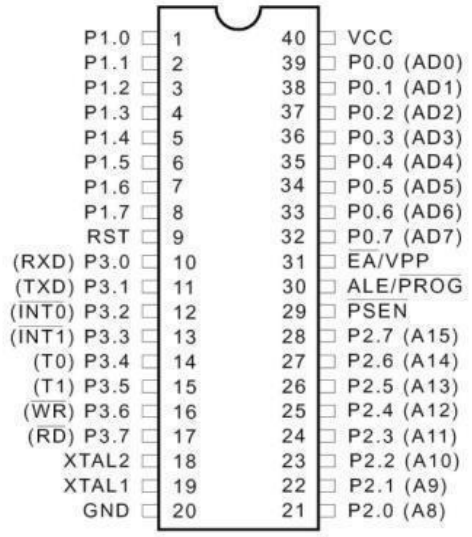
1. There is an obstacle in the front and the left and right side is free.
2. There are obstacles on all the three sides. i.e., front, right, left.

4. HARDWARE MODULE

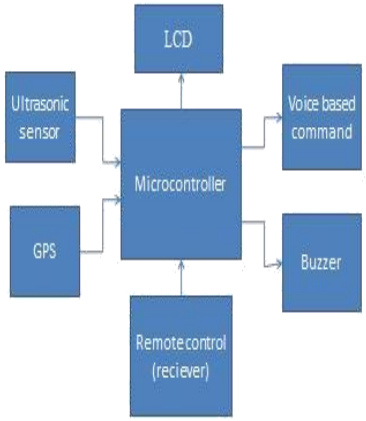
4.1 Microcontroller (AT89S52)

It is a low power, the device is manufactured using Atmel's high density nonvolatile memory technology and is compatible with the industry standard 80C51 instruction set and pin out. It provides 256 bytes of RAM,8k bytes of flash, watchdog timer, there 16-bit timer/counters. High-performance cmos-8bit microcontroller with 8k bytes of in system flash programmable and erasable read only memory.

4.2 Pin Diagram



BLOCK DIAGRAM OF WALKING STICK



4.3 Ultrasonic Sensor

Ultrasonic sensor transmits an ultrasonic waves into the air and detects reflected waves from an object. There are many applications for ultrasonic sensors, such as in intrusion alarm systems, automatic door openers and backup sensors for automobiles. Velocity of wave propagation is expressed by multiplication of frequency and wavelength. Because of higher resolution, it is possible to get higher measurement made large accuracy. Metal, wood, concrete, glass, rubber and paper, etc., reflect approximately 100% of ultrasonic waves, these objects can be easily detected. In order to detect the presence of an object, ultrasonic waves are reflected on objects.

4.4 Buzzer

A buzzer or beeper is an audio signaling device, which may be mechanical electromechanical, or electronic. Typical uses of buzzers and beepers include alarms, timers and confirmation of user input such as a mouse click or keystroke. Early devices were based on an electromechanical system identical to an electric bell.

4.5 LCD Display

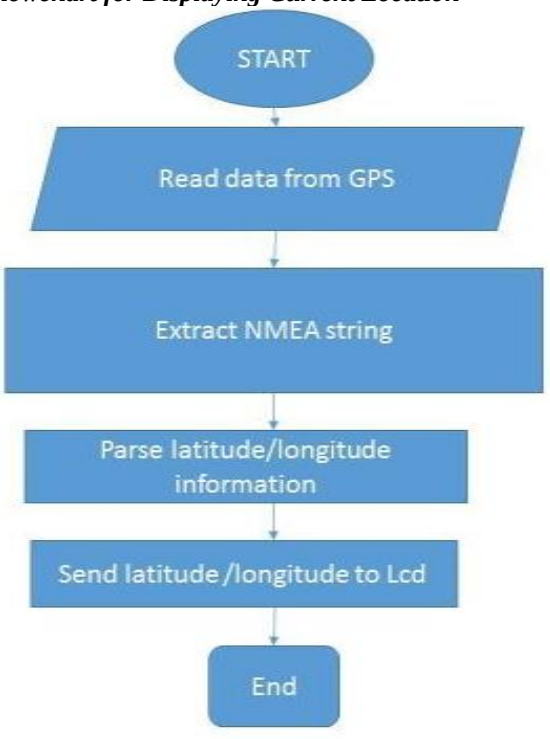
LCD (liquid crystal display) is the technology used for displays in notebook and other smaller computers. Like light-emitting diode (LED) and gas-plasma technologies, LCDs allow displays to be much thinner than cathode ray tube (CRT) technology. It displays 16 characters in 2 lines.

5. SOFTWARE MODULE

5.1 GPS (Global Positioning System)

A GPS system is for tracking purpose. In our paper the GPS is used to track the people (i.e.) visually challenged people, it gets an information through the GPS modem. The Global Positioning System (GPS) is a satellite-based navigation system made up of a net. GPS tracking unit is a device, normally carried by a moving vehicle or person that uses the Global Positioning System to determine and track its precise location. Hence that of its carrier, at intervals. Work of 24 satellites placed into orbit. The recorded location data's can be stored within the tracking system. This allows the asset's location to be displayed against a map backdrop either in real time or when analyzing the track later, using GPS tracking software.

5.2 Flowchart for Displaying Current Location

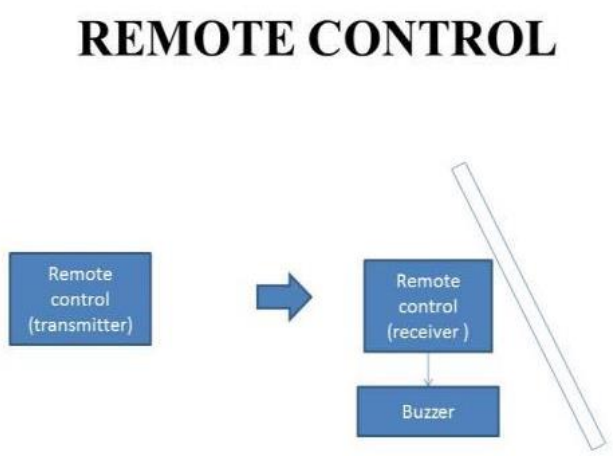


5.3 Voice Module

The APR9600 device gives a true single-chip voice recording. It is nonvolatile storage and playback for 40 seconds -60 seconds. The voice is stored in SD card or pen drive.

5.4 DC Motor

A DC motor is an electrical machine that converts direct current into mechanical power. Most type of motors gives rotary motion. DC motors can be controlled by varies power supply.



6. CONCLUSION

The smart stick acts as a basic platform for the coming generation of more aiding devices to help the visually impaired to be more safe. This device abate dependency of visually loss people on family, friends. The smart stick identifies obstacles in front, right, left side of the person in the form of voice messages rather than buzzer based vibration. The main advantage of this project is to provide low cost and easily understanding an environment around a visually challenged people.

REFERENCES

[1] Shraddha Bunnan, Gagan Pratap Singh, S.P. Tondare, "Ultrasonic Blind Walking Stick for the Visually Impaired", IJRET*: International Journal of Research in Engineering and Technology.*

[2] D.Sekar, S.Sivakumar, P.Thiyagarajan, R.Premkumar, M. Vivek kumar, "Ultrasonic and Voice Based Walking Stick for Blind People", *International Journal of Innovative Research In Electrical, Electronics, Instrumentation and Control Engineering*, Vol. 4, Issue 3, March 2016.

[3] Yuvan, D.Manduchi, "Dynamic environment Using a virtual white", in *Computer vision and pattern recognition CVPR* 2005.

[4] Mohd Helmy Abd Wahab, Amirul A.Talib, Herdawatie A.Kadir Ayob Jahori, A.Naraziah, Roslina.M.Sidek, Ariffin A., "Smart cane: assistive cane for visually impaired people", *IJCSI*, Vol. 8, July 2011.

[5] Hashino Ghurchian R, "A blind guidance system for street crossings based on ultrasonic sensors", *Information and Automation (ICIA)2010 IEEE International conference, June 2010.*