



SMART BLIND MAN STICK

Dr. Ravi M K^[1], Pramodh Punithan D^[2], Yatish S^[3]

¹Assistant professor, Dept of ECE, RRIT

^{2,3}8th sem Dept. of ECE, RRIT

ABSTRACT

This paper describes the smart stick with the use of arduino nano. The life of blind and visually impaired people is very different. They face many difficulties in their life and they can not go to any places without taking any help from others. Since they cannot see, they often get hit by objects in roads like poles, walls, vehicles, people etc. as a result they may severely injured. It may leads to face humiliation and lose confidence in themselves. There are chances that they can get lost. In such cases, it is very difficult for their family members to find them. Even though they are provided with stick, in which they can only able to detect the obstacles in front of them. It is not much helpful for them in order to avoid obstacles, the Smart Stick for Blind people in which visually impaired person can be able to detect the object from a further distance and they could avoid it using ultra sonic sensors, and if they are lost, by using GPRS and GSM modules their family members can track them easily by sending a message to the stick. If the stick get lost he can find his stick by pressing the remote button then buzzer sound will come from the stick, so he can go collect the stick. We also provided one emergency SOS button at the thumb in case of emergency. If anything accidentally happens at that time he can use the SOS button.

Keywords: Arduino nano, GPRS, GSM, Smart stick, Ultrasonic sensor



I. INTRODUCTION

Blind people facing a lot of difficulties in their daily life while crossing the roads. Since they can not move to one place to other place without taking any help from others. They can get damaged from the obstacles while walking so as a result we proposed the smart blind man stick with the following features. This walking stick is an alternative to the traditional walking stick. Here, we are using Arduino NANO board with Atmega328 microcontroller, ultrasonic sensor to detect the object in front of the person within the range of 2cm-400cm, LDR is used to detect whether it is day or night, GSM and GPS modules are used to track the exact location of the blind person, RF transceiver is used to find his stick if stick is misplaced by pressing the remote. RF transceiver is turned on when the stick is in off condition, we also used the water sensor to check whether the stick is operating on dry or wet field and it gives a response by vibrating the stick so he can aware of the water on ground.

II. PROPOSED SYSTEM

The Smart Man Blind Stick will help the Blind and Severely Visually Impaired people to walk and roam across the city where they want to very easily with surety of not getting hit by any kind of obstacle. As well as we will have track of the route they travel with the help of GPS. If they are in any kind of problem of feel stuck/ lost, they only need to press the button in their Smart Blind Man Stick and with the help of GPS their close ones will get their latitude and longitude through which they can be found easily.

This project is also provided with one SOS button at the thumb in case of emergency. If anything accidentally happens at that time he can use the SOS button so his close ones or his relatives can track the exact location of the blind person with latitude and longitude via Google maps and also this stick is added with RF transceiver so he can find his stick if it is misplaced, by pressing the remote button then buzzer sound will come from the stick so he can take back the stick easily. It is get turned on when the stick is in of condition.

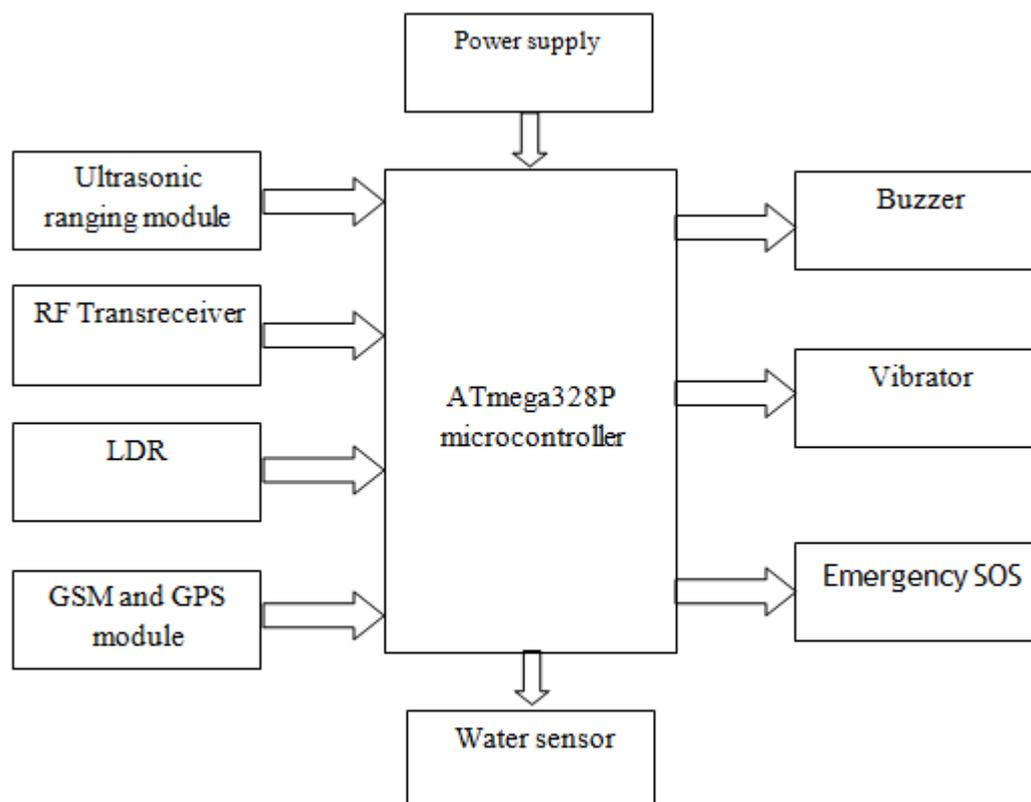


Figure 1: Block Diagram

IV. OVERVIEW OF THE SYSTEM

4.1 Arduino NANO board:

The Arduino nano is a microcontroller board based on the ATmega328. It has 14 digital input/output pins in which 6 can be used as PWM outputs, A0-A7 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

4.2 Ultrasonic ranging module :

Ultrasonic ranging module HC-SR04 is used so that blind person can feel safe while walking on the road. If any objects arrived with in a range of 2cm to 400cm then stick gives him a response by vibrating and also with a buzzer sound so he can aware of that object. We added pair of ultrasonic ranging modules so the stick can detect the lower objects small stones and higher objects too.



Figure 2: Ultrasonic ranging module

4.3 Light dependent resistor:

An LDR or Light dependent resistor is also known as photo resistor, photocell, photoconductor. It is a one type of resistor whose resistance varies depending on the amount of light falling on its surface. When the light falls on the resistor, then the resistance changes. These resistors are often used in many circuits where it is required to sense the presence of light. These resistors have a variety of functions and resistance. For instance, when the LDR is in darkness, then it can be used to turn ON a light or to turn OFF a light when it is in the light.

4.4 GSM and GPS module:

In this module through GPS and GSM the longitude and latitude of the stick is tracked which is sent to the emergency contact in emergency situations. The latitude and longitude of the stick is sent as a text message. A GSM modem is a device which can be either a mobile phone or a modem device which can be used to make a computer or any other processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network operator. It can be connected to a computer through serial, USB or Bluetooth connection.

A GPS device will retrieve from the GPS system location and time info altogether atmospheric condition, any place on or close to the planet. A GPS reception needs Associate in Nursing patent line of sight to four or additional GPS satellites.

4.5 RF Transreceiver:

In this module RF transreceiver is used so he can find his stick if it is misplaced, by pressing the remote button then buzzer sound will come from the stick so he can take back the stick easily. It is get turned on when the stick is in of condition.

The RF module is a small size electronic device, that is used to transmit or receive radio signals between two devices. The main application of RF module is an embedded system to communicate with another device wirelessly. This communication may be accomplished through radio frequency communication. For various



applications the medium of choice is radio frequency since it does not need line of sight.

V. METHODOLOGY

The system is initialized with few predefined values. Later a frequency of 40khz for 0.25ms is generated and sent to the ultrasonic sensor using the pins trigger and echo. Later the reflected signals are computed in the AVR controller. If the received signal is within the predefined range, then it is noted on the memory. If the received signal is out of range, then it is calculated by algorithm. If the detected signal is greater then, a trigger pulse is initiated to indicate or caution the blind person of some obstacle. The algorithm also calculates the distance at which the obstacle is present which is too near or far from the blind person, and notifies the user. By using the ultrasonic sensor some of the experiments are carried out to calculate the distance of objects which we frame it as an obstacle.

VI. CONCLUSION

The main purpose of this project is to produce a prototype that can detect objects or obstacles in front of users and gives a warning back, in the forms of vibrations and buzzer sound, to users so they can aware of the obstacles. Combination of ultrasonic sensors and a microcontroller function for detection of obstacles in front of them. This project is to help people with disabilities that are blind to facilitate the movement and increase safety. They can even find the stick if it is misplaced with in the range of 70-80m by pressing the remote button of RF transmitter.

The components or parts that we used in the stick are also easily available and less in cost. And besides all that the manufacturing cost is also quite low, that makes the stick affordable for people of all class and age.

VII. Future scope

- The programmable wheels would steer the stick away from the obstacles and also leading the blind person towards the destination.
- Internet of Things is a trending concept which can increase the benefits of the smart stick by allowing one stick to communicate with another smart stick (or mobile , PCs) nearby to utilize the functionality of the other stick when one stick's functionality breaks down
- More sensors can be used for further application.
- Android application can be developed.
- In further we can connect aadhar card details of the blind person so it will help the government to serve the physically challenged persons even better



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