iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** VII **Month of publication:** July 2018

DOI: http://doi.org/10.22214/ijraset.2018.7064

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue VII, July 2018- Available at www.ijraset.com

Arduino based Automated Stick Guide for Visually Impaired Person

Pooja[1], H.M.Preeti[2] Dr. Basawaraj Gadgay[3]
[1] *Dept.of VLSI & Embedded systems VTU Centere for PG Studies Kalaburagi, Karnataka,India*
[2]*Assistant professor,VTU Centre for PG Studies Kalaburagi,Karnataka ,India*
[3]*Research Guide & professor, VTU Centre for PG Studies Kalaburagi,Karnataka ,India*

Abstract: ***In this paper a stick guide model represented for visually impaired persons to guide in their way, which consist of a Global Positioning System (GPS) and a Global System for Mobile communication (GSM) modules along with sensors like Ultrasonic and Infrared sensors. This is a smart stick that will make the visually impaired persons guiding their way. GPS module is used in this to get the current location information of the person, that location will be sent via Short Message Service (SMS) to the registered numbers using a GSM module. Ultrasonic Sensors are used for obstacle detection through the ultrasonic waves produced by it, and Infrared sensor is used for detection of right &left obstacle with the vibrator which vibrates on detecting an obstacle. The main objective of this model is to help a blind to live a better life.***
KEYWORDS: ARDUINO UNO SENSORS, GSM MODULE, GPS MODULE ,DC MOTOR.

I. INTRODUCTION

It is based on the use of new technologies to improve visually impaired person's mobility. Our research focuses on obstacle detection, pit detection, water detection and finding location in order to reduce navigation difficulties for visually impaired people. Moving through an unknown environment becomes a real challenge when we can't rely on our own eyes. Since dynamic obstacles usually produce noise while moving, blind people develop their sense of hearing to localize them. A visionless person commonly uses a walking cane for navigation. The walking cane is a simple and purely mechanical device to detect static obstacles on the ground, uneven surfaces. This device is light, portable, but its range is limited to its own size. Another option that provides the best travel aid for the blind people. This system presents a concept to provide a smart electronic aid for blind people. The system is intended to provide overall measures artificial vision and object detection, real time assistance via global positioning system (GPS). The aim of the overall system is to provide a low cost and efficient navigation aid for blind which gives a sense of artificial vision by providing information about the environmental scenario of objects around them. In this system embedded system plays a major role. In this system we are using the Ultrasonic sensor, Pit sensor, Water sensor, GPS module, GSM module , Driver, Vibrator, Voice synthesizer, Embedded system and Battery. Ultrasonic sensors used for detection of obstacle, That signal is send to the embedded systems. Pit sensor is used to analysis any dent or pit present in the path and water sensor is used to sense any water present in the path. And this signal is also given to the embedded system. GPS receiver is used to track the position .GSM is used for mobile communication. Battery present in the system is used to give power to all the units present in the system.

II. LITERATURE SURVEY

R. Radhika, P.G. Pai, S. Rakshitha and R. Srinath et al [4] proposed "Implementation of Smart Stick for Obstacle Detection and Navigation" Their proposed system utilized infrared, ultrasonic and water sensors. It also used GPS and GSM module. GPS to give positioning and navigation to the stick. GSM module helps to give notifications when the blind person is faced with threats. The system is powered by a rechargeable battery. The hardware implemented on their proposed system consists of the Pair of ultrasonic sensors, Infrared sensor, Water sensor, GPS module, GSM/GPRS module, and Arduino Uno microcontroller board (ATmega328P). The smart stick facilitates the blind person to make calls at times of emergency via the GSM/GPRS module. The GPS module also helps to trace the blind person through the data collected by it. It warns the blind person through beep sound whose intensity increases as the person nears the obstacle which aid him to move aside of the obstacle. Also, when obstacles are detected, it invokes the right speech warning message through a Bluetooth . M.H. Mahmud, R. Saha and S. Islam[2](2013) "Smart Walking Stick – An Electronic Approach to Assist Visually Disabled Persons." Their device is a microcontroller based automated hardware that can assist a blind to detect obstacles in front of him/her promptly. The hardware consists of a microcontroller PIC16F690 incorporated with ping sonar sensor, proximity sensor, wet detector, a GH311 Ultrasonic obstacle sensor, a micro pager motor and additional equipment. The simplicity of the proposed design makes it easy to use by any person and at the same time the cost of manufacturing

©IJRASET: All Rights are Reserved

such sticks is kept low. The power consumption of the proposed stick is low and can be operated easily. It is also very cheap compared to the conventional ones. Obstacle and hole can be determined easily by sensor readings. The design has an added vibratory feedback mechanism necessary for creating vibratory signal for multiple disable persons to get precise information from the output. Also, the microcontroller can be code-protected so that its security cannot be overridden except by the user or vendor.

III. PROPOSED DESIGN METHODOLOGY

This system consists of arduino uno , GSM module, GPS module, sensor module, power supply module etc parts. Among them, arduino uno control module is composed of 14 digital pins leads out I/O ports. Our proposed project first uses ultrasonic sensors to detect obstacles ahead using ultrasonic waves. On sensing obstacles the sensor passes this data to the arduino Uno. The arduino uno then processes this data and calculates if the obstacle is close enough. If the obstacle is not that close the circuit does nothing. If the obstacle is close the arduino Uno sends a warning in the form of voice. It also detects and sounds a different buzzer sounds. IR sensor is used for right& left obstacle detection and alerts the blind people by sound.water sensor is used for detecting the presence of water it is also give sound alert to blind people. if the stick is fall down means its will the location to mobile it will the to find the blind people.RF remote is using for detecting the stick if it is lost. The stick also includes the vibrator, If the obstacle is close the arduino uno sends a warning through vibration.

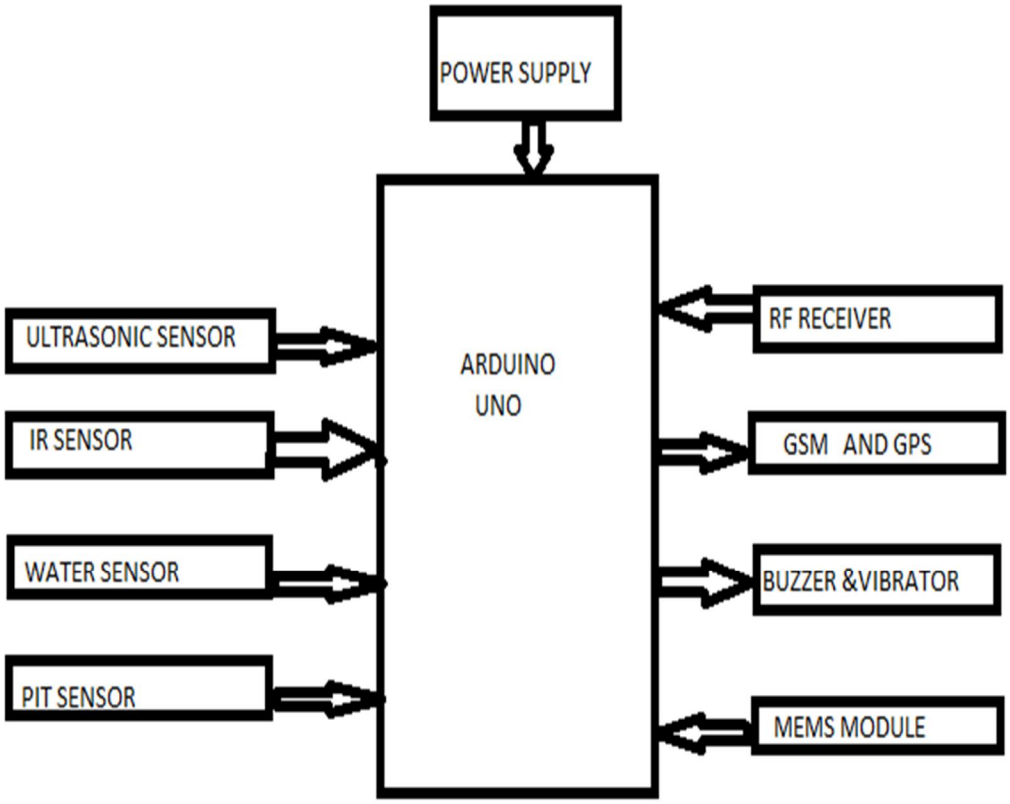


Fig 1 Proposed method

IV. HARDWARE IMPLEMENTATION

A. Power Supply

The input to the circuit is applied from the regulated power supply. The a.c. input i.e., 230V from the mains supply is step down by the transformer to 12V and is fed to a rectifier. The output obtained from the rectifier is a pulsating d.c voltage. So in order to get a pure d.c voltage, the output voltage from the rectifier is fed to a filter to remove any a.c components present even after rectification. Now, this voltage is given to a voltage regulator to obtain a pure constant dc voltage.

©IJRASET: All Rights are Reserved

B. Arduino uno

The arduino uno is widely used open source microcontroller based on the ATmega328P microcontroller. The board features 14 digital pins and 6 analog pins.

C. Ultrasonic Sensor

The HC-SR04 ultrasonic sensor utilizes sonar to decide separation to a question . It offers phenomenal non-contact extend discovery with high precision and stable readings in a simple to-utilize bundle. From 2cm to 10cm . Its activity isn't influenced by daylight. It comes finish with ultrasonic transmitter and beneficiary module.

D. IR sensor

The sensor outputs a logic one(+5V) at the digital output when an object is placed in front of the sensor and a logic zero(0V), when there is no object in front of the sensor. An onboard LED is used to indicate the presence of an object. This digital output can be directly connected to an Arduino, to read the sensor output.

E. GSM module (900/1800 MHz)

Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc) for computer. GSM/GPRS MODEM is a class of wireless MODEM devices that are designed for communication of a computer with the GSM and GPRS network. It requires aSIM (Subscriber Identity Module) card just like mobile phones to activate communication with the network.

F.GPS module

The GPS based blind device with user input interfacing get alert the blind person when reaches destination by voice .It consists of microcontroller and GPS and one voice module to generate the voice.The Micro controller is the heart of the device. It stores the data of the current location which it receives from the GPS system. So that it can make use of the data stored to compare with the destination location of the user. By this it can trace out the distance from the destination and produce an alarm to alert the us.

G. RF module

The RF module, as the name suggests, operates at Radio Frequency. The corresponding frequency range varies between 30 kHz & 300 GHz. In this RF system, the digital data is represented as variations in the amplitude of carrier wave.

H. APR 9600 RE-Recording Voice IC

The APR9600 device offers true single-chip voice recording, non-volatile storage, and playback capability for 40 to 60 seconds. The device supports both random and sequential access of multiple messages. Sample rates are user-selectable, allowing designers to customize their design for unique quality and storage time needs. the device is ideal for use in portable voice recorders, toys, and many other consumer and industrial applications.

I. DC Motor

Vibrator is a one type of dc motor For generating the alert signal we have used a vibrator which generate different pattern of vibration depending upon the type of obstacle. A DC motor in simple words is a device that converts direct current(electrical energy) into mechanical energy.

J. WATER SENSOR

Water sensor is designed for water detection,water level connecting a water sensor to an arduino is a great way to detect a water level etc. it can be used to detect the presence ,the level volume of water in this we will connect the water sensor to digital pin 8 on Arduino and will enlist led to help identify when water sensor comes into a contact with a source of water .For the water sensor we use two metallic plate under the stick ,when water touches on this stick then buzzer is on.

©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue VII, July 2018- Available at www.ijraset.com

K. Piezo Buzzer

A piezoelectric buzzer creates sound utilizing the piezoelectric impact. Piezoelectric is a ability of materials to create electric charge because of connected mechanical anxiety. It resembles an amplifier.

V. EXPERIMENTAL SETUP AND RESULT

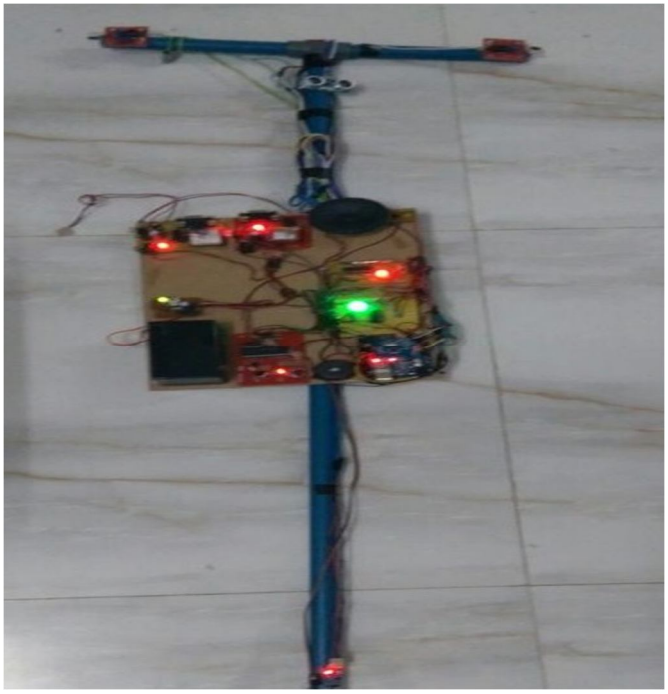


Fig 2: Experimental set up

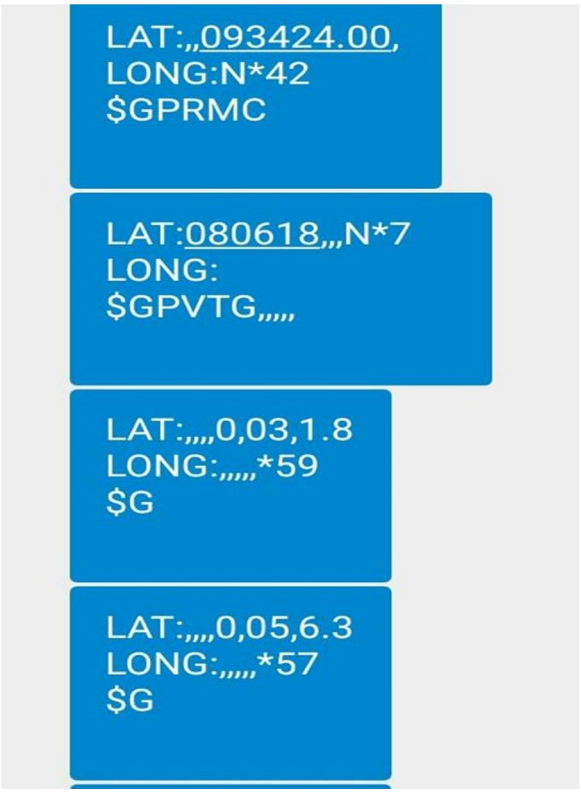


Fig 3 GPS location of latitude &longitude value

©IJRASET: All Rights are Reserved

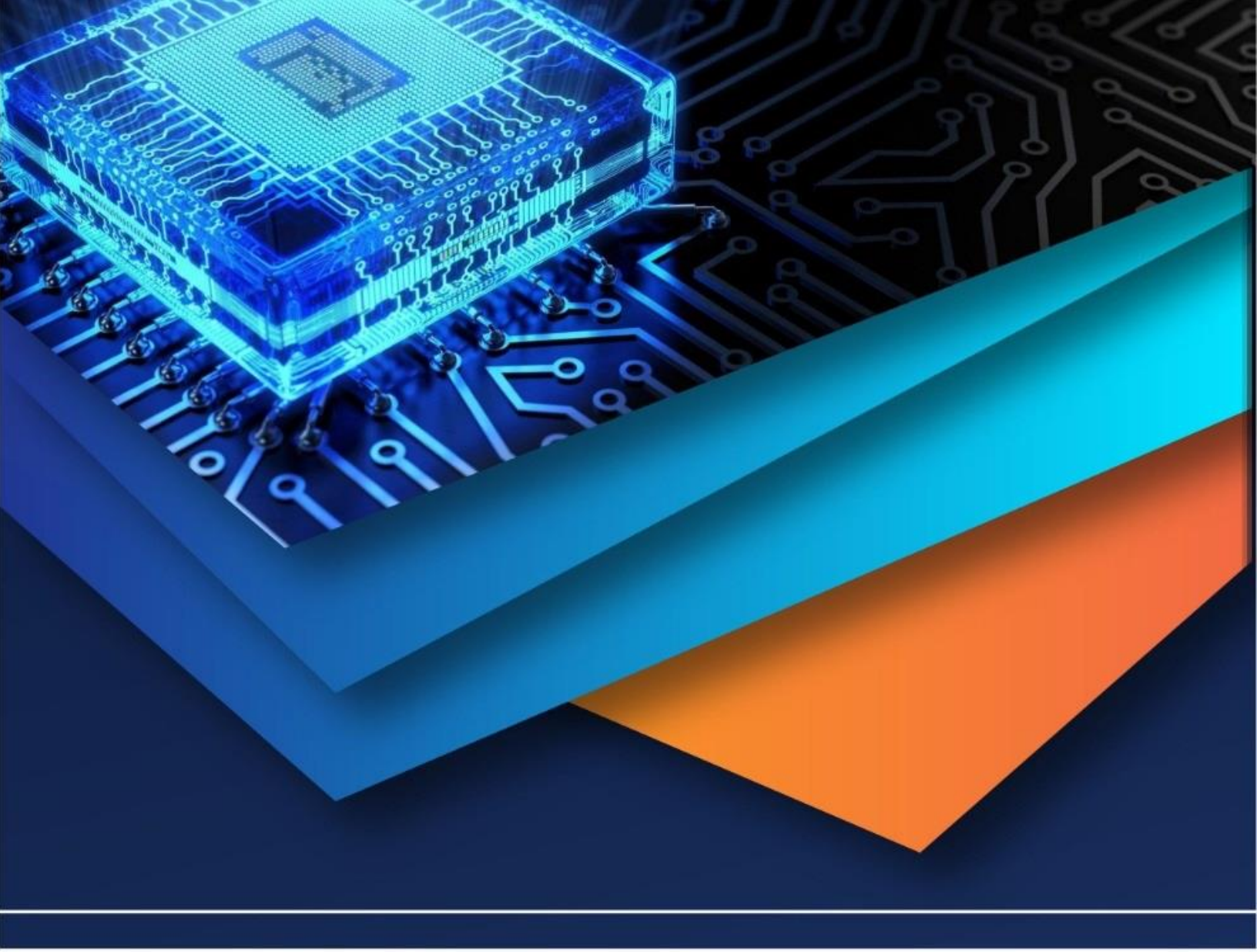
VI. CONCLUSION

The designed blind stick working efficiently with low power rechargeable battery. It can help the visual impaired person appreciably in guiding in their way. the blind people will able to move from one place to another without others help. it gives good results in detecting obstacles placed at distance in front of the user. as far as the localization is concerned it will be able to provide accurate details of the location of the blind if in case they lost with help from the GPS. and it has GSM module for mobile communication. The solution developed is a moderate budget navigational aid for the visually impaired. However minimizing cost leads to compromises in performance.

REFERENCES

[1] R. Radhika, P.G. Pai, S. Rakshitha and R. Srinath "Implementation of Smart Stick for Obstacle Detection and Navigation." International Journal of Latest Research in Engineering and Technology, vol. 2, number 5, pp. 45-50, 2016.
[2] M.H. Mahmud, R. Saha and S. Islam "Smart Walking Stick – An Electronic Approach to Assist Visually Disabled Persons." International Journal of Scientific and Engineering Research, vol. 4, number 10, pp. 111-114, 2013.
[3] A. Jose, G. George, M.R. Nair, M. J. Shilpa and M. B. Mathai "Voice Enabled Smart Walking Stick for Visually Impaired." International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, vol. 5, pp. 80-85, 2012

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)