



A Smart Mobility Aid for Visually Impaired

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ABSTRACT: The smart walking Stick helps blind people in moving and allowing them to perform their work easily and comfortably. In normal cane or stick, the detection of the obstacle is done by using the sensor. But it is not efficient in the case of visually impaired persons. Because the blind person does not know what type of things or what type of the objects come in front of him or her. The blind person cannot recognize what is the size of that object and how far is he from the object. So it is difficult for blind person to move here and there. But smart walking stick supports Object recognition and output comes mainly in the form of Voice output. In Smart Walking Stick, we detect the object with the help of a camera. The stick measures the distance between objects and Smart Walking Stick by Ultrasonic sensor. When the objects or obstacles come in range of the ultrasonic sensor, the speaker tells the name of obstacle in front of the stick. The smart walking stick is very useful for those people who are visually impaired and are often need help from others. It allows the user to walk freely by detecting obstacles in front of him. Images will be captured using a camera and the camera is connected to the Raspberry Pi. If any obstacle comes in front of blind person, he can know about the obstacle by hearing the sound generated by the head phone. The smart walking stick is very useful for the visually impaired persons for their safety and freedom from the other persons at all the time.

KEYWORDS: Electronic stick, visually impaired, blind people electronic assistance.

I. INTRODUCTION

The WHO estimates that there are 285 billion people in world with visual impairment. Presently blind people use a white stick as a tool for directing them when they move or walk. Here we developed a smart mobility aid for the visually impaired. We developed a tool which can serve as blind stick which is more helpful than the conventional one. This will assist the blind person during the walk and provides an alarm if any hurdle is detected. It also has additional features of sending SOS messages in case of emergency. Our project needs hardware devices like arduino board, GSM and GPRS module, ultrasonic sensor, pulse measuring and temperature sensor. Thus our main idea is to provide full freedom to blind people.

II. LITERATURE SURVEY

This paper reviews the existing electronic assistance for blind people. Currently, blind people use a traditional cane as a tool for directing them when they move from one place to another. Visually impairment is a factor that greatly reduces the mobility of people. Currently the most widespread and used mean by the visually impaired people are the white stick, however it has limitation. With the latest technology, it is possible to extend the support give to people with visual impairment during their mobility. In this paper we proposed a system named voice aided electronic stick, whose objective is to give users the confidence to move around in unfamiliar environments. In this paper we proposed an idea of designing electronic stick using Global System Messaging (GSM), Global Positioning System (GPS) and Ultra-sonic technology.

The world is moving in a fast manner and technologies and growing day by day. The visually impaired people depend on other. It is independently do their jobs and identify the climate condition with the help of temperature sensor. It also has additional future of sending SOS messages in case of emergency (decreases of pulses). It also acts like a normal walking stick by measuring distance. The project needs simple hardware devices like an Arduino board, GSM and GPRS module, ultrasonic sensor, pulse measuring and temperature sensor. Thus our main idea is provide full freedom to the blind people.



The smart walking Stick helps blind people in moving and allowing them to perform their work easily and comfortably. In normal cane or stick, the detection of the obstacle is done by using the sensor. But it is not efficient in the case of visually impaired persons. Because the blind person does not know what type of things or what type of the objects come in front of him or her .The blind person cannot recognize what is the size of that object and how far is he from the object. So it is difficult for blind person to move here and there. But smart walking stick supports Object recognition and output comes mainly in the form of Voice output.In Smart Walking Stick, we detect the object with the help of a camera. The stick measures the distance between objects and Smart Walking Stick by Ultrasonic sensor.When the objects or obstacles come in range of the ultrasonic sensor, the speaker tells the name of obstacle in front of the stick. The smart walking stick is very useful for those people who are visually impaired and are often need help from others. It allows the user to walk freely by detecting obstacles in front of him. Images will be captured using a camera and the camera is connected to the Raspberry Pi. If any obstacle comes in front of blind person, he can know about the obstacle by hearing the sound generated by the head phone.The smart walking stick is very useful for the visually impaired persons for their safety and freedom from the other persons at all the time.

III.PROPOSED SYSTEM

Ultrasonic sensor

The HCSR04ultrasonic sensor uses sonar to determine distance to object like bats do.It offers Excellent non contact range detection with high accuracy.ultra sonic transducers operate at frequencies in the range of 30-500khz.The speed of sound is341 meters per sec in air

Pulse sensor

The basic heart beat sensors consists of a light emitting diode and a detector like a light detecting resistor or a photodiode .The heart beat pulses cause variation in the flow of blood to different regions of the body.we can expect the frequencies found inHRV studies to range from 0.04HZ to more than 0.4HZ

GSM Module

GSM (SIM900A) Modems are easy long range interface where we need to read sensor data or control electrical equipment .We will start with selection ofGSM modem,At commands and connection of GSM module with arduino.Give 12V 2amp power supply to GSM use of less current power supply can cause reset problem in GSM modem give sufficient current to GSM modem

WORKING PRINCIPLE

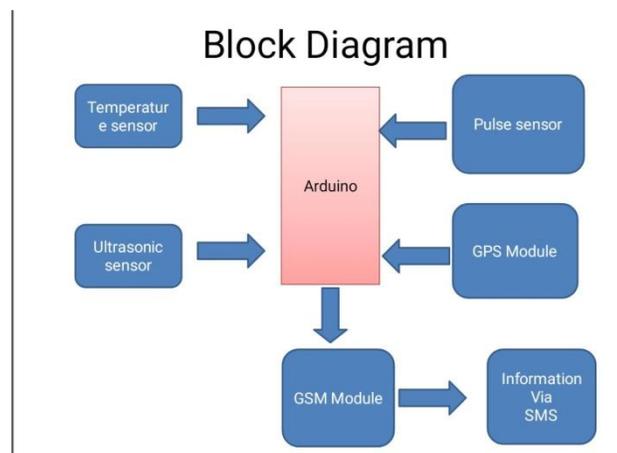


FIG1:BLOCK DIAGRAM

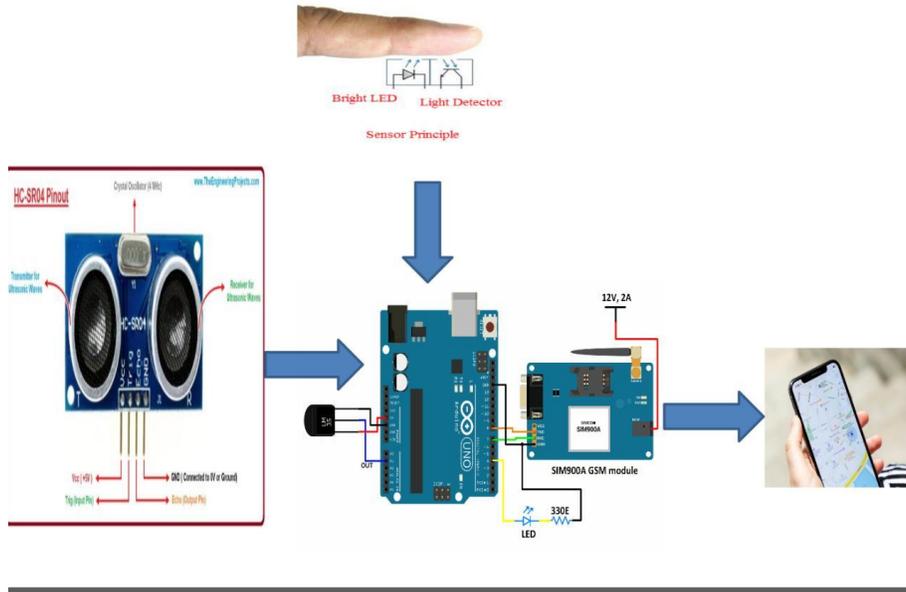


FIG2 :CIRCUIT DESIGN FOR VISUALLY IMPAIRED

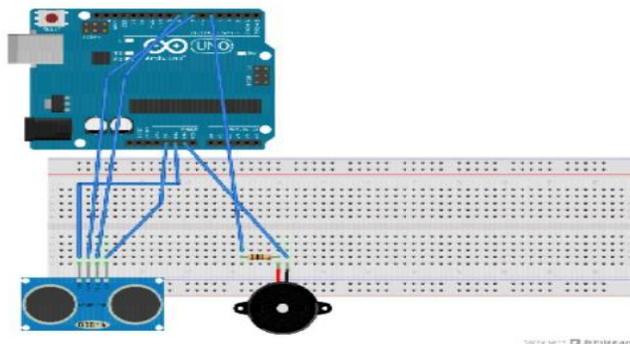


Figure : arduino with ultrasonic sensor

- Echo pin-9
- Trigger pin-10
- 5V - VCC GND-GND

Three ultrasonic Sensors for obstacle detection for facing left, centre and right respectively the sensors were placed thus to ensure obstacle detection above the knee level .

The Arduino UNO is a microcontroller board based on the ATmega 328 it has 14 digital input/ output pins of which 6 can be used as PWM Outputs 6 analog inputs

Trigger input is connected in 10th pin and echo output is Longitude in 9th pin In this ultra sonic sensor have trigger pin is located in 10th pin that get all waves echo pin located in 9th pin that receives this way.



Trigger pin collects all ultra sonic waves as input and echo pin as output ultrasonic sensors detect the object first it detect the centre sensor if there is no object move front else there is an object it sense the left sensor then sense the right side. if obstacle in all side mean collision occur.

GPS: is detect the current location of the person Then the information is send to their parents of respective person through the GSM temperature sensor is used to detect the climate. if the weather is cloudy then the information is said to the person through the void module connected with stick.

Pulse sensor is connected in risk pulse sensor ie used to detect the body condition of the respective person. if some time pulse reduce the information is send to the parent by writing GSM module

IV.RESULT

The range of the ultrasonic sensors have been frequently varied from 5 meters to 10 meters to aid in measuring the efficiency of the sensors. Out of 5 trials using the 10 meters range we have accomplished a successful 4 outcomes which translates an efficiency rate of 80%.

The temperature sensor and the pulse sensor have been tested and found to be effective in different scenarios.

V.CONCLUSION AND FEATURE SCOPE

Our system has been proved to be more efficient, so it is feasible for using it .Additionally certain features can provide more usability. To improve the range and efficiency of the system , in future a better sensor and a microcontroller like Raspberry pi can be interfaced. This helps in optimizing the mechanism and would further lead to incorporating additional features to further enhance the utilization of the product.

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