

Development of an Intelligent Assistance System with Location Tracking for Visually Impaired and Elderly People

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Abstract: The work introduces an electronic way to find framework for outward obstruction and overcome individuals Subject. This framework understands the obstacle around as far as 40cm in front, left and right by using ultrasonic and infrared sensors. It calculated the partition of the distinguished item from the issue and gets ready. It needs to be staying away from obstacles. It utilizes stick for disapproval to more issue about to identified obstruct and its partition. This present system deploys into the AT89S52 microcontroller, after deploying microcontroller immediately sends continues information to the ultrasonic sensor.

The internet is accessible with alternative of optimum server as per hand stick relaxation and necessity to subject. The GSM/GPS location tracking demonstrates location and cost-effective hand stick real-time system with minimum physical interface for potency of visually impaired people. To reach safe and independent potency, Blind people mainly depends on declared information, initial experience, the awareness of others, and/or technology to guide unknown outdoor and indoor surrounding. To avoiding the obstacles for using different sensors.

IndexTerms – GPS, Atmega328 Microcontroller, Ultrasonic Sensor, Infrared Obstacle Sensor, Accelerometer

I. INTRODUCTION

There are numerous direction frameworks for outwardly reducing explorers to drive rapidly and securely against obstructions and different dangers. A visually impaired client conveys a white stick or direction hound as their portability help. With the headway of present-day innovation, A Wide range of kinds of implement can be utilized to help the portability of the visually impaired. These individuals are typically alluding to as hardware move gadget. The significant capacity is the obstacle for the visually impaired to acquire data about the area of Aqaba in an obscure area. With this data, they have to get to their goal and evade startling obstructions. The location and cautioning framework comprise of ultrasound and to infrared sensors that identify the encompassing deterrents and send sign to the microcontroller for the preparation Computes the separation of potential snags and give the client input in like manner to maintain strategic distance from potential deterrents.

This structure is produced using ATmega328 microcontroller, Three-Hub MEMS Accelerometer, ultrasonic sensor SR-04, infrared tangle sensor, Double band GSM modem, GPS recipient, signal alert unit, LCD show unit, and power supply circuits. This structure is expected to check if there are any hindrances either in front or left or right detect. It uses MEMS accelerometer to distinguish the fall of the person. It more and GPS for zone following and GSM for sending prepared SMS message to gatekeeper's wireless, close by other important features. The system uses a microcontroller-based circuit to manage the working of the entire structure. This structure uses ultrasonic sensor to identify dissents front way promotion. Infrared sensors for separating obstacles in left and right detected. Inside certain extent of the individual and sounds booms of a particular sort to hail hindrance.

The framework utilizes a microcontroller-based circuit to deal with the working of the whole framework. This framework utilizes ultrasonic sensor to detect questions front way and infrared sensor for recognizing hindrances in left and right bearings, inside certain scope of the individual and sound of a specific kind to flag impediments. One increasingly significant component of the framework is that the framework permits the deciding of the fall of visually impaired individual and to Conway a SMS with his/her GPS area to the overseer/relatives/friends and family of the individual struck in an unfortunate situation or being lost.

1.1 Objectives

- The main aim of the proposed work to implement and build a active prototype an effective, the simple and user friendly system for the persons who are blind, we use different sensors in our proposed work to walk blind person safely and securely,
- To navigate by electronic devices for blind people.
- Here some many different sensors are helpful to find out the obstacles while blind people are walking towards.
- This system uses ultrasonic sensor to sense objects in front direction and infrared sensors for detecting obstacles in left and right directions, within the range of sound frequency.

1.2 Methodology

This work built using Atmega328 Microcontroller and consists of other sub- units, namely, Three-Axis MEMS Accelerometer, Ultrasonic Sensor SR-04, Infrared Obstacle Sensor, Dual Band GSM Modem, GPS Receiver, Buzzer Alarm Unit, LCD Display Unit, and Power Supply Circuits. A pair of sensors is mounted on the stick having the range from 40- 45cms for detecting obstacles in front direction and two Infrared sensors are mounted on left and right sides to detect and avoid obstacles on either sides ranging from 2-10cms.

A buzzer is used for producing loud beep sound if the person is about to hit with any obstacle. The Three-Axis MEMS Accelerometer is used to detect the fall of the person by continuously monitoring the inclination in X, Y and Z directions. The system finds the fall, initially, sounds the buzzer and tries to catch attention of nearby people.

It waits for the disable button pressed and allows a fixed duration of time to prevent sending of alert message by pressing button, it gathers the location information in the form of horizontal and vertical from GPS receiver and sender a SMS alert message, which contains location information, to a pre-programmed mobile number. This system is programmed for the required algorithm using C++ by the support of Arduino IDE.

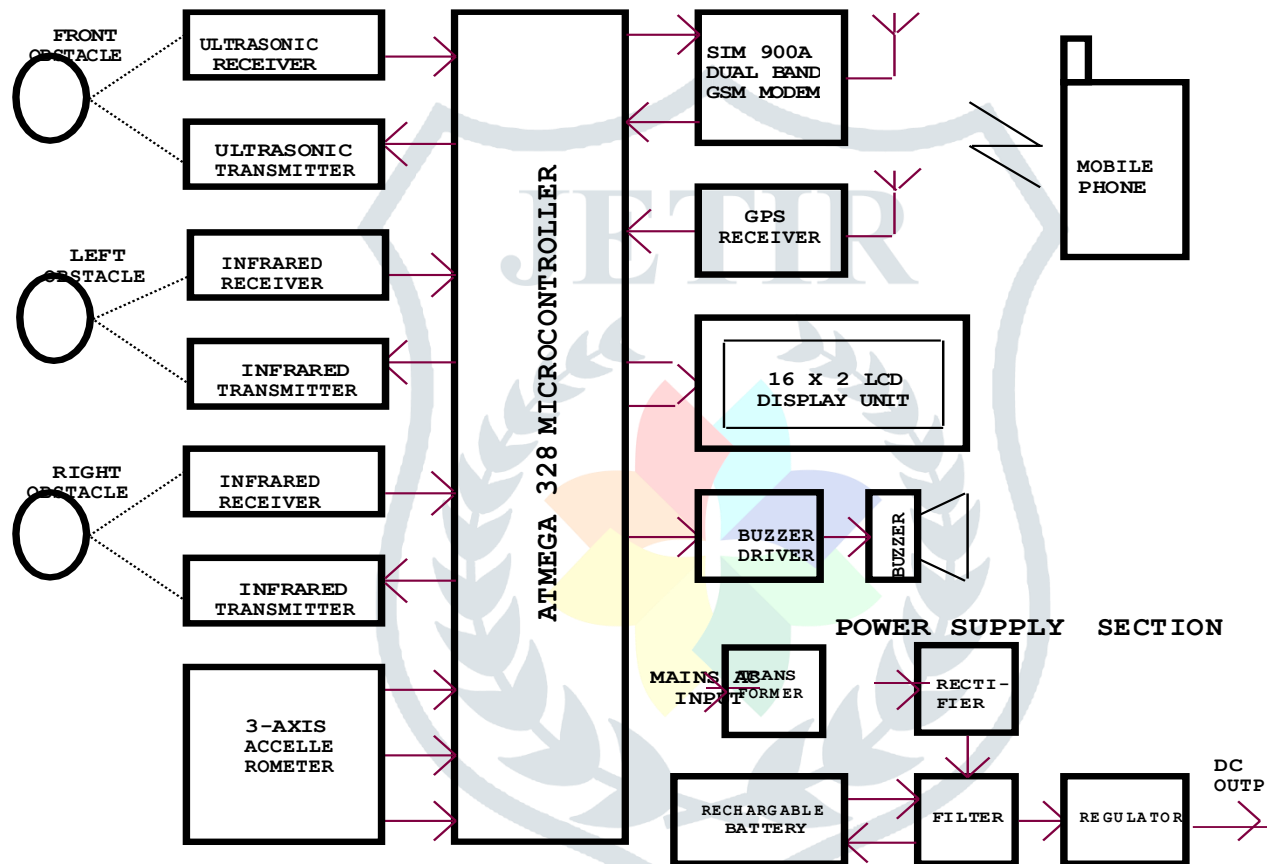


Fig. 1 Intelligent Assistance System with Location Tracking for Visually Impaired and Elderly People.

II. LITERATURE SURVEY

In [1]. Brazilian. Dazzle white stick is acquainted with visually impaired individuals after the First World War a portability device to recognize the deterrents in a way to client. This work develops an android-Nano formed obstruction discovering the visually impaired individuals, to need a visually impaired individual distinguishing to snags utilizing Ultrasonic sensors and android portable application. It can advise the visually impaired individual about the conditions and current state of the way where he/she is strolling. The fundamental target of this paper is to assist visually impaired individuals with moving all the more openly by utilizing a solid stick.

In [2]. Ambilian Intelligent Walking Stick for Visually Impaired Subjects. Outwardly hindered individuals discover extraordinary trouble in moving around unreservedly without a human guide, particularly in another landscape. iWalk is a clever strolling stick extraordinarily intended for outwardly incapacitated people to improve and ease route. iWalk utilizes ultrasonic and water sensors to recognize impediments and water ahead. The water sensor incorporated in that enacts an unmistakable bell on the off chance that it

distinguishes water. The framework accompanies a remote RF remote control that exceptionally sounds buzzer when squeezed, that helps in finding the stick on the off chance that it gets lost. The effectiveness of the proposed arrangement has been sufficiently tried on a dataset made out of randomized areas with deterrents and water.

In [3]. R Khlaikhayai Smart Cane for the Visually Impaired. As of now, outwardly debilitated individuals utilize a conventional stick as an instrument for guiding them when they move starting with one spot then onto the next. Despite the fact that, the customary stick is the most far reaching implies that is utilized today by the outwardly hindered individuals, it couldn't assist them with detecting threats from all dimensions of hindrances. In this specific situation, we propose another keen framework for controlling people who are outwardly disabled or somewhat located. The framework is utilized to empower outwardly debilitated individuals to move no sweat and certainty as a located people. Additionally, the framework helps in distinguishing the potholes. The framework is connected with a GSM-GPS module to stick point the area of the outwardly hindered individual and to set up a two-way correspondence way in a remote design. In addition, it gives the heading data just as data to evade impediments dependent on ultrasonic sensors. A bell and vibrator engine are likewise added to the framework. The entire framework is intended to be little, light and utilized related to the white stick. The outcomes have demonstrated that the blinds that utilized this framework could move autonomously and securely.

In [4]. K Wang. a shrewd help framework for outwardly weakened/daze individuals, which is made out of wearable savvy glasses, a keen strolling stick, cell phones application, and on-line data stage. At the point when outwardly impeded/dazzle individuals wear the proposed brilliant and holding the proposed keen strolling hand stick, along these lines the deterrents to recognized. On the off chance that an outwardly hindered/daze individual is tumble down, at that point the related data (GPS, tumble down, and so forth.).

III. PROPOSED SYSTEM

This developed present work is represented with block diagram in fig. It shows the main sensors, an Atmega328 Microcontroller, MEMS Accelerometer, Ultrasonic Sensor SR-04, Infrared Obstacle Sensor, GSM Modem, GPS Receiver system, Buzzer Alarm Unit, LCD Display Unit, and Power Supply Circuits. One pair of ultrasonic sensor is finding the range from 40-45cms for detecting obstacles in front direction and two Infrared sensors are mounted on left and right sides to detect and avoid obstacles on either sides ranging from 2-10cms. The coordination in between the Ultrasonic-sensor, infrared sensor is promoted to develop a corresponding model that is capable to give responsible warning in case of any obstacles.

A buzzer is used for producing loud beep sound if the person is about to hit with any obstacle. The Three-Axis MEMS Accelerometer is used to detect the fall of the person by continuously monitoring the inclination in X, Y and Z directions. If the system finds the fall, initially, it sounds the buzzer and tries to catch attention of nearby people.

The system will wait until the disable button to be press and allows fixed duration to prevent sending of alert message by pin. If the desired button is not pinned on time, it gathers d location information in the form of horizontal and vertical from GPS receiver and sender a SMS alert message, which contains location information, to a pre-programmed mobile number, for help.

Advantages

- This can be used in both inward and outward location.
- Blind people tilt somewhere this system gives message to their respective phone number.
- When they get disturbed by any obstacle the system will alert them by making different sounds.
- The system is very helpful for the blind people safety and security.

IV. SYSTEM DESIGN

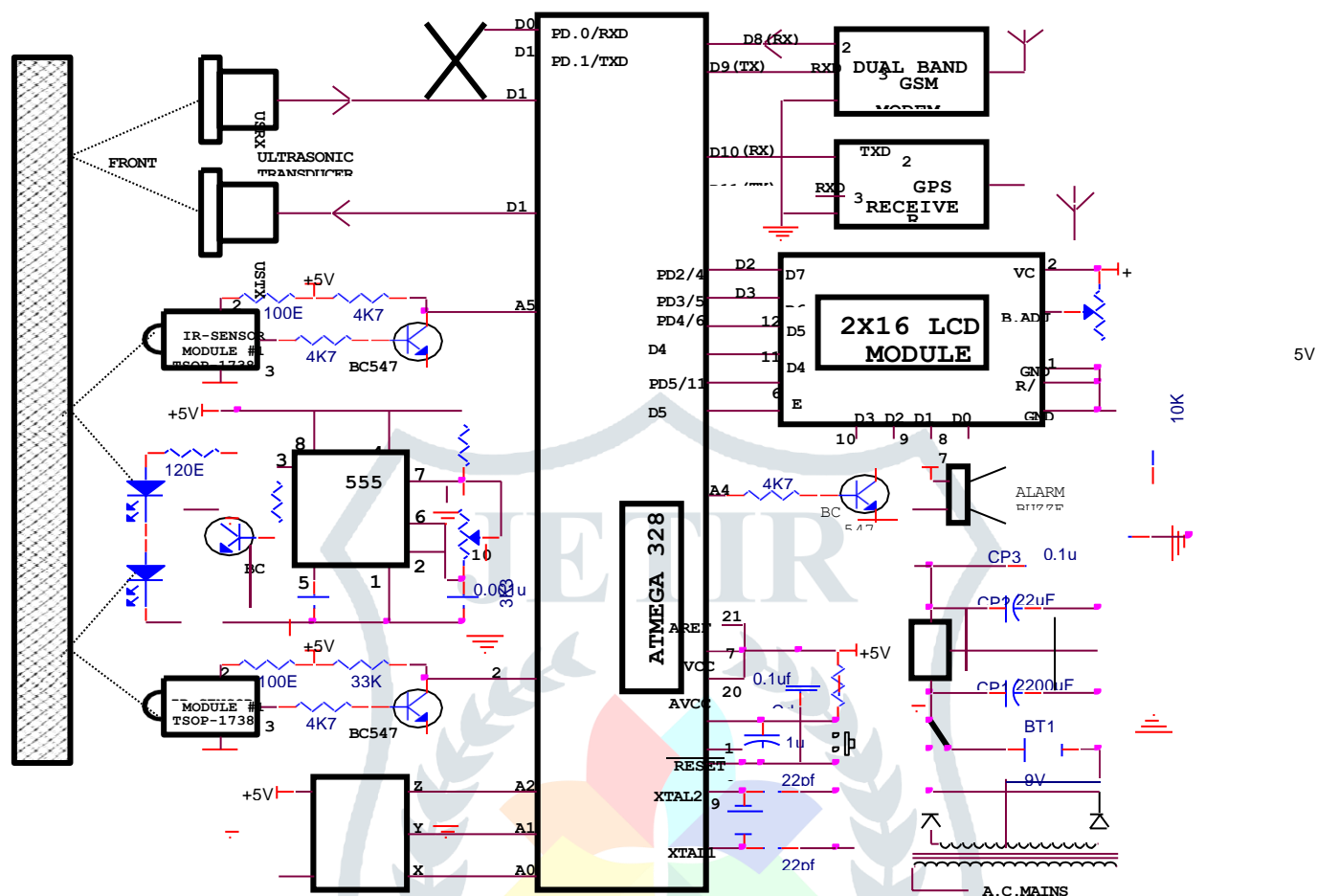


Fig. 2 Circuit Diagram of the model for Visually impaired People

As circuit diagram shows the IOT based industrial process parameter monitoring and control system. It consists of Atmega 328 microcontroller module, LCD Display Unit, Relays & Relay Driver Circuit, Buzzer & Driver and Power Supply Units.

The Atmega 328 microcontroller is working as a small, embedded computer which performs all the control functions of the system by performing the internal flash program memory. The analog signals obtained by the sensors represent the present values of the physical parameters.

After the power switch is turned on or a reset is done, the microcontroller starts to function. In the beginning, it initializes all peripherals attached to it and displays the title messages. Then it reads the present parameter values from various sensors attached to it using ultrasonic and displays them on the LCD display and checks if any parameter has crossed its threshold value. If none of the parameters are abnormal, it keeps the buzzer and corresponding relays off and reenters into the regular monitoring loop.

Similarly, the fluid level is measured using fluid level sensor. This sensor produces an analog signal corresponding to stick. This signal is amplified in signal conditioning circuit and then fed to another analog input pin of Atmega 328 microcontroller for conversion into digital value. When the current level is below set point the relay connected to the stick takes place and this continues till the current level value becomes equal to set point value. Once the current level value reaches the set point value, the GSM is turned on by sending a signal to the relay which controls the GPS. The sensor and IOT side unit reads the analog voltages arriving at analog input pins of Atmega 328 microcontroller and displays them on LCD display.

4.1 MODULE DESCRIPTION

The block diagram of the “**Development of intelligent Assistance System with Location Tracking**” is shown in the diagram. It consist the following modules.

1. Ultrasonic Sensor
2. Infrared Obstacle Sensor
3. Three-Axis MEMS Accelerometer

1. Ultrasonic Sensor: -

Utilizing ultrasonic sensors to decide the separation to close by articles. It transmits ultrasonic waves into the air at 30000Hz. If the object is present in the way of the wave in the air, the desired wave return reflected to a beneficiary system. After the calculating movement time and speed of the sound. We may figure the length.



2. Infrared Obstacle Sensor: -

Infrared (IR) Obstacle sensor, as the name proposes distinguishes object or any obstacle coming the sensors way. This sensor comprises of an Infrared Transmitter, an Infrared Detector, and hardware support. The IR Transmitter carries inaudible regulated light bar pointing towards the IR Receiver unit.

The IR recipient is un-influenced by the surrounding normal light. An opening is cut on the edge of the wheel. The IR transmitter put on one of the demo haggle IR beneficiary is set on the contrary side of the wheel to detect the rotational speed of the wheel. Both transmitter and recipients are mounted to the point that the transmitted bar falls on the collector just when the gap comes in the middle.

3. MEMS Accelerometer for Tilt (Three-Axis) Sensing: -

The ADXL335 MEMS accelerometer yields three simple qualities relating to the X, Y and Z course organizes. Increasing speed esteem created in every hub is perused separate pins. By detecting the measure of dynamic stimulating, you can break down the manner in which the gadget is moving.

An accelerometer creates a voltage corresponding to the tilt and these voltages are supported to an Analog to Digital Converter and afterward to the microcontroller. The microcontroller routinely checks the yields of the accelerometer and when it is tilted past a point of confinement on either X or Y heading.



V. IMPLEMENTATION

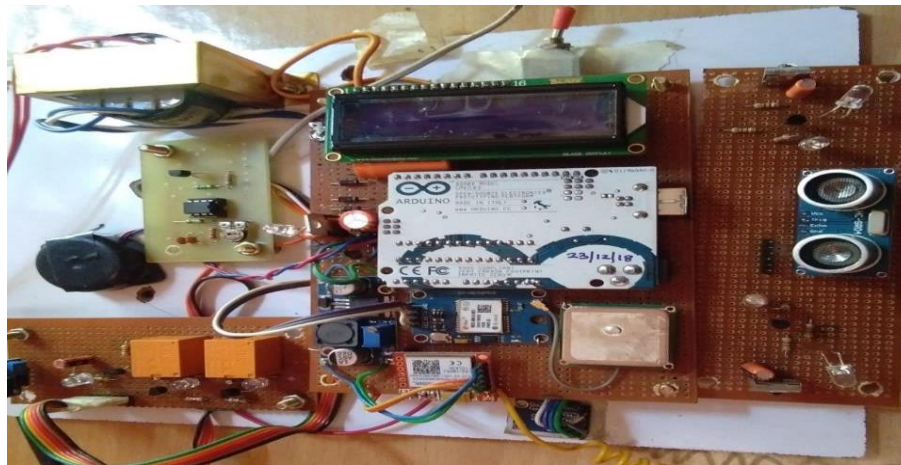


Fig. 4 Complete Structure of Work Module



Fig. 5 Connection Ultrasonic Sensor & Infrared Sensor

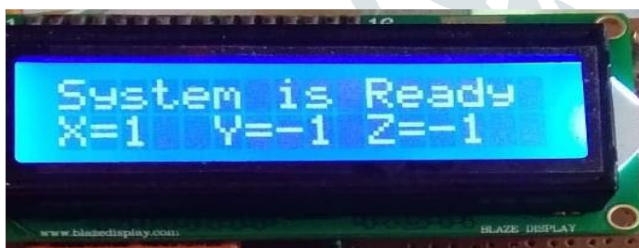


Fig. 6 Adjusting the Parameter Value

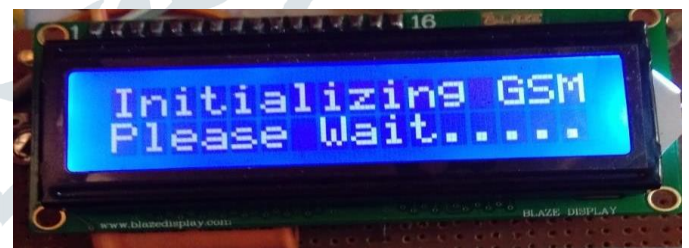


Fig. 7 Connecting GSM

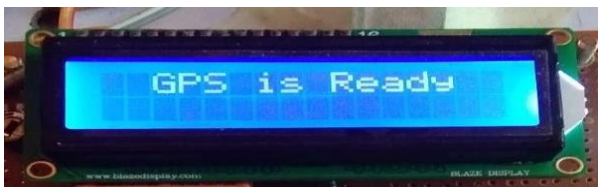


Fig. 08 GPS is Ready



Fig. 09 Location Tracking

5.1 TEST RESULTS.

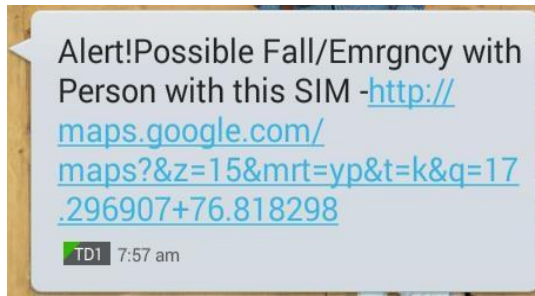


Fig. 10 SMS Sent with GPS link



Fig. 11 Location is Located

VI. CONCLUSION

To design an Blind impaired people device which is IOT based that contain the different sensors to detecting the front, Left, and Right obstacles and if blind people are tilt on any road side it will automatically connect with GSM and location tracking with the help of GPS and sent message to the respective number . The device is very helpful for blind people for using the stick and they can easily move from one place into another place.

It is more user-friendly and with additional features like.

1. High range ultrasonic sensor can be used.
2. More sensors can be used for further application.
3. GPS tracker can be used for exact Position.
4. Android implementation can be enlarged.
5. Code can be improved or adjust certainly.

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