Voice Assistive Smart Walking Stick for Physically Impaired Person Using IoT

Dr.Dayanand J, Professor, GNDEC, Bidar, Karnataka, INDIA, jdayanand1@gmail.com

Jessica Priya, Student, GNDEC, Bidar, Karnataka, INDIA, jessicapriya007@gmail.com

Abstract - **This task introduces a structure and usage of voice assistive keen strolling stick that encourages the visually impaired individuals to travel separately. The proposed hardware comprises of Arduino UNO, Sensors, APR33A3 voice yield, GPS and GSM. To make it increasingly helpful the dampness sensor that distinguishes and cautions the visually impaired if any dampness substance is available to stay away from elusive ways, fire sensor that alarms about the flame and LDR sensor to inform the visually impaired individual about murkiness by giving voice feedback.**

Keywords — APR33A3 voice yield, Arduino Uno, Fire sensor, GSM and GPS, LDR sensor, LED, Moisture sensor, Smart Stick, Ultrasonic sensor.

I. INTRODUCTION

Outwardly tested individuals confronting numerous issues in their regular daily existence, frequently have a troublesome time to explore outside the earth. The pivotal physical incapacity is that the Visual Impairment. The visually impaired individuals need to confront numerous issues in their regular day to day existence. The most exceedingly awful issue is that identifying object before them so as to venture ahead. Around the world, between 300 million and 400 million individuals are outwardly tested because of different causes. As indicated by world Health Organization (WHO), around 36 million are visually impaired. Prior visually impaired individuals were completely relied upon instructed canines and white sticks to move freely in obscure regions. Items created for the outwardly debilitated have uncommonly focused on specialized apparatuses, for example, perusing machines and stepping printers for Blinds. Numerous Navigation helps separated from the stick have still to be actualized so that prompting their endorsement by the outwardly tested network. In a steady actually creating world numerous electronic gadgets are came into exist which lessens the issues looking by individuals who are with inability. A basic framework has been arranged and created which help the blinds to move autonomously and the framework utilizes GPS and GSM modules to discover the area.

II. LITERATURE SURVEY

Assorted activities contain be prepared in the common civic to support the visually impair. "Venture Prakash" [1] is a helpful mission to help the visually impaired youngsters particularly via preparing them to use their minds to get familiar with a lot of articles around them. In [2], the bond has a ping sonar sensor to identify the detached items. It additionally has a wet finder to recognize the water. The microcontroller utilize is PIC microcontroller. The microcontroller circuit is outwardly of the bond yet is ensure through a code so its protection can't be wrecked. The major input specified to the consumer is throughout the trembling engine. In [3], three sensors be utilize viz. ultrasonic, pit sensor as well as the water sensor. Certainly, yet this is a PIC base structure. The input agreed is throughout the trembling just as the speaker/earphones. There is a GPS structure where-in the consumer wants to encourage his region. In [4], the creator has made a separable unit comprising of an ultrasonic sensor and a vibration engine. It very well may be fit on any stick. It identifies snags up to 3m. The vibration input fluctuates in the force as the obstruction comes closer. Various methodologies have been taken with the basic role of making an innovation to help the outwardly hindered. The needs set by various creators are diverse leaving an extent of progress in each application.
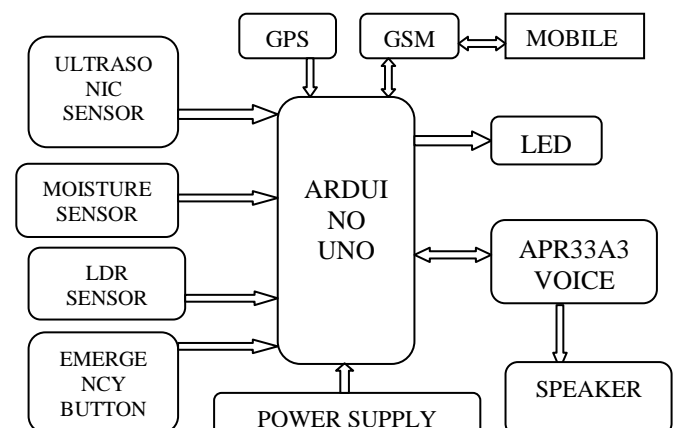
III. SYSTEM DESIGN

**Figure 3.1: Block diagram of proposed system**

The Figure 3.1 demonstrates the square graph of the proposed framework comprises of different equipment gadgets which are mounted on the stick for the activity of the strolling stick. The gadgets are Arduino Uno which is Microcontroller, ultrasonic sensor, dampness sensor, LDR sensor, fire sensor, LED, voice playback module, GPS and GSM module.
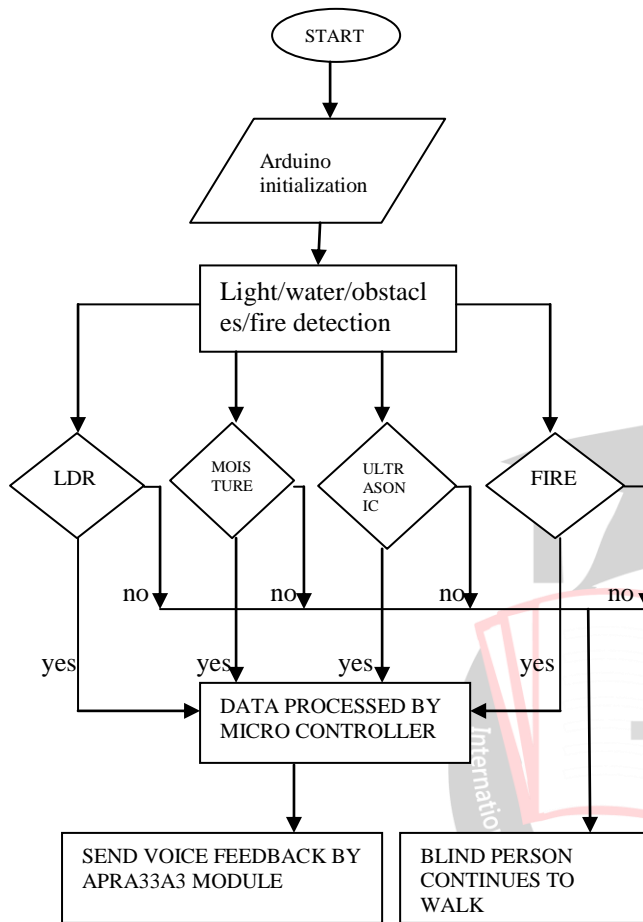
Figure 3.2 Flow diagram of Object detection

The object detection flow diagram is as shown in figure 3.2, the arduino is initialized and if any obstacle comes in the blind person way then ultrasonic sensor will give information about that object, LDR sensor will give information about the light, moisture sensor about water, fire sensor about fire detected then the data processed by microcontroller is sent to the APR33A3 voice module which gives information to the blind person through voice command. If not the blind person will continue to walk.

The flow diagram of blind man location tracking is as shown in figure 3.3 where arduino is initialized and if the person is in any trouble then his care taker will get the text message along with the location of that blind person by setting up of GPS for location and GSM for sending SMS to the care taker with some help text and location along with longitude and latitude, otherwise the person continues his walk smoothly.
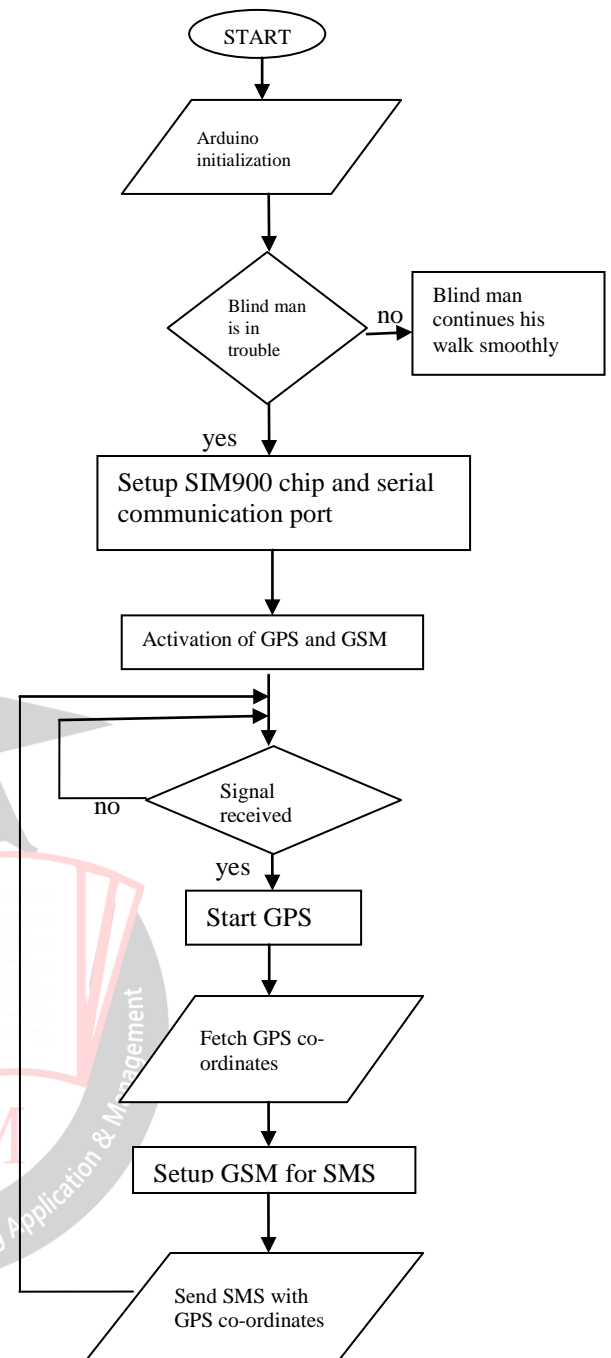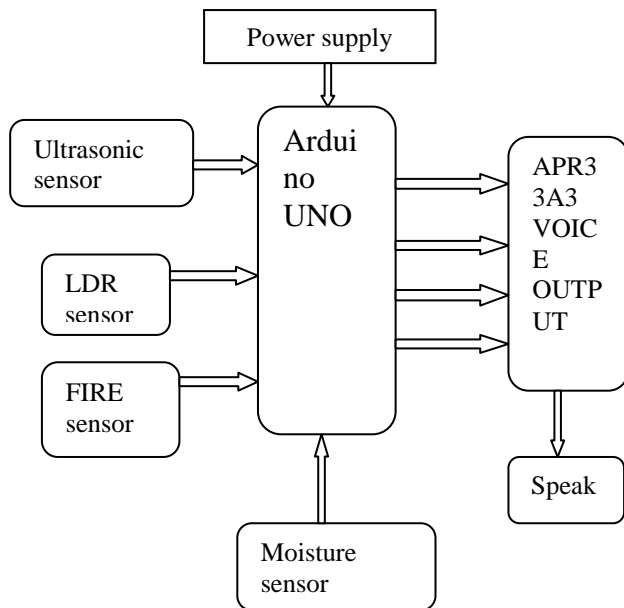
Figure 3.3 Flow Diagram of Blind Man Location Tracking

IV. IMPLEMENTATION

The three modules are utilized to actualize the voice assistive savvy stick is as per the following

1. Sensor module
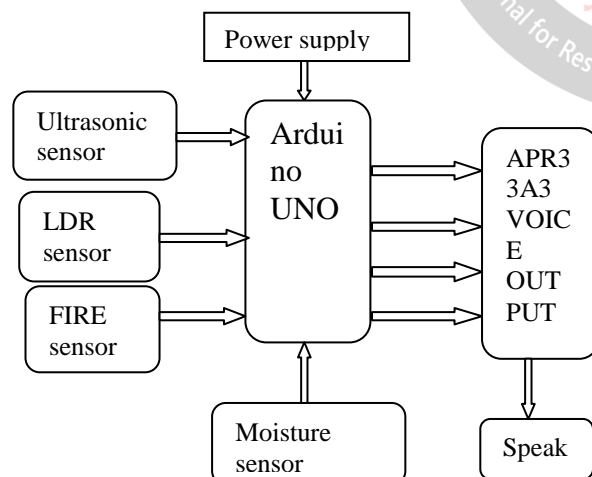2. Tracking module
3. Voice playback module

4.1 Sensor Module

Figure 4.1: Block diagram of Sensor module

As appeared in the figure 4.1 the sensor module comprises of microcontroller arduino Uno and sensors. Power is given to arduino, it gets signals from the ultrasonic sensor when it recognizes any item, the flame sensor when it identifies fire, the dampness sensor when it distinguishes water and LDR sensor when it recognizes haziness and every one of these sign are given to the yield APR then it will be passed to speakers so as to offer data to the visually impaired individual through voice message.

4.2 Tracking module

Figure 4.2: Block diagram of Tracking module

Following framework comprises of microcontroller to which power is provided, GPS and GSM modules, crisis switch and LED status as appeared in figure 4.2. At whatever point the visually impaired individual is stuck in an unfortunate situation or lost in his manner then he can press the crisis switch on utilizing this a message will be sent to his guardian or his companions whose number is given at first in the code inside two minutes they will get the instant message alongside the area of the visually impaired individual sent utilizing GPS and GSM module with the goal that overseer can proceed to assist the visually impaired individual with coming out of that inconvenience securely. The LED is utilized to give sign about the GPS and GSM introduction and network.

4.3. Voice playback module

At whatever point the article is identified, water is distinguished, or fire is recognized that is yield of sensor module, the data about this yield to the visually impaired individual who is utilizing the voice assistive keen strolling stick will get it through voice message by means of speakers.

V.   EXPERIMENTAL RESULTS

5.1. Object detection
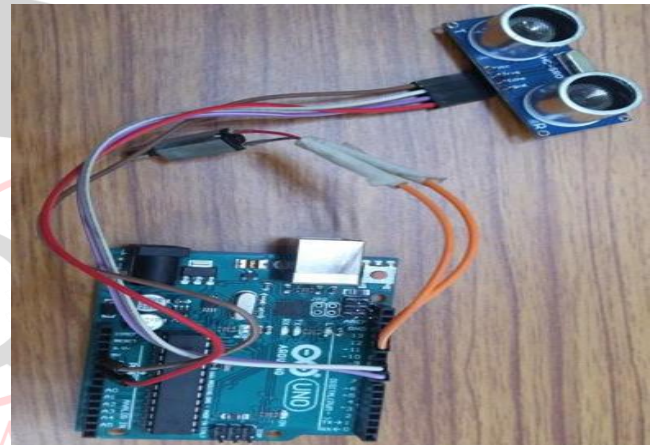
Figure 5.1: Object Detection Module using Ultrasonic sensors

5.2. Testing and examination of GPS Results

A test has led to test how much time the GPS takes to send an area arranges as SMS through GSM. A few tests were made on GPS which was directed in various barometrical conditions. Successions of 20 tests were performed, 60% of all SMS was sent inside one moment. 70% of SMS was sent under 2 minutes and 80% of the messages were sent inside 3 minutes. In this way the GPS module is working in an acceptable manner and is appropriate for pressing circumstances. At the point when the visually impaired individual press a crisis catches, through GSM Module the GPS area will be sent as message to the versatile of approved individual, which demonstrates the scope and longitude position where precisely the visually impaired individual is found.
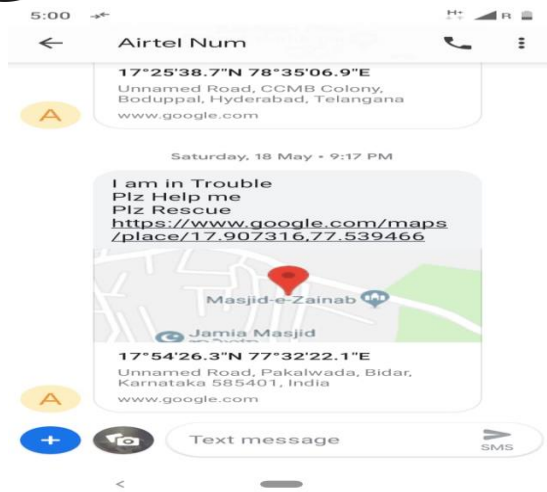
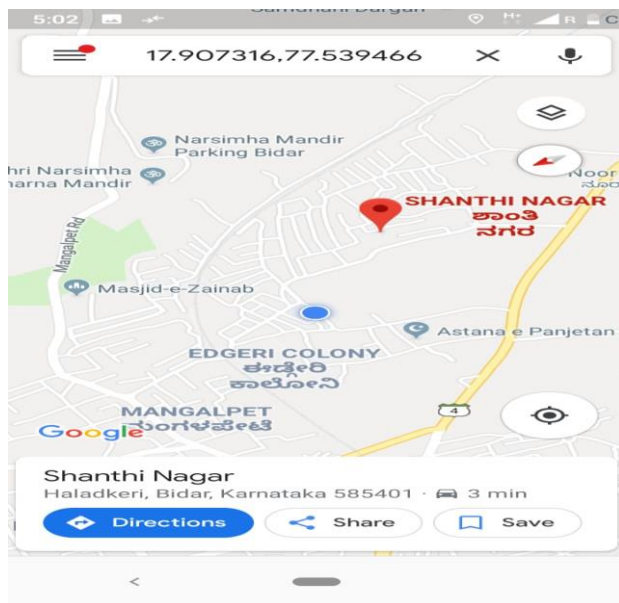**Figure 5.2: screenshot of SMS Received by predefined number**

Figure 5.3: Screenshot of location Access on Google map

5.3. Complete model portrayal of Voice Assistive Smart strolling stick

The figure 5.4 demonstrates the total structured model portrayal of strolling stick. It diminishes not to subject to the next relatives. It is straightforward and simple to utilize. It helps in maintaining a strategic distance from minor crashes and along these lines gives the more security. Voice play back module gives alert about the articles through speaker. Crisis catch is given which enacts GPS and GSM to sends area data to the guardians if the visually impaired individual is in risk.

Figure 5.4: Complete representation of the hardware system

VI. CONCLUSION

The fundamental objective of this work is to give a keen strolling adhere to the blinds to navigate around the environment with no cooperation with any sighted people. The hardware is implemented using Arduino UNO hence the system is little in size also comfortable to carry along. The voice playback module will give directions through any language which blind person knows. The GPS and GSM modules will work effectively in sending SMS as quickly as possible as per the subscriber's specification. Hence this stick can be used by any physically impaired person.

VII. FUTURE SCOPE

The framework can be adjusted by utilizing the standards of radar to identify the long running target objects. By distinguishing the shade of tablet box a visually impaired individual can allow the tablet for his medical problems this can be accomplished by executing the shading acknowledgment sensor procedure. The yield can be given through vibrations alongside voice message so as to make it simple to use for any visually impaired and hard of hearing individual. Likewise the arduino remote can be utilized so as to locate the savvy stick effectively by any physically disabled individual.

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