Smart Stick for Blind People

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Abstract — The life of blind and visually impaired people is very different. They face many problems in moving from one place to another. Since they cannot see, they often get hit by objects in roads like poles, walls, cars, 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 identify the object by tapping it. 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, using GPRS and GSM modules their family members can track them easily.

Keywords—Smart Stick, Arduino Uno, Location Tracking, Sensors, Object Detection.

I. INTRODUCTION

Blind people find it difficult to move in this world as they get distracted by the obstacles, they may even get lost. So in the proposed system the above mentioned cases are taken into consideration and implementation is provided. In order to help the blind people for detecting object the proposed system make use of ultrasonic sensors to track the person. The system makes use of GPS and GSM modules to find the location. The main objective of this project is to reduce the cost and to provide a better solution for the visually impaired.

II. RELATED WORK

A. Advanced Electronics Based Smart Mobility Aid for the Visually Impaired Soceity

The realm of electronics is growing rapidly. Advanced electronics are employable in assisting the visually impaired society in various ways. According to World Health Organization (WHO) approximately 285 million people are blind. Major researches have been under consideration on developing a smart stick for seeking a smoother routine life and welfare towards the blind society. This paper proposes and analyses a brand new thought in eliminating the stick and mount these sensors on the visually handicapped person body itself [4].

B. Real-time Dangling Objects Sensing: A Preliminary Design of Mobile Headset Ancillary Device for Visual Impaired

This analysis planned a mobile Real-time Dangling Objects Sensing (RDOS) prototype, which found on the cap to sense any front barrier. This device utilizes low cost un-hearable sensing element to act as another complement eye for blinds to know the front hanging objects. The RDOS device will dynamically regulate the sensor's front angle that's trusted the user's body height and promote the sensing accuracy. Two major needed algorithms to measure the height-angle activity and un-hearable sensing element alignment and planned unit area. The analysis team additionally integrated the RDOS device with mobile automation devices by human action and Bluetooth to record the walking route [3].

C. Assistive Infrared Sensor Based Smart Stick for Blind people

In this paper authors tend to propose a smart stick with lightweight weight, low cost, user friendly, quick response and low power consumption and stick supported by infrared technology. A combination of infrared sensors will observe stair-cases and different obstacles presence within the user path. The experimental results gives good accuracy and therefore the stick is ready to observe all of obstacles [2].

D. Design and Implementation of Mobility Aid for Blind People.

The proposed system is a jacket which will have sensors mounted on it. There will be five sensors mounted on the jacket. One sensor detects potholes or stairs. The other obstacle near head. The three sensors are used to detect obstacles in front, right and left direction. The user is notified about the obstacle through specific voice commands which are stored in a Micro SD card. These instructions are played by the microcontroller and are heard by the user through the headphones [1].

III. PROCEDURE FOLLOWED IN THE 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.

E. Recognizer Module

This module is basically responsible for recognizing the obstacles coming in the way of the person and make a vibration in the physical stick to notify the user that he is about to face an object.

F. GPS and GSM 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 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, [2] and is subject to poor satellite signal conditions. In exceptionally poor signal conditions, as an example in urban areas, satellite signals could exhibit multipath propagation wherever signals skip off structures, or area unit weakened by environmental condition. Clogged lines of sight could arise from a tree cover or within a

structure, like in an exceedingly building, garage or tunnel. Today, most standalone GPS receivers area unit employed in cars. The GPS capability of smartphones could use aided GPS (A-GPS) technology, particularly once GPS signals area unit poor or unavailable. However, the mobile network a part of the A-GPS technology would not be accessible once the smartphone is outside vary of the mobile reception network.

Global System for Mobile Communications (GSM) services area unit a typical assortment of applications and options accessible to transportable subscribers everywhere the planet. The GSM standards area unit outlined by the 3GPP collaboration and enforced in hardware and code by instrumentation makers and transportable operators. The common place makes it doable to use constant phones with very different companies and services, or perhaps stray into very different countries. GSM is that the world's most dominant transportable commonplace.
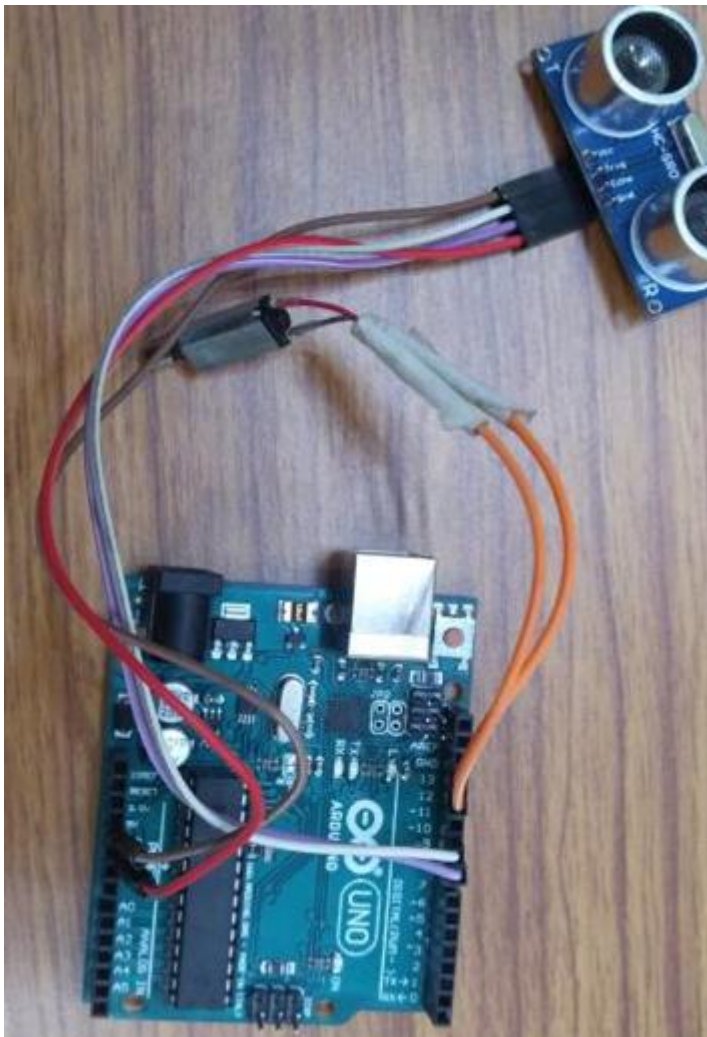

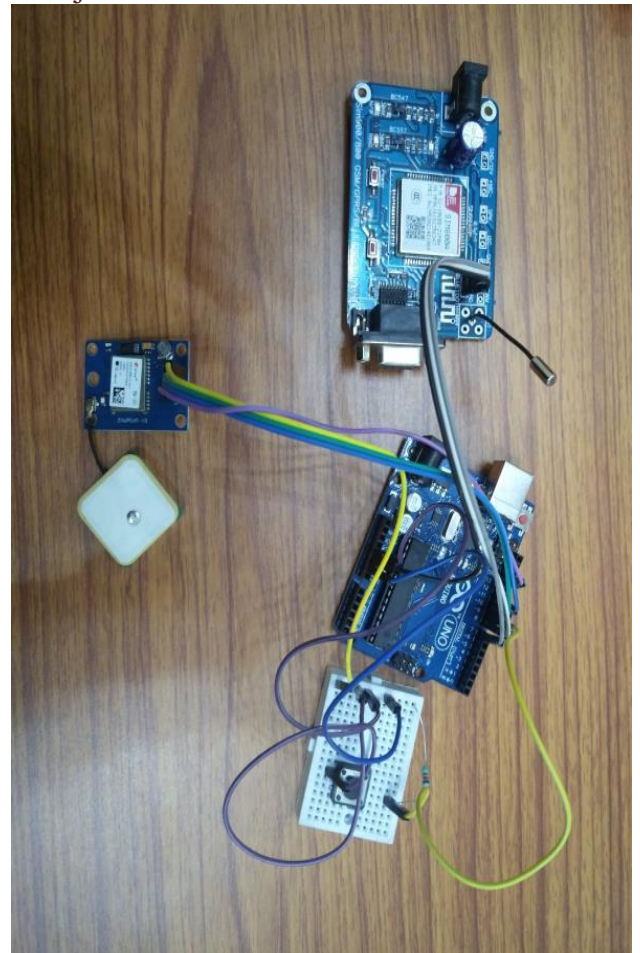Fig 1. Object Detection Module using Ultrasonic sensors

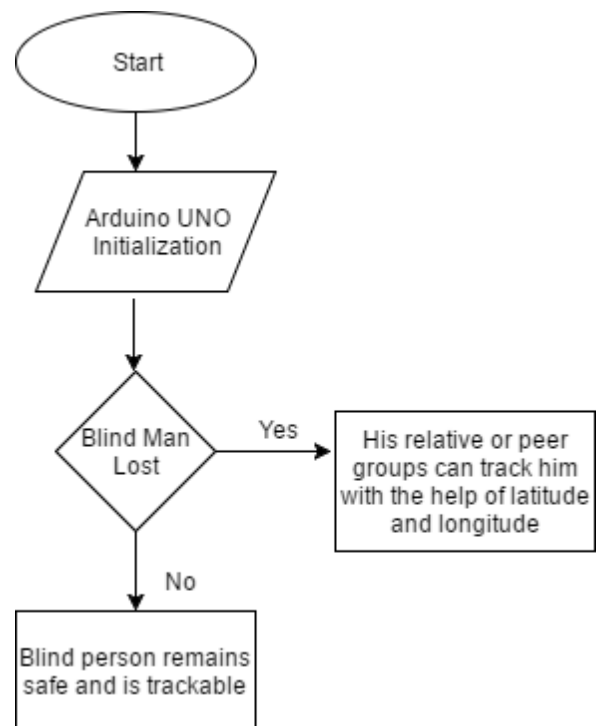Figure 2: Location tracking module using GSM and GPS

Fig 3. Flowchart for Blind Man Location Tracking

G. Arduino UNO

Arduino UNO is an open source tool which is readily available. The main advantage of using this controller is that it is very easy to implement as it follows the object oriented programming paradigm for the implementation of the code. Any special functionality can be easily shared are interfaced by importing the required library files. It has 14 digital pins and 6 analogue

pins which can be used to input or output the data. This controller remains as the heart of our system as monitors the complete working of our model. Our system uses the analogue pins for input from the IR proximity sensor and the digital pins to output the light signals, alarm sound and the commands to the servo motors. And the IDE for this controller is open source software.

H. Ultrasonic sensors

In industrial applications, inaudible sensors are characterized by their dependableness and outstanding skillfulness. inaudible sensors is accustomed solve even the foremost complicated tasks involving object detection or level activity with millimetre exactness, as a result of their activity technique works dependably underneath most conditions.

No different activity technique is with success place to use on such a large scale and in such a big amount of completely different applications. The devices are very strong, creating them appropriate for even the toughest conditions. The detector surface cleans itself through vibration, which isn't the sole reason why the detector is insensitive to dirt. The physical principle—the propagation of sound—works, with many exceptions, in much any atmosphere.

The activity technique used by inaudible sensors has been viewed as Associate in Nursing to a fault complicated technology, and solely used as a "last resort" as an answer for significantly tough applications. Those times have long ago passed

Ultrasonic sensors have tried their dependableness and endurance in nearly all industrial sectors. These sectors include:

• Mechanical engineering/machine tool
• Food and drink
• Woodworking and furnishings
• Building materials
• Agriculture
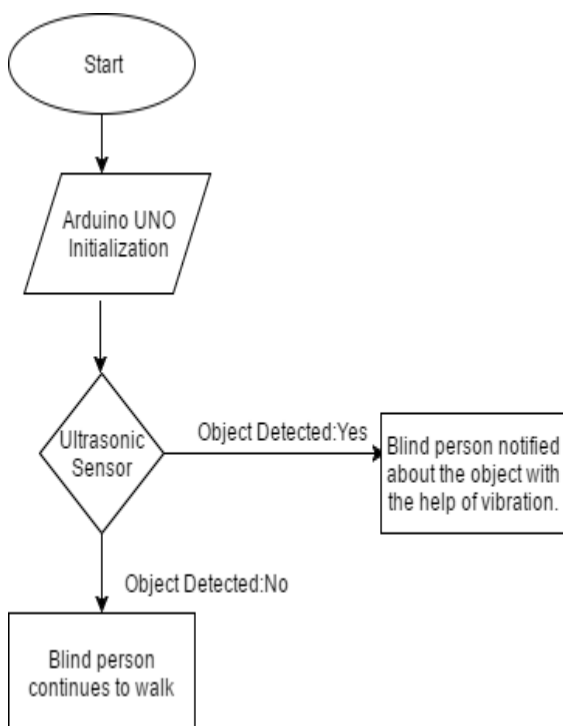• Construction
• Pulp and paper
• Material handling
• Level activity

Fig 3. Flowchart for Object detection

CONCLUSION

In this paper a brief discussion is made on the working of smart stick for blind people which not helps in detecting objects using ultrasonic sensors but also provides a feature of tracking them with the help of GSM and GSM modules.

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