

Smart Stick For Blind Person Assisted with Android Application And Save Our Souls Transmission

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ABSTRACT: Today technology is improving daily in different aspects in order to provide flexible proposes Smart Stick for blind person. But there is no such kind of good system to navigate a blind person and help in emergency situation. In this paper, user friendly device is proposed that can identify the obstacles in the path using ultrasonic sensors. In this system blind person will navigated through a stick interfaced with an android application. A blind person can establish voice call or SMS to a predefined number just by pressing the emergency button on stick using GSM module. In addition, people will get notified as Facebook status updated with emergency alert. This system develop an android application which is smart and user-friendly. While walking in public place during night time, the blind person can use stick as a flashlight which illuminates automatically.

KEYWORDS:Ultrasonic sensor, Android application, GSM, Bluetooth, LDR, PIC 16F877A, Facebook Server.

INTRODUCTION

Blindness is a very common disability among the people throughout the world. According to the World Health Organization (WHO), 253 million people are visually impaired worldwide, 36 million are blind and 217 have low vision. About 89% of vision impaired people live in low and middle income countries. Recent survey source uncovered that India has now become the country with world's largest number of blind people. There are 36 million blind people across the globe, over them 8.8 million people in India were found to be in 2015. Fig.1 shows the number of people visual impaired, with low vision and blind per million population in the six WHO Regions and in India and China separately. Navigation system caters needs of the blind people who are not able to move from one place to another without the help of others. The usage of the blind navigation system is very less and efficient in India.

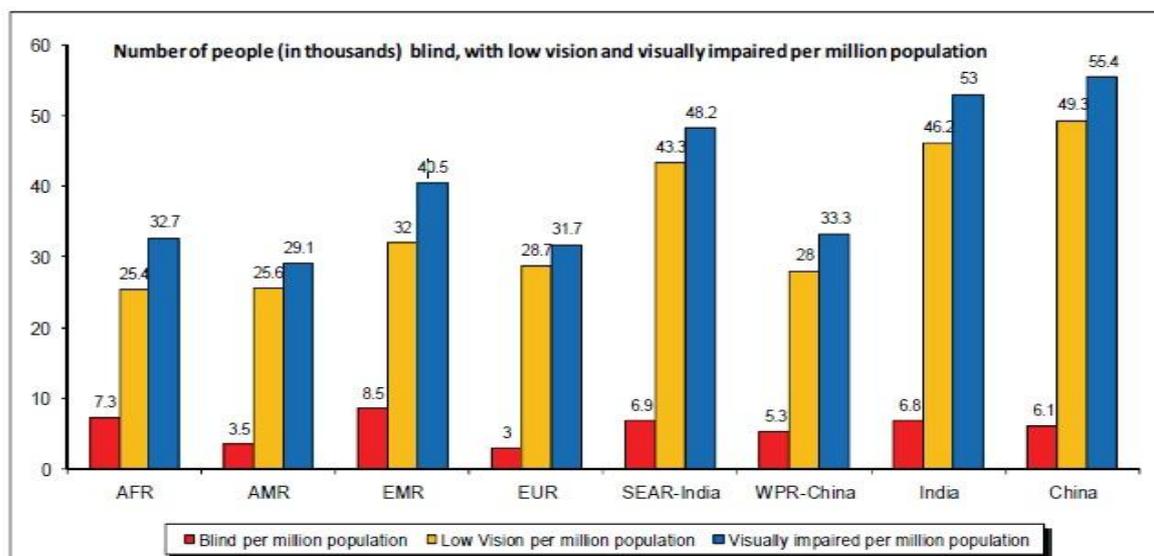


Fig.1 Global Prevalence of Visual Impairment

The blind travelers depend on other guides like blind canes, people information, trained dogs, etc. When a visually impaired person is walking in the street, he may encounter several problems in the way such as obstacles like human, animal or wall, pit or staircase, muddy surface, fire and many others which can create

troubles like accident or injuries to him even after holding conventional sticks. If the person is holding this electronic intelligent voice stick while walking it will help him to protect himself from these hurdles.

The scope of this project is to develop a low-cost system that assist blind and visually impaired without the help of sighted people. They need help to walk outside and all other daily essential works. Navigating a blind person is a great challenge as blind person has to rely on other. The simplest and most widely used travelling aid used by all blinds is the white cane. It has provided those people with a better way to reach destination and detect obstacles on ground, but it cannot give them a high guarantee to protect themselves from all level of obstacles [1]. There has been many efforts but even now, it is not easy for the blind people to move independently from one place to another. Walking in a public place during night time is one of the challenging task for visually impaired peoples because other people will not notice that the person is blind and in rush they may accidentally clash with them [2].

To solve this great problem it has been studied by many researches about support instruments for eye-sight. So the project glows a system that tries to remove the curse of blindness and make them self- dependent to do their daily chores. This system design and develop a portable unit (stick) for the blind people for easy use and navigation in public places through sensors [3]. Also this system provides emergency alert by making call or SMS to the predefined emergency phone number. Additionally people will get notified as face book status updated with emergency alert. The proposed device works in both night and day and it is very reliable and effective.

EXISTING METHODOLOGY

There are number of blind people in the society, who are suffering while exercising the basic things of daily life and that could put lives at risk while travelling. There is a necessity these days to provide security and safety to blind people. There have been few devices designed so far to help the blind.

Blindness or visual impairment is a condition that affects many people around the world. The usage of the blind navigation system is very less and is not efficient. The blind traveller is dependent on other guide like white cane, information given by the people, trained dogs etc. Many virtually impaired people use walking sticks or guide dogs to move from place to place. A guide dog is trained for guiding its users to avoid the accidents from objects and barriers over a fixed path or in a fixed area. When a visually impaired person uses a walking stick, he waves his stick and finds the obstacle by striking the obstacles in his way.

PROPOSED METHODOLOGY

The proposed system consists of following steps:

1. To provide artificial guidance to the visually impaired people with the help of a PIC controller, Ultrasonic Sensors and audio outputs with the help of Android Device. The same sense with vibrations, which can be sensed faster as compared to voice. This objective consists of two things:
 - a) Object detection in front
 - b) Pit detection along the road
2. To get wireless connectivity of stick with android cell phone.

In this system a Bluetooth module HC-05 is used to send the data of detected object to the android application. Since Bluetooth module is very cheap and easy to interface with the microcontroller and android phone so we used this module to communicate between the hardware module and android application.
3. Emergency voice call or SMS button with Facebook alert

This system provides emergency alert by making voice call or Short Message Service (SMS) to the predefined emergency phone number Global System for Mobile Communication (GSM) module. Additionally people will get notified as face book status updated with emergency alert.

4. Designing and developing android application which is smart and easy to use and user friendly as well.
5. Smart Night Lamp
Designing signalling system which knows the other people that the stick carrying person is blind at night. It senses the light intensity present outside and the stick will get illuminated automatically.

BLOCK DIAGRAM

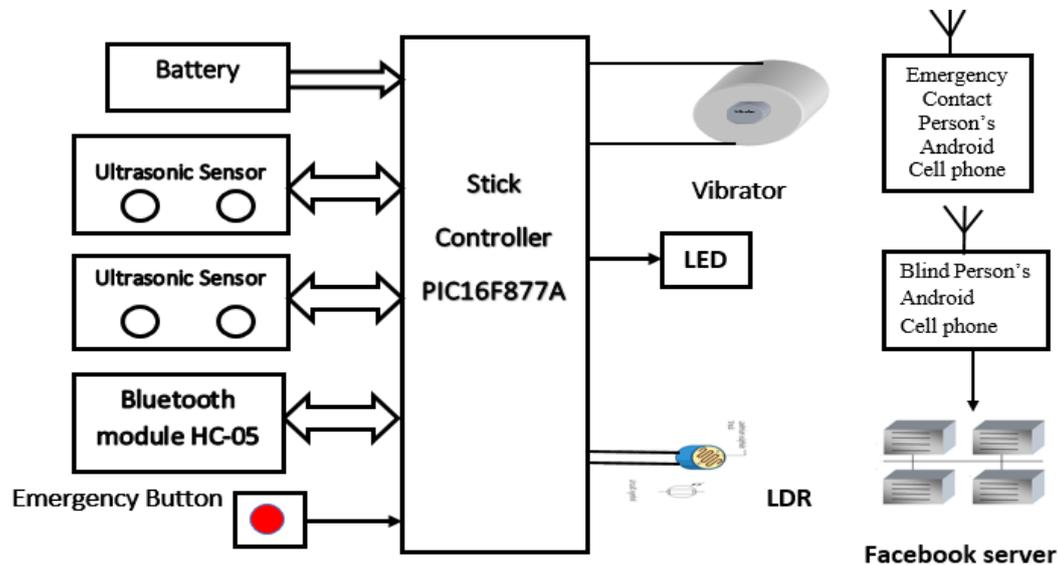


Fig.2: Proposed system Block diagram

SYSTEM OPERATION

The proposed system block diagram to assist with an android application and Save Our Souls(SOS) transmission for blind Person as shown in Fig.2. This embedded system consists of various sensors used for range finder and Pit detection along with Vibrator, speaker or headphone, Bluetooth, microcontroller, LDR, LED and Battery.

Ultrasonic range finders will be used to detect objects in front and pit as well. Ultrasonic sensors work on a principle similar to radar or sonar which evaluates attributes of a target by interpreting the echoes from radio or sound waves respectively [3]. Ultrasonic sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor. Sensors calculate the time interval between sending the signal and receiving the echo to determine the distance to an object [1]. That signal is sent to the embedded systems.

Pit sensor is used to analyze any dent or pit present in the path and this signal is also given to the embedded system. The output of these both sensors will give to PIC controller (PIC 16F877A) which processes the output and consequently drives the vibrator motors. When there is an obstacle or pit along the road blind person will sense two senses like vibration and sound [4].

The Stick is facilitated with Bluetooth module HC-05 is used to communicate with the android cell phone. In such situations blind will get notified with vibrations present on the stick as well as wireless signal will be transmitted over Bluetooth [5] link to a cell phone. The android application will get data and convert it into speech so that blind can hear alert.

SOS(Save our souls) term referred here is not exactly the Morse code used as international distress signal but the emergency alert when person is in need while emergency occurs. In emergency situation blind person can establish call or emergency message to a predefined number just by pressing a single button on stick. Stick can generate a call [6] or emergency message [7] which will be transmitted to emergency contact numbers. Additionally people will get notified as face book status of emergency contact numbers will be updated with emergency alert.

LDR (Light Dependent Resistor) gives the output in form of change in resistance which can be converted into voltage by using signal conditioner circuit and same can be given to the controller. An LDR sensor is used in the Smart stick whose resistances change due to change of the light intensity. During night the LDR will have high resistive (M ohm) path and no current pass through it but through a LED connected parallel with it. Due to this flow of large current the LED connected in front of the stick illuminates brightly and acts as a Flashlight which can be easily noticed by others [2]. It alerts the people around about the presence of blind person and thus provides him sufficient space to pass the way.

FLOWCHART

The flow chart shown in Fig. 3 represents the algorithm for the PIC16F877A microcontroller which processes the data and sends it to the android application via HC-05 Bluetooth module. Since this system used the ultrasonic sensor to measure the distance it is affected by several types of noise and the obtained distance is deviated from the actual distance so it is an important issue to find the best result. If any object is detected in front by the sensors situated on the stick, vibrate the motor and then send feedback to the application.

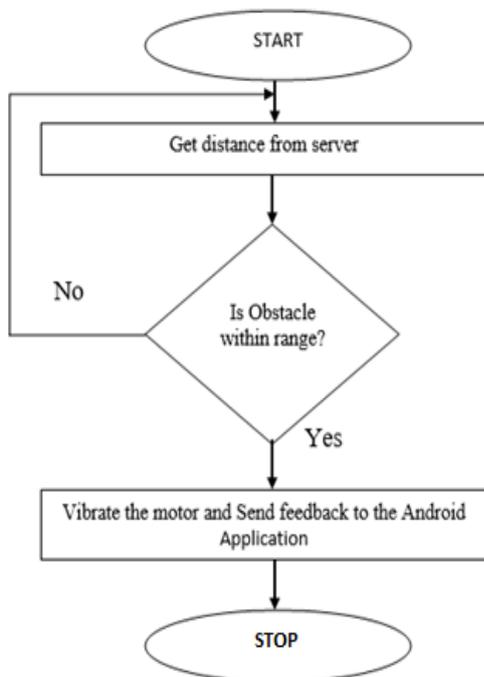


Fig.3: Flowchart of Obstacle Detection

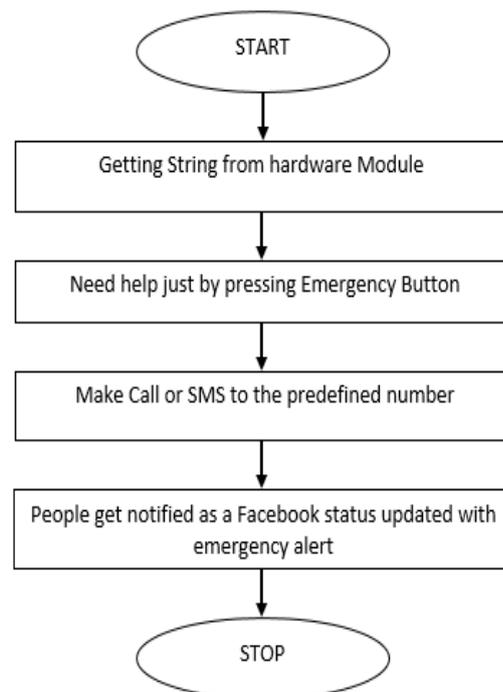


Fig.4: Flowchart of Emergency Alert using Android Application

Fig.4 shows the blind person can make voice call or SMS to a predefined emergency phonenumber saved in the application just by pressing the emergency button on stick. Additionally people will get notified as face book status updated with emergency alert.

CONCLUSION

This paper describes design and implements a Smart Stick with various programmed features for blind person. The project uses some of very efficient and accurate electronics to make the blind navigator simple to use and effective for the blind person. It uses ultrasonic sensors interfaced with an android application to detect the obstacles. The system also provides emergency alert to ensure their safety. The emergency switch on the stick helps user to communicate with his/her relatives in case of emergency through voice call or SMS. Also during night blind person can be protected whenever needed which will ensure additional safety. The proposed system tries to eliminate the flaws in the previous system. It aims to solve the problems faced by the blind people in their daily life. If proposed method implemented on board it will be more efficient, accurate and more convenient to use.

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