MULTIFUNCTIONAL BLIND CONTROL FOR VISUALLY IMPAIRED PEOPLE

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Abstract: In the current scenario there is need of personal guide for blind people. This multi-functional blind stick presents smart electronic aid for blind people. For most of us who are normal and healthy can reach the destination easily but for unfortunate the blind people finding location becomes extremely tedious process. So, this project constitutes to help for people who are blind which lead to development in their quality of life. The blind stick helps people to traverse freely and feel socially convenient and secure.

It is a simple designed plan that blind people don't need to stand out for someone's help. The project spotlights on the important work done in the field of wearable electronics and the features which comes as extremists. The blind consist of ultrasonic sensors which detects the object in present and provides Raspberry for analysis of the object distance and it will help the person on whether the object is closing very fast and provides warning in the particular direction. It has additional features like GPS which assist to send location of a person through SMS in emergency time after pressing the switch and it also has as a feature of reading the books by analysing it digitally and fed the analised through earphones.

I. INTRODUCTION

Visual impairment is one of the issues that several millions of people suffer from. They go through a lot of difficulties even to complete the basic chores. Even in their own home or office they struggle to navigate from one place to another without being dependent on anybody. As per the data from WHO (world health organization) there are around 253 million people with visual disablement out of which nearly 35+ million are totally blind and 217 million have moderate to severe vision impartment which constitute a huge part of the population.

Visually impaired people or in other words especially abled people are the ones who face a lot of difficulties even to accomplish their daily routine chores. Most of them even though they don't want, have to rely on other people for some kind of help. As a result, there is a need for a cost-effective system that can be used by blind people to walk easily and comfortably. So, There are thousands of technologies have been developed for the assistance of these people. Computer vision being one of these technologies is providing the most promising solution. Blind people find hard time navigating around the street. Due to their inability to see world, they are often in danger of getting hit by obstacle and vehicle. Therefore, A smart solution is proposed for blind people so that they can use this in their daily life.

According to the survey of World Health Organization (WHO), approximately 285 million human beings are visually –impaired in world and 39 million are completely blind.

The Electronic Travel Aids (ETAs) with sensor and sound structural design for improving navigation for blind people. We proposed a navigation technology like ultrasonic sensors &amp, cell application. We also know about typical blind sticks. It can sense any object or obstacle with the help of ultrasonic sensors. It shows correct location with the help of GPS system. They can walk outside securely. If in case he/she lost somewhere the closest relative or care taker can get location and message alert by pressing the emergency button.

We already know about the common blind stick used by the visually impaired people, but we present it by advance technologies sensors, sound system, other electronic components. Multifunctional blind stick allows direction or navigation using modern techniques like ultra-sensor and some mobile applications. Now a days we can see the so many developments projects about blind stick they are mainly based on the object or obstacle detector.

II. PROBLEM STATEMENT

Blind people have a difficulties to detect the obstacle in their way by moving one place to another place and it is very tough to find the proper location. But now a days by using smart stick they are getting the solution of living without the help of another person. There are lots of strategies or ways that have been adopted by visually impaired people to address this hassle of theirs.

A traditional approach that has been used for years by the visually impaired humans is using dogs that could help so as to navigate through their paths. One more traditional methods use stick to find obstacle, these sticks are used to find the obstacle in front. User gets to know the obstacle in front of him when the stick touches the obstacle. But it cannot detect without object contact with the obstacle which sometimes is dangerous since we have to detect object bit farther away.

And the system uses Global Positioning System (GPS) to help the blind people to reach their destination and in case of emergency it locate the user, sends the location of the user through SMS to the emergency contact and police using the Global System for Mobile Communications (GSM) technology. The device also captures the image of the assault and surroundings of the user or victim using USB Web Camera. Blind people cannot read normal books since they cannot see, they can only understand special books which are designed to blind but the problem is not every book is designed for blind people.

III. OBJECTIVE

1. To build a device which is able send live location of the user when emergency button is pressed.
2. To build device which will be able to capture image of a book and identify the text and convert and play in audio format.
3. The device should be able to detect obstacle using ultra sonic sensor.
4. The device should be easy to manufacture and affordable to everyone.
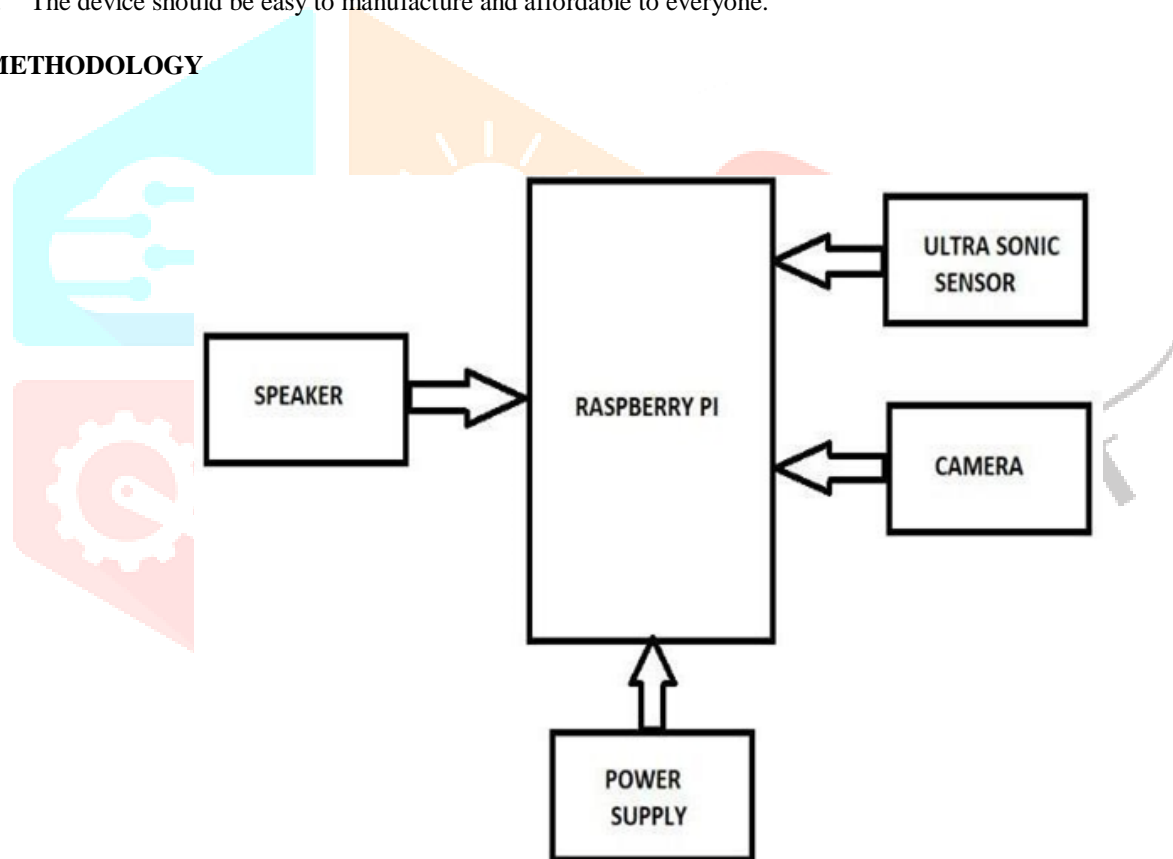
IV. METHODOLOGY
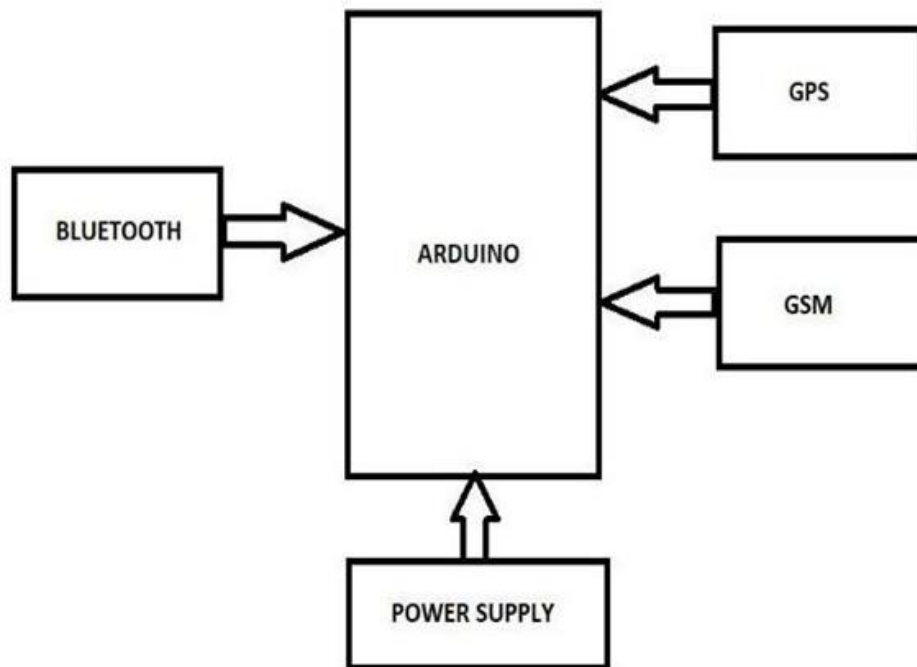

Fig a: Block Diagram of Raspberry pi

Fig b: Block Diagram of Arduino

The Brain of our system is raspberry pi, all the processes are executed by raspberry pi. The system implemented a camera which is used to take live video capture. The video is then processed by raspberry. This camera is connected to raspberry pi And SD card is connected to raspberry pi, in this SD card operating system of raspberry pi is stored (Raspbian OS). An ear phone is connected to raspberry pi to audio jack through which audio is played. So, primarily the Ultrasonic sensor detects the obstacles near it and the system is also designed to recognize the text and to convert the recognized text into audio format using a Tessaract software. And the project also have an implementation to obtain location of the user to the related person of the user in case of any emergencies.

Our project consists of three functionality

1.   Obstacle detection using ultra sonic sensor
        An ultrasonic sensor will be connected to stick which measures the distance of object in front of it using ultra sonic echo and sends the values to the raspberry pi. Raspberry pi calculates and plays distance measurement using audio format.

2.   Text recognition and audio conversion
        Live video acquisition using camera is the first step. video will be converted into frames of images which will be used to detect text in the image. The image is then pre-processed to achieve required resolution using open cv library. Preprocess image will be sent to Convolution Neural Network based text detector tesseract library which detects text and announces using speaker.

3.   Emergency alert using GPS-GSM
        In case of emergency user can press SOS button which will trigger alert function. In Arduino fetch GPS location data from GPS module and send it to the family members / friends /concerned person using GSM module as SMS alert.

V. APPLICATIONS

1.   It can be used to assist blind people.
2.   It can be used by the impaired people to reach the desired destination easily by their own.
3.   It can be used to read books by themselves.
4.   It can be used to assist old age people.
5.   It can be used to assist people with slow reaction speed due to head injury.
6.   It can be implemented in automobiles to increase safety.

VI. ADVANTAGES

1. It can detect automatically.
2. It indicate right and left alarm signal.
3. It can detect object from indication support.
4. It can get information with an indication.
5. It is very simple to use.
6. The station will be detected automatically and voice assistant will help blind.
7. Automatic alarming system.
8. Fully paper less system.

VII. RESULT AND DISCUSSION

Result 1: Successfully implemented ultrasonic sensor and the distance measured is played via earphone.

Result 2: Successfully interfaced camera and text detection and text converted into audio and played via earphone.

Result 3: Successfully interfaced GPS - GSM - Arduino and emergency SMS is sent to the guardians.
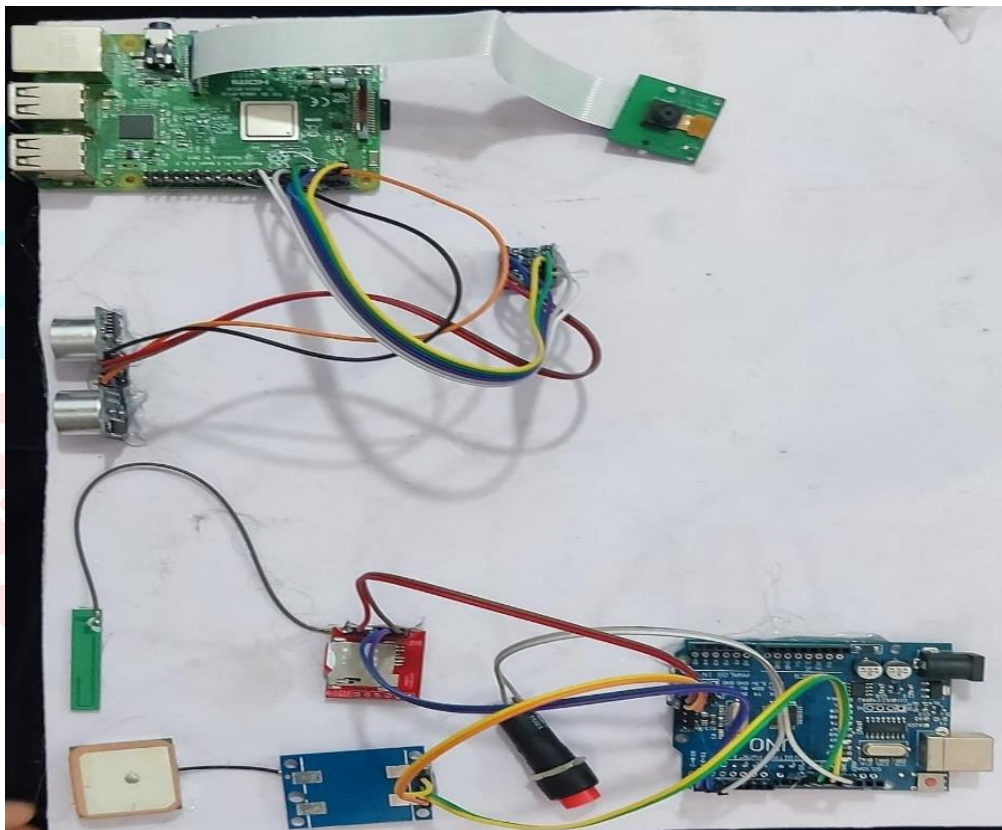

Fig c: Board view of blind stick

VIII. CONCLUSION

This system provides overall support for the blind society in guiding. The Ultra-sonic sensors helps in wide range obstacle detection. The main aim of this system is to act as a secure guard and help the blind to be aware of their surroundings. Here the stick acts as a basic plat form for the coming generation of more aiding devises to help the visually impaired to navigate safely both indoor and outdoor. It is affective and affordable. This system offers a low cost reliable, portable, low power consumption and robust solution for navigation with obvious short response time. Future work includes the addition of face recognition to find out the people before them.

This system use GPS module, ultra-sonic sensors, providing voice assistant through headphone to the blind people. The system tries to eliminate the faults. The system navigates the blind people easily through the voice. And tell about the distance or steps involve in direction.