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A White Cane for Visually Impaired Peoples

Pradeep S. Togrikar[1], Samadhan P. Thore[2], Vaishnavi S. Bagade[3], Shital B. Ghadage[4]

[1]*Assistant Professor, E & TC Engineering Department, S. B. Patil College Of Engineering Indapur (MH), India,*

[2,3,4]*UG Student, E & TC Engineering Department, S. B. Patil College Of Engineering Indapur (MH), India,*

Pradeep.togrikar@gmail.com[1], samadhanthore138@gmail.com[2], Shrikrishnabagade86@gmail.com[3], ghadageshital0@gmail.com[4]

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Abstract

This paper presents the design and development of smart stick for blind person. One of the most significant challenges encountered by visually impaired individuals is ensuring safe navigation from one location to another. Further, todays conditions of the roads make it even more difficult for them to walk outdoors without anyone assistance. The proposed prototype utilizes the internet of things (IOT), paradigm to establish a connection between the visually impaired and their environmental. Multiple sensors can be used to detect obstacles. The prototype designed discussed here is a simple and affordable smart stick for blind person equipped with various IOT sensors and modules also this prototype provides away to send a message about the user location to the concerned people.

Introduction

Visual impaired is a significant challenges faced by millions of people worldwide, affecting their daily lived and independence. The primary objective of our system is to improve visually impaired individuals to navigate confidently and independently. Own innovative solution utilizes sensor technologies to detect the obstacle within their path and provides audible alerts, ensuring their safety and mobility. The main characteristics for a smart blind stick to be cost effective, efficient and useful for every visually impaired person. One of the unique featureof our design prototype is that the user becomes incapacitated by problems they will be able to send a notification to their family members and other relatives.

Literature Survey

This proposed system is integrated with ultrasonic sensors for various distance of the obstacle [4]. In this proposed system GPS and GSM modules are integrated with the Arduino Uno to detect the current. position of the user and send the alert message their concern relatives. This system shares the users latitudes and longitudes to their relatives which is used to find the current location of user [7]. Interesting quickening agent architecture and 0128 bit wide memory interface empower 032bit code execution at the most extreme clock rate. The GSM module and GPS module will convey utility Rs232 convention with Arduino Uno [12]. The presence of obstacle will be sensed using an ultrasonic sensors. If the obstacle comes in front of the range of ultrasonic sensors, user will get the information about obstacle by hearing the voice message from the headphone[15]

PROPOSED METHODOLOGY

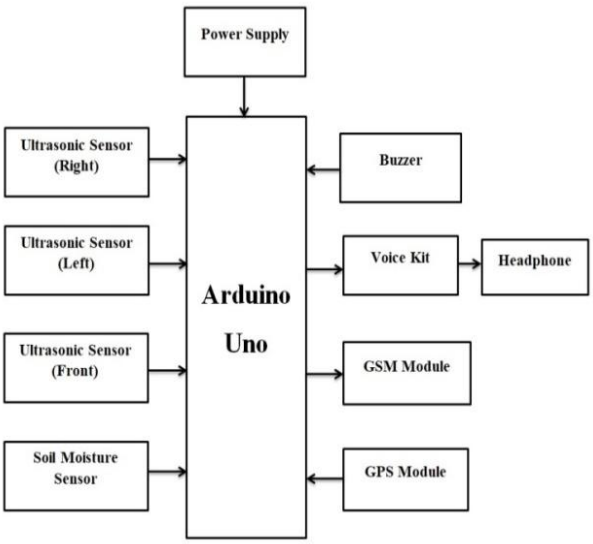

Fig.3.1: Block Diagram of the Smart Stick For Blind Person Using Arduino

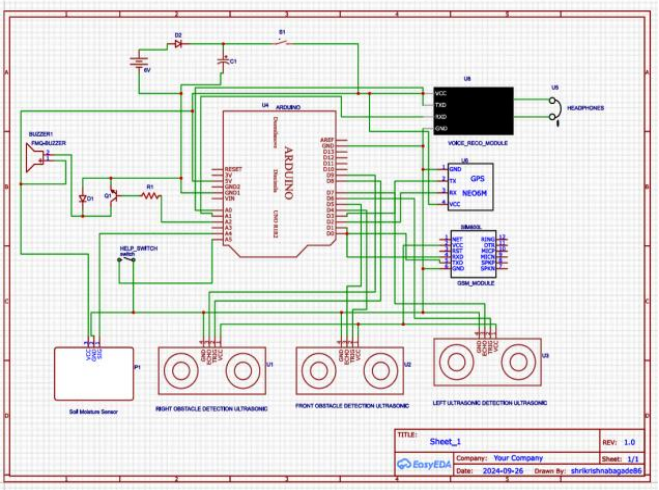

Fig.3.2: Circuit Diagram of the Smart Stick For Blind Person Using Arduino

The proposed prototype implemented in this paper is shown below in Figure 1. It consists of various components such as an ultrasonic sensor for obstacle detection. The soil moisture sensor is utilized to detect wet surfaces and provide an alert message to the user, indicating whether a particular surface is safe for walking or not, along with corresponding voice commands. The power supply provided to the Arduino Uno is +5V through a rechargeable battery. The Arduino has been programmed to calculate the distance of any object from the sensors. The programmed language used in Arduino Uno is C language. Upon the detection of the obstacle, a voice kit delivers the message through the headphones. In this prototype, the ultrasonic sensor, soil moisture sensor, GPS, and GSM module are assembled with an Arduino Uno. The GPS and GSM modules are utilized to send alert messages with locations to the user's relatives.

APPLICATIONS

- **Obstacle Detection:** Ultrasonic sensors are used to detect obstacle in the users path.
- **Navigation Assistance:** GPS & GSM modules for location tracking and alert message.
- **Object Distance Indication:** This system can be provide varying levels of feedback to indicate the proximity of an obstacles.
- **Health Monitoring:** Tracking physical activity or providing reminders for medication.
- **Communication:** Headphones or voice commands that allow users to interact with their smartphones.

RESULT AND DISCUSSION

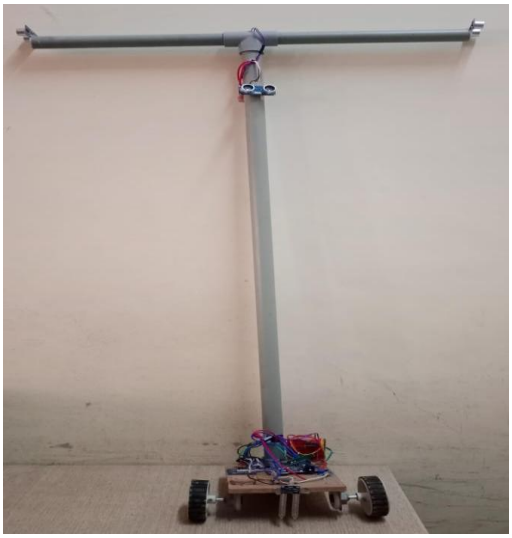

Fig.5.1: Project Setup of the Smart Stick For Blind Person Using Arduino

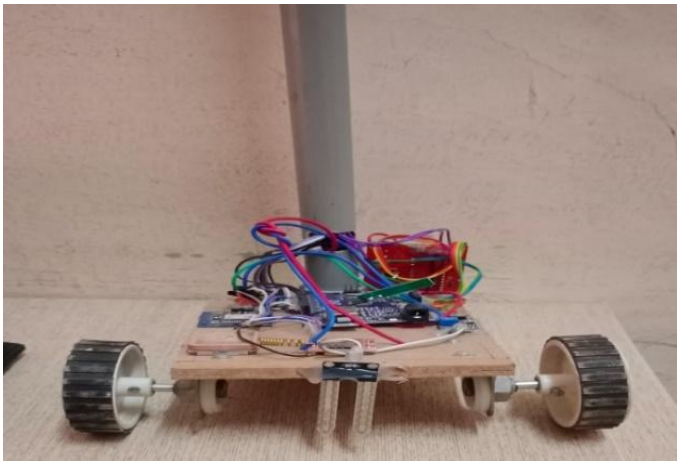

Fig.5.2: Project Setup of the Smart Stick For Blind Person Using Arduino

In the designed blind stick project, an Arduino Uno and ultrasonic sensors are utilized to detect obstacles, alerting the user with a buzzer when an obstacle is nearby, thereby enhancing navigation and safety for visually impaired individuals. Additionally, it tracks the location and sends messages to the family members of the impaired person through GPS and GSM communication in emergency situations.

RESULT

NAME OF SENSOR	*DISTANCE DETECTED RANGE (CM & %)*	*NAME OF DETECTED RANGE MESSAGE*	*SWITCH PRESSED MESSAGE*
1.Soil Moisture Sensor	if = 0 %	Dry Soil	
	if = 100 %	Wet Soil	
	if >= 80 %	Fairly Wet	
	if <=20 %	Moisture is Low	ALERT I AM IN DANGER
2.Ultrasonic Sensors (Front, Left, Right)	if *>150* cm	Object Not Detected	
	if *<100* cm	Object Is Close	ALERT I AM IN DANGER

Table 5.3: Result Table of the Smart Stick For Blind Person Using Arduino

Future Work:

- Increase Independence.
- Provide Accurate and Timely Information.
- Advanced AI Integration.
- Improve User Interface.
- Integration with Smartphones.

Conclusion

In conclusion, the smart blind stick project successfully demonstrates a significant advancement in assistive technology for visually impaired individuals, providing a reliable and user-friendly tool to detect obstacles and enhance navigation safety through the integration of ultrasonic sensors and microcontroller technology. The technology enables modules that provide real-time information about the surroundings and the location tracking of the user. The Blind Walking Stick has finally been developed, designed to assist individuals with visual impairments. Its primary objective is to address the challenges faced by blind individuals in their daily lives. It is adequately equipped to fulfill its role in enabling a visually impaired person to walk independently, as the stick aids in detecting obstacles. ***Additionally, the system incorporates*** measures to ensure safety. Low-cost ultrasonic range finders, in conjunction with a microcontroller, are utilized to measure the distance to obstacles, ensuring that they are sufficiently detected. This project aims to assist all blind individuals worldwide, making it easier for them to navigate freely wherever they wish. It has been developed to facilitate the movement of blind individuals in front of them effectively. The project is designed to aid people with visual impairments by enhancing mobility and increasing safety. Modifications can be made to the project by installing additional sensors and vibrators, allowing the stick to vibrate upon detecting an obstacle. Vibrations can be sensed more easily compared to other signals.

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