e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:05/Issue:06/June-2023 Impact Factor- 7.868 www.irjmets.com

SMART STICK FOR BLIND PERSON

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DOI : https://www.doi.org/10.56726/IRJMETS42217

ABSTRACT

This paper presents the smart blind stick is a promising assistive technology that aims to enhance the mobility and independence of visually impaired individuals.you can very well know about it they can't walk without the help of other. One has to ask guidance to reach their destination. they have to face more struggles in their life daily life. using this blind stick , a person can walk more confidently. this stick detects the object in front of the person and give response to the user either by buzzer command This literature review provides an overview of existing research and developments related to the implementation of a smart blind stick using Arduino, GSM, GPS, and Ultrasonic technologies. The review examines various studies, methodologies, and findings in this field, highlighting the advancements, challenges, and future directions of this innovative solution.

Keywords: Arduino Mega 2560, Arduino, GSM, GPS, Ultrasonic Sensors.

I. INTRODUCTION

Smart Blind Stick Using Arduino, GSM, GPS, Ultrasonic, Moisture Sensor, and Solar PanelThe visually impaired face numerous challenges in their daily lives, especially when it comes to mobility and navigation. Traditional white canes have been the primary tool for assistance, but advancements in technology have paved the way for more sophisticated and effective solutions. One such solution is the development of a smart blind stick, which integrates various technologies to provide enhanced functionality and independence for visually impaired individuals.

This introduction focuses on the integration of Arduino microcontrollers, GSM modules, GPS receivers, ultrasonic sensors, moisture sensors, and solar panels in the design of a smart blind stick. Each component contributes unique features and capabilities to create a comprehensive and versatile assistive device.

Arduino microcontrollers serve as the brain of the smart blind stick, enabling the integration and control of multiple sensors and modules. With their programmable nature, Arduino boards allow for customization and adaptation to specific user needs. They provide the necessary processing power and connectivity options to make the blind stick smart and interactive.

GSM modules play a vital role in communication. They enable the smart blind stick to send and receive alerts, emergency messages, and notifications to caregivers or emergency services. This communication capability enhances the safety and security of visually impaired individuals, providing them with a reliable means of reaching out for assistance when needed. GPS receivers are incorporated into the smart blind stick to provide accurate positioning and navigation assistance. By leveraging satellite technology, GPS enables visually impaired users to determine their location, plan routes, and receive turn-by-turn guidance. This feature empowers them to navigate unfamiliar environments independently and with confidence. Ultrasonic sensors are essential for obstacle detection and avoidance. Moisture sensors can be integrated into the smart blind stick to detect wet surfaces or rain.

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II. LITERATURE SURVEY

This was a wearable technology for the blinds. One of the main feature of this device is that it will be affordable. The Arduino Pro Mini 328- 15/16 MHz board is worn like a device. This was equipped with ultrasonic sensors, consisting of module. When the sensor detects any object it will notify the user by beep or vibration. Arduino, wearable band, buzzer, blind, people, ultrasonic. Using the sensor, visually impaired can detect the objects around them and can travel easily.

III. MODELING AND ANALYSIS

1. Arduino Mega: The main microcontroller board that controls the entire system.

2. Ultrasonic Sensors (4): These sensors are used for different purposes:

- Object detection: One ultrasonic sensor is utilized to detect the presence of objects in the vicinity.

- Upstairs detection: Another ultrasonic sensor is employed to detect if there are stairs or an elevated surface.

- Downstairs detection: A third ultrasonic sensor is used to identify if there are stairs leading downward.

- Pothole detection: The fourth ultrasonic sensor is dedicated to detecting potholes or uneven surfaces.

3. GPS Sensor (NEO-6M): This module is responsible for receiving GPS signals and providinlocation coordinates. It allows you to determine the precise position of the system.

4. GSM Module (SIM900A): This module facilitates communication capabilities for your system. It allows you to send alert messages via SMS with location coordinates. Additionally, it can make alert calls to predefined numbers.

5. Moisture Sensor: The moisture sensor is employed to detect the presence of moisture on a surface. It helps monitor the moisture levels of the environment.

6. Other Components: The circuit might also include additional components such as resistors, capacitors, LEDs, and connecting wires to support the functionality and integration of the various sensors and modules.

The Arduino Mega acts as the central processing unit, collecting data from the sensors, processing it, and making decisions based on predefined conditions. Depending on the specific requirements of your project, the code running on the Arduino Mega will interpret the sensor data and trigger appropriate actions, such as sending alert messages with location coordinates via the GSM module or activating warning indicators.

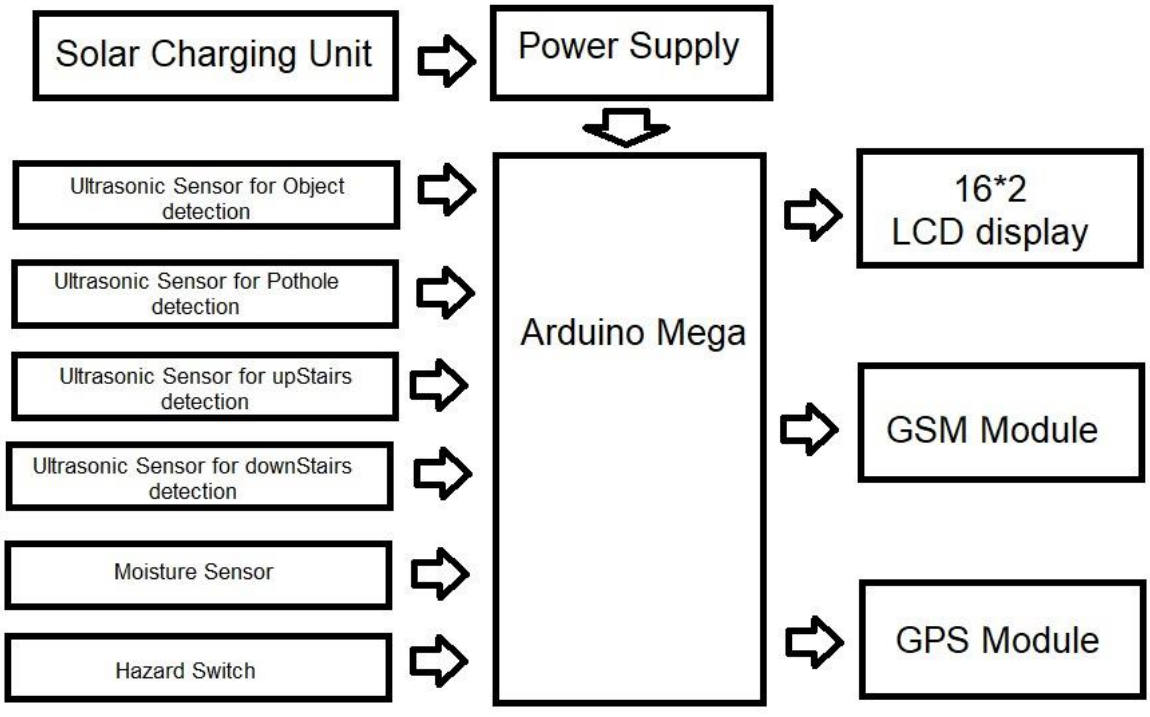

Fig 1.: Block Diagram

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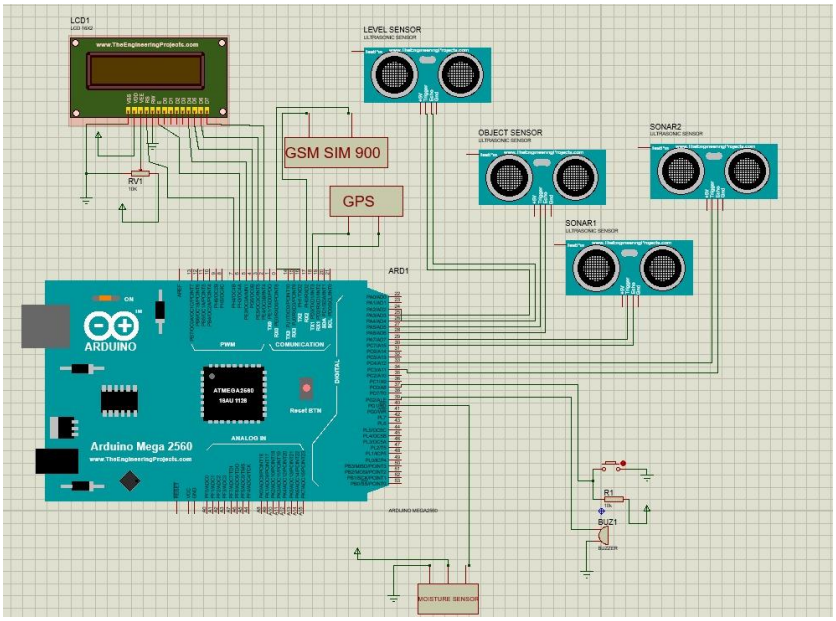

Fig 2: Circuit Diagram

COMPONENT DETAILS

1. Arduino Mega25601

The arduino mega is like the uno's big brother. it has lots (54!) of digital input/output pins (14 can be used as pwm outputs), 16 analog inputs, a usb connection, a power jack, and a reset button. it contains everything needed to support the microcontroller; simply connect it to a computer with a usb cable or power it with a ac-to-dc adapter or battery to get started.

The large number of pins make this board very handy for projects that require a bunch of digital inputs or outputs (like lots of leds or buttons).

Fig 3: Arduino mega2560

2 Ultrasonic Sensor Features

- Operating voltage: +5v
- Theoretical measuring distance: 2cm to 450cm
- Practical measuring distance: 2cm to 80cm
- Accuracy: 3mm
- Measuring angle covered: <15°
- Operating current: <15ma
- Operating frequency: 40hz

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Ultrasonic sensors emit short, high-frequency sound pulses at regular intervals. These propagate in the air at the velocity of sound. If they strike an object, then they reflected back as an echo signal to the sensor, which itself computes the distance to the target based on the time-span between emitting the signal and receiving the echo.

Fig 4. Ultrasonic Sensor - Working

3. GPS AND GSM Module

We need to GPS tracking device for bind person whenever he need a help also its useful for family member easy to track . Trough a short messaging service (SMS)

Short Messaging Service (SMS) from customized Global System for Mobile communication (GSM) module is designed for wireless radiation monitoring through . This module is able to receive serial data from radiation monitoring devices such as survey meter or area monitor and transmit the data as text SMS to a host server. The current design is an embedded application system. Arduino is a based tracking system using GPS and GSM modules. This system is used for tracking and positioning any location by using the Global Positioning System (GPS) and Global System for mobile communication (GSM).

Tracking of Any Persons & Material is a process in which one can track the vehicle's location in form of latitude and longitude. GPS coordinates are the value of allocation.

A GPS consists of a group of satellites and well-developed tools as receivers. GPS module consists of a U-Blox NEO6M module and a GPS antenna.

GPS receiver is the main component in this system. This component receives the coordinates from the satellite for every second, with date and time.

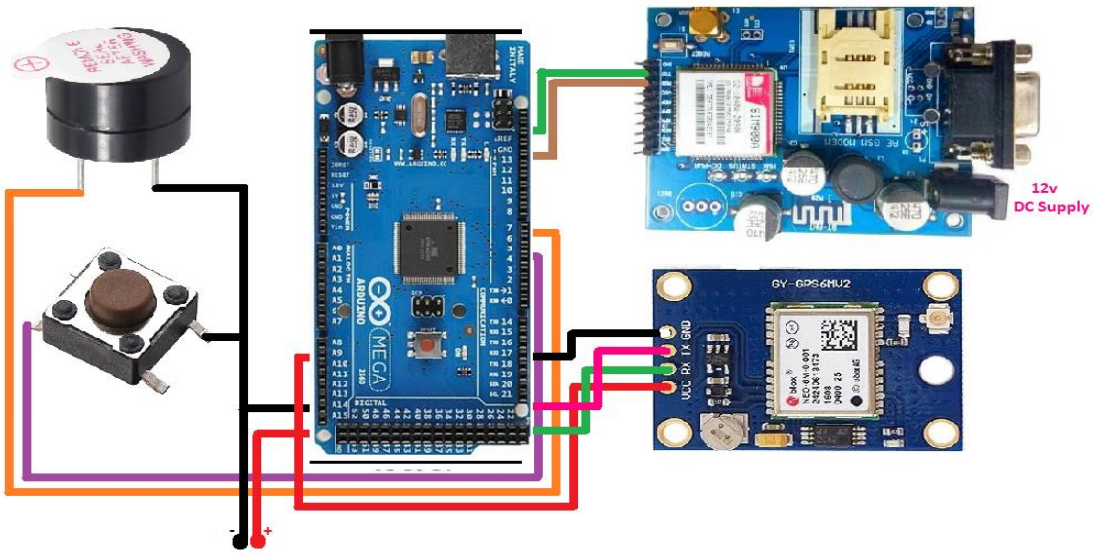

Fig. 5. GPS AND GSM Module

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IV. RESULT

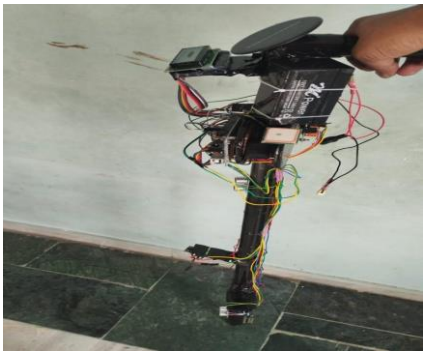

Fig 6. Final Result

V. ADVANTAGE

- This system is capable of detecting potholes.
- The system detects obstacles and alerts the blind person through buzzers and be easily used for navigation
- This system is also capable of detection Upstairs and Down stair
- Location of the blind person is sent to his family members in case of emergency.

VI. CONCLUSION

In conclusion, the literature survey on smart blind sticks using Arduino, GSM, GPS, and ultrasonic sensors provides valuable insights into the advancements and challenges in this field. The research indicates that the integration of these technologies has enabled the development of innovative solutions to assist visually impaired individuals in their daily navigation and obstacle detection tasks.

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