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# IOT ENABLED SMART BLIND STICK

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***Abstract:*** Outwardly disabled people face difficulties in exploring their environmental factors freely. To address this, we propose an IoT-empowered brilliant stick that upgrades portability and security. The shrewd stick uses three ultrasonic sensors for impediment discovery toward the front, left, and right headings. A water sensor is consolidated to identify puddles and keep the client from venturing into water. An APR module is utilized to change over instant messages into voice cautions, giving impediment admonitions and water location alarms through a speaker. The framework is constrained by an ESP32 microcontroller and incorporates live area following through a devoted Android application. The application permits guardians or friends and family to screen the client's area progressively, improving wellbeing and inner serenity. The IoT-empowered brilliant stick offers an exhaustive answer for outwardly hindered people, working on their versatility and freedom.

***Index Terms*** **– ESP32, APR MODULE.**

## I. INTRODUCTION

Visual deficiency is the shortfall of vision. It likewise alludes to a lack of optic that can't be changed with some other simple ways. Divided optic inadequacy recommends getting restricted or incomplete optic power. Complete optic weakness doesn't construe anything to watch. Among the huge sorts of insufficiency, visual deterrent is maybe the most serious handicap and impacts various people all over the planet. The Worldwide Plan of Sicknesses describes visual lack as a distance vision deterrent that presents visual perception more unfortunate than. Furthermore, as shown by the World Wellbeing Association (WHO), around 2.2 billion people are ostensibly debilitated around the world. The cost of this colossal segment can be enormous.

The examination marks out related issues and proposes a splendid and hindered solution in view of IoT that makes a debilitated person's life more direct and extensively easier. Contrasting and other essential gadgets, "Savvy Stick" is more astute and fruitful. As those debilitated people need the assistance of an insightful stick continually, the gadget will give them a sharp and mechanical game plan to certain while move. The essential point is to offer and ensure a without strain living as like as should be expected individuals. Disabled individuals can be followed by means of GPS and the Blynk application. On the off chance that a visually impaired individual experiences any issue, he can communicate an instant message to his guardian by squeezing the remote button. In the event that he faces deterrents, he will be directed through voice messages. All fundamental elements will. be to no end on the off chance that the visually impaired man loses the stick. As an answer, a caution is set with the Parcel based shrewd visually impaired stick related with a far-off regulator. This alarm assists with finding the lost stick. Numerous people who will use this outwardly impeded stick will carry on with a happy and useful life.

With regards to India, it is for all intents and purposes challenging to fix visual inadequacy, yet the clever visually impaired stick will offer them the opportunity to redesign their way of life. The elements will offer its clients the chance to be freed from the greater part of their tensions concerning their developments.

## II. METHODOLOGY

- Utilize three ultrasonic sensors to detect obstacles in the front, left, and right directions, providing real-time feedback to the user.
- Incorporate a water sensor to detect the presence of water on the ground, alerting the user to avoid stepping into puddles.
- Utilize an APR module to convert text messages into voice alerts, providing warnings for obstacles and water detection through a speaker.
- Implement live location tracking through a dedicated Android application, allowing caregivers or loved ones to monitor the user's location in real-time.
- The microcontroller ESP32, processes the sensor data and triggers the appropriate alerts.

SYSTEM DESIGN

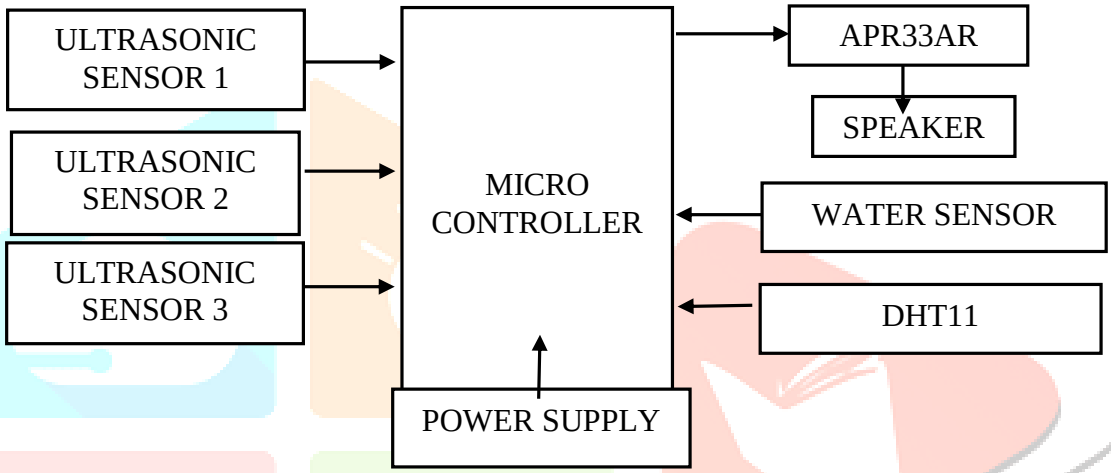



Figure 1: System Design

The IoT-enabled smart stick for visually impaired people incorporates various sensors and modules to enhance safety and functionality. It utilizes three ultrasonic sensors positioned at the front, left, and right sides to detect obstacles and provide feedback to the user. Additionally, a water sensor is included to alert the user of wet surfaces, helping to prevent slips and falls. Voice alerts are generated using an APR module connected to a speaker, providing auditory cues to the user based on the sensor inputs. The microcontroller, either an ESP32, processes the sensor data and triggers the appropriate alerts. To further enhance functionality, the project includes live location tracking via Android applications, allowing caregivers or family members to monitor the user's location in real-time for added safety and security. Finally, a temperature sensor is integrated into the system to provide environmental information to the user. The temperature data is updated to the Blynk platform, allowing for remote monitoring and analysis. Overall, this project combines IOT technology with sensor integration and mobile applications to create a comprehensive solution for assisting visually impaired individuals in navigating their surroundings safely and effectively.

## III. MODULE DESIGN

1. **Identify Components:** List out all the components you plan to use, such as ultrasonic sensors, water sensor, APR module, ESP32, temperature sensor, speaker, and any other necessary components.

**2. Circuit Design:** Create a circuit diagram that shows how all the components will be connected to the microcontroller. Ensure that the connections are correct and that each component is properly powered and grounded.

**3. Microcontroller Programming:** Write the code for the microcontroller (ESP32) to read data from the sensors, process it, and trigger the appropriate alerts through the APR module and speaker. Also, include code to update the temperature data to the Blynk platform.

**4. Sensor Integration:** Mount the sensors on the smart stick in the desired positions. Ensure that they are securely attached and positioned correctly for accurate detection.

**5. APR Module and Speaker Setup:** Connect the APR module to the microcontroller and configure it to play the desired voice alerts. Connect the speaker to the APR module and ensure that it is loud enough for the user to hear.

**6. Testing:** Test the entire system to ensure that all components are working correctly. Test the sensor detection, voice alerts, temperature sensing, and Blynk integration to verify that everything is functioning as intended.

**7. Enclosure Design:** Design an enclosure for the smart stick that protects the components from damage and provides a comfortable grip for the user.

**8. Final Assembly:** Assemble all the components into the enclosure, making sure that everything fits properly and is securely fastened. Test the smart stick again to ensure that it is working correctly.

**9. User Interface:** Consider adding a user interface, such as buttons to allow the user to know the temperature near the smart stick or access additional features.

**10. Documentation:** Document the entire module design process, including circuit diagrams, code, and assembly instructions. This will be useful for future reference and troubleshooting.

## IV. IMPLEMENTATION

**1. Hardware Setup:**

- Assemble the microcontroller (ESP32), ultrasonic sensors, water sensor, APR module, speaker, temperature sensor, and any other components onto a circuit board.
- Connect the sensors, APR module, and speaker to the microcontroller according to the specified pin configurations.
- Power the circuit utilizing a reasonable power source, like a battery-powered battery.

**2. Software Development:**

- Write the firmware for the microcontroller to initialize sensors, read sensor data, and trigger alerts based on sensor inputs.
- Implement logic for obstacle detection using ultrasonic sensors and moisture detection using the water sensor.
- Integrate the APR module to generate voice alerts and control the speaker for output.
- Develop communication protocols for sending temperature data to the Blynk platform and receiving commands from Android applications for live location tracking.

**3. Android Application Development:**

- Create Android applications for live location tracking using the appropriate programming languages and frameworks (e.g., Java, Kotlin).
- Implement features to display the user's location in real-time and communicate with the module for location updates.
- Ensure the application is user-friendly and accessible to visually impaired individuals, possibly incorporating voice commands or tactile feedback.

**4. Integration and Testing:**

- Connect the module to the Android applications and ensure proper communication between the two.

- Test the entire system for functionality, including obstacle detection, moisture detection, voice alerts, temperature monitoring, and live location tracking.

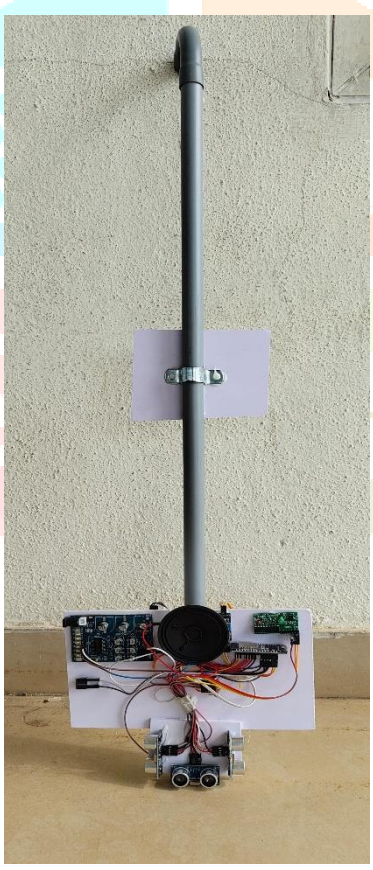
- Lead ease of use testing with outwardly debilitated people to accumulate input and make fundamental changes for further developed client experience.

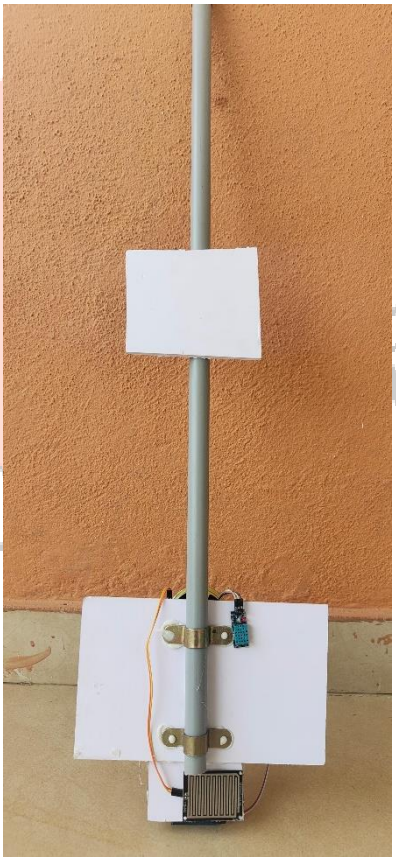
**5. Deployment:**

- Once testing is complete and the system is deemed reliable, deploy the IoT-enabled smart stick for real-world use by visually impaired individuals.

- Give client preparing and support to guarantee clients can actually use the gadget for safe route. improves the portability and security of outwardly weakened people.

## V. RESULT





We have successfully developed smart stick which gives instructions about threats like obstacles and puddles through speaker in which blind person can walk with more safely and independently in his surroundings. We also include features like location sharing through blynk application where caretaker can request blind person location and A separate remote for lost stick detection.

## CONCLUSION

It is challenging for blind individuals to move or live in encompassing without assistance. In this way, they as a rule utilize white stick to direct them during moving. Despite the fact that it very well may be useful, it doesn't ensure saving visually impaired individuals from chances. These customary ways can be utilized for low level deterrents recognition as it were. The IOT stick goes probably as a fundamental stage for the coming age of extra supporting devices to assist the apparently incapacitated with investigating safely both indoor and outside. It is strong and sensible. It prompts extraordinary results in distinctive the impediments on the method of the client. The system offers an insignificant cost, strong, helpful, low power use and fiery plan course with short response time.

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