Third Eye For Visually Impaired People

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***Abstract*—The Blind Stick App is an advanced mobile application designed to enhance the mobility, safety, and independence of visually impaired individuals. Leveraging GPS and emergency contact management, this app creates a reliable, supportive environment that connects users with their caregivers and loved ones in real-time. The app includes an innovative emergency button on the smart stick itself, allowing users to send instant alerts in critical situations. When this button is pressed, the stick transmits its unique ID to the application, which then immediately ends the user's live location to the designated emergency contacts added within the app. This feature ensures that help can reach the user quickly, providing peace of mind for both the user and their caregivers.**

***Index Terms*—Emergency Contact Management, Live Location Tracking, Secure Login and Registration.**

I. INTRODUCTION

The Blind Stick App is a transformative mobile application developed to support visually impaired individuals by enhancing their mobility, safety, and independence. Designed with a user-friendly interface and robust functionality, this application works in conjunction with a specially equipped smart blind stick to provide real-time location tracking, emergency support, and easy connectivity with caregivers or trusted contacts. In today's tech-driven world, accessibility solutions are becoming more prevalent, and the Blind Stick App stands out as a practical, accessible tool that caters directly to the needs of the visually impaired. By using GPS, contact management, and emergency alerting features, this app helps users overcome some of the everyday challenges of visual impairment, promoting safety and peace of mind for both the users and their loved ones. One of the stand out features of the Blind Stick App is its emergency button integration on the smart stick itself. In the event of an emergency, the user simply presses this button, instantly triggering an alert to the app. The unique ID of the stick is then sent to the application, allowing it to identify the specific user and send the individual's live location to their pre-selected emergency contacts. By removing the need for users to operate complex devices or navigate a smartphone in times of distress, this feature makes the app exceptionally accessible and reliable for individuals with limited vision. The Blind Stick App also allows users to manage emergency contacts with ease. On the main dashboard, users can add trusted contacts by simply entering the name and phone number of the person they wish to reach in emergencies. These contacts are displayed immediately on the dashboard, giving users a quick reference point whenever needed. This functionality not only helps users feel secure but also reassures their loved ones by providing a clear means of communication and location sharing.

II. LITERATURE SURVEY

[1] This study introduced an IoT-enabled navigation system designed for visually impaired users. The system incorporated a range of sensors, such as ultrasonic sensors and a GPS module, which provided real-time obstacle detection and location information. Notifications were delivered through auditory cues, allowing users to navigate without relying Onsight. By integrating IoT, the device was connected to a mobile application for location sharing and emergency alerts. Inspired by this work, our project uses Bluetooth for short-range communication and integrates with a mobile application to provide navigation assistance and emergency notifications, enhancing accessibility.
[2] A smart walking stick for visually impaired individuals was proposed in this research, which utilized ultrasonic sensors to detect obstacles. Upon

detecting an obstacle, the device generated vibration alerts to notify the user. Although effective in detecting objects, the study
highlighted limitations in terms of directional guidance and emergency response capabilities. By referring to this work, we incorporated audio feedback to offer more comprehensive navigation instructions. We added an emergency button that, when pressed, sends the user's unique ID and location to pre-selected contacts through the connected mobile app, thus extending the utility beyond basic obstacle detection.
[3] This study developed an emergency alert system specifically for visually impaired users, which allowed them to send alerts to family members by pressing a button on a wearable device. The alert included the user's real-time GPS location. While effective in emergency situations, the system lacked integration with navigation assistance features. Taking inspiration from this research, our proposed system combines emergency alert functionality with obstacle detection in a single device. The Blind Stick system incorporates a button that, when pressed, sends a unique ID and GPS coordinates to the user's emergency contacts via the mobile application, improving user safety and usability.
[4] This research focused on ultrasonic technology for obstacle detection, achieving effective identification of nearby objects. However, it relied on separate external devices for communication, which limited user convenience.
[5] This research explored wearable devices for obstacle detection, featuring proximity sensors and GPS based tracking systems to monitor the user's surroundings. While the system effectively tracked locations and provided basic obstacle alerts, it did not include an emergency alert function. Inspired by this work, our project combines ultrasonic sensors for accurate obstacle detection and a dedicated emergency button. The button, when pressed, sends an alert with the stick's unique ID and the user's GPS location to emergency contacts, providing added security for users in distress.

III. Models AND Methodology

The Smart Blind Stick System is an innovative assistive device that leverages IoT and Machine Learning to enhance mobility and safety for visually impaired individuals. This device integrates multiple sensors connected to an Arduino microcontroller, which processes real-time data to guide users through various environments, alerting them to potential hazards. The proposed system is designed to provide continuous feedback through ultrasonic, infrared, and water sensors, enabling users to detect obstacles, identify surface conditions, and receive alerts in emergency situations. The main goals of the Smart Blind Stick are to improve the safety of visually impaired individuals and allow them greater autonomy in navigating their surroundings.

[1] Ultrasonic and IR Sensors for Obstacle Detection
Ultrasonic Sensors are placed at the front, top, and bottom of the stick to detect obstacles at different heights and distances. These sensors measure the distance between the stick and any nearby objects and communicate this information to the Arduino.
If an obstacle is detected within a specified range, a signal is sent to the Arduino, which then activates the buzzer and vibration motor. Different patterns of vibration and sound indicate varying types of obstacles, allowing the user to understand the nature of the hazard and adjust their movement accordingly.

[2] Emergency System with GPS and GSM
An emergency button on the stick enables the user to request immediate assistance if needed. When pressed, the GPS and GSM modules are activated, sending the user's current location to a pre-configured emergency contact. This feature is particularly beneficial in unfamiliar or potentially dangerous environments, as it ensures the user can quickly alert someone in case of distress.

[3] Mobile Application Integration
An optional mobile application allows users or caregivers to monitor the device status and receive notifications if the emergency button is activated. The app also provides access to device settings, enabling adjustments for feedback intensity, sensor sensitivity, and GPS tracking. Through Bluetooth connectivity, the app can deliver real-time updates, ensuring caregivers can assist users when necessary and making it easier for users to customize the device to their specific needs.

II. METHODOLOGY

The procedure for developing a Smart Blind Stick, as outlined, follows a clear and methodical approach:

[1] Project Planning and Requirements Definition:
Identify
The core features needed: obstacle detection, water detection, GPS tracking, emergency alerts, and user feedback mechanisms.
Define the objectives and determine how these features will work together to assist the visually impaired.
[2] Hardware Assembly:
Components like ultrasonic and infrared sensors (for obstacle detection), GPS module (for location tracking), GSM module (for emergency SMS), and Bluetooth module (for mobile app connectivity) are connected to an Arduino microcontroller.

- Arduino for hardware control.
- Ultrasonic and Infrared sensors for obstacle and water detection.
- GPS & GSM modules for location tracking and emergency alerts.

and uploading code to the Arduino using the Arduino IDE, which allows the sensors to detect obstacles, wet surfaces, and provide location tracking, while GSM is programmed to send SMS alerts in emergencies. Each component is then

Principle of Operation:
Obstacle Detection Sensor
The obstacle detection sensor, commonly using ultrasonic or infrared sensors, detects obstacles in the user's path by emitting sound waves or infrared light and measuring the time it takes for the wave to bounce back. The sensor calculates the distance between the user and the obstacle based on the time taken for the reflection, providing real-time proximity data. This data is then processed to determine if an obstacle is too close, and feedback is provided to the user (e.g., vibrations or audio alerts).

GPS Module
The GPS module uses signals from satellites to determine the stick's location on Earth by calculating the time it takes for signals to travel from the satellites to the receiver. This information is then Processed to provide accurate coordinates (latitude and longitude). The GPS can be used for location tracking, helping the user find their current position or guide them to a specific location through integration with a mobile app or alert system.

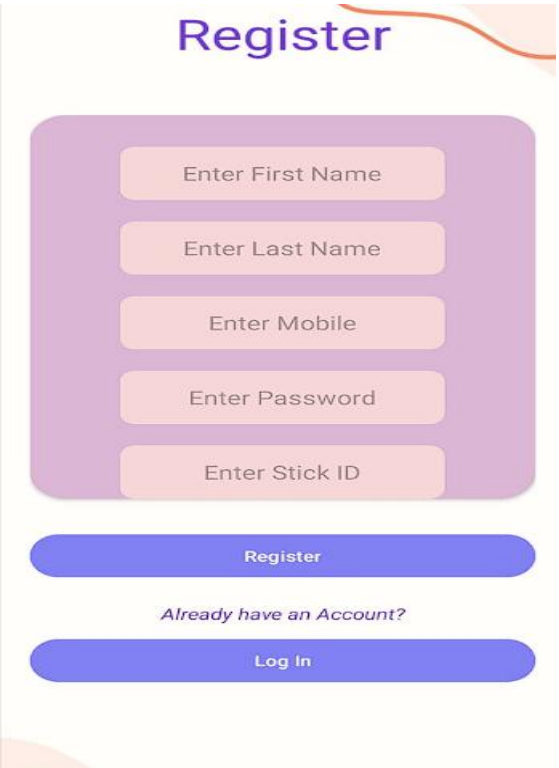
Ultrasonic Distance Sensor
Ultrasonic sensors use sound waves to measure distances. The sensor sends out high frequency sound waves and waits for the echo to return after hitting an object. The time it takes for the echo to return is used to calculate the distance to the object. This data is crucial for the blind stick to detect obstacles and avoid collisions, particularly useful in narrow or crowded spaces.

Bluetooth Module
The Bluetooth module enables wireless communication between the Smart Blind Stick and a Mobile device or other Bluetooth-enabled devices. The module allows the user to receive data or send alerts to their smartphone or connected devices, such as an app for remote monitoring, navigation assistance, or emergency notifications. It also facilitates integration with voice assistants for voice command functionalities.

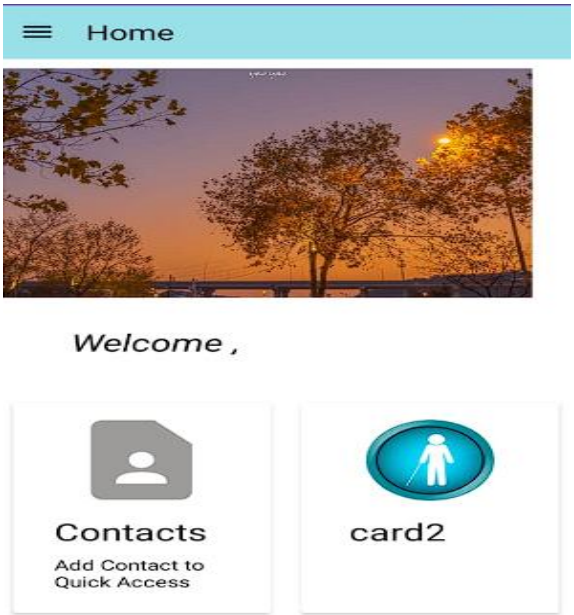
IV. RESULT

1)Stick

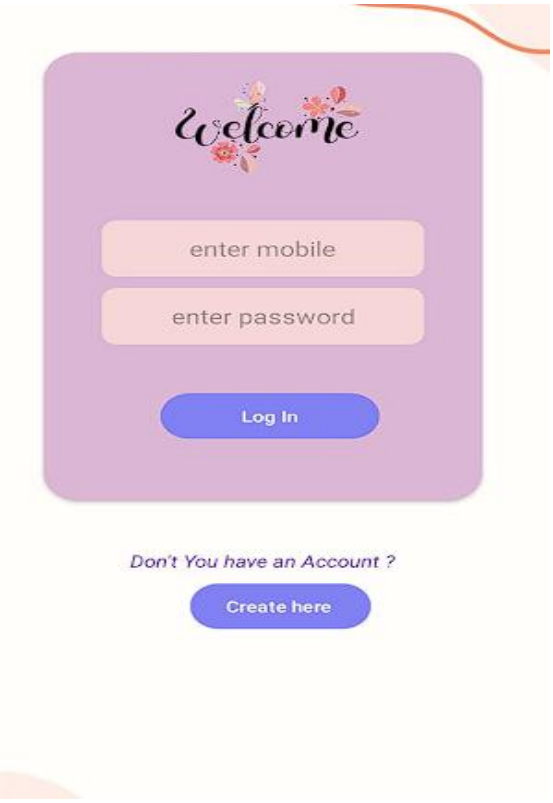
2)Register



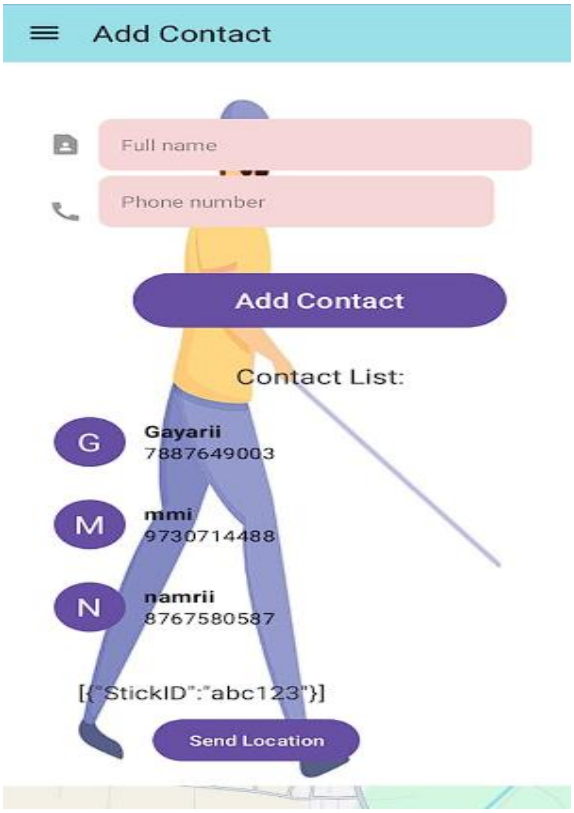
4)Home-Page



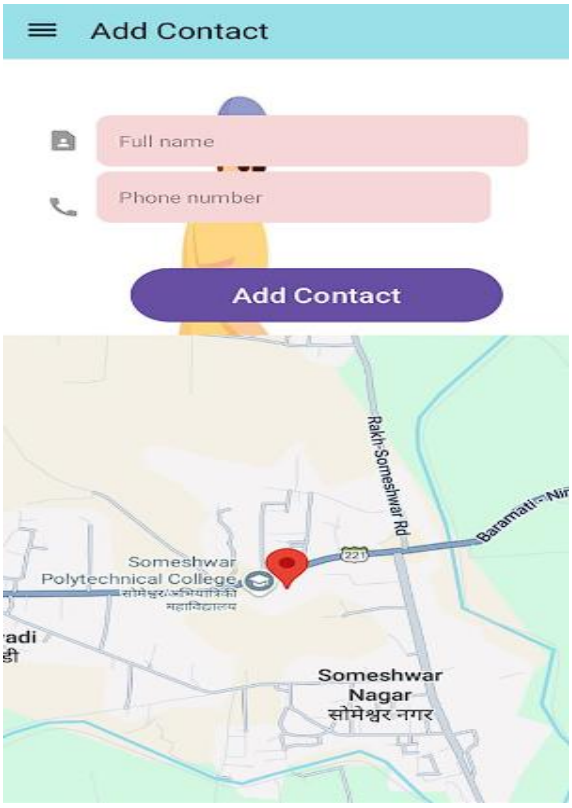
3)Log in



5)Add Contact



6)Send Location



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