

Annexure3b- Complete filing

INVENTION DISCLOSURE FORM

Details of Invention for better understanding:

1. TITLE: ESP32 ASSISTIVE DEVICE: Empowering the Blind with smart stick technology.


2. INTERNAL INVENTORS/ STUDENTS:

TEACHER

| | |
|-------------------------------|--|
| A. Full name | Dr . Praveen Malik |
| Mobile Number | 9719437711 |
| Email (personal) | |
| UID/Registration number | 23314 |
| Address of Internal Inventors | Lovely Professional University, Punjab-144411, India |
| Signature (Mandatory) | Praveen Malik |

PROJECT TEAM

| | |
|-------------------------------|---|
| B. Full name | Jatin Pareta |
| Mobile Number | 6367280356 |
| Email (personal) | Jatinpareta3229@gmail.com |
| UID/Registration number | 12213121 |
| Address of Internal Inventors | Lovely Professional University, Punjab-144411, India |
| Signature (Mandatory) |  |

| | |
|-------------------------------|---|
| C. Full name | Sagar Gurjar |
| Mobile Number | 7568674547 |
| Email (personal) | Sg9983474547@gmail.com |
| UID/Registration number | 12213169 |
| Address of Internal Inventors | Lovely Professional University, Punjab-144411, India |
| Signature (Mandatory) |  |

| | |
|-------------------------------|---|
| D. Full name | Sanish Sheokand |
| Mobile Number | 9050705553 |
| Email (personal) | sanishsheokand@gmail.com |
| UID/Registration number | 12213453 |
| Address of Internal Inventors | Lovely Professional University, Punjab-144411, India |
| Signature (Mandatory) |  |

For External Inventors, NOC (No Objection Certificate) from the affiliated institute/university/Industry/lab etc. is mandatory for each individual inventor and their respective topic. For NOC, format is attached below.

N/A

3. DESCRIPTION OF THE INVENTION:

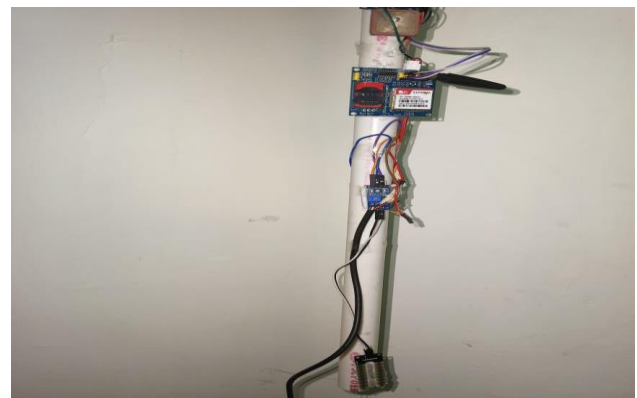
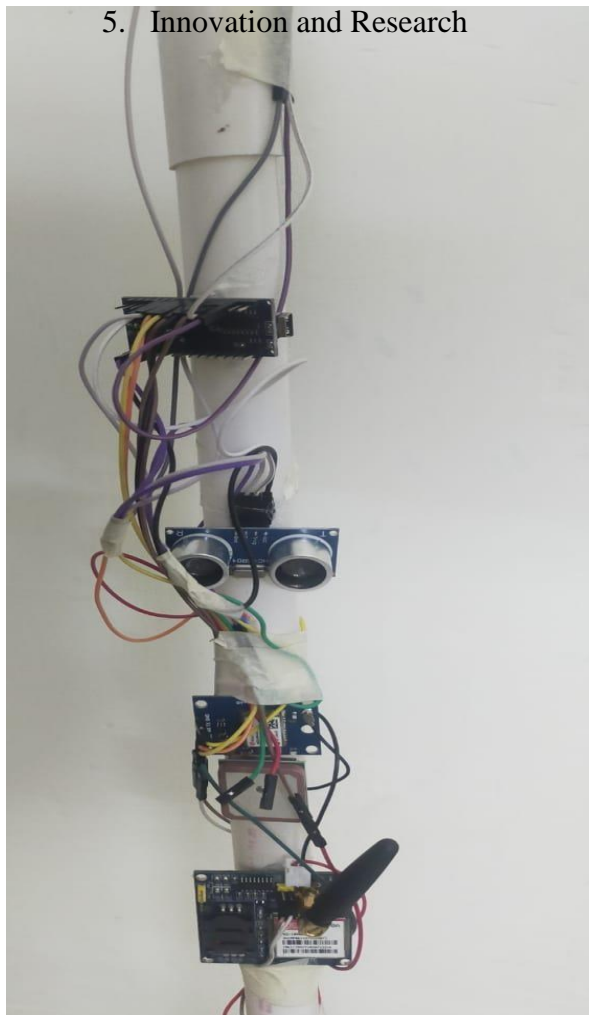
Incorporating the ESP32 microcontroller alongside GPS, GSM, ultrasonic sensors, and a buzzer, a sophisticated system aids visually impaired individuals in enhancing mobility and ensuring safety. Through seamless coordination facilitated by the ESP32, this system provides immediate monitoring and assistance.

TECHNICAL WORKING

A system designed to assist visually impaired individuals utilizes the ESP32 microcontroller along with Thing Speak for distance monitoring and a water sensor to detect rain. Acting as the central controller, the ESP32 manages these features to ensure safety and facilitate navigation. It continuously gathers data from Thing Speak to assess distance, allowing it to identify obstacles and ensure a safe path for the user. Concurrently, the water sensor detects rainfall and promptly relays this information to the ESP32, which then alerts the user to wet conditions and potential dangers. Through auditory or tactile alerts, the system notifies the user of obstacles and adverse weather conditions, thereby enhancing their safety during travel. This integrated system capitalizes on the ESP32's connectivity and firmware capabilities, providing seamless monitoring and assistance to empower visually impaired individuals with improved mobility and autonomy.

PURPOSES

1. Enhanced Safety
2. Improved Mobility
3. Accessible Information
4. Empowerment
5. Innovation and Research



A. PROBLEM ADDRESSED BY THE INVENTION:

The invention of a home control system using ESP32, GPS , GSM , Buzzer , Moisture Sensor , Switch etc.

1. Enhancing mobility and safety for individuals with visual impairments requires innovative solutions that address various challenges they face in navigating their surroundings. Traditional blind sticks offer limited functionality, but by integrating advanced technologies, we can significantly improve their effectiveness.
2. One crucial enhancement involves integrating GPS technology into the stick, enabling real-time location tracking and navigation assistance. This feature provides users with vital information about their surroundings, especially in unfamiliar areas, thereby enhancing their mobility and independence.
3. Obstacle detection is paramount for navigating through crowded or unfamiliar environments safely. Utilizing ultrasonic sensors, the stick can detect obstacles in the user's path and provide timely feedback through vibration or auditory cues, thereby enhancing safety and mobility.
4. Communication and assistance are essential, especially in emergency situations. Integrating GSM technology enables the stick to send alerts or messages to predefined contacts, allowing the user to request assistance or communicate their whereabouts effectively in case of emergencies.
5. Orientation and navigation features are also crucial for maintaining a sense of direction. By combining GPS technology with audio cues or vibration feedback based on the user's orientation, the stick can help users navigate their surroundings more effectively.

B. OBJECTIVE OF THE INVENTION

1. Develop a blind stick prototype that integrates GPS technology for real-time location tracking and navigation assistance.

2. Incorporate environmental sensors, such as rain sensors, to detect and alert users to changes in weather conditions, enhancing their environmental awareness.
3. Implement obstacle detection capabilities using ultrasonic sensors to detect and provide feedback on obstacles in the user's path, improving safety and mobility.
4. Integrate GSM technology to enable communication and assistance functionalities, allowing users to send alerts or messages to predefined contacts in emergency situations.
5. Design orientation and navigation features that provide audio cues or vibration feedback based on the user's orientation, aiding in spatial awareness and direction-finding.

C. STATE OF THE ART/ RESEARCH GAP/NOVELTY: Describe your invention fulfil the research gap?

| Sr. No | Patent I'd | Abstract | Research Gap | Novelty |
|--------|------------------------------|---|---|--|
| | 10.1080/10618600.2014.901225 | D. V. Lindberg and H. K. H. Lee, "Optimization under constraints by applying an asymmetric entropy measure," J. Comput. Graph. Statist., vol. 24, no. 2, pp. 379–393, Jun. 2015, doi: 10.1080/10618600.2014.901225. | While the ESP32-based smart stick integrates components like GPS, GSM, Buzzer, Moisture Sensor, and Switch, there's a notable research gap in comprehensively understanding its functionality and effectiveness in facilitating navigation and communication for visually | the holistic exploration of the ESP32-based smart stick's capabilities, which integrates components such as GPS, GSM, Buzzer, Moisture Sensor, and Switch, aiming to empower visually impaired individuals in navigation and communication. This research seeks to |

| | | | | |
|---|--|--|--|---|
| | | | impaired individuals, particularly in real-world scenarios with varied environmental conditions and user contexts. | comprehensively evaluate the device's performance and effectiveness in real-world scenarios characterized by diverse environmental conditions and user contexts, providing valuable insights into its practical utility and potential for enhancing the independence and safety of visually impaired individuals. |
| 2 | | | | |
| 3 | | | | |

D. DETAILED DESCRIPTION:

The advanced blind stick project aims to revolutionize mobility and safety for individuals with visual impairments by developing a cutting-edge assistive device that integrates state-of-the-art technologies. The primary objective is to design a blind stick prototype that addresses various challenges faced by visually impaired individuals in navigating their surroundings. The prototype will incorporate GPS technology for real-time location tracking and navigation assistance, providing users with essential information about their environment, particularly in unfamiliar areas. Additionally, the stick will feature environmental sensors, such as rain sensors, to detect changes in weather conditions and alert users to potential hazards like rain, enhancing their environmental awareness and enabling them to take necessary precautions.

Furthermore, obstacle detection capabilities will be implemented using ultrasonic sensors, enabling the stick to detect obstacles in the user's path and provide timely feedback through

vibration or auditory cues, thereby improving safety and mobility in crowded or unfamiliar environments. The integration of GSM technology will facilitate communication and assistance functionalities, allowing users to send alerts or messages to predefined contacts in emergency situations, ensuring prompt assistance when needed. Moreover, orientation and navigation features will be designed to provide users with audio cues or vibration feedback based on their orientation, aiding in spatial awareness and direction-finding.

An alerting system using buzzer or vibrating mechanisms will also be developed to notify users of sudden changes in elevation or other potential hazards, enhancing their situational awareness and reducing the risk of accidents. Throughout the development process, user testing and feedback sessions will be conducted to iterate and refine the blind stick prototype, ensuring its effectiveness and usability for individuals with visual impairments. Collaboration with relevant stakeholders, including individuals with visual impairments, accessibility experts, and assistive technology organizations, will be paramount to gather insights and ensure the project meets the needs of the target user group.

E. RESULTS AND ADVANTAGES:

The result of implementing the home control system using ESP32, using ESP32, GPS , GSM , Buzzer , Moisture Senor , Switch and the Thing Speak app is a versatile and efficient solution for blind people . Some advantages of this project include:

- **Enhanced Navigation:** Incorporating GPS technology enables the blind stick to provide real-time location information, aiding navigation and enhancing mobility for users in unfamiliar environments.
- **Emergency Assistance:** With GSM integration, the stick can send alerts or messages to predefined contacts in case of emergencies, ensuring that users can request assistance or communicate their whereabouts when needed.
- **Environmental Awareness:** The inclusion of a moisture sensor allows the stick to detect environmental conditions such as rain or wet surfaces, providing users with important information to navigate safely and avoid potential hazards.
- **Safety Alerts:** Utilizing a buzzer, the stick can provide audible alerts to warn users of obstacles, sudden changes in elevation, or other potential hazards in their path, enhancing safety and preventing accidents.

EXPANSION:

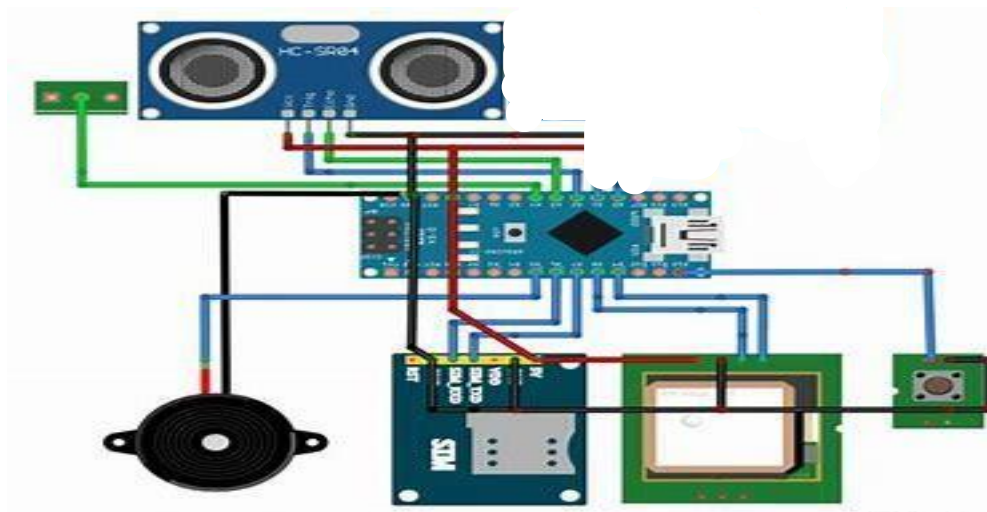
Expanding the capabilities of the advanced blind stick project involves integrating additional components such as ESP32, GPS, GSM, buzzer, moisture sensor, and switch to create a holistic solution tailored specifically for individuals with visual impairments. Through the incorporation of these elements, the blind stick becomes more adaptable and versatile, significantly improving the user's navigation, safety, and overall experience.

The integration of GPS technology plays a pivotal role by enabling the blind stick to offer precise location tracking and navigation assistance. This functionality empowers users to confidently navigate through unfamiliar environments, fostering a greater sense of independence and security. Furthermore, the incorporation of GSM functionality enhances the stick's communication capabilities, allowing users to send alerts or messages to predefined contacts in emergency situations, thereby ensuring timely assistance when required.

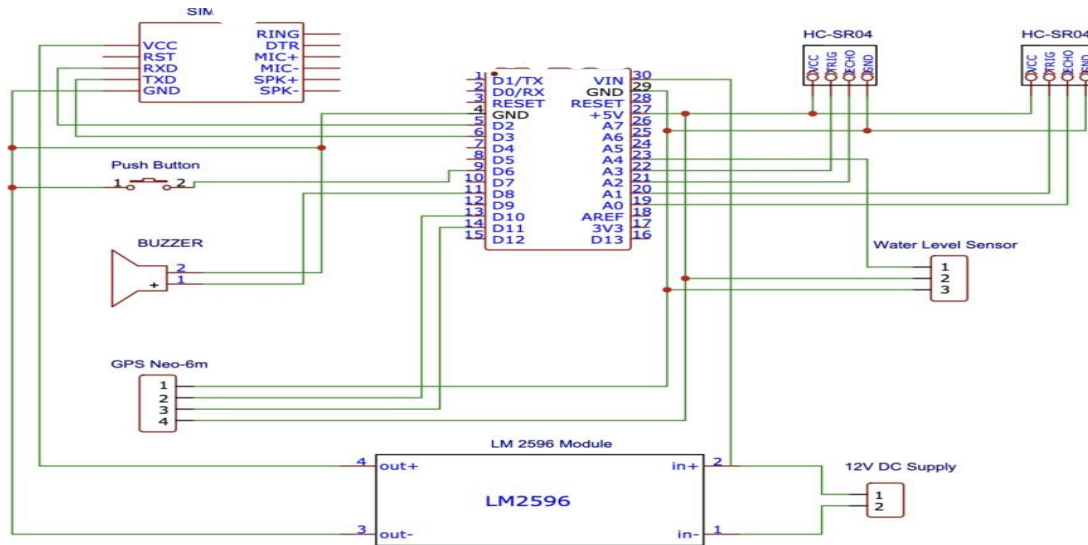
Moreover, the addition of a buzzer further enhances safety by providing audible alerts to warn users of potential obstacles, sudden changes in elevation, or other hazards in their path. Meanwhile, the integration of a moisture sensor enhances environmental awareness, enabling the blind stick to detect conditions such as rain or wet surfaces. This feature proves invaluable in helping users navigate safely and avoid potential dangers posed by inclement weather conditions.

G. WORKING PROTOTYPE/ FORMULATION/ DESIGN/COMPOSITION:

BLOCK DIAGRAM



CIRCUIT DIAGRAM



G. EXISTING DATA: Any clinical or comparative data necessary enough to support your invention. (Comparative)

N/A

4. USE AND DISCLOSURE (IMPORTANT):

| | | |
|--|---------|--------|
| A. Have you described or shown your invention/ design to anyone or in any conference? | YES () | NO (✓) |
| B. Have you made any attempts to commercialize your invention (for example, have you approached any companies about purchasing or manufacturing your invention)? | YES () | NO (✓) |
| C. Has your invention been described in any printed publication, or any other form of media, such as the Internet? | YES () | NO (✓) |
| D. Do you have any collaboration with any other institute or organization on the same? Provide name and other details. | YES () | NO (✓) |
| E. Name of Regulatory body or any other approvals if required. | YES () | NO (✓) |

5. Provide links and dates for such actions if the information has been made public (Google, research papers, YouTube videos, etc.) before sharing with us.

N/A

6. Provide the terms and conditions of the MOU also if the work is done in collaboration within or outside university (Any Industry, other Universities, or any other entity).

N/A

7. Potential Chances of Commercialization.

N/A

8. List of companies which can be contacted for commercialization along with the website link.

N/A

9. Any basic patent which has been used and we need to pay royalty to them.

N/A

10. **FILING OPTIONS:** Please indicate the level of your work which can be considered for provisional/ complete/ PCT filings (Mandatory to mention).

N/A

11. **KEYWORDS:** right keywords for searching our invention-

Blind Stick, Smart Systems, Embedded , ESP 32 Assistive Device

