Blind Aid Stick

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***Abstract*— There are millions of blind persons in the globe who are in constant need of assistance. It is difficult for these visually challenged folks to travel outside their homes on their own. The Smart Blind Stick that we will build provides a better and more convenient way of life for blind people by allowing them to move around independently. Ultrasonic sensors, a water sensor, and a panic button are all included in the stick. This device can identify impediments up to 400 cm in front of the users using an ultrasonic sensor which transmits a cycle of wave burst in time period of 10ms. We employ image processing techniques to recognize the sign board placed on the road to optimize the projects. The traffic sign recognition from captured/input passed photos is determined by the CNN algorithm running in the PC for proof of concept. The image captured by the camera/loaded image will be captioned and provided to the user as an audio format using pyttsx3 engine. This audio will explain what the image is and what should be done, effectively acting as a virtual eye for the blind.**

I. AIM

Blind individuals experience a ton of difficulty collaborating with their environmental factors. Our primary objective is to establish a climate that will help blind people in exploring, distinguishing hindrances, and getting crisis alarms for their benefit. We have chosen to help them with our undertaking,, which is a hybrid of IoT and App Integration. For improved walking comfort, we've also integrated traffic/road sign recognition utilizing image processing.

II. INTRODUCTION

There are a number of challenges that humans have no control over. Blindness is an example of such a problem. The main goal of working on this project is to bring attention to the world's blind population and to provide them with technical assistance in all aspects of their lives. This condition causes blind persons a great deal of difficulty in doing their daily tasks. One of their most pressing issues is transportation, such as crossing roads, commuting by rail, or visiting other public locations. They also have difficulty identifying obstructions in front of them while walking down.

the street, which makes it risky. They constantly require humanitarian aid to complete the task. However, there are situations when individuals are helpless due to a lack of suchaid. Their reliance erodes their self-assurance.

The shrewd stick is a proposed approach for permitting them to perceive their general surroundings. We recommend an answer as a brilliant stick with minimal expense, quick reaction,low power consumption, lightweight, and foldability in this study. It has an ultrasonic sensor that detects obstructions in front of the user, a water sensor that detects water, oil, or a slippery surface, help buttons in case of an emergency, and alocation sender.

In a variety of ways, an onboard computer vision system that can detect and recognize traffic signals could assist the driver in avoiding accidents. On-board vision technology could enhance reality by displaying upcoming warning signals in advance or even keeping them displayed on a screen after the sign has passed. This reduces the likelihood of the individual missing a crucial sign.se components, incorporating the applicable criteria that follow. The objective of this task thought is to make blind individuals' lives more straightforward on the grounds that they experience a few snags in their regular routines, like while voyaging or directing any movement.

III. LITERATURE SURVEY

1. Image Processing and Embedded System for Blind Navigation Sacinah Jamaluddin and Zul Azizi Hailani are the authors. Description: This paperinspired us to create a navigation system that aidsin the mobility of blind people. This paper suggeststhat we capture a live video of that individual and seize the video feed in front of a blind person and that this live video may be viewed by the admin.[1]
2. Smart Cane: Visually Impaired People's Assistive Stick AmirulATalib and MohdHelmy Wahab are the creators. Depiction We got the idea for Voice message and Vibration from this paper. When a individual identifies an obstacle with the utilization of a brilliant stick, the visually impaired individual becomes mindful of it by deciphering the Vibration alert and that's what voice message shows up from the cell phone. [2]

Electronic Path Guidance for Visually Impaired People AuthorName-IwanUlrich and Johann Borenstein Explanation-We gained from this Paper instructions to decide the reach essential for distinguishing a hindrance or thing from the area of a savvy stick. We want to characterize a limit esteem, and if the hindrance falls inside that reach, it could be recognized effectively; any other way, it can't. [3]

3. Development of an Electronic Travel Aid Using Ultrasonic Sensors by AlexHarold and Chris Gearhartare the authors. Illustration- From this article, we learned that to capture video images, some processing is necessary. Using

some algorithms and methods, we do various operations on the picture to capture it. Live surveillance of the individual may also be observed on the admin side. All processing data is saved in a serialised manner on the server. [4]

4. A Blind or Partially Sighted Person's Automated Mobility and Orientation System Abdel Ilah Nour Alshbatat is the author. Description- We learned about GSM, GPS, and sensors such as integrated ultrasonic sensors, accelerometer sensors, and infrared sensors from this study. Which one is more appropriate, and how do they perform and identify obstacles? [5]
5. Sung Jae Kang, et al., "Development of an Intelligent Guide-Stick for the Blind," produced a sensor-based circuitry consisting of Ultrasonic Sensor and DC motors for detecting obstacles; nevertheless, the gadget weighs 4.0 kg and may be inconvenient for users. This is a significant drawback.[6]
6. They proposed a solution for blind individuals in this research by incorporating an ultrasonic sensor into a blind stick. The gadget is used to detect impediments within a four-meter range, while the infrared instrument is used to detect nearer issues in front of blind individuals. As a result, the radio frequency transmitter and receiver assist the user in locating the smart stick using the buzzer. When an obstruction is detected, the vibration motor in the smart stick is triggered and creates a vibration.

IV. EXISTING SYSTEM

There was a created system for a blind smart stick that uses infrared (IR) sensors to provide early notice of an impediment. The stick vibrates to inform the visually impaired people after recognizing the obstructions. The smart stick, on the other hand, is designed solely for obstacle detection and does not assist the blind in emergency situations. Furthermore, the infrared sensors are ineffective because they can only identify the closest impediment in a limited distance.

V. PROBLEM STATEMENT

It is quite easy for people like us who are healthy to find, watch, and go to their destination, but it is extremely difficult for blind people to do so. They are continuously looking for someone to assist them in getting to their destination. Using Blind Stick, they will be able to solve their difficulty.

It is very simple for healthy people like us to locate, observe, and get to our destination, but it is incredibly difficult for blind people to do so. They are always on the lookout for someone to help them get to their objective. They will be able to fix their problem by using Blind Stick

I. PROPOSED SYSTEM

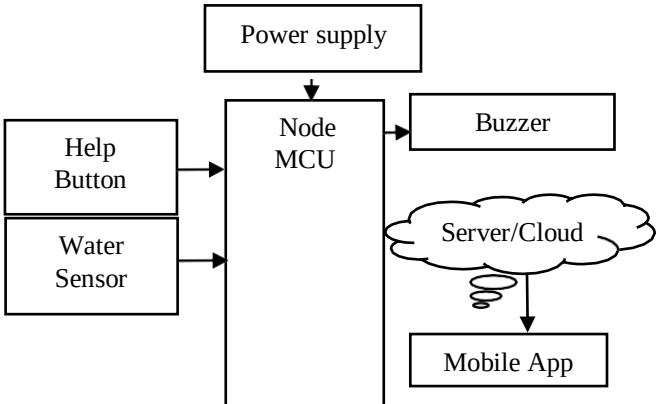
The Blind Stick is a special navigational guide made for outwardly debilitated people. We offer a redesigned blind stick that permits outwardly debilitated people to explore using current innovations easily. The visually impaired stick has an ultrasonic sensor, a buzzer, a water sensor to detect a water log on the road, and an emergency switch. The ultrasonic sensors in our suggested technology are used to identifyimpediments ahead utilising ultrasonic waves. When the sensor detects obstructions, it sends the information to the microcontroller. The information is then handled by the microcontroller, which decides whether the obstruction is close enough. In the event that the hindrance isn't sufficiently close, the circuit has no impact. Assuming the obstacle is in nearness, the microcontroller conveys a message to the ringer to sound.. In any case, by building knowledge instruments on the highest point of the equipment, exploiting conceivable existing sensors also, the presence of an organization of installed units, one can both ideally oversee accessible assets at the unit and network levels as well as give expanded functionalities , far past those accessible. By building insight systems on top of the equipment, exploiting conceivable existing sensors and the presence of an organization of implanted units, one can both advance accessible assets at the unit and organization levels, as well as give increased usefulness a long ways past what is right now accessible.

II. OBJECTIVE

The framework's significant objective is to give a compelling route instrument for blind individuals that gives them a vibe of vision by giving data about their current circumstance and objects.. This system also has an SOS and an alerting system. Because the smart walking stick is abasic and purely mechanical gadget for detecting ground obstructions. This device is compact and lightweight. It gives the greatest travel assistance to the individual. The visually impaired individual can move between various locations without the help of others. The goal of this project idea is to make blind people's lives easier because they experience several obstacles in theirdaily lives, such as when traveling or conducting any activity.

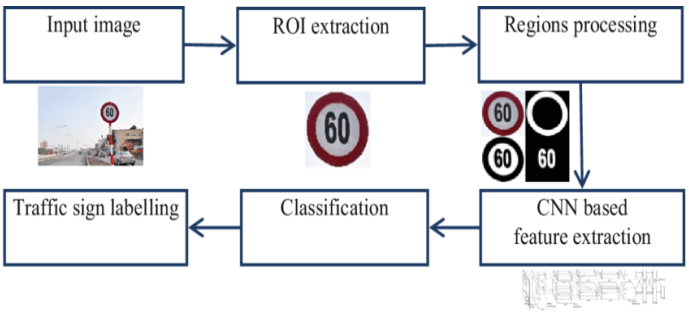
To make it easier for the person, we have also added traffic sign detections using computer vision, which helps the blindperson to automatically identify the traffic signs while walking on the road

VI. METHODOLOGY



The main object of this project is to come up with an idea tohelp blind and visually impaired society people. Using blind stick the blind person can walk independently on his ownand stick will assist the person to navigate. People with visual disabilities often depend on external assistance fortheir help like humans, trained dogs, or some kind of electronic device as their support systems. We accomplishedthis goal by adding buzzer, Water sensor and ultrasonicsensors which will help the user to overcome this difficulty. The working behind blind stick is that it is utilized for some unique purposes like detecting gadget for blind individual. The circuit gives 5V of force supply and keeps up with its result at the steady level. It is utilized to identify object utilizing Ultrasonic sensors and surface ground water using water sensor. If any object is sensed near the person, the ultrasonicsensors will sense it and will send the data to the NodeMCUand buzzer will turn ON, water sensor is utilized to recognize the water present on the ground while walking.
There is a help button provided on the stick in case ofemergency, if the blind person is in trouble, as soon as he presses the button an notification is send to the guardian indicating that the person needs help.

IMAGE PROCESSING PART



We hope that through working on this project, we will be able to comprehend the challenges that computer models.

confront and devise a solution to improve the accuracy and clarity of image classification, which will help us understand the many concepts of Machine Learning and Image Processing. Creating a graphical user interface (GUI) to test the model with multiple traffic sign images
For the blind person's safety, a traffic sign detection and recognition (TSDR) system has been introduced. A TSDR system detects and recognizes traffic signs in photos acquired by cameras or imaging sensors, displaying to the user the traffic laws that apply to that stretch of road. In bad traffic, a person may fail to observe traffic signs, resulting inan accident.
The objective of traffic sign recognition is to track down the areas of interest (ROI) where a traffic sign is probably going to be present. To gain the principal sign, you'll have to edit the additional room, you'll need to crop the extra space. ROI stands for Return on Investment. ROI determines the location of the traffic sign based on its shape, dimensions, and other factors. The traffic signs have been clipped, which is advantageous. The background image has been deleted because it isn't relevant. As a result, we assumethat a considerable portion of the image can be dismissed as unnecessary. The color and shape of traffic signs are predetermined, making them easier to distinguish and recognize.

Classification

The sign is classed in this section depending on the kind, shape, and color of the sign, as well as the information it provides. Elements of a histogram of arranged angles (Hoard): HOG separates a picture into little squares cells,works out a histogram of arranged angles in every cell, standardizes the result with a square wise example, and returns a descriptor for every cell.

VII. SYSTEM REQUIREMENT

- **SOFTWARE REQUIREMENT**
  - Arduino IDE
  - Python IDLE
  - Blynk

- **HARDWARE USED**
  - ESP controller(NodeMCU)
  - Ultrasonic sensor

- Water sensor
- Panic button

Power supply

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