A Smart Walking Stick for Blind People Using IOT

A PROJECT REPORT

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***Abstract*— The intelligent walking stick makes it easier and more comfortable for blind persons to navigate and complete their tasks. The normal stick does not perform obstacle detection, making it ineffective for those who are visually impaired. Considering that a blind individual has no idea what kinds of things or objects are in front of them. The person is unable to gauge the size of the thing or how far away they are from it. Moving about is tough for someone who is blind. In a smart walking stick, the object is located with the aid of an ultrasonic sensor, which is also used to calculate the distance between objects. If there is a challenge up front.**

Keywords— ESP32, Ultrasonic, Arduino IDE (Integrated Development Environment),

I. INTRODUCTION

Since sight accounts for 83% of the information a human receives from their environment, vision is the most crucial component of human physiology. Each year, there are more people who become blind. Those with visual impairments have trouble recognizing even the smallest details with healthy eyes.

According to a 2011 WHO (World Health Organization) survey, around 70 million people (about twice the population of California) worldwide-or 1% of the entire population, have vision impairments, and among them, 10% are completely blind (about 7 million people) and 90% have low vision (63 million people). They face navigational challenges in their daily lives, trying to get from one point to another in a timely and safe manner. They frequently rely on outside help, which can come in the form of humans. The walking cane, sometimes known as a white cane or stick, and guide dogs are some of the traditional and antiquated navigational aids for those with vision impairments, and both are marked by numerous flaws. Essential skills and training phases, range of motion, and extremely little information presented are some of these aids' most serious flaws.

The goal of this project is to create a smart stick (cane) that will aid visually impaired people in navigation. Our strategy entails modifying this conventional cane with some electronics and sensors like ultrasonic sensors, water sensors, buzzers, to record information about the presence of obstacles on the road. Any obstruction within a range of 2 cm (about 0.79 in) to 450 cm (about 14.76 ft) can be detected by ultrasonic sensors. As a result, the user will always be warned if there is an obstruction within this range. If there is water in the user's path, a water sensor will detect it. Because ultrasound is immune to external noise, it is used by most blind navigation systems. The rapid advancement of current hardware and software has made it simpler to offer intelligent navigation systems to the blind.

The following reasons justify the necessity for a smart walking stick:

- **Cost:** The equipment is inexpensive and accessible to everyone who needs it because the intended user or customer is a visually impaired individual, who frequently has a low-income rate.
- **Reduce Mishaps:** It would be possible to save the lives of both blind individuals and other accident victims with a smart walking stick. Poor or no vision causes many visually impaired persons to perish. However, using a smart walking stick may assist in lessening the frequency of these incidents.
- **Ease of life:** Since the project's overall goal is to make life easier for blind people, this would enable them to live independently and easily. It would also make it easier for them to travel between locations without having to rely on others.

The system's advantage is that it may prove to be a low-cost solution for millions of blind people around the world.

Accidents involving visual impairment that have been documented by various agencies:

- Hyderabad, Begum pet visual-impaired child dies after falling from a school building If the child had a smart cane, it would have alerted him about the depth before he stepped to the edge of the terrace and fell from the fifth floor to the bottom, saving his life (that there is no ground).
- In February 2020, Cleveland Gervais, 53, passed away at Eden Park in southeast London after falling off the platform. The inquest found that a lack of tactile pavement, which can alert those with vision impairments when they are getting close to an edge, "more than marginally" contributed to the accident.

II. OBJECTIVE

The absence of sophisticated features in conventional white canes that may help blind people navigate their surroundings safely and freely is the main issue that a smart walking stick for the blind seeks to solve. Walking presents various difficulties for blind people, including avoiding obstructions on the ground, navigating traffic, and losing their bearings. Blind people might overcome these obstacles and gain more freedom with the aid of a smart walking stick equipped with innovative sensors and navigational systems. It can make it easier, safer, and more independent for blind persons to move around their environment. The world's blind population would benefit from a smart walking stick that considers these issues and enhances their quality of life and safety. Their lives will be made simpler and more fulfilling by our endeavor.