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Smart Navigating Stick

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Abstract: ***The scope of this study is to create a product that will benefit persons who are blind or have to rely on others frequently. This is a unique concept that enables visually impaired persons to move around and go from one location to another with speed and confidence by identifying surrounding obstructions. They merely need to hold this device in their hands like a regular stick, and it will assist the individual in overcoming the impending challenges. Ultrasonic, Moisture, and Night sensors are among the sensors included. Designing an assistive system for visually impaired persons that can detect impediments and suggest alternate pathways for the blind are among the goals of this research project.***

Keywords: Smart stick, water Sensor, Ultrasonic Senor, Night Indication, Arduino

I. INTRODUCTION

The smart navigating stick is a technique to help sightless people to recognize their way. Blind people are unable to carry out daily activities like as going down the street, visiting friends or relatives, or doing any other mundane tasks. Technology advances at a rapid pace, allowing people to live better, simpler lives. Therefore, the solution for this major problem is proposed by designing a stick that can aid the person to walk safely without having fear of hitting someone on the way or any solid objects. In this stick we have used Arduino, ultrasonic sensor, Water Sensor, Night Indicator, Vibrating Motor, Buzzers, LEDs etc. In this project, we have built a guide stick to help blind people to understand whether there is an object around the stick or not. Smart Navigating stick is an innovative stick designed for visually disabled people for improved navigation. We here propose an advanced smart stick that allows visually challenged people to navigate with ease using advanced technology. The ultrasonic sensor, as well as light and water detection, are included in the smart navigating stick. Our proposed project starts with ultrasonic sensors that employ ultrasonic waves to detect objects ahead. On sensing obstacles, the sensor passes this data to the microcontroller. The microcontroller then processes this data and calculates if the obstacle is close enough. If the obstacle is not that close the circuit does nothing. If the obstacle is close the microcontroller sends a signal to sound a buzzer. It also detects and sounds a different buzzer if it detects water and alerts the blind. One more feature is that it has the night sensor or indicator which lightens up the LEDs when blind persons travels through the dark place.

II. PRINCIPLE

The Smart Navigating Stick is a unique navigational aid created for visually impaired persons. We here propose an advanced smart stick that allows visually challenged people to navigate with ease using advanced technology. The smart stick is integrated with ultrasonic sensor along with light and water sensing. Our proposed project starts with ultrasonic sensors that employ ultrasonic waves to detect objects ahead. The sensor sends data to the microcontroller when it detects objects.

III.PROBLEM STATEMENT

Because humans receive the majority of their information from their surroundings through sight, vision is the most significant element of their life. Individuals who are visually impaired encounter a variety of challenges, one of which is self-navigating in an unfamiliar environment. Physical movement is, in fact, one of their most difficult tasks. There are several instruments and smart technologies available today for visually impaired individuals to use for navigation, but the most of them have significant limitations in terms of portability, and the majority of them require extensive training to use. Those devices necessitate a lot of upkeep. Jordy, MyEye2, and other smart devices are highly expensive.

Normal Stick, Pet Dog, and Smart Devices are some of the present methods for sight impaired people that they employ for assistance (MyEye2, Jordy etc.). The difficulty with existing systems is that they are made of normal stick, which may easily fracture or break. Cost of a pet dog is exorbitant. Common Drawbacks (Including Smart Devices): They are difficult to transport and require extensive training to use. Traditional and oldest mobility aids for people with disabilities. The user would be tired by these hefty designs. The goals of this study are to create an assistive technology for visually impaired persons that can identify obstructions and suggest alternate pathways for the blind, and that requires little training and can be carried like a regular stick without causing any difficulties in its use.

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IV. PROPOSED APPROACH

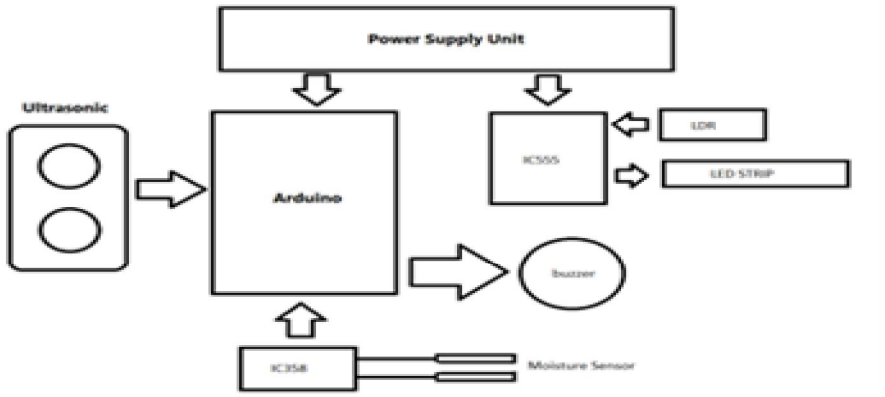

Fig. 1.1

A. *Components Description*

1) *Ultrasonic Sensor:* A Transducer can measure distances using ultrasonic waves. It consists of two parts, transmitter, and receiver. The transmitter emits the ultrasonic waves. The receiver detects the reflecting signals from the objects. The ultrasonic sensors work based on a principle which called “The Time of flight” using the speed of sound. A rang of pulses between (20 KHZ to 200 KHZ) is emitted by the sensor. When the pulse impacts an object and then reflected; therefore, the receiver of the sensor will be able to detect this signal.
2) *Arduino:* A microcontroller chip is based on Atmega328p microchip. It is an open-source board. The board has 14 digital pins, 6 analogue pins and can be powered by USB cable or 9v external battery.
3) *Buzzer:* A "piezo buzzer" is basically a small speaker which will be connected directly to an Arduino. "Piezoelectricity" is an impression where certain crystals can deform once electricity is applied to them. By applying an electrical signal at the proper frequency, the crystal will create sound.
4) *Vibrating Motor:* A vibratory motor is a motor that is improperly balanced. In alternative words, there is an off-centered weight attached to the motor's rotational shaft that causes the motor to wobble. The amount of wobble may be modified depending on the amount of weight can be attached, the weight's distance from the shaft, and the speed at which the motor spins.
5) *Water Sensor:* Water Sensor is placed at the bottom of the stick, so that if there is water present on the surface gets detected by the water sensor and with the help of buzzer and a vibrating motor it alerts the blind person and prevent the person from any harm due to the water present on the surface. It is a combination of two wires that are openly placed at the bottom of stick, when these wires come in contact with the water, they complete the circuit and buzzer starts.
6) *Night Sensor:* We use night sensor LDR (Light Dependent Resistor) here because if the blind person walking through the dark place or at night, then the sensor detects it, and it lightens up the LEDs and the person or any vehicle coming towards the blind person gets alert by seeing the lighten LEDs and they pass away without provide any harm to blind person.

B. *Working*

Technologies are rapidly evolving, allowing individuals to live better and easier lives. As a result, a design for a stick that can assist a person in walking safely without risk of colliding with another person or solid objects is presented as a solution to this serious problem. We used Arduino, ultrasonic sensor, water sensor, night indicator, vibrating motor, buzzers, LEDs, and other components in this stick. To detect motion, an ultrasonic sensor was placed in front of the stick, and a vibrating motor and buzzer were utilized as alarms to inform the user if an obstruction was detected near him. Water sensor is positioned at the bottom of the stick, so that if there is water present on the surface, the water sensor detects it and informs the blind person with the help of a buzzer and a vibrating motor, preventing the blind person from being harmed by the water existing on the surface. We utilize a night sensor LDR (Light Dependent Resistor) because if a blind person walks in a dark area or at night, the sensor detects it and lights up the LEDs, which alerts anyone or any vehicle approaching the blind person, causing them to flee without harming the blind person. We deploy a buzzer and a vibrating motor as an alerting device that sends sound and vibrations to the blind individual.

V. FUTURE SCOPE

A variety of future scope are available that can be used of with the stick such as usage of Global Positioning System(GPS) can help the blind person to source to destination route information. GPS can help to find the shortest and best path as accordingly to Google map. GSM (**Global System for Mobile)** attachment can help in future for any immediate casualty help. It helps the family member of the blind person to get his/her location if something happens to the blind person. It may also contain special arrangement to connect the walking stick to Adhaar card of blinds, helping the government serve the physically disable even better. The Fire sensor that sense any kind of fire, allowing the safe walk of the blind people in order to avoid catching fire may be used in this device to provide safety.

VI. CONCLUSION

The aim of this device is to solve the problems faced by the blind people in their daily life. The system also takes the measure to ensure their safety. This project will operate to help all the blind people in the world to make them easier to walk everywhere they want. It was done to help the blind to move in front very well. It is used to help the people with disabilities that are blind to facilitate the movement and increase safety.

This device will emerge as one of the best devices that can provide the help for blind person to navigate easily. This device is affordable and easy to handle and requires less training to use. Hence, this device will act as an Aid for blind and help them to overcome their difficulties and make their life easy.

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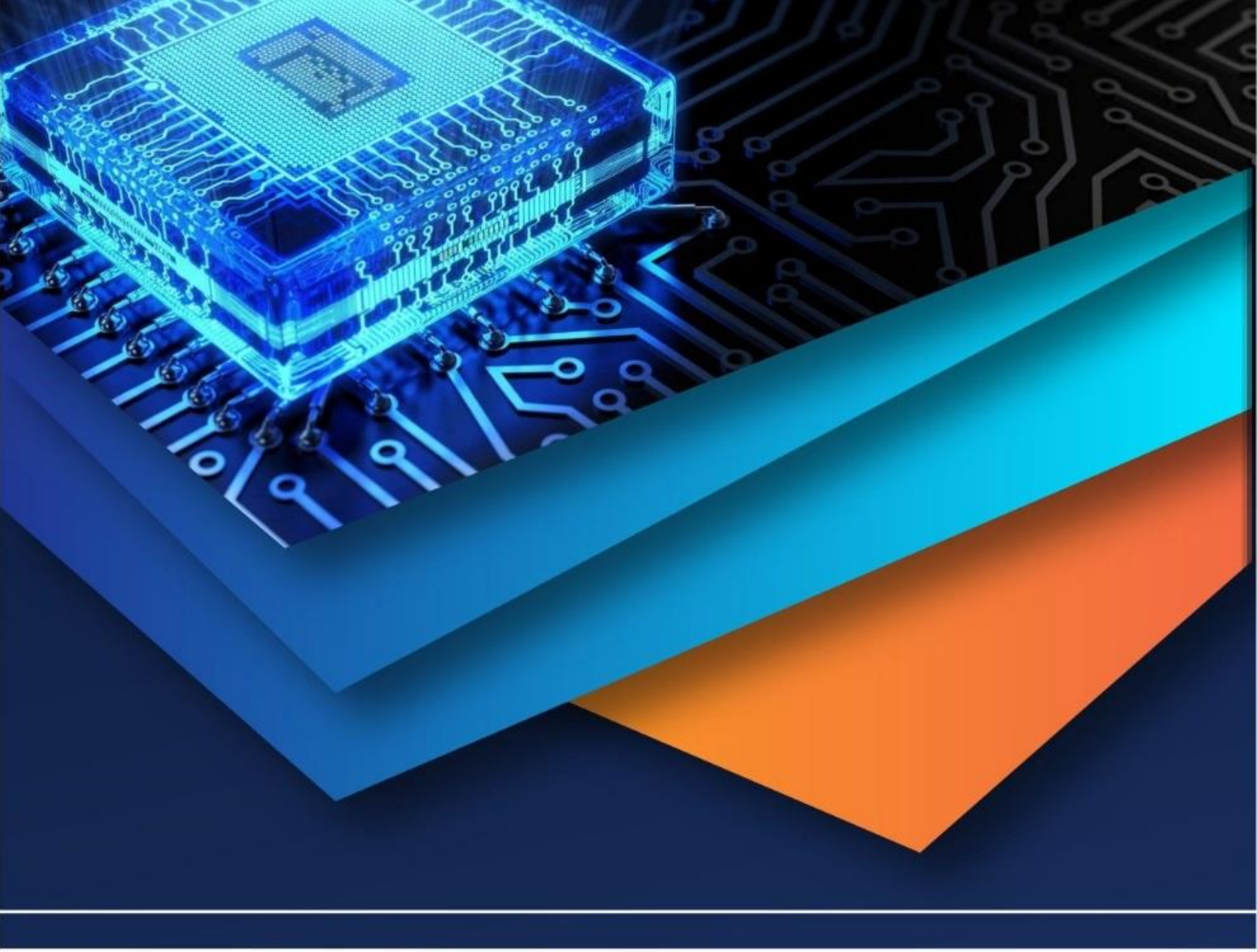

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