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# Implementing Smart Shoes for the Blind and Visually Secure Movements Using IOT

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**ABSTRACT :** This abstract introduces Blind and visually impaired people who encounter many challenges in their mobility and navigation. This system is developed to detect obstacles, wet floors, and patient falls. In case of the presence of one of the above incidents, the user will be notified acoustically using some voice alarms. Moreover, a compatible phone application is designed to notify the patient's parents in case of any issue and share his location. As the system is dealing with human health, some safety measurements were taken into consideration in the design phase, mainly electrical safety, to reduce errors and false alarms as well as to increase accuracy. The proposed study is for Visually Impaired People which helps them to accomplish their tasks. Visually Impaired People face issues while traveling outdoors, this paper presents a literary review of overcoming such issues by making wearable sensors by planting them on shoes using IOT (Internet of Things). Use of ultrasonic sensors and Vibration motor to notify the end-user regarding upcoming obstacles. Sending of data using WiFi module such as footstep count using MEMS sensor to the Guardian.

**KEYWORDS:** IOT, WiFi Module, Sensors

## I. INTRODUCTION

Sight is considered the most important sense and blind people are observed with pity by others. Visually Impaired face difficulties moving and transporting from one place to another whereas normal people don't face such hurdles. Shoes are the basic common thing which the man uses and to provide wearable technology inbuilt with it makes it easier to track their tasks. This wearable device is planted on the shoes and a buzzer will go on once it encounters any obstacle. IoT is a recent technology that creates a global network of devices that are capable of communicating and exchanging data with each other through the internet. This technology makes it easier for the user to communicate with the device. Several studies have found that physical activity or exercise can improve your health reduce the risk of developing several diseases and help battle depression.

### 1.1 PROBLEM STATEMENT

- The system developed here is a moderate-budget navigational aid for visually impaired people.
- Minimization in cost leads to compensation in performance

### 1.2 OBJECTIVE

- Using smart shoes for visually impaired people need not to be depending on others for mobility.
- The systems we have designed consist of sensors and vibrators for sensing the surrounding environment and giving feedback to the blind person.
- It is used as a safety device as well as a navigation device. The electronic hardware will be fixed in shoes for users. Users will wear the shoe and travel anywhere, and the attached sensor will sense obstacles near the shoe alerts with the help of visually impaired people.
- Also with the Help of IOT, the data of the Blind person will be transferred to the Guardian of the Blind person through a Wifi module using a MEMS sensor.
- India contributes about 21% of the blind people in the total population.



### 1.3 SCOPE AND STUDY

The scope of the project involves India contributing about 21% of the blind people over the total population. In a million population, there are around 53 visually impaired persons, 46 thousand have low vision and around 7000 have completely lost their vision. What happened around us, all the things and this whole world are visible to us because we have proper eyesight. But many people around us can't able to see all the things happening in the world and those people face many challenges in their day-to-day life. This paper presents the Smart shoes for that blind person. In Arduino Uno, ultrasonic sensors, buzzer, battery, and jumper wires are used. This circuit is implemented on shoes. Blind people can use these smart shoes indoors as well as outdoors. In every blind person-friendly device ultrasonic sensor is used. It is like the main part of the circuit or device. When any object is detected in the path of a blind person ultrasonic sensor gives a signal to the buzzer and the buzzer starts beeping and alerts the blind person.

The Smart Shoes are a novel device designed to help blind or visually impaired users navigate safely and quickly among obstacles and other hazards.

- The system will be based on four major functionalities: detection of obstacles, wet floors, and patient falls as well as the development of a phone application.
- The alarm systems, consist of two modules: the embedded alarms in the shoes (vibration motors and audible notifications) and the phone application notifications.
- All these modules are based on hardware and software parts and the communication protocols and tools needed for communication between each one of them.
- The system consists of the central processing unit, which is the microcontroller for this system. It is the master processor that collects data from all sensors, processes them, and generates the required alarms

## II. COMPONENTS

### 2.1 COMPONENTS AND SPECIFICATIONS:

- Node MCU
- Ultrasonic sensor
- MEMS sensor
- Vibration motor
- Buzzer
- Arduino IDE software
- Embedded C programming

## III. BLOCK DIAGRAM

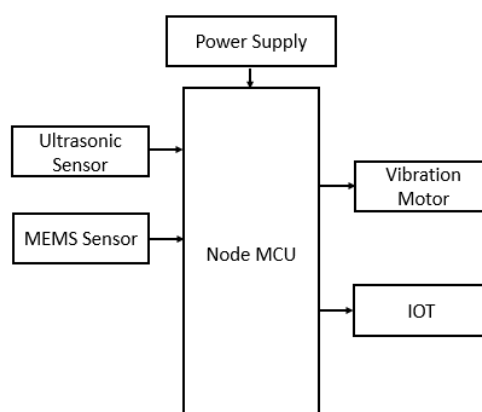


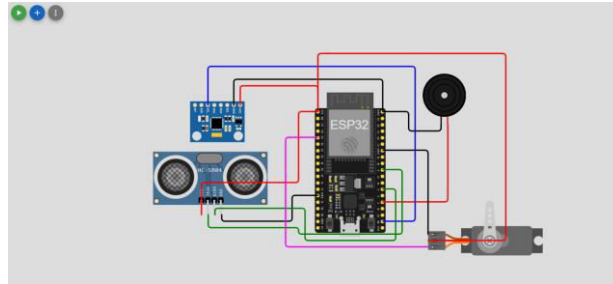
Fig -1: Block Diagram of Smart Blind Shoe

### 3.1 WORKING

The device that we have developed consists of ultrasonic sensors paired with a Vibration motor for sensing the surrounding environment for obstacles and covering the maximum area by the motor. These are integrated into buzzers

which give feedback to the user about the position of the nearest obstacles in range. The idea is to make the user independent and protect him/her from potential obstacles which can be fatal for the user. We propose a system consisting of smart shoes. Hardware will be fixed in the user's shoes. When the user wears the shoes and walks somewhere, sensors attached to the hardware will sense obstacles and the Vibration motor will vibrate and buzz for a left/right turn through the path. Through IOT the Data about the Blind person's safety the information will be sent to the Guardian using a MEMS sensor by Wifi Module.

#### IV. CIRCUIT DIAGRAM



**Fig -2:** Circuit Diagram of Smart Blind Shoe

#### V. RESULT AND DISCUSSIONS

The device that we have developed consists of ultrasonic sensors paired with a Vibration motor for sensing the surrounding environment for obstacles and covering the maximum area by the motor. These are integrated into buzzers which give feedback to the user about the position of the nearest obstacles in range. The idea is to make the user independent and protect him/her from potential obstacles which can be fatal for the user. We propose a system consisting of smart shoes. Hardware will be fixed in the user's shoes. When the user wears the shoes and walks somewhere, sensors attached to the hardware will sense obstacles and the Vibration motor will vibrate and buzz for a left/right turn through the path. Through IOT the Data about the Blind person's safety the information will be sent to the Guardian using a MEMS sensor by Wifi Module.



**Fig -3:** Hardware Kit

#### VI. CONCLUSION

In conclusion, In this paper, we discussed how we are going to embed wearable sensors on the shoes. This system is low-cost and user-friendly, thus attracting more customers and increasing demand for it. It is convenient for Visually Impaired People as it helps them to be resistant to accidents and maintain fitness without relying on others. The Internet has become a part of day-to-day activities. With the advent of technology, we introduced Smart Shoes using IOT and made it available to users anywhere at any time. We manifested how wearable sensors can forward data and present it to the users in a desired way.

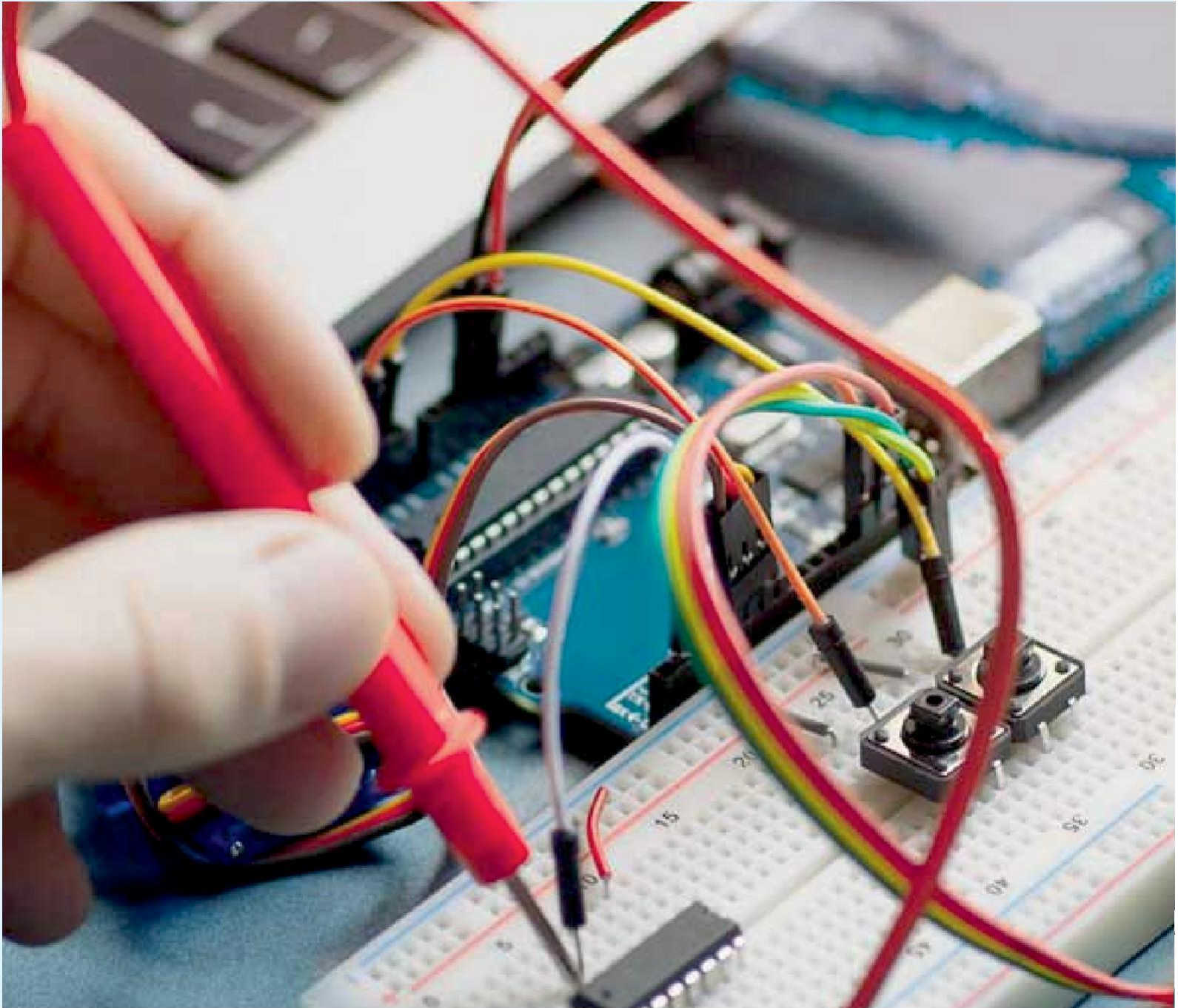


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