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Smart Stick for the Visually Impaired using Bluetooth

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Abstract: ***Vision is the most important part of human physiology as 83% of information human being gets from the environment is via sight. With the growing speed of technological advancement, smart phones have become the essential components of our daily performance. However, there is no cost effective device for the visually impaired people to detect obstacles in front of them while walking therefore a smart stick can help them in commuting and allow them to perform their work easily.***

I. INTRODUCTION

Blind people face lot of difficulties while travelling from one place to another. The cane is the most popular hand held aid the blind use. Smart blind stick for the blind and visually impaired are one of the most important mobility aids for these kind of people. Those who have the visual acuity of 6/60 or the horizontal extent of the visual field with both eyes open less than or equal to 20 degrees, these people are considered blind. Such people are in need of aiding devices for blindness related disabilities. A survey by WHO (World Health Organization) carried out in 2017 estimates that in the world, about 1% of the human population is visually impaired (about 70 million people) and amongst them, about 10% are fully blind (about 7 million people) and 90% (about 63 million people) with low vision. The main aim of the system is to provide a best environment for the blind persons which gives a sense of vision by providing the information about their surroundings and objects around them

II. PROBLEM IDENTIFICATION

A trained dog generally called guardian dog assists the blind to avoid obstacles. The dog can only be used for guiding them to a familiar path. They need a tool to guide their way to do the activities and enhance their safety and security. Some of the sticks in the market have not implemented sensors to detect stair cases or potholes in front of the user. This poses as a serious threat for the person. Blind people might also have difficulties on differentiating about the different vibration modes, since all the alerts must be provided only through vibrations and a buzzer, the person requires much training for getting adapted to using the stick.

III. OBJECTIVES

A. To enable the visually impaired to navigate around independently.
B. To provide real time voice assistance with better accuracy and making navigation safer.
C. To provide a low cost solution for giving a blind person a sense of vision work easily.
D. To notify the saved contacts about the blind in case of emergencies.

IV. EXPECTED OUTCOMES

The smart stick will help the blind and visually impaired people to walk and roam across the city where they want to very easily. The solution for this is a smart stick which is embedded with infrared sensor to detect stair-cases and pair of ultrasonic sensor to detect any other obstacles in front of the user and alert them through voice messages via the smartphone that is connected.
The stick is interfaced with an android application through bluetooth. It provides real time voice alerts to the user. The application will be user friendly and convenient for the blind since it does not require them to access the smartphone frequently except when they need to open the application during startup and in cases where they misplace their stick. If they are in any kind of problem or feel lost, they only need to press the button in their smart stick which notifies their emergency contacts of the situation as a message that will be sent along with the exact location of the blind person to the contact through the smartphone. While walking in public place during night time, the blind person can use stick as a flashlight which illuminates automatically to indicate his presence. They can also find the stick if anyhow misplaced by them by pressing a button on the android application which will make a sound on the stick.
The main objective of this project is to reduce the cost and to provide a better solution for the visually impaired. The smart stick is of low cost, fast response, low power consumption, light weight.

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V. HARDWARE REQUIREMENTS

This chapter provides detailed picture of the hardware components being utilized. It provides details of features of important hardware components like NodeMCU, Ultrasonic sensors, Infrared sensors, PIR sensor, Bluetooth module, Light dependent resistor (LDR) and Buzzer. Detailed explanation of interface configuration and procedure adopted is described.

Design of a system incorporates visualization of the final output with having knowledge of input to the framework. Modules that are necessary for the development of the device are to be designed. Most efficient components information of various manufactures accessible in market is to be gathered.

A. Components Used Are

1) NodeMCU
2) Ultrasonic Sensor
3) IR Senso
4) LDR
5) Moisture Sensor
6) Self-developed Android app

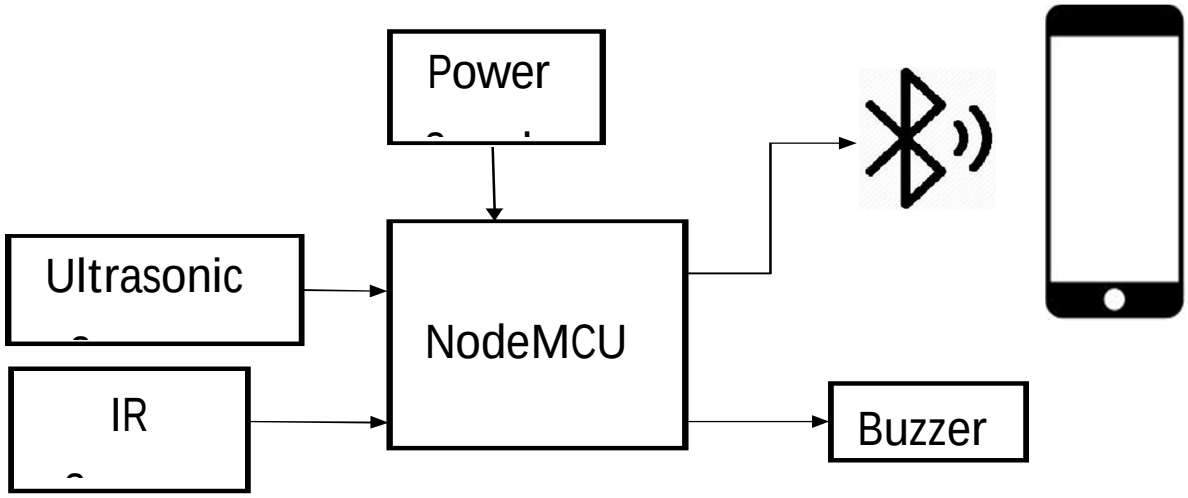
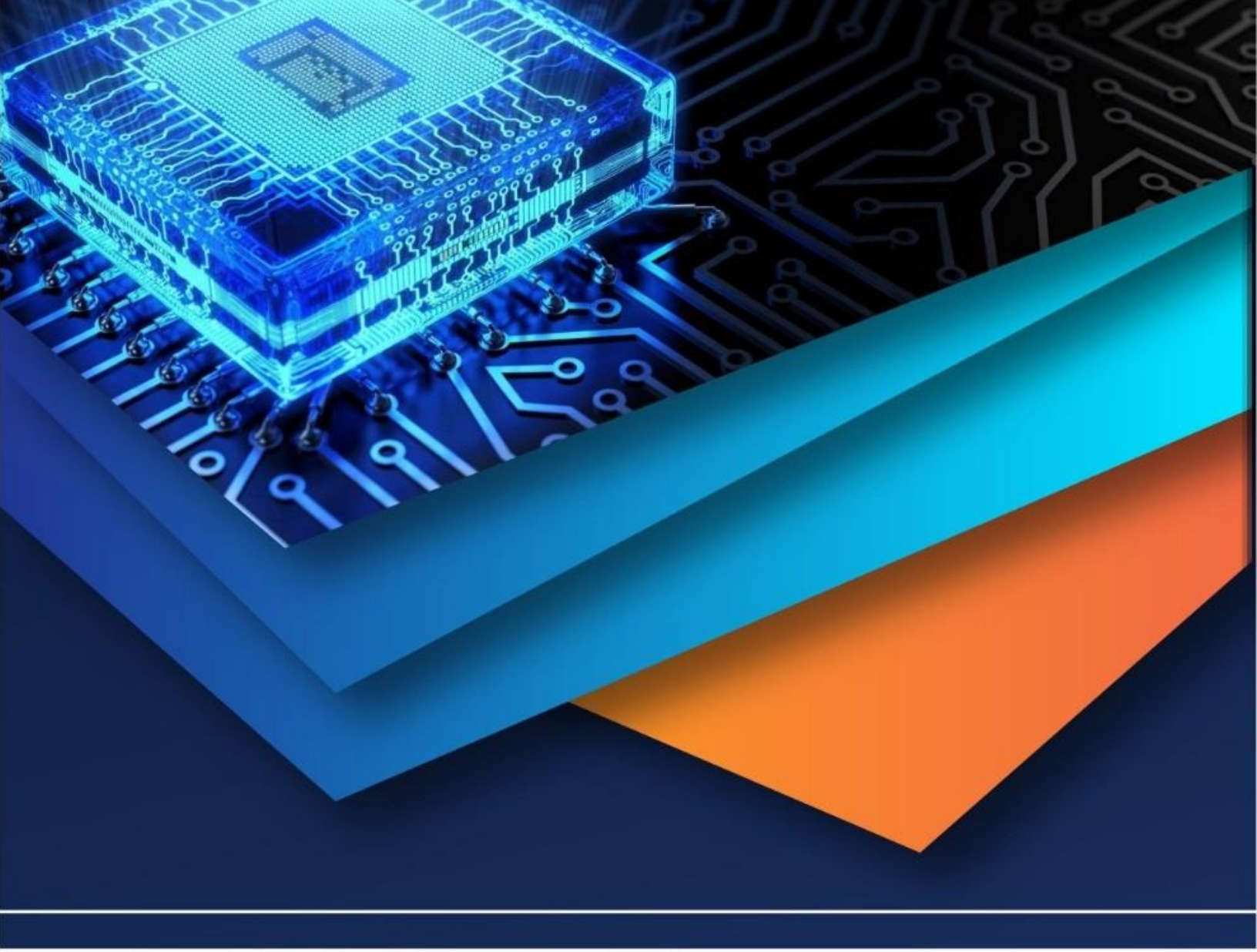


Fig 1.0 Block Diagram of Smart Stick

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