

MULTI-FUNCTIONAL STICK FOR VISUALLY IMPAIRED PEOPLE

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ABSTRACT

One of the biggest problems faced by the visually impaired is navigating from place to place, be it indoors or outdoors. Further, the adverse conditions of the roads make it even more difficult for them to walk outdoors. They have to be alert at all times to avoid consequences like colliding with stable or moving obstacles, ascending or descending staircases, slipping down wet terrain. Also, At times they may be in distress and might want to send an alert message to their relatives or friends about their whereabouts. These problems of blind people can be addressed with the intervention of technology. Several sensors can be used to detect anomalies like obstacles, staircases and wet terrains respectively. The prototype discussed here is a simple, sophisticated and affordable smart blind stick equipped with various IoT sensors and modules. Also, this solution provides a way to send a message about the whereabouts of the user to the concerned people.

Keyword :- IoT, Sensors, Impaired, GPS, Arduino

1. INTRODUCTION

According to the World Health Organization, there are nearly 285 million people with some form of visual impairment out of which 86% people have low vision and 14% people are blind. Vision is one of the most important senses to humans to survive. Vision helps to connect with the surroundings. People deprived of vision rely on other dependencies like a simple walking cane or other people. In familiar places like the interiors of a house, they memorize the site directions, obstacles on their way and navigate according to them. However, it is not always safe for the blind to rely on their memory to move from one place to another. Especially when they are out-doors. Not all the times blind people are offered help from others and hence there is a need for a device, such as a stick, which can assist the visually impaired people in all forms of life. The main characteristics for the stick to be useful to every visually impaired person is for it to be efficient and cost effective. The obstacles such as people, vehicles, stones in the outdoors and stairs, walls, furniture in the indoors hinder the way of the blind. The blind stick developed, alerts the user about various obstacles through a vocal sound from a speaker on the stick. The stick can also detect wet and damp surfaces and raise a vibratory alert to the user. To a person who is visually impaired, a mobile phone doesn't effectively serve the purpose to send a panic message whenever the person ends up at a location unknown to him. A simple button on the stick will do the job of sending a message to the acquaintances of the blind person. A software application is designed to let the acquaintances change, add or delete the phone numbers. The user can also set up the phone numbers with the help of the supplier, who has admin access to change the phone numbers. To assist the user if a stick is misplaced, a remote with button is provided, which when pressed, makes a buzzer sound on the stick.

1.1 PROBLEM STATEMENT

People deprived of vision rely on other dependencies like a simple walking cane or other people. It is not always safe for the blind to rely on their memory to move from one place to another. They have to be alert at all times to avoid consequences like colliding with stable or moving obstacles, ascending or descending staircases, slipping down wet terrain. The blind stick developed in this project will be used to alert about various obstacles, detecting wet and damp surfaces, also it will send messages to concerned people in different situations.

2. LITERATURE SURVEY

A literature review is a survey of scholarly sources (such as books, journal articles, and theses) related to a specific topic or research question. It is often written as part of a thesis, dissertation, or research paper, in order to situate your work in relation to existing knowledge. It establishes the authors' in-depth understanding and knowledge of their field subject. It gives the background of the research. Portrays the scientific manuscript plan of examining the research result. Illuminates on how the knowledge has changed within the field.

Year of Publication	Author	Publication Paper/Conference	Project Title	Application
July 2020	Vanitha Kunta, Charitha Tuniki, U. Sairam	IEEE Explore/ ICCES	Smart stick for visually impaired people.	Obstacle & water detection, alert message when in danger.
May 2018	Saurav Mohapatra, Subham Rout, Varun Tripathi, Tanish Saxena, Yepuganti Karuna	IEEE Explore/ ICOEI	Smart walking Stick for blind integrated with SOS navigation system.	Obstacle detection & video calling concerned people in case of need.
June 2015	Naiwrita Dey, Ankita Paul, Pritha Ghosh, Chandrama Mukherjee, Rahul De, Sohini Dey	IEEE Explore/ ICCTCT	Ultrasonic sensor based smart blind stick.	Detection of obstacle using ultrasonic sensor.

3. PROPOSED SYSTEM

In this project ARDUINOMEGA microcontroller is used to interface with the sensors and to the communication devices. The ultrasonic sensor is used to identify distance among the objects on three side (left, right, front). The soil moisture sensor is used to identify the wet object in front of the person. The LCD is used to update the latest information in the LCD. APR voice module used to record and play the recorded voice. The keypad used to send the multiple information through the different keys. The emergency situation the location of the blind person send through the GSM. we have a ultrasonic sensor for object detection, APR module is used to intimate the blind. Key pad is used for emergency purpose once the key pad will press automatically emergency alert will go with the help of GSM and GPS. APR voice process is used to send voice alert.

3.1 BLOCK DIAGRAM

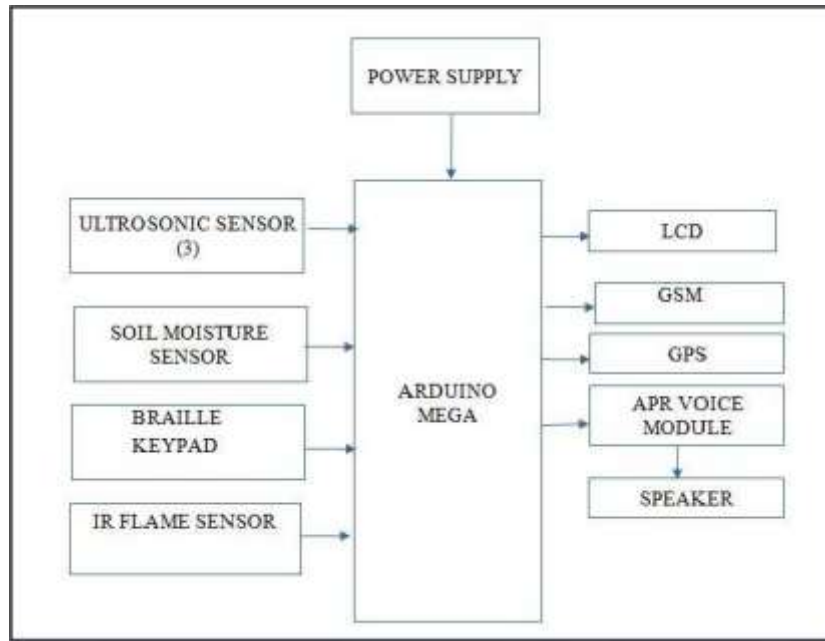


Fig -2: Block Diagram

3.2 CIRCUIT DIAGRAM

A circuit diagram is a graphical representation of an electrical circuit. A pictorial circuit diagram uses simple images of components, while a schematic diagram shows the interconnections of the circuit using standardized symbolic representations. The circuit diagram of the proposed system is shown in fig 2,3,4.

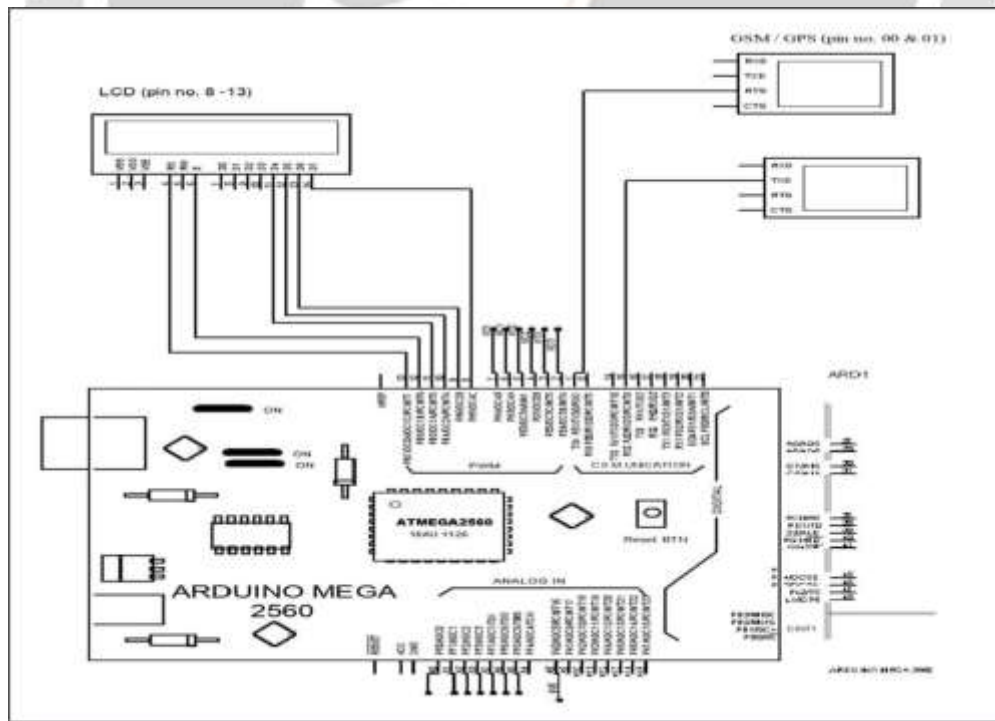


Fig -2: Circuit Diagram(Arduino Mega Circuit diagram)

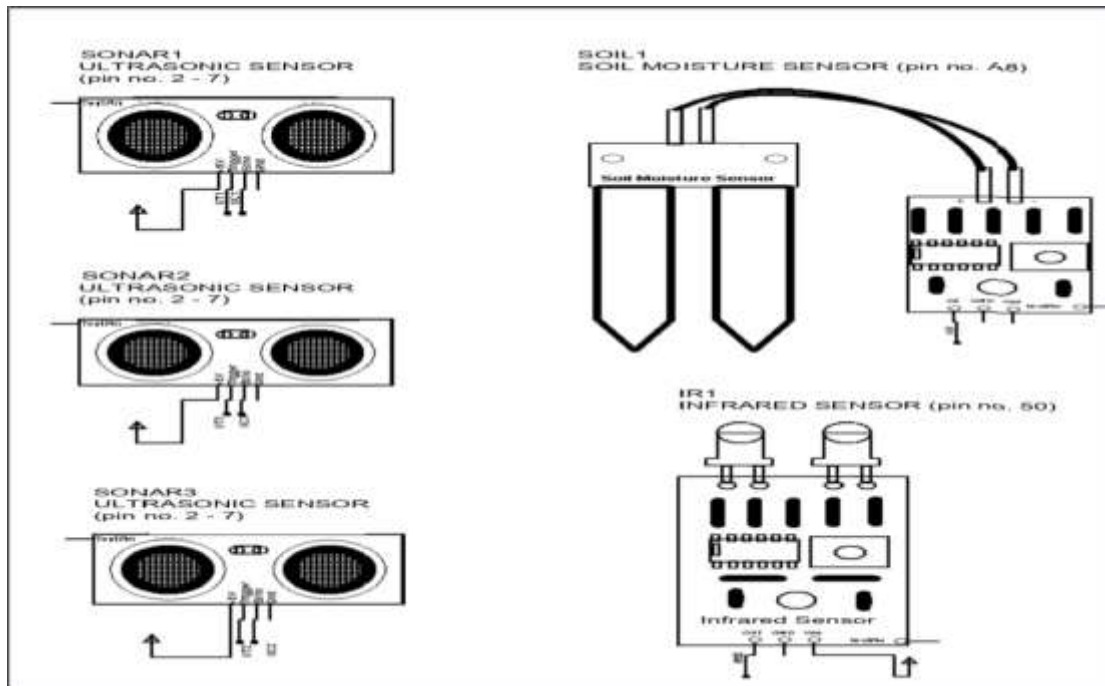


Fig -3: Sensors

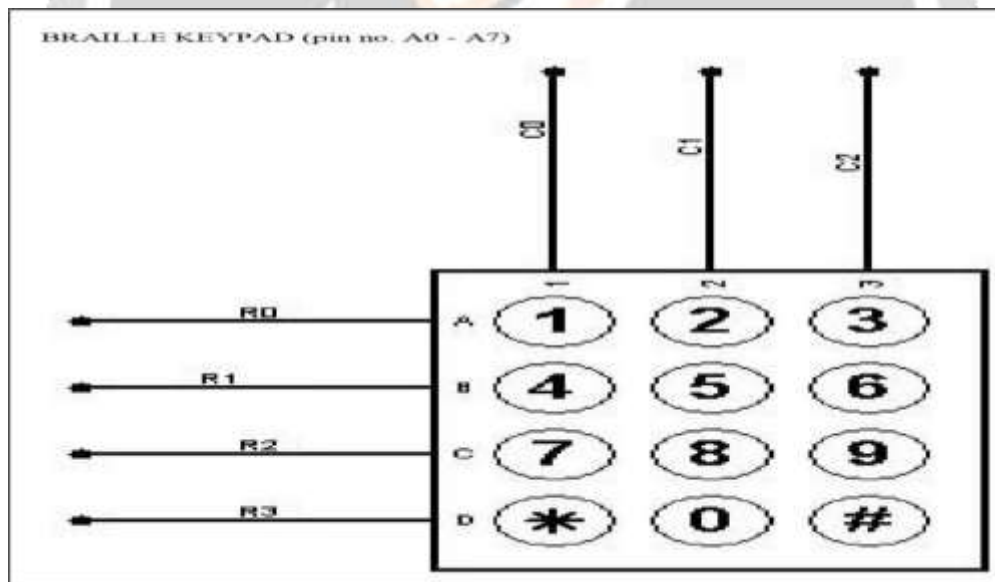


Figure 4:Braille Keypad

4. CONCLUSIONS

The blind stick proposed in this project can aid the visually impaired user by helping him/her navigate through different terrains and obstacles. The Stick is also able to inform the users location to their caretakers depending on the button pressed in case of emergency or distress. The new feature braille keypad is added which helps to send messages to different concerned people according to the different situation. The remaining keypad can be used for different function as per the need.

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