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Smart Navigational Shoes for the Blind Person

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Abstract: This paper introduces a thought regarding managing the issues looked by blind people through smart shoes. A large portion of the general population is managing visual deficiency. So to keep away from this navigational shoe can be develop for blind people with obstacle detection and water recognition. In this system four vibration motors are utilized for giving the best possible indications like right, left, front and back. As indicated by the heading, motor will begin vibrating. So the visually impaired people can go anywhere without much of a stretch. IR sensor is utilized for obstacle detection In the project that the obstacle is distinguished out and about then buzzer will turn ON. Additionally if the water is available on street it will distinguish by water sensor lastly this information will show on LCD.

Keywords: Vibration Motor, Bluetooth module, LCD, Obstacle detection, Float sensor, Arduino UNO.

I. INTRODUCTION

An embedded system is a computer system with a devoted capacity inside a bigger mechanical or electrical system, frequently with continuous figuring imperatives. It is embedded as a component of an entire gadget regularly including equipment and mechanical parts. Embedded systems control numerous devices in like manner utilize today. Android is a working system created by Google for portable systems. It depends on the Linux bit and intended for touch screen cell phones, for example, cell phones and tablets. Android's UI is chiefly in light of direct control, utilizing touch signals, for example, swiping, tapping and squeezing, to control on-screen objects, alongside a virtual console for content info. Our essential goal here is to make the best utilize of the sensors which are accessible within reach for constant deterrent location and route. The sensors to be utilized need to of least size and cost giving most extreme usefulness keeping in mind the end goal to help a visually impaired person explore and move around self-governing. The use of Android is confined to its highlights which are not visual but rather will in any case help a visually impaired person. The client should have the capacity to launch his application without viewing anything on the device with the sole help gracious the hardcoded keys on the Android device. All the highlights of the sensors, Arduino microcontroller and Android are to be consolidated to outline another device for self-sufficient portability of a visually impaired person.

II. LITERATURE SURVEY

A complete and reliable sensing system for obstacle detection can value a lot from the collective usage of numerous types of sensors, especially from the active - passive combination. Any precise type of technology may have hitches to meet all necessary necessities in order to detect an obstacle in various lighting or weather conditions. The muddle background and intricate moving patterns of all objects which may appear on a road scene in urban streets demand erudite processing of sensor inputs. In order to overcome this problem, a sensor - fusion and segmentation approach can be used. From the technology's point view, different sensing technologies such as ultrasonic sensor, microwave radar, laser scanner and computer vision can be used for obstacle detection task. The main problem is to design algorithms that are robust enough to reliably detect and warn for any obstacles that can appear in front of the user on the road area. A motion supporting device is proposed which can be used to help navigate in the surroundings and avoiding from collisions with obstacles. This could help decrease health costs incurred and improve the quality of care and independence of the elderly. Conventionally, mobility-assisting devices have been electromechanical devices, in which the main function is to provide physical support for the elderly whilst moving around using canes and wheelchairs. Microcontroller and wireless network applications and usages have increased the functionality of these devices in terms of obstacle detection and information processing. They have also brought in stirring new concepts, which make these devices to be hands free and small. The system which is proposed here is based off optical and ultrasonic sensors. These are able to detect a wide range of obstacles, such as small objects on the walkway, large static obstructions (e.g., building wall), as well as stairs and uneven surfaces, and hence warns the wearer several times before making contact with the object.

III. PROPOSED SYSTEM

In our proposed system we design a shoe that navigates the route from source to destination. Since the system is implemented in shoes we used a battery for power supply. Bluetooth is used to get the location coordinate from mobile phone by using GPS setting from mobile. Need an android app for searching the route destination to source route. We

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are proposing novel technique to assist blind person to track route in efficient way. The shoes sync up with a Smartphone app that uses maps and vibrate to tell users when and where to turn to reach their destinations. When any blind person need to go on obscure street or we need to discover our goal for this reason we are utilizing GPS for course following however it is not helpful to utilize GPS amid the driving. So to overcome or to fathom this issue we are accompanying new innovation which will fulfill our trip to following the course. Our system would rotate around thinking of a navigational shoe model that could match with cell phone utilizing bluetooth and help to give navigational data through vibration motors put all around shoe. Basically, these shoes could give signs about when to proceed, where to go ahead and what kind of swing to take (left or ideal) to individual impaired wearing these navigational shoes. The control unit gives vibration according to the route coordinates in shoes to indicate blind person. So the visually impaired person moves in the direction of the vibration. In such case it is exceptionally unpredictable assignment to see a mobile phone on an opportune premise. Henceforth require route without using much phone. Navigational shoe is a shoe which gives you the bearings in like manner. Vibrations are furnished with the assistance of which client come to know where to go ahead. GPS i.e. worldwide situating system assumes a key part in this. To begin with client needs to set the goal on his telephone and tap the begin driving catch, naturally it will take client's present area as source i.e. begin point for drive and begins giving esteems. The scope and longitude of client is figured to know the present position after he/she begins moving. The estimations of scope and longitude bringing from GPS and gave to the advanced mobile phone. An advanced cell needs to associate with shoes for association. A microcontroller is settled in shoe which is in charge of further handling. Subsequent to getting esteems from PDA, microcontroller forms the information and as needs be client gets vibrations accordingly. Right cultivator will vibrate when right swing should be taken and left shoe will vibrate when left swing should be take. Additionally if the water is available on street it will distinguish by water sensor lastly this information will show on LCD.

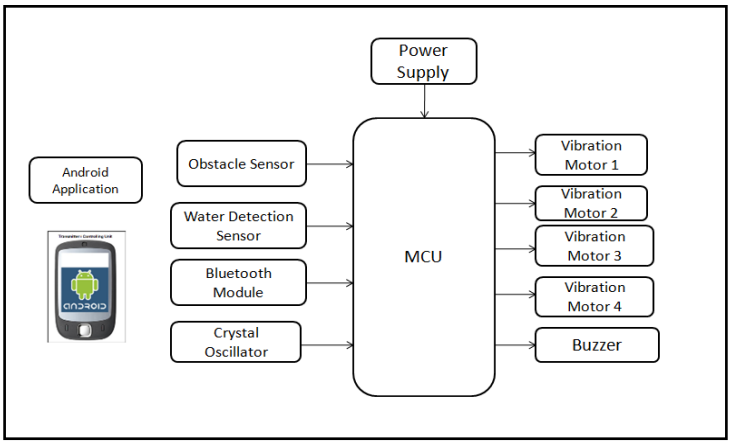

Figure 1: Block diagram of proposed system

IV. HARDWARE REQUIREMENTS

1. Microcontroller: AVR: 5V, 8-bit, 16 MHz

Arduino/Genuine Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. Connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

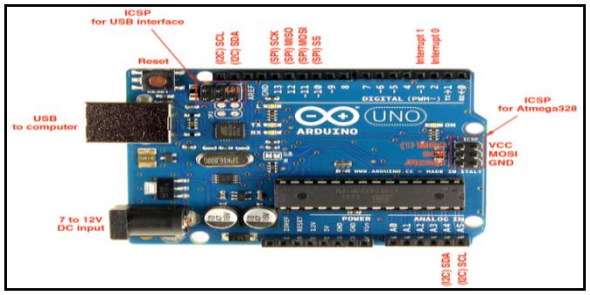

Figure 2: Arduino Board

2. Ultrasonic sensor

An Ultrasonic sensor is used to detect the obstacle that can gauge the distance to an object by utilizing sound waves. It allots separate by sending a sound wave at a particular frequency and tuning in for that sound wave to bounce back. By

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recording the slipped by time between the sound wave being produced and the sound wave bobbing back, it is conceivable to ascertain the separation between the sonar sensor and the object.

Figure 3: Ultrasonic Sensor

3. Bluetooth

HC-05 Bluetooth Module: HC-05 module is a simple to utilize Bluetooth SPP (Serial Port Protocol) module, intended for straightforward remote serial connection setup.

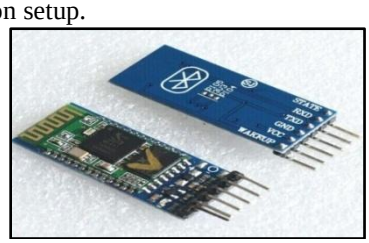

Figure 4: Bluetooth

4. Vibration motor

This tiny vibration motor produces vibrations by spinning an eccentric shaft at over 9000 RPM when powered at 1.5 V. It is intended for operation around 1.5 V), and polarity is not important (the motor can run CW or CCW). See the datasheet under the resources tab for more information on this motor.

Figure 5: Vibration Motor

5. Water Sensor

It is a simple sensor and it is an easy to use tool for detecting water. It can act as a simple switch, where the switch is normally open and when there is water, the switch closes.

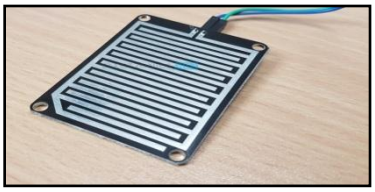

Figure 6: Water sensor

V. SOFTWARE REQUIREMENT

- Android Studio
- Xampp server
- Operating System : Windows 10
- Technology : Java, J2EE
- Web Technologies : Html, JavaScript, CSS
- Web Server : Tomcat server
- Java Version : J2SDK 1.7 / 1.8

VI. SYSTEM IMPLEMNTATION

Software modules:

- Select Rout
- Bluetooth connection module for object detection

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- Google map origin and destination to identify the turns
- Live navigation

Dijkstra's Algorithm:

- Set the distance to the source to 0 and the distance to the remaining vertices to infinity.
- Set the current vertex to the source.
- Flag the current vertex as visited.
- For all vertices adjacent to the current vertex, set the distance from the source to the adjacent vertex equal to the minimum of its present distance and the sum of the weight of the edge from the current vertex to the adjacent vertex and the distance from the source to the current vertex.
- From the set of unvisited vertices, arbitrarily set one as the new current vertex, provided that there exists an edge to it such that it is the minimum of all edges from a vertex in the set of visited vertices to a vertex in the set of unvisited vertices. To reiterate: The new current vertex must be unvisited and have a minimum weight edges from a visited vertex to it. This can be done trivially by looping through all visited vertices and all adjacent unvisited vertices to those visited vertices, keeping the vertex with the minimum weight edge connecting it.
- Repeat steps 3-5 until all vertices are flagged as visited.

VII. IMPLEMENTED SYSTEM

Figure 7: Implemented System

VIII. CONCLUSION

The Proposed execution introduces the general system of a system for following and checking courses in obscure regions. The system comprises of small scale controller, vibrator engine, Bluetooth gadget and Hand held application which comprises of GPS administrations. In this we are actualizing the Smart Shoe which is wearable and it can be utilized as a part of any outside condition while being append able to shoe. It can be utilized easily by client to increment simplicity of utilization.

IX. RESULT

Thus, with the ease of use and faster response time, a visually impaired person can sense, feel, listen and walk with the environment around him with the help of these Smart Shoes.

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