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Smart Shoe for Visually Impaired

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Abstract: Eyes play important role in our day to day lives and are perhaps the most valuable gift we have. This world is visible to us because we are blessed with eyesight. But there are some people who lag this ability of visualizing these things. Due to this, Visually impaired people face many challenges when moving in unfamiliar public places.285 million people are estimated to be visually impaired worldwide: 39 million are blind and 246 have low vision. Hence, wearable device should design for such visual impaired people. Smart shoes is wearable system design to providedirectional information to visually impaired people. To provide smart and sensible navigation guidance tovisually impaired people, the system has greatpotential especially when integrated with visualprocessing units.During the operation,the user is supposed to wear the shoes. When sensors will detect any obstacle, user will be informed through Android system being used by the user. The Smart Shoes along with the application on the Android system shall help the user in moving around independently.

Keywords: Navigation, Android, Smart Shoes, Visually impaired, sensors.

I. INTRODUCTION

According to survey of WHO (World Health Organization) held out in 2011 we come to know that in world about 1% of the human population is visually impaired and amongst them about 10% is fully blind. The main concern for blind people is mobility. They need to depend on other for mobility. This approach present a tool for visually impaired people that will help them to navigate. Now android mobile is commonly used by everyone. With help of Android application, wearable device is to be madenavigate path. The system we have designed consists of sensors and vibrators for sensing the surrounding environment and giving feedback to the blind person of the position of the nearest obstacles in range. The idea is toextend the senses of the user through this after a training period, without any sensible effort. We propose smart shoes for blind people. Electronic component is fixed in shoes of users. User will wear shoes for easy mobility. Sensors will sense obstacles, vibrators will vibrate for left/right turn through path. Using smart shoe, blind people need not to be depend on others for mobility. This paper describes the architecture and discusses the possible benefits of the system we have designed. In this work, system is designed which is cheap, a simple friendly user, smart blind guidance system. It is implemented to improve the mobility of both blind and visually impaired people in a various area.

II. LITERATURE SURVEY

1. Object Detection System for Blind People

Various diseases caused by Visual impairment and blindness has been hugely reduced, but there are many people who are at risk of age-related visual impairment. Visual information is the basis for most navigational tasks, so necessary information about the surrounding environment is not available to visually impaired people are at disadvantage. In this context system propose a system, named Smart Vision, the ability to move around in unfamiliar environment whose objective is to give blind users, whether indoor or outdoor, a user friendly interface. This paper propose mainly in the development of the computer vision module of the Smart Vision system.

2. Wearable navigation assistance - a tool for the blind

This paper describes tool for a navigation for visuallyimpaired persons. The important parts are: a multi-sensory system (comprising stereo vision,acoustic range finding and movement sensors), a mapper, a warning system and a tactilehuman-machine interface.

3. Ultrasonic Smart Stick for Visually Impaired People

Making walking stick smart and more helpful is the aim of this paper is to get familiar with the work done. The literatures related to this topic were reviewed and analyzed. These smart sticks need to be modified as technology improves. The simulation results are calculated for the ultrasonic sensors, water sensor and Bluetooth model in one microcontroller. So work related to this project is done in this paper wide survey and we have shortlisted some useful aspects from each project. This will also help to decide designing approach

4. Energy Harvesting for Smart Shoes

Consumer reliance on wearable electronic devices has grown significantly in the past decade. As wearable electronic devices evolve and proliferate, there will be a growing need for more power delivery to distributed points around the

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human body. The current approach to power distribution is clearly becoming problematic as more appliances are carried. We are forced to either use more small batteries that require replacement everywhere or run wires through our clothing to supply appliances from a central power source. A new approach, which eliminates the power wiring problem, is developing and storing electric energy at the devices themselves by scavenging waste energy from human activities. The human activity of walking is an important source of energy harvesting. According to estimations, 67 watts of power are available in the heel movement of an average (68 kg) person walking at a brisk pace. But only a few percentage of this energy is suitable for the alimentation of an electronic device. This problem is approached by using the energy from the weight transfer during a step to perform useful work. So this paper is focused on the development of an "easy to use" and "cheap general purpose" device for the storage and management of the harvested energy with particular applications on shoes.

5. A Shoe-Embedded Piezoelectric Energy Harvester for Wearable Sensors
Wearable sensors are becoming smaller and increasingly widely used, resulting in an increasing need for independent and compact power supplies. Electrochemical batteries, cannot meet the need because of their limited energy storage capacity and potential environmental and health risks. This has driven the development of wearable energy harvesters, which harvest the mechanical energy dissipated in human motion to provide renewable and clean energy. Piezoelectric energy harvesters and nano-triboelectric generators can convert mechanical energy into electric energy directly, thus their structures are more compact and simpler in comparison to those of other types. The mechanical energy dissipated in shoes can even power a computer, serving as an attractive energy source for wearable harvesters. This paper develops a shoe-embedded piezoelectric energy harvester, which can be integrated in a shoe readily for energy harvesting from human locomotion. Two harvester prototypes are made and tested. The first one is made up of a multilayer polyvinylidene difluoride (PVDF) film and a structure of engineering plastics, which is placed under the heel. The second one is designed as an insole shape and used as a normal insole, consisting of a structure of flexible silicone rubber and two multilayer PVDF films. In order to store the harvested energy and provide a constant DC output voltage, a power management circuit is designed.

6. Optical Device Indicating a Safe Free Path to Blind People
Pathfinder using a LED and aphotodiode An active optical is implemented because an electronic travel aid to improvethe mobility of persons who are blind. By using radiometric calculations the protected path isoptimized. typical configurations of obstacles are studied: an opening, a sidepanel, a front panel, and a post of Protection zones is proposed. The results in real configurationssuch as parked cars, trees, and dustbins are presented too. Finally,we explain how the device which can be used in real life by visuallyimpaired people, in conjunction with the typical white stick.

7. Wearable Obstacle Detection System for Visually Impaired People
This paper presents an obstacle detection system to help visually impaired people. User gets alerted of nearest obstacles in range while traveling in their environment. The system we propose detects the nearest obstacle via an ultrasonic sensor system and sends back feedback to inform blind person about its location. The system aims at increasing the mobility of visually impaired by offering new sensing abilities.

III. EXISTING SYSTEM

Stick is provided to blind or visual impaired people to navigate path. Using stick, blind people come to know about obstacles but they need someone to navigate path. Use of stick is not efficient. It becomes harder for blind people for mobility. Dependency of these people has been increased. Other option is to provides the besttravel aid for the blind is the guide dogs.Dogs are trained according to their owner requirement. complex situations like cross walks,stairs, potential danger, know paths andmore is detected analyzed . handle fixedon the animal pass Most of the information through tactile feedback by theAttitude of his dog is analyzed and The user is able to feel the, analyze the situation andalso give him appropriate orders. But guidedogs are still far from being affordable,around the price of a nice car, and theiraverage working time is limited.

IV. PROPOSED SYSTEM

We are proposing novel technique based on IoT implementation. Wearable device i.e. smart navigational shoe is proposed. Electronic kit is fixed in shoe which can be used by blind or visual impaired person. Hardware kit consists of four vibrators, one Arduino, Bluetooth connection and one battery. Sensors will sense any obstacle detected while moving along path. It will be informed to users. An Android application is developed which is integrated with smart navigational shoes. User will enter source and destination in phone. Path is displayed using map to users. This application is integrated with shoes. According to path, vibrators will vibrate along that path. If left turn need to take according to navigation , Vibrator set on left side will vibrate. If right turn need to take according to navigation , Vibrator set on right side will vibrate. Architecture diagram of hardware is as follow.
Bluetooth connection is provided through which mobile and electronic part can be connected. Approach is to make user friendly system for blind as well as visually impaired person.

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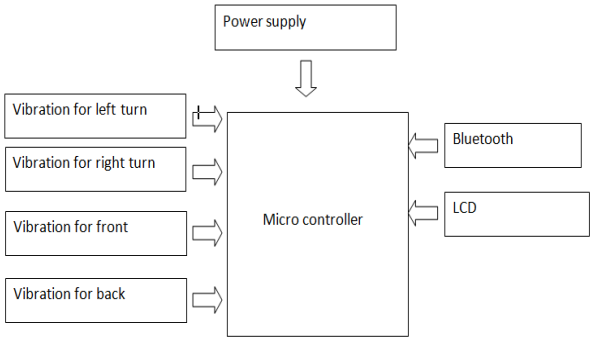

Fig:- Block diagram

Fig:- Over view of Proposed system

V. ADVANTAGE

1) The comparably higher accuracy and better comprehensibility , simplicity and low weight of a actuator System.
2) It does not require users to hold or carry their smartphones in specific ways in order to be able to navigate properly.
3) Navigation Assistance while travelling.
4) Distraction-free travel.
5) Automatic rerouting and alerts.
6) Various User-controlled Vibration pattern.
7) User friendly system.

VI. CONCLUSION

In order to make use of latest technology, we have proposed android based navigational shoes system. Wearable electronic kit is proposed. Main goal of this proposed system is to provide navigation assistance for this visually impaired person. Sensors will detect obstacles and vibrators will vibrate accordingdirection. Right cultivator will vibrate when right swing should be taken and left shoe will vibrate when left swing should be taken. Our approach is make easy application to make visually impaired person to live independently.

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