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e-Vision: An Innovative Electronic Travel AID (ETA) sor Visually Impaired

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Abstract
Blind people face every day problems in commuting from one place to another, be it indoors or out on the road. This paper presents an ultrasonic sensor which detects obstacles in the way. A voice recognition system identifies the voice and according to input processes the destination.
This paper presents an electronic navigation system for visually impaired and blind people (subject). This system understands obstacles around the subject up to 500 cm in front, left and right direction using a network of ultrasonic sensors. This proposed system uses ATMEGA32 microcontroller based embedded system to process real time data collected using ultrasonic sensor network.
The RFID section uses an array of cheap RFID cards which stores location address data, the RFID reader (pen shaped) reads data from the cards according to the user voice input. The outpit of this a GPS type speech navigation system.
Keywords: Visually impaired, voice recognition system, ultrasonic sensor network, RFID.

Introduction
Imagine walking into an unfamiliar airport. The places we have to search for, airline ticket counter, security check-in, boarding gate, are difficult to find even with signs. Imagine how much of a challenge this would be if you cannot even see the signs! Everyday situations present similar challenges. The problem of indoor navigation remains largely unsolved. It should be noted that mobility and navigation are two distinct problems. Outdoor mobility can present more potential dangers to blind travellers because obstacles and hazards such as motor vehicles and dangerous terrain can be life-threatening. Since indoor hazards tend to be far more benign, the safety issues addressed by typical travel aids are less useful indoors.

According to survey conducted in 2009 by World Health Organization on disability, there are 269 million visually impaired and 45 million blind people worldwide. Ageing populations and lifestyle changes means that chronic blinding conditions such as diabetic retinopathy are projected to rise exponentially. Without effective, major intervention, the number of blind people worldwide has been projected to increase to 76 million by 2020 if current trends continue.The goal of this project is to develop navigational assistance technology for the blind or visually impaired. Specifically, we seek to develop a portable Electronic Travel Aid (ETA) for visually impaired users, along with the accompanying radio frequency identification (RFID) localization infrastructure used to equip buildings. In our research through literature, interviews and ethnographies with the visually impaired and rehabilitation service workers, as well as interviews with various researchers we identified that one of the major problems the visually impaired experience is trouble with indoor navigation in unfamiliar buildings. Imagine the wide open spaces in an airport concourse; even if there are braille signs at the counters, the blind may not be able to find them! There has been little done in regards to indoor navigation in current assistive technologies, known as Electronic Orientation Aids (EOA)[1][2], possibly due to high cost for instrumentation and limited capabilities. The projects goal is to break down these barriers by introducing an EOA system which is relatively inexpensive for both the blind and the businesses that equip their buildings. We propose using RFID tags[2] to set up a location tagging

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infrastructure within buildings such that the blind can use an RFID equipped ETA to determine their location as well as software that can utilize this localization data to generate vocal directions to reach a destination.

Background description

The above ETA works on the simple principle of voice recognition in conjuncture with a RFID section and an obstacle detection system using ultrasonic sensors.

When the visually challenged person speaks the location in to the microphone, the system recognizes the destination, the RFID tags guide the person through to the destination using RFID reader pen attached to at theend of the blind man's stick[2]. The Ultrasonic sensors which are five in total will detect is there is any obstacle ahead and notify the person using a buzzer or with a simple vibration[1].

Materials and methods

The ETA that we will make will contain the most efficient modules available to our disposal.
The RFID section will consist of an array of RFID cards placed at a determined distance. An RFID reader(pen sized). The Ultrasonic sensor HC-SR04 a total of 5 in number. Two of which will be fitted over a pair of spectacles to detect obstacles above the waist height, while the remaining three will be affixed on a waist belt that will detect obstacles at waist height and below it.
The voice recognition device an HM2007 based system stores trained words and recognizes them when detected. A voice conversion module that converts pre-stored RFID card data into voice. The output modules contain a buzzer, a speaker through a 3.5mm jack, an LED array, and an LCD display for trial and testing purpose.

Figure:

Figure 1: Block Diagram

Observations

The previous ETA's either contained the RFID section or the Ultra-Sonic section. No ETA had both the systems integrated. The e-Vision ETA uses both the RFID and Ultra-Sonic sections into one system, enabling the visually impared to guide through difficult places like a mall a railway station, bus terminal etc.

For the future implementation instead of a fairly expensive voice recognition we can use a handheld device such as a mobile phone with integrated application embedded into it. This integration with the hand held device will make the system less bulky more efficient and lite.

Conclusion and future work

This paper will be the basic paper of our project future implemtation would yield complete paper which would contain every other detail.
The solution that we propose for this problem consists of an RFID reader carried by the user, and a network of inexpensive RFID tags in the building to be navigated. The RFID reader will be connected to a portable computing device such as a cellular phone. This device, the ETA, will use prepared map data to determine the user's present location and the route to a destination specified through a voice interface or using buttons on the device.

References

[1] Shripad S. Bhatlawande, JayantMukhopadhyay and ManjunathaMahadevappa. Indian Institute of Technology, Kharagpur, India.
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