

Blind Audio Guidance System

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ABSTRACT

Today, blind or visually impaired people have a wider array of career possibilities than ever before in history because of a combination of events. They can be successful in almost any job. We cannot count the number of different jobs people who are visually impaired are engaged in today or will be in the future. The possibilities of visually impaired people are enormous these days because of the development in advanced technologies. But can the latest advances in technology help in creating a friendly and conducive environment for the blind and visually impaired? This paper evaluates the use of RFID (RADIO FREQUENCY IDENTIFICATION) as a possible cost-effective solution to the problem of guiding blind or visually impaired people, after examining its pros and cons. This paper describes the technical and functional architecture of the system for orientation and guidance of a blind person using available modern technology. The described system consists of a digital sensor for determining the location by dead reckoning technique, radio frequency marks in space and handheld device that provides voice guidance instructions.

I. INTRODUCTION

India has the largest population of blind people in the world. That's over 12 million people. Blindness, the most severe form of visual impairment, reduces people's ability to perform daily tasks without assistance. Those who are blind or suffer from a visual impairment feel helpless under these circumstances. Some are comfortable with the idea of having a dog as a constant companion in order to get assistance. However, it is not always easy to get a well-trained pet. Most of them live in the poorest parts of the country with little or no access to even basic health care facilities. The issues of navigation and organization for the blind are very

diverse and complex in nature. Navigation can be especially troublesome for a visually impaired person. However, for a visually impaired person, doing things such as reading traffic signals and street signs can be extremely challenging, if not impossible. In order to overcome these challenges, a visually impaired person might use none, one, or even a combination of the following means of aid depending on their skill level and personal preference: walking cane, guide dog, and sighted guide. The sighted guide can be immensely effective, as well provide social comfort, though it restricts the independence of the blind individual. Guide dogs and walking canes allow for a more independent means of travelling, although they are limited in unfamiliar environments.

The Blind Audio Guidance System can provide a solution to this problem.

a. Current Patents and Existing Technologies In India:

- **Smart Canes** – provide obstacle detection.
- **Sonar vision glasses** – also may provide obstacle detection.
- **GPS navigation systems** – provide directions, but not reliable or accurate enough for use in buildings.

II. WHY NOT GPS NAVIGATION SYSTEM?

Well, the question arises in everyone's mind why to go with the unfamiliar RFID rather than our conventional GPS. Global Positioning Systems (GPS), which are the rapidly growing technology, have been a major breakthrough in the usage of satellite technology, allowing users to identify their real time location anywhere in the world. GPS based

products which can plan routes within seconds are already widely available to consumers. Ground shipping companies have started to take advantage of GPS since it has the ability to provide useful real time information. In spite of all these advantages the reason for discarding Global positioning systems (GPS) is that it can be rather efficient in unfamiliar environments, but are still very expensive and unusable indoors. The GPS cannot have the facility to retrieve information about the indoor environment. This is the paramount reason for hanging on with the Radio Frequency Identification which is otherwise known as RFID.

III. WHAT IS RFID?

So basically, RFID is nothing but RADIO FREQUENCY IDENTIFICATION. Radio frequency (RF) technology is a very small chip for the purposes of automatically identifying and tracking tags attached to objects commonly used to transmit and receive information without wires. It is a non-contact system that uses radio frequency electromagnetic fields to transfer information to another for the purpose of automatic identification. A wide variety of electronic devices such as television, radio, and wireless telephone use radio frequency technology to transmit or receive information. Government should implement this system as a solution for blind people problems because it will improve their navigation, will replace the methods used before, it will increase their dependence and also it will provide more security.

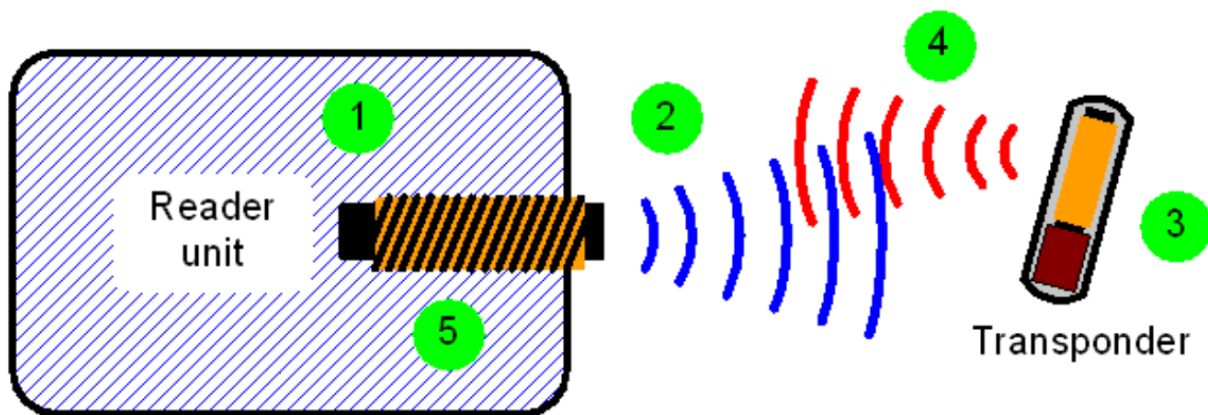


FIG. NO.1 TRANSMISSION AND RECEPTION OF RFID

IV. WHAT MAKES THE RFID SYSTEM UNIQUE?

While all of the steps taken so far have been helpful in increasing independence for the blind and partially sighted, there are still many everyday obstacles that are difficult to overcome. Organizational tasks can be difficult to do for a blind or partially sighted person. Packaged food items are indistinguishable by touch, as are other common items such as medicine bottles. Additionally, navigation can be difficult for the blind when

attempting to determine what roomhe/she is about to enter, or what street they are turning on. For a blind person, a simple tripdown to the local convenience store can be mentally tiring. Unlike a sighted individual, they can never allow their mind to wander, and must always carefully observe their surroundings. Preliminary research into the use of technology has shown an improvement with this aspect of navigation, with one user indicating that it “successfully decreased the cognitive load that must be devoted to navigation so that he could concentrate more on conversation. This is precisely why any advancement in navigational and/or organizational aids can make a serious difference.

V. WORKING

ActiveWave RFID solutions use modern wireless technologies to help you track inventory and equipment. An ActiveWave RFID system is composed of an RFID reader, a standard Windows based PC, and RFID tags or transponders. The RFID tag is attached or placed inside of the equipment or inventory. ActiveWave RFID tags contain microelectronic circuits that store product information. The tags transmit this information to a remote RFID reader using WIRELESS TECHNOLOGY.

Initially, the RFID reader, holding the microcontrollers and microchips is installed in the buildings. When a person wants him/her to be guided, he speaks the destination by pressing the

sound button. This gets recognized by the RFID reader and the RFID reader uses radio waves to communicate information between a tag, which stores information, and a reader, which interprets the information being told. RFID provides online information. Each RFID tag contains a unique ID and it generally contains an antenna that creates a small charge that is enough to cause the tag to transmit its ID." the blind person can be monitored receiving information from a central base for being help in case of emergency



FIG. NO 2. A BLIND LISTENING TO AUDIO INSTRUCTIONS GIVEN

VI. NAVIGATION SYSTEM

The RFID system improves the navigation in two kinds of environments:

- INDOOR ENVIRONMENT
- OUTDOOR ENVIRONMENT

A. INDOOR ENVIRONMENT

It provides travel information from location to another, describing position and location. It can be inserted in pathways inside a building and give information about room numbers, corridors and also

the name building. Indoor navigation infrastructure is used with Wi-Fi and Bluetooth.

B. OUTDOOR INFRASTRUCTURE

It is concerned with route of information from the origin to the destination. It is waterproof and heat resistance. This allows for a self-describing, localized information system with no dependency on a centralized database.

VII. OPERATION

The Blind Audio Guidance System using Radio Frequency Identification. The system hopes to provide a portable unit that can easily be carried and operated by a visually impaired user. It could easily be incorporated into a walking cane. The steps involved in this method are the following

STEP 1: It hopes to allow visually impaired users to simply press a button, speak the desired destination.

STEP 2: The person will be guided there with the use of audio instructions. The audio instructions are predefined.

STEP 3: The guiding cane is used that identifies the obstacle in the pathway of the visually impaired person.

STEP 4: When an obstacle is detected by the BLUETOOTH earphone on the cane, then immediately the person is alerted by the audio instructions.

STEP 5: Once he reaches his destination point, a message is sent to the person.

Thus this makes the life of visually impaired people.

A systematic representation is shown

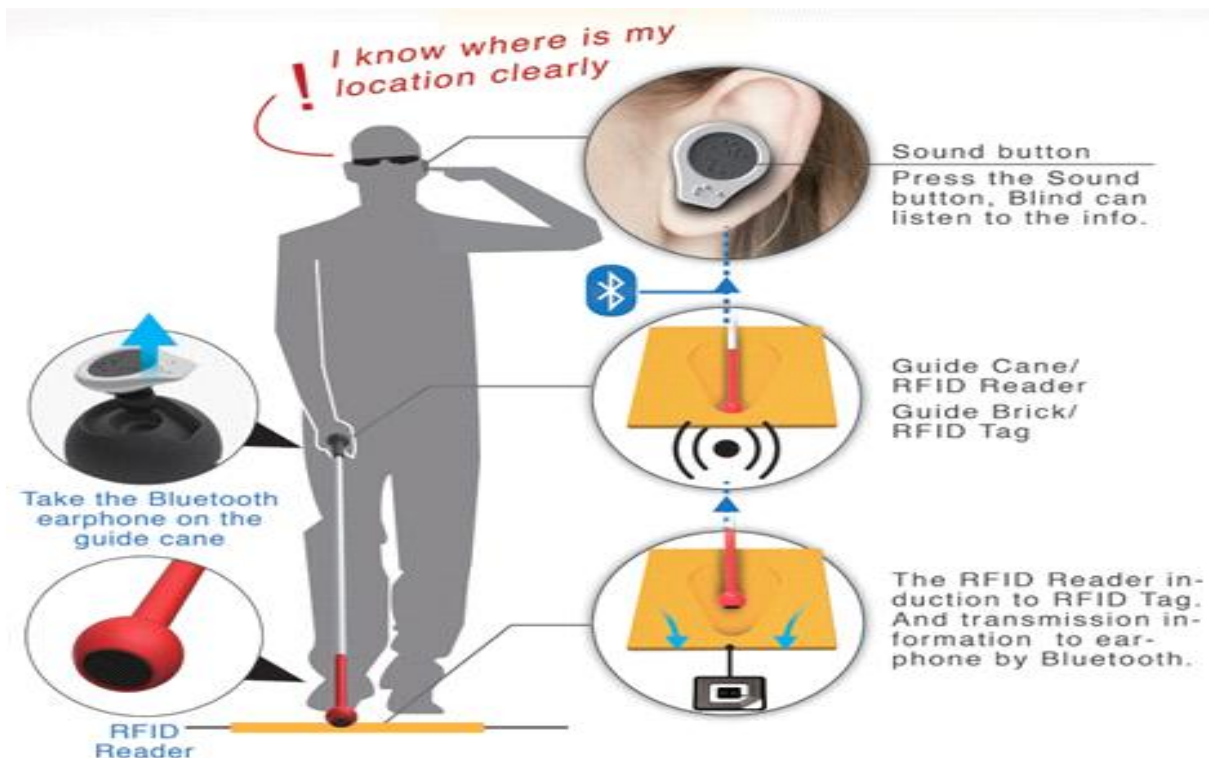


FIG NO 3: A PERSON USING RFID SYSTEM

VIII. ADVANTAGES OF RFID

The most basic question is why to use such novel technology when we have our antiquated Wireless sensors which require high amount of sensors making circuit complex.

RFID has more uses over other technologies.

- No special positioning needed
- Fast - Read or write to many labels or tags at the same time
- Easy to install
- The RFID will provide more security.
- They provide security for the user and the information stored, protecting the coordinates of navigation
- Active tags can send information to a reader anytime
- Identify items even when they're moving
- Store useful information on active tags
- Active tags can be configured for a specific application
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IX. CHALLENGES

- Low cost RFID readers have a short read range.
- Long range readers require more power and cost much more.
- Speech recognition may be problematic due to unwanted noise and false reads.

X. WAYS OF OVERCOMING THE DIFFICULTY:

When a new technology is invented, it doesn't mean that its features are all advantageous. There will always be a disadvantage. But the thing in this system the disadvantages are less compared to other methods. This makes the people feel comfortable about this method.

The cost is low and also the range provided is also low. This can be easily overcome by using this RFID reader in all places, like in all buildings. This provides more range and cost will also be considerable. If the reader is installed in many places then the power requirement is also less. Thereby the second disadvantage would also be neglected.

XI. CONCLUSION

The system is on this way to become a viable solution for aiding in the organization and navigation for the blind and partially sighted people. This would allow the blind to save money and avoid a lot of expenses since the difference to maintain and pay the dog guide or human guides is quite large. System will increase their confidence enabling them to move independently and in an organized orientation in indoor and outdoor spaces and getting to be a more normal person in the society. This frequency radio will not allow the modification of the information.

XII. REFERENCES

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