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A PATH FOR HORIZING YOUR INNOVATIVE WORK

## BLUE-FI BASED NAVIGATION SYSTEM

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**Abstract:** The major challenge in front of visually impaired person is a way finding- the ability of a person to find out his own route. Generally it is seen that those impaired persons need to depend on other persons. In the outdoor environment they do their work with the help of GPS. Most Visually impaired persons tend to do their productive work in the indoor spaces like offices, schools etc. and do not wish to be socially awkward. The GPS is only work in open atmosphere but those signals cannot be useful at the indoors. Wi-Fi infrastructure which works outdoor as well as indoor area. There is no any requirement for special arrangements of special network like RFID and mesh network in the Wifi infrastructure. Here we prepare a review paper for a mobile-phone based indoor navigation system which is easy to use, low-cost.

**Keywords:** Bluetooth, Wifi, Wifi access points, speech synthesis etc.



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## INTRODUCTION

The number of people with visual disabilities is around 135 million, of which 45 million are blind[5]. For people with visual disabilities navigation in unfamiliar buildings is more difficult than outdoors. Visually impaired persons have a lot of problems to acquire environmental information. Moreover, obstacles which are not dangerous to ordinary people are able to become dangerous to them. Most of time they need to be depend on other persons for their work. Though they use blind stick to acquire these information, it is still hard for them to walk around in most of the places and also not cover whole area. A lot of studies have been done to develop a system which assists blind people. The main difficulties in the indoor navigation are : missing known landmarks, overcoming obstacles it might be risky sometimes, not all the blind can read Braille tags. One of the major disadvantages of the existing indoor navigation systems for the blind is the high price of hardware part, which in most cases is not consistent with the income of blind people.

The work we present in this paper is based on the review of some latest papers which are based on bluetooth and wifi to improve visually impaired people mobility. Here we explain the low cost infrastructure and easily available wifi and the bluetooth in mobile phone.

### 1. MATERIALS AND METHODS

#### 1) Bluetooth :

Bluetooth is the first wireless technology. Bluetooth is useful for short-distance device-to-device communication. The most basic form of Bluetooth connectivity exists in the form of the master and slave. A master Bluetooth device is connected and communicates with a number of slave devices in the network. The bluetooth is generally use for connecting the devices for exchanging the data between them.

- Bluetooth access points:

Bluetooth is a device having accessing in the range of 10 meters. These access points are need to help core bluetooth protocols like link management protocol, logical link protocol & service discovery protocols. there is a one more need require is of radio frequency communication protocol which supplied the binary data. Bluetooth beacons can be easily attached to wifi at decision points to help determine the location of a user. The smartphone app, after detecting a Bluetooth beacon in discovery mode, will provide associated navigation messages to travelers. The navigation program runs continuously in the background as a service on the smartphone. It will continuously scan for Bluetooth devices in the vicinity and identify available information

related to work zone and signalized intersection by comparing the ID of detected Bluetooth beacons with the spatial database. And then tell the direction via speech synthesis.

How to measure distance by bluetooth access points:

- $y$  = dependent variable
- $\alpha$  = regression coefficient
- $x$  = input variables
- $\beta$  = error term

$$y = \alpha \ln x + \beta$$



Fig1: Bluetooth System

## 2) Wi-Fi :

Wi-Fi is another technology we considered to locate the user. Using Wi-Fi access points, we would the user's location based on signal strength. Wi-Fi works by mapping received signal strength indicator into a distance. The system uses both Wi-Fi and Bluetooth requiring the user must connect to both networks when entering a building to determine their location.

Wi-Fi Access Points: They allow to connect the wired network, like local area network. Network to provide access shared information and internet connectivity. In this paper it tracking the information from other devices and send it to server and vice versa.



Fig2 : Relation Between WiFi and Bluetooth Access Points

### 3)Server:

Server plays a very important role in the system. It stores the information of many assets. for example it stores the bluetooth addresses and device names in it, Which is used for the further process.

At the time of localization finding the database on the server being used.

### 4)Wi-Fi access points:

Wi-Fi access points are used for connecting devices. It connects the devices like the LAN.

How to measure distance by Wi-fi access points:

- $f$  = is the signal frequency (in hertz)
- $d$  = is the distance from the transmitter (in meters)
- $c$  = is the speed of light in a vacuum.

FSPL is the function of frequency and distance between transmitter and receiver.

$$FSPL(dB) = 10 \log_{10} \left( \left( \frac{4\pi}{c} df \right)^2 \right)$$

### 5)Node of Gateway:

The Gateway nodes are those nodes which are being used to connect the bluetooth & the WiFi network.

## III. SYSTEM IMPLEMENTATION

Blue-hi based system work as follows:

This system take the input from the gateway node and server which stores the distance information of different palaces from the user. This system is used for accurately find out the distance of the user.

The distance is calculated are as follows:

- $x_n$  : X-Coordinate of the receiver  $n$ (in meters)
- $y_n$  : Y-Coordinate of the transmitter  $n$ (in meters)
- $d_n$  : distance calculated by the corresponding model of the transmitter  $n$ (in meters)
- $x$  : unknown X-Coordinate of the receiver
- $y$  : unknown Y-Coordinate of the receiver

$$d_n^2 = (x - x_n)^2 + (y - y_n)^2$$

With the help of this equation it find out the exact location of user and other place.

- $\tilde{x}$  : vector of unknowns corresponding to the X-coordinate and Y-Coordinate of the receiver.
- $A, b$  : System of equations in matrix form

$$x = (A^T A)^T A^T b$$

Given this,  $x$  and  $y$  values, corresponding to the coordinates of the receiver, are estimated with the minimum amount of error.

After collecting and calculating the distance of user and the place through the Wi-fi and bluetooth gate way node it stores all the information at the server then according to the changing location the following process dectects the route to user.

The speech recognition, speech synthesis and command processing takes place as follows:

#### Speech recognition:

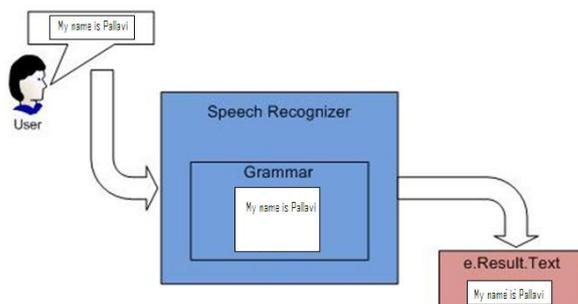


Fig 4:speech recognition

In the speech recognition ,it a process in which voice is converted into text format. It get the voice or command through headset from the user. speech recognition is a process to convert acoustic signal captured from headset. The recognized words are final results for processing to reply person.

**Speech synthesis:**

In the speech synthesis the text format is converted into the voice for the next step in which that voice is detected to the user in form of commands.

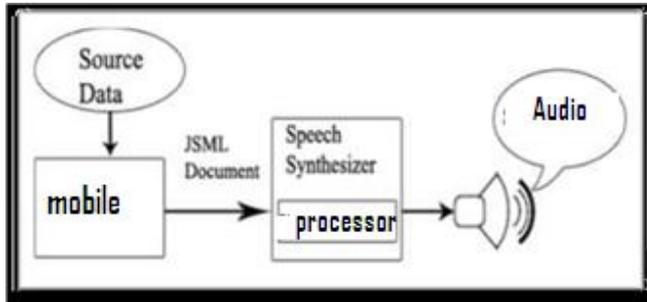


Fig5:Speech synthesis

**Command processing:**

In the command processing after understand the knowledge it can do the correct task, what the user need Then the interaction processes. simultaneously speak with user for effective communication and verify the task.

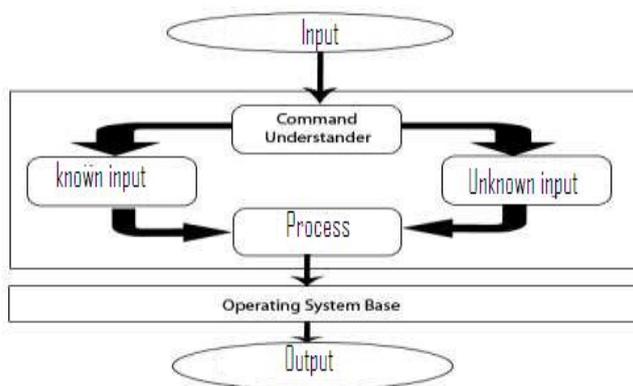


Fig6:command processing

**IV. RESULTS AND DISCUSSIONS:**

Thus in this paper we review the technique for visually impaired person with the help of bluetooth and wifi network which are having a low cost. In this infrastucture there no need do special arrangements of different tags for visually impaired persons and also no need to carry

any heavy circuit or anything with the user. only with the help of mobile phone he can able to track his own way.

## V.CONCLUSION

In this paper with the help of WiFi and bluetooth which are the low cost and easily available. wifi is the easily available infrastucture in the present decades. here we used the mobile phones for tracking and speech synthesis. which are easily available to any person. there is large scope after adding some recent features in this system. for example barcode scanner and generating the map. The most important thing related to this paper is it have the very low cost as compare to the other infrastructure like RFID, mesh network.

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