

# AN IMPLEMENTATION OF ANDROID MOBILE BASED LOCATION FINDER

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**Abstract**— Mobile devices are frequently used for communication. But now in these days this device is capable to perform more than simple voice chat and massaging. These mobile devices are running various applications and frequently used for web access and other computational task. These devices are designed using various utilities and sensors. Maximum android devices are made with the Wi-Fi access facilities for accessing the internet based service through Wi-Fi access points. This presented paper is an implementation and design of a monitoring and location tracking application by which, using android based mobile phones are used to invigilate the position of an end user.

**Keywords**—location estimation, Wi-Fi, Access Points, Android Devices

## I. INTRODUCTION

Communication is a traditional need of human, using these friends is connected to each other, and business information is distributed from one place to other. That is a revolution of communication system. Due to frequent uses of communication system and rapid need of new features are lead to converter traditional systems into newer kind of computing devices. Now in these days these devices are includes various different kinds of sensors and internet accessing facilities. Basically android mobiles are includes internet access, GPS tracking, and various other advance features. This proposed implementation is based on the Wi-Fi devices which are used by an android machine for accessing the internet based services. This feature is used here for invigilating the mobile devices for a college or any working campus. the paper includes the implementation of a web services and android machine based geo location tracking application which is uses the Wi-Fi access points for locating any node which is accessing the Wi-Fi in a campus without using the GPS sensors from the mobile devices. The main aim of the proposed system is to facilitate indoor monitoring and invigilation for able-bodied and impaired persons. The handheld devices will have the capability to guide a person along the most desirable path to their selected destination. The system will be easy to implement in buildings that have existing wireless connectivity. The basic functionalities must meet three primary objectives:

- Graphical path such as map is not generated from user location to destination.
- Routing algorithm is not used to calculate the optimal path from user position to destination.
- The device must be able to accurately determine its location in a building.
- The device must guide a user along an optimal path to their destination.

- The device must have an intuitive user interface.

These objectives will require accomplishing through the design and integration of subsystems.

- 1) The first objective is to be able to locate the handheld device in a building. The device should be able to use signal strength measurements of the available wireless networks to accurately locate itself in a building. The device should be able to look up its exact location in relation to the map according to the wireless propagation model.
- 2) The second objective is to use routing algorithms to be able to lead the user to their final destination by finding the shortest possible route and leading the user along it. Finding the optimal algorithm for determining the correct path with a minimum requirement for computing resources is necessary.
- 3) The third and final objective is to create a user interface that is intuitive. The user should be able to look up a desired destination and the device should be able to show the user a route to it. A database of possible destinations should be provided. In the building that we will be testing this application in, the device should support searching of the database by multiple parameters.

This section of the paper includes the basics of the proposed work with the primary goals to achieve. In the next section of the paper includes the introduction of the simulation scenario where the given application is working.

## II. PROPOSED MODEL

The proposed work is a development of an indoor navigation and location tracking system using smart-phone with Android operating system. Previous work

in this domain motivates us for development of a new approach that uses data from the device's to determine user's position and direction. To simulate the convinces in communication a routing algorithm calculates the optimal path from user position to destination. The proposed technique promise to provide future indoor navigation systems that can be used in verity of applications such as malls, museums, hospitals, and college campuses. The proposed technique is based on the organizational infrastructure which is currently used for providing the internet based services to the end mobile users. The basic concept behind the proposed work is to use the Wi-Fi access point for monitoring the mobile users in a campus with their accurate position. This method consumes RSS method for estimating the current user position.

The growing demands for location aware systems that filter information based on current device location have led to an increase in research and product development. However, most efforts have focused on the usability aspect of the problem and have failed to develop innovative techniques that address the essential challenge of this problem: the positioning technique itself.

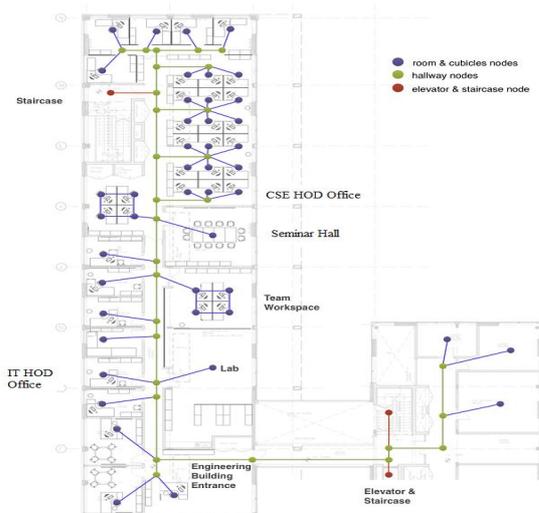


Figure 1 application infrastructure

The proposed system is a software application which is required to design using android based mobile devices and Wi-Fi access points. Using the Wi-Fi signal strength and the internet services with Wi-Fi enabled mobile devices monitoring is performed. This may have a disadvantage, to use the monitoring application continuous internet faculty is required for accurate positioning. The above given figure shows the computer science and information technology department infrastructure, which includes various Wi-Fi access points which is currently providing the internet based services. The proposed work is indented to design the monitoring system using the same infrastructure. Therefore some basic elements those are required for development is as:

**Network database:** that is a storage unit installed on the monitoring application, this data base includes a number of tables for access control and positioning data for a mobile devices. The mobile positioning table contains the information about the mobile device and current Wi-Fi access points. This information is continuously updated during a specific time. Each time the Wi-Fi device information is updated for getting information about where the mobile node available.

**Proxy server:** the monitoring server machine includes the proxy server, proxy server provides a way by which all the access points are continuously getting services from a static point.

**Monitoring server:** that is an application designed for keep the all information and estimates the mobile location according to the available data on the network database.

**Mobile application:** an android mobile application is also required to develop for gathering the access point's information. This application is collect the information and using the visual studio web services module update the mobile device information and Wi-Fi access point information into the data base.

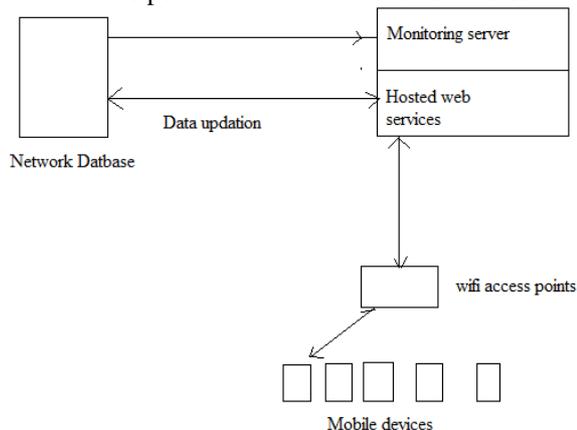


Figure 2 conceptual work flows

The above given diagram (figure 2) shows the system work flow of the proposed system. The system includes the independent mobile devices which are able to travel anywhere in the given infrastructure. these mobile devices includes an application which is able to gather information about the access points and using web services the mobile application is able to send and receive data from the network database.

The monitoring server contains the hosting of web services and the visualization application, using this application any invigilator can get the information about the mobile positions, and their mobility information.

This section introduces the design aspects of the proposed monitoring and navigation system. The next section introduces the implementation of the proposed monitoring system.

### III. IMPLEMENTATION

The implementation of the complete system is conducted using three different technologies namely android, visual studio and java framework.

**Client application development:** that is a supporting android application developed, that application is able to connect via a Wi-Fi access points. When the device connect through any access point, than it collect the following information from access point.

1. Nick name
2. DeviceID (MAC address and IP address)

This information is combined with mobile information, such as mobile IP address, nick Name and send to the server machine's database using a web service.

**Web service development:** the web services are the intermediate computational functions, which is incorporated with android device application. The mobile device receives services through Wi-Fi access points, using the available signals, therefore strength and weakness of signals are decides the distance from the access points. In other words less distance of access point is high strength and week signals are denotes the larger distances. The main aim is to design web services is to performing the distributed services. The mobile phones are access these services as the strength of signals are varying by 1% of whole strength received in front of access point. In order to get the information of the mobile location the below given assumptions are made.

**Assumptions:** according to the research survey Wi-Fi access points of b and g series are having the range of 30-100 meters. On the other hand the N series Wi-Fi access points are available with 250 meters. The whole calculation of distance measurements is achieved for considering the N series Wi-Fi access points.

**Server design:** to visualize the mobile user server application is developed using Java framework. in this server a part of web hosting is also installed which is help to host web services using IIS server with MS SQL server for data base management. This application gathers data from the data base to visualize the current mobile user's position. the position of the mobile device is calculated using the below given formula, suppose the signal strength received at 0 meter distance is S, and with increasing the distance by 1 meter signal strength is effected by  $\partial$ , therefore with each meter increment in mobile position the factor is increases by their distance times.

$$\text{signal strength} = S + \text{distance} \times \partial$$

Therefore

$$\begin{aligned} \text{Signal strength} - S &= \text{distance} \times \partial \\ \text{distance} &= \frac{\text{signal strength} - s}{\partial} \end{aligned}$$

Form the above given equation the distance form Wi-Fi access point and mobile device is estimated and mobile is currently on which cluster is defined using the RSS method. In the next section of the paper includes the performance of the system is listed.

### IV. RESULTS ANALYSIS

After developing the whole application some facts are evaluated to provide the efficiency of the proposed system, in order to performance assessment.

#### A. server and client response

The total time required to make an update request and total time required to update the database is given here as the client and server response.

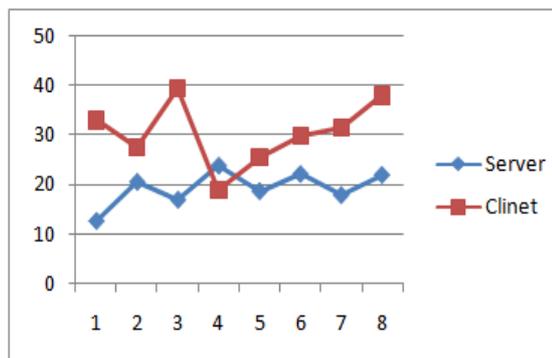


Figure 3 client & server response time

The above given diagram provides the client and server response, to update the data into the data base. in addition of that the total memory requirement of both ends are also evaluated during the experimentation.

#### B. Memory Uses

The total memory required to successfully execute a task is known as memory uses by the system. in order to show the performance of the system memory uses of the android mobile and server machine is estimated and given using the figure 4. Where server machine consumes more memory at the server side, but the android machine consumes less memory as compared to the server machine.

#### C. Delay

The total time required to fetch the data from database and mapping over GUI is given here as the delay of the system. That is shown using figure 5.

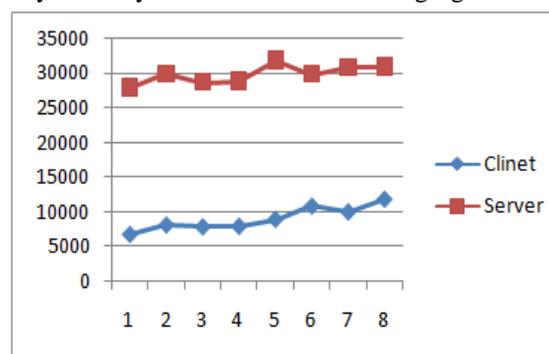


Figure 4 memory uses

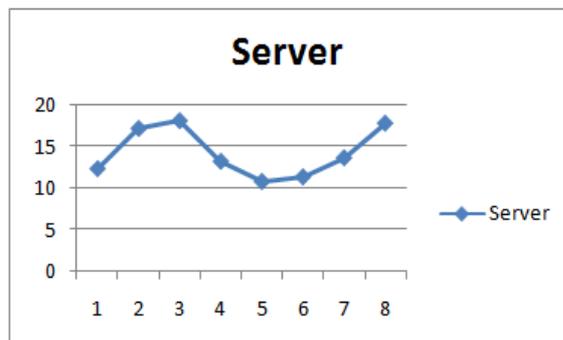


Figure 5 shows the Delay

This section of the given paper draws the results and the performance of the system. In the next section includes the conclusion and future extension of the given work.

### CONCLUSION AND FUTURE WORK

The given paper is an implementation of the monitoring and navigation system using android mobile and Wi-Fi access points. This paper includes the application of wireless network utilities. That includes the requirement and objectives of the proposed working model. Finally a system work flow is presented by which the proposed model is easily becomes implementable and the methodology of the proposed application is listed in this paper. After implementation of the proposed work the performance of the developed system is estimated in terms of memory, response time and finally the mapping delay between database and server GUI.

The proposed implemented model provides the much accurate results for location estimation. In future the proposed work is extended for the correct mobility direction estimation using new methods.

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