

INDOOR POSITIONING SYSTEM

It is a well-known fact how GPS/GIS has evolved and nurtured the dire need of an accurate positioning and navigation system. From being initially developed in the 1960s for the United States Air Force, to being used by almost everyone trying to find their way on the street. There is no doubt that location based services and GPS in particular has been an integral and very influential part of the technology evolution. But one place where GPS does not work accurately is indoors due to various blocking agents like walls, roofs & other objects.

IPS (Indoor Positioning System)

Indoor Positioning Systems, in its most generic sense is nothing but indoor GPS. The idea being providing navigational aid that we enjoy outdoors, indoors via smartphones. In a previous article from Sachin (Read Here), He gave an insight on what indoor GIS actually means, what are its capabilities and applications. Let's see how it can be incorporated in terms of technology.

There are various wireless technologies available which are used for indoor positioning:

WiFi

Since, the access points are already available in most of the buildings nowadays, initial infrastructure setup might not be a factor to worry about. On the contrary, if it is not available, then can prove to be very costly and ineffective to setup and configure.

WiFi uses the RSSI (Received Signal Strength Identification) and MAC Id to position the device in the network. It may have accuracy issues depending on the interference by foreign objects and also triangulation is no much accurate and easy to form into an algorithm.

BLE

In my previous article, I explained about BLE (Bluetooth low energy) technology and beacons. (Read Here). This technology can be very effective in implementing the idea of indoor GIS because of its cost and energy effective attributes. Since a beacon transmits signal to a close range as compared to WiFi, accuracy of pinpointing is dynamically improved.

Triangulation

Now, triangulation and fingerprinting of a device in contact of a network of beacons can be done very simply with basic algorithm as compared to RSSI via wifi.

Since, the network contains a no. of beacons (close range) spread across an area or floor, it is easier to determine the location via the strength of received signal (RSSI).

Proximity Zones

Also proximity zones help a great deal to further add a determining dynamic factor in terms of location of the device. Proximity of a device from a beacon is nothing but the distance of the device from the beacon.

Like, Immediate, near, far, unknown.

As a matter of fact, this system has already been implemented successfully by a company, Estimote, that manufactures beacons.

Open Source Alternatives

There are a few open source alternatives like [RedPin](#) and [Anyplace](#) for indoor positioning system. They largely depend on the user to add data like fingerprinting, floor plans, POIs and building blueprints in Jason format.

Conclusion

There is a lot of stuff happening in this domain and it is just the matter of time when it will be spreading like fire in a forest as there is a dire need of indoor GIS and navigation solution. Just as an example, nobody really likes to wonder where their favorite store is when inside a mall and looking at the floor map, well, not that exciting.