

Location Based Tracking: The Need of the Hour

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Abstract: Now a days, Location Tracking Is Becoming A Useful Application And Popular Area Of The Research. It Can Be Installed As An Application In The Mobile Phones. This Work Elaborates Different Types Of Location Tracking Tool. It Also Gives Various Types Of Location Tracking Methods Like Sensor Network Based, Global Positioning System Based And Some Intelligent Algorithms. A Client Send Request To Find The Location Of An Entity And The Location Tracking System Returns The Coordinate Position Points Of The Required Object.

Keywords: Location Tracking, Global Position System, Intelligent Algorithm, WSN

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I. Introduction:

Location Based Tracking Can Be Very Useful For Family Members Who Wants To Trace Their Dear One At Any Instance Of The Time. It Is Feasible Due To Various Techniques Like Mobile Telecommunication Services [1], Global System For Mobile Communication(GSM) [2] And Geographic Information Systems (GIS) [3]. With The Development Of Smart Phones Navigation And Position Tracking Becomes Easy. The Smart Phones Have Enough Processing Power And Memory To Install And Run The Location Tracking App. For Mobile User, Location Based Tracking Is Quite Useful While Travelling, They Can Easily Get The Direction And Route Towards A Destination. Location Tracking Can Also Be Used For Marketing And Advertisement In A Geographical Area And The Most Important; It Can Be Used To Track A Person And Other Valuable Items. A Location-Based Service (LBS) Is A Software-Level Service That Uses Location Data To Control Features [4]. LBS Allowa User To Access The Location Of An Object Through Personal Digital Assistance (PDA), Smart Phone Or Tablet. It Can Also Be Used To Search Train Timings And Nearby Hospitals And The Restaurant. Online Tracking Through Social Networking Sites Is Very Popular These Days E.G. A Person Can Share Her Location Through Facebook, But It Can Also Breach The Privacy Of A Person.

II. Literature Review:

Dark Sky Is The Most Accurate Source Of Hyper Local Weather Information. With Down-To-The-Minute Forecasts, User Will Know Exactly When The Rain Will Start Or Stop, Right Where You're Standing [5]. The Glympse App Is Used For Both Personal And Vehicle-Ness Use. When A Person Wants To Disclose Your Location To Friends, Family, Or Vehicle-Ness Associates [6]. If Sheis Running Late, Her Location Can Be Made Known. She Has Complete Control Of Who Can See It And Is Informed Of Your Location. HabshiEt Al. Has Designed A System To Record Road Accidents In An Area [7]. It Helps Policemen To Identify The Location Of Accident.

III. Location Tracking Tools:

Location Tracking Needs Some Tools To Locate An Object Like Mobile, Person Or Some Other Valuable Item. These Tools Are As Follows:

- i. **Cell ID:** A GSM Cell ID Is An Exclusive Number Used To Identify Each Base Transceiver Station (BTS) Or A Part Of A BTS Within A Location Area Code (LAC) If Not Within A GSM Or WCDMA (Wideband Code Division Multiple Access) Networks. A Single Cell Alone Cannot Send Useful Information About A Person In That Area; However Three Cells Can Give Exact Information About A Person As Shown In Fig. 1. With The Help Of Cell Tower Triangulation, It Is Possible To Determine The Location Of A Phone Within An Area Of Approximately $\frac{3}{4}$ Square Mile [8].

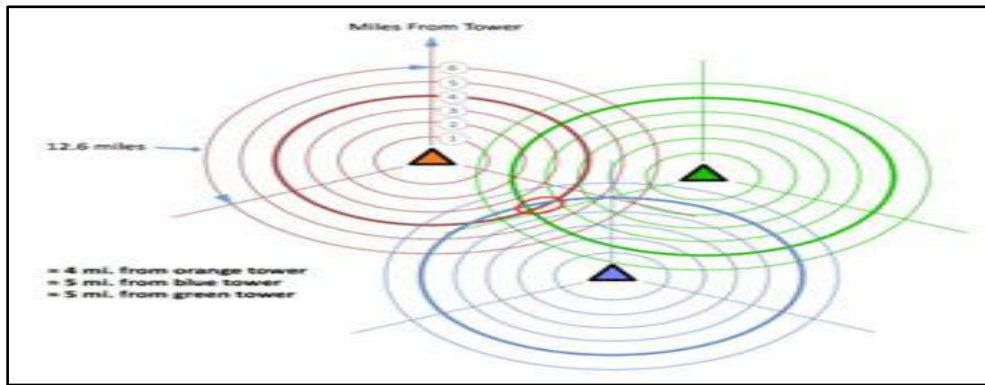


Fig. 1.Cell Tower Triangulation

- ii. **Location Area Identification:**Each Location Area Of A Public Land Mobile Network (PLMN) Has Its Own Unique Identifier Which Is Known As Its Location Area Identity (LAI). This Number Is A Unique International Identifier And It Is Used For Position Notifying Of Mobile Users. It Is Collection Of 3 Decimal Digit Mobile Country Code (MCC), A 2-3 Digit Mobile Network Code (MNC) And A Location Area Code (LAC) Which Is A 16 Bit Number[9]. It Is Shown In Fig. 2[10].

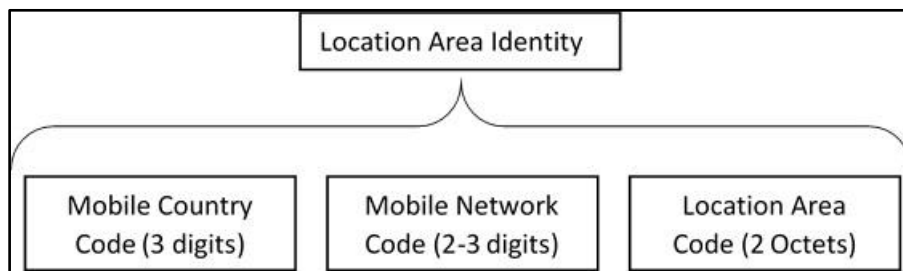


Fig. 2Location Area Identification

- iii. **Global Positioning System (GPS):**The GPS [11] Is A Satellite-Based Global Radio Navigation System. It Provides Geo-location And Time Information To A GPS Receiver Anywhere On Or Near The Earth Where There Is An Unobstructed Line Of Sight To Four Or More GPS Satellites. Its Processing Has Been Shown In Fig. 3 [12]. The Gps Can Be Used To Communicate The Accurate Location Of A Person Or Any Vehicle (Stationary Or Moving). It Records The Data About Entity Then Transmits It To A Central Server With The Help Of A Satellite Modem In A Real Time Scenario Or Later. There Are Mainly Three Types Of GPS Tracking Devices Follows:
 - a. **Data Pushers** Which Are Mainly Used For Personal Tracking. It Records Data In Short Periods And Transmits To The Central Server. It Can Also Measure Speed Of The Vehicle While Tracking.
 - b. **Data Pullers** Send Only Requested Information To The Server.
 - c. **Data Loggers**Stores Position Of Person/Vehicle, These Do Not Transmit Information To The Central Server.



Fig. 3:GPS For Tracking.

Location Based Tracking Methods:

1. **Local Intelligent:**Bhatia Et Al. Has Provided A Localize Intelligence Algorithm In Which User Can Describe Specific Areas Like Her Home Or Her Relative Place. This Algorithm Gives Approximation Location Of The User [13]. They Have Designed A Location Engine Which Coordinated With Android Location API. This Engine Takes Location Points OfAndroid Client And Converts Them Into Coordinates Of The Actual Geographical Location Of The Mobile User. The Computed Geographical Coordinates Are Matched Against The Points Stored In A DatabasenamedSqlite. They Have Also Designed A Plotting Engine Which Draws The Points On A Map.

2. **Wireless Sensor Network Based:**

Wireless Sensor Network (WSN) [14-17] Can Also Be Used As Location Tracking System, But The WSN Also Suffers From Energy Holes Problems [18-20]. Tseng Et Al. Have Proposed A Context Aware Location Tracking Of A Moving Object [21]. This Method Can Be Used In Situation Where There Is No Central Or Backbone Network. The Sensor Which Is Close To The Moving Objecttransmits Information To Other Sensors In The Network. This Sensor May Take Help Of The Nearby Sensors And Constrain Farthest Sensors From Sensing The Moving Object. It Reduces The Energy Draining Problems Of The WSN[22-24]. Jang Et Al. Have Kept A Balance Between Energy Proficiency Of Sensor Nodes And Accuracy Of Data Tracked By These Nodes[25]. They Used Cluster Based Approach In Which A Set Of Nodes Detect The Object Using Back Off Procedure And Data Accuracy Is Maintained By Increasing The Transmission Power [26] Of The Nodes. Chen Et Al. [27] Have Organized Object Tracking In A Tree Format Which Aggregates The Information About Object Movement. This Method Can Handle Many Moving Object At A Low Cost. Zhou Et Al. Have ProposedbayesianFiltering-Based Mobile Target Tracking In WSN [28]. Fig. 4 Represents The Tracking Of A Moving Object In WSN.

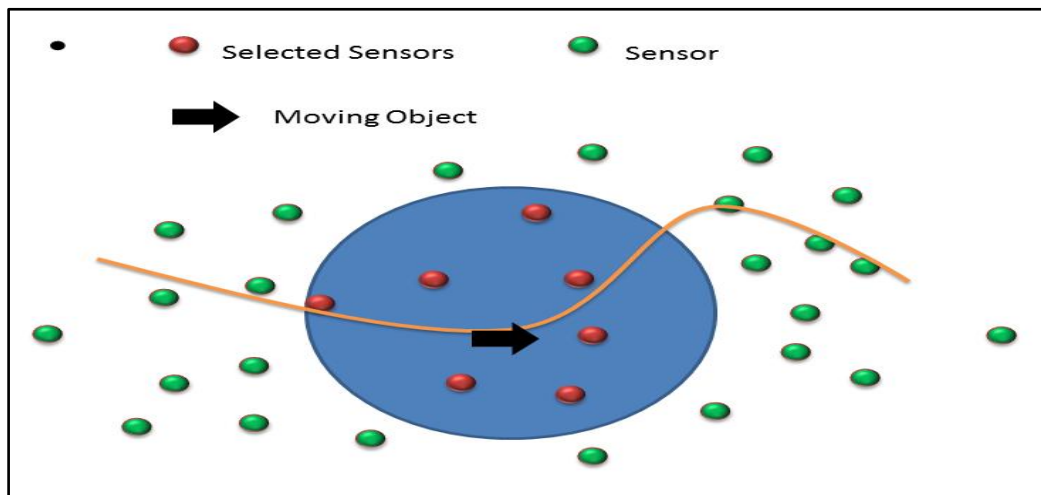


Fig. 4:Tracking Of A Moving Object By Sensor Nodes In WSN.

3. **GPS Based Location Tracking:**

SamulaHas Presented AnAndroid And GPS Based Mobile Application To Mark The Current And Previous Positions Of An Object At Certain Intervals [29]. It Enables A User To Go Back To Its Previous Location. It Also Creates An Interface Between Google Map And The Tracked Object. The Google Maps API (Application Programming Interface) Allows Java Based Smart Phone To Show Mapping Information. The Google MappermitsMaps To Be Definitely Integrated Into Website For All Forms Of Location Tracking. GPS Based Android Device, Accepts Radio Signals From The Satellite And Locate The Actual Data On The Earth. The Google Map Provides Locality Information To The Device.

4. **ANDROID Based Tracking:**

Automated Numeration Of Data Realized By Optimized Image Detection (ANDROID) Is An Open Source Mobile Operating System [30]. GadriEt Al [30] Have Designed An Android Based Land Vehicle Tracking App Which Was Able To Decide And Reveal The Current Location Of A Vehicle That Was Embedded With A GPS Receiver On A Map. Testing Of Objects Can Be Done By Using Following Tools [31-32]. Some Other Useful Related Application of Location Tracking Are Given In [33-37].

IV. Conclusion

This Research Work Presents The Need And Importance Of The Location Tracking System In Ones Life. It Describes Different Tools Which Are Needed For Location Tracking Along With Location Tracking

Software. It Analyzes Different Methods Which Were Developed In Recent Years To Enhance The Location Tracking.

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