USING IP FOR LOCATION TRACKING

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ABSTRACT:

A Location Based services (LBS) is a software-level service that uses location data to control features. Such LBS is been used in social networking today for information processing which serves various purposes like entertainment and security. These LBS are accessible using mobile devices through the mobile network and uses the geographical position of the mobile device typically with the help of Global Positioning System (GPS). However, it is not easy to access these Location Based Services for data analysis and mining, because a limited access interface is offered by them, which is a limited k-Nearest-Neighbor (KNN) search interface. This interface returns the k nearest tuples from the database for an input location provided, where k is a small constant typically ranging from 50 to 100. We create a mechanism by which tracing of user location is done by user IP address of mobile rather than traditional GPS locator. By using this mechanism we can increase the precision of user's location and also increases number of tuples in the database which will provide more services options to the user. The mechanism is demonstrated using a real time system implementation that serves our purpose.

Keywords: Location Tracking, Internet Protocol, Location Based Services

[1] INTRODUCTION

Location based services (LBS) are very feasible for solving day-to-day problem. This feasibility is the very reason for exponential increase in Location based services' popularity. These LBS services are extremely useful and critical in many businesses and also provide data in real time of a particular location in many government organizations. LBS may include several services related to an individual's or a group's location. The world's leading example for LBS are Google Maps, Nokia HERE etc. Various businesses and website make use of these services like Facebook, Twitter etc.

However, it is not easy to access these Location Based Services for data analysis and mining, because a limited access interface is offered by them which is a limited k-Nearest-Neighbor (KNN) search interface. This interface returns the k nearest tuples from the database for an input location provided, where k is a small constant typically ranging from 50 to 100.

A common assumption is made that all the LBS data is accessible by the system or the data to the LBS is provides by some online system. However, such data needs to be downloaded before it is provided to as an input to the system for further processing. Many a times this assumption proves to be incorrect, making existing projects unable to work with almost all real-time LBS systems that strictly a here to the rule of query rate limitation, i.e., limitation is implemented on the number of requests from an IP address or API account for a certain time period. This is because the kNN method accesses only a small number of k tuples in the database per query, this drawback makes it extremely difficult, although not impossible to gather the location specific data that is necessary for the computation purpose in real-time. Also power consumption of a GPS system is quite large for an individual's perspective and cannot be used in crisis for accessing LBS.

Solutions for the above mentioned problems can be obtained by creating a mechanism which is sharp in contrast to the existing systems. This mechanism can fetch the mobile user's location in real- time with the help of the mobile network. Also the tuples in the database can be increased and mapped to the fetched location to provide efficient services in return. This mechanism requires nothing other than the mobile users IP address and the corresponding tower information to find the location of the user, thereby increasing the precision of the user's location. This "hidden" LBS data gathered can be used for analytics through a series of aggregate queries. This can serve various business needs. Also, tracking over IP may also prove a solution to the problem of power consumption presented by global positioning system(GPS).Nowadays, almost all application require the use of mobile data. These devices are already assigned IP for data-consumption. Using this same IP for getting location specifics instead of GPS may lead to reduction of power consumption required in functioning of LBS. The proposed mechanism is composed of three major units, such as IP data set validation, Location Tracking and Offers Relevance Searching. These units implement algorithms for each level of the architecture depending on the required analysis. The IP data-set validation identifies the IP address of the given subject and validates if the returned IP is true or fake. The location tracking unit tracks the corresponding location, it converses to the routing tower of the ISP with which the subject is connected to get its unique area and location. Offers Relevance Searching searches or shortlists the offers available for the subject in its particular area and displays the result. The proposed design efficiently processes and analyzes IP data, gives relevant offers' data and can perform analytics for decision-making. This design is also power efficient as it avoids usage of GPS for Location Tracking. User can find offers relevant to them and not unusable ones.

[2] OBJECTIVE

The amount of data collection has increased. The reason behind this is combined annotation of social media interactions, scientific experiments and e-commerce applications, resulting in continuous evolution of data. As a result of this, data generation from different sources, new generation data and present challenges is not all relational and lacks predefined structures.

In this project we try to sort these issues and provide a way for better acquisition and processing of this type of data. We will be analyzing the real time IP tracking data and try to provide relevant offers of that location for B2B.

[3] THEORY

Let us discuss Proposed LBS architecture depicted in figure below:-

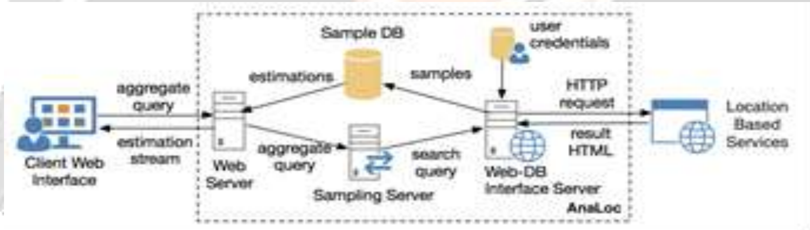

Figure 1: Basic Architecture

Our LBS system is divided into 4 components:

1. Client Web Interface
2. Web Server
3. Sample Database
4. Sampling Server

[A] Client Interface

A Client Interface provides a Graphical User Interface (GUI) which allows users to the query the LBS system through this restricted input interface. Client UI takes input from user based on his/her interests and gives output in graphical manner. It provides options to the user and manages the queries as per the options. The estimated output is displayed that is concerned with options that are provided, by the web interface.

[B] Web Server

The web server provides user with a web interface that allows the specification of the user's queries and visualized the estimated aggregates. The user can specify the aggregate queries through the web interface. This web interface will also be used by the LBS to display offers to the users on the output interface. The output interface can also be used to display the estimated aggregates in 2D line chart, pie charts, bar graphs, etc., which can be used to visualize the changes in our estimations. It is also possible to produce more sophisticated visualizations. Web Server finds the position of the user by tracing its IP address.

After acquiring the position of the user through its IP address then tower Id is located through which users actual location is find out. After acquiring its location, the location is then filtered out and approximate location is find out so offers can be sort out as per its location. The location of the user is send in the form of query to the sampling server.

[C] Sample Database

This component stores location specific offers in its database. This component will co-ordinate with the Sampling Server for mapping the users location to the offers within the Sample Database. The results will be then returned to the Web Server.

[D]Sampling Server

This component approximated the user's location based on his IP address .The Sampling server then gives the location to the Sample Database. In sampling server the offers are mapped as per the location and set to return the result to the user. But before sending the queries to the user they are checked with the user credentials so that whether the queries are as per user specification and its credits.

[4] APPLICATIONS

The proposed model can be used in e-commerce to extend the market of given product by providing commercials and offers to relevant users. E-commerce can be extended beyond the limited range and conversely improved within a certain range.

Social Networking has become an integrated part of today's individual. Today almost all information is gathered through social networking. The given model can be used in social networks to provide newsfeed about the location the user currently resides in. This model can also be applied for vehicle tracking which is of great importance nowadays. The business based on delivery and posting by vehicles can find great ease in keep in record of all their vehicles through this method.

Government has been proved to provide substantial resources or services to citizens some of which include but may not limit to Polio doses, free check-up for heart patients etc. A person can know if such services are being provided nearby. Emergency always arrives unannounced and location tracking can be a crucial tool in such times of emergency. This model can be used for location tracking in times of emergency.

[5] ADVANTAGES

The primary reason and advantage of this model is specification. This model can be used to provide area-specific services to user. All the services provided are relevant area-wise to the user. If any application that uses this model has a basic user credential database then it may be attached and user-specific as well as area-specific services will be provided to the users.

The intended mechanism is real time i.e. it works on real time data and provides real time outcome to the specified user. The cloud server is used for real-time processing. Using cloud server provides a better pace and it is crucial reason behind faster processing.

While already using an established database for providing services after tracking location, the model does not need to scan the whole database for providing relevant services. The area-specific nature of the model means it does not need to scan the whole database. If the application using this model has availability of user credential the search for services narrow down further.

[6] LIMITATIONS

The major limitation behind this model is that it requires static IP address for proper functioning. Many errors may generate due to dynamic IP address which may also result in ambiguity.

Also due to requirement of static IP address, the internet connection used should be stable. This is because fluctuating network may result in constant changing of IP address.

The intended model is strictly mobile data driven as lack of a constant internet connection results in unasigning of IP address, which may result in collapsing of entire model. Thus, this model is strictly data-driven.

The server should have zero or if not possible minimum downtime. This is because the entire functioning of this model takes place on cloud server, thus server cannot afford having downtime and must be working 24 X 7.

Sustainability may be in question, that is the offer must not change until all the users prescribing a particular service have completed the process of using it. It should not change midway while someone is trying to use the provided service.

[7] CONCLUSION

Choosing optimal query terms is the foundation of crawling the unstructured databases in the Hidden Web. Our paper proposes a new term weighing scheme that helps to solve the issues of optimal query selection by effectively selecting optimal terms. It gives a variable measure of the document frequency of terms because the location of the term which normally varies among the documents forms the basis for the assigned weights. The experiments conducted clearly shows that our approach efficiently crawls the Hidden Web pages due to the merit of our approach which lies in the various machine recognizable statistics derived from the skeleton of the document (HTML tags).

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