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Location Aware Query Reorganisation using KNN

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Abstract— **Location-based services (LBS) enable mobile users to query points-of-interest (e.g., restaurants, cafes) on various features (e.g., price, quality). In addition, users require accurate query results with up-to-date travel times. Lacking the monitoring infrastructure for road traffic, the LBS may obtain live travel times of routes from online route APIs in order to offer accurate results. Our goal is to reduce the number of requests issued by the LBS significantly while preserving accurate query results. Our proposed work, the user has an access to router via an internet. Based on his present location he has to choose the destination point, and then LBS will communicate with server and shows you the nearest places of his choice. First, we propose K-NN Route analysis to exploit recent routes requested from route APIs to answer queries accurately. Then, we design effective lower/upper bounding techniques and ordering techniques to process queries efficiently. Also, we study parallel route requests to further reduce the query response time. Our experimental evaluation shows that our solution is three times more efficient than a competitor, and yet achieves high result accuracy (above 99 percent).Combine information across multiple routes in the log to derive lower/upper bounding travel times, which support efficient and accurate range and KNN search. Develop heuristics to parallelize route requests for reducing the query response time further. Evaluate our solutions on a real route API and also on a simulated route API for scalability tests.**

Keywords:

Location based services,Shortest path,Real time tracking,Nearest neighbour.

I. Introduction

Mobile ad hoc networks (i.e., decentralized networks created on the fly by hosts located in proximity of one another) are no longer just a research concept. Due to their aptitude to require minimal effort to setup, ad hoc networks are suitable for a wide range of applications, including battle field's communications and disaster recovery operations. In August of 2015, researchers at the National Institute of Standards and Technology (NIST) demonstrated an ad hoc network prototype for first responders in building fires and mines collapse. Unmanned vehicles (aerial, terrestrial, and aquatic) with autonomic operation of a few hours already can be sent to regions where human presence is deemed dangerous [3, 4], and they can form networks on the fly to report observations to command and control centres. When the hosts (or nodes) of an ad network are mobile, the network is called a mobile ad hoc network (MANET). This proposed work focuses on a subset of MANETs, namely vehicular ad hoc networks (VANETs).

II.VEHICULAR ADHOC NETWORKS

The Vehicular Adhoc Network (VANET) consists of vehicles that are designed using wireless communication technology. In recent trends, VANET mainly focuses on the application development which can be grouped as improving road safety, traffic efficiency, and maximizing the benefits of road users. In VANET, research on routing is limited to vehicles of short distance. But in some applications, it is necessary to send data to far vehicles. This is carried out by connecting vehicle with Road Side Units (RSUs) [2]that are interconnected with each other through a high-capacity mesh network. When Vehicles and RSUs are equipped with onboard processing and wireless communication modules, the communications between vehicle-to-vehicle and vehicle-to-infrastructure are directly possible when it is in range or also across multiple hops. With the help of Internet, the users of RSUs are allowed to download maps, traffic data, multimedia files and also to check emails and news update. We refer these types of VANETs as Service-Oriented VANET that provides data to drivers and passengers virtually. The basic communication architecture of VANET is shown.

In recent years, most new vehicles come already equipped with GPS receivers and navigation systems. Car manufacturers such as Ford, GM, and BMW have already announced efforts to include significant computing power inside their cars and Chrysler became the first car manufacturer to include Internet access in a few of its 2009 line of vehicles.

This trend is expected to continue and in the near future, the number of vehicles equipped with computing technologies and Mobile network interfaces will increase dramatically. These vehicles will be able to run network protocols that will exchange messages for safer, entertainment and more fluid traffic on the roads. Standardization is already underway for communication to and from vehicles. The Federal

Communication Commission (FCC) in the United States has allocated a bandwidth of 75MHz around the 5.9GHz band for vehicle to vehicles and vehicles to road side infrastructure communications through the Dedicated Short Range Communications (DSRC) services.

The emergence of vehicular networks would enable several useful applications, both safety and non-safety related, such as automatic road traffic alerts dissemination, dynamic route planning, service queries (e.g., parking availability), audio and video file sharing between moving vehicles, and context-aware advertisement.

To deploy these services, three types of communications involving moving vehicles are considered, including cellular network, vehicle to roadside infrastructure and ad hoc vehicle communications.

Brief descriptions of each of these types of communication are provided below. Note that hybrids means of communication involving combinations of the methods described here

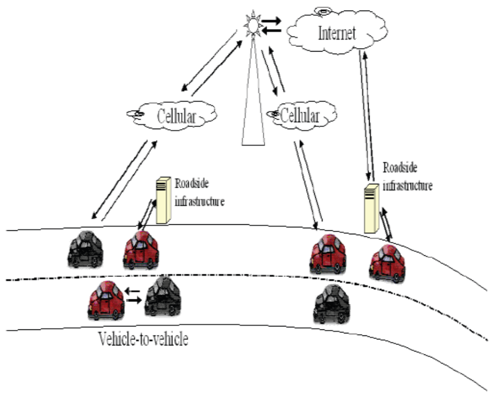


Fig. Vehicular networks can be formed in three ways: using cellular network, roadside infrastructure or vehicle-to-vehicle communications.

A. Communications through Cellular Network:

The first method connects vehicles to the Internet through cellular data networks using any of the following technologies: EV-DO, 3G, GPRS, etc. This service is already commercially available from car manufacturers and from other third-parties. In most commercially available solutions, the vehicle is transformed into a IEEE 802.11 (WIFI) hotspot and the Internet connection can be shared by many computers in the car. Usually, a limit is set on the amount of data transfer (e.g., 1GB or 5GB maximum per month). The main advantage of this method of connection is that the vehicle will have Internet access wherever cellular coverage is available. The main drawbacks are the dependence on the cellular operator coverage network and the limited available data rates (rates vary around 500Kbps-800Kpbs).

B. Vehicle to Roadside Infrastructure Communications:

The second method uses roadside infrastructure. Here, vehicles connect to other vehicles or to the Internet through roadside access points positioned along the roads. Two main variants can be found in the literature: the access points could be installed specifically for the purpose of providing Internet access to vehicles or the latter could make use of open 802.11(WiFi) access points encountered opportunistically along city streets [18]. The advantage of this method of connection is that vehicles will be able to connect to the Internet using much higher data rates (e.g., 11Mbps) than through the cellular network. The drawbacks include the cost related to installing access points along the roads to obtain reasonable coverage. Additionally, in the case where open access points are used, the access points owners' consent would legally be required before such a service is deployed.

C. Vehicle-to-vehicle (ad hoc) Communications:

Using Internet-based communications to and from vehicles will probably remain the method of choice for communications as long as the ratio of WiFi -enabled vehicles remains low. However, the prevalence of WiFi-ready vehicles will open the way for ad hoc networks of moving vehicles [11, 19]. The advantage here is the addition of a distinct, high bandwidth network to the existing infrastructure network. The main drawback is that these networks could require new set of protocols as the viability of vehicular networks applications described above is conditioned by whether or not VANET routing protocols are able to satisfy the throughput and delay requirements of these applications

PROBLEM STATEMENT

This proposed work addresses the problem of efficient routing and forwarding in VANETs. VANETs were selected for this study because, among the vehicular networks, the ad hoc configuration has the greater potential of widespread use: it is scalable (compared to cellular communication), low-cost, and provides higher bandwidth. Even though VANETs show great promise, their success is dependent on whether VANET routing protocols are able to satisfy the throughput and delay requirements of applications deployed on these networks. Thus, this proposed work aims to answer questions such as: Do existing MANET routing protocols work well in VANET? If not, what are the main characteristics of VANETs that influence routing and how can they be incorporated in better protocols? Are current forwarding protocols enough or can they be optimized for VANET characteristics.

III.LITERATURE REVIEW

A.Secure Ring Broadcasting (SRB)

Based on the receiving power, the secure Ring Broadcasting divides the nodes into three groups such as Inner node, Outer node and Secure Ring nodes . The Inner nodes are the nodes that are present nearest to the source node whereas Outer nodes are present away from source node and the node with preferable distance from source node is called as Secure Ring nodes. By reducing number of retransmission messages, more stable routes are gained. This is the only advantage of SRB. Here, this protocol has more control packet overhead as disadvantage.

B. Efficient Routing Protocols For Connecting Vehicles With Internet:

Here in this type of protocol, a hybrid gateway is discovered to avoid the problem of high velocity and overhead. When the vehicle is in transmission range, then the communication between the vehicle and the gateway is directly established or in the other case through a multi-hop path. Here if all the vehicles are equipped with GPS then the location, speed, direction and also the future location of neighbours can be predicted. Each gateway broadcast message using geocast within a specific area. These messages contains position, speed and direction of the sender, addresses of the relay nodes, time of the expiration of the route, zone of broadcast message and the location of the gateway. From the information about the distance of gateways and the density of traffic, a zone of broadcast is defined for each gateway. This zone delimits the process of broadcasting. When vehicles receive the broadcast message it checks the timer of the message and the zone of broadcast. This mechanism reduces the problems related to the flooding of the network and also insures the selection of more stable path.

IV. EXISTING SYSTEM

In Existing techniques cannot be used effectively in a wireless broadcast environment, where only sequential data access is supported. It may not scale to very large user populations. In an existing system to communicate with the server, a client must most likely use a fee-based cellular-type network to achieve a reasonable operating range. Third, users must reveal their current location and send it to the server, which may be undesirable for privacy reasons. Indexing on road networks have been extensively studied in the literature. Various shortest path indices have been developed to support shortest path search efficiently. The previous works to process range queries over points-of-interest (POIs), with respect to shortest path distances on a road network. The evaluation of range queries and user queries can be further accelerated by specialized indices. In our problem scenario, query users require accurate results that are computed with respect to live traffic information. All the above works require the LBS to know the weights (travel times) of all road segments. Since the LBS lacks the infrastructure for monitoring road traffic, the above works are inapplicable to our problem. Some works attempt to model the travel times of road segments as time-varying functions, which can be extracted from historical traffic patterns. These functions may capture the effects of periodic events (e.g., rush hours, weekdays). Nevertheless, they still cannot reflect live traffic information, which can be affected by sudden events, e.g., congestions, accidents and road maintenance. The above works are inapplicable to our problem because they consider constant travel times on road segments (as opposed to live traffic). Furthermore, in this work, we propose novel lower/upper travel time bounds derived from both the road network and the information of previously obtained routes, these bounds have not been studied before.

V. PROPOSED SYSTEM

In this proposed work is a novel approach for reducing the spatial query access latency by leveraging results from nearby peers in wireless broadcast environments using K-NN. Our scheme allows a mobile client to locally verify whether candidate objects received from peers are indeed part of its own spatial query result set. The method exhibits great scalability: the higher the mobile peer density, the more the queries answered by peers. The query access latency can be decreased with the increase in clients. Online Route API. Examples dataset downloaded and stored on My-SQL Such API computes the shortest route between two points on a road network, based on live traffic. It has the latest road network G with live travel time information. Location-Based Service/Server (LBS). It provides mobile users with query services on a dataset P, whose POIs (e.g., restaurants, cafes, temples) are specific to the LBS's application. The LBS may store a road network G with edge weights as spatial distances, however G cannot provide live travel times. In case P and G do not fit in main memory, the LBS may store P as an R-tree and store the G as a disk-based adjacency list. Our objective is to reduce the response time of queries while offering accurate query results. It is important to minimize the number of route requests issued by the LBS because route requests incur considerable time.

VI. PROPOSED METHDOLOGY

When person desire to know destination information based on consumer's requirement say for illustration user needs to reach nearest ATM or hospital. He can get ATM or hospital information using internet service provider(ISP). However he wishes effective result with respect to travel time and fee (i.e. nearest route). KNN-Route analysis consequently person needs application that supplies all of the expertise he desires. The proposed procedure entails almost always three predominant modules, user module, LBS module and Route-Saver module.

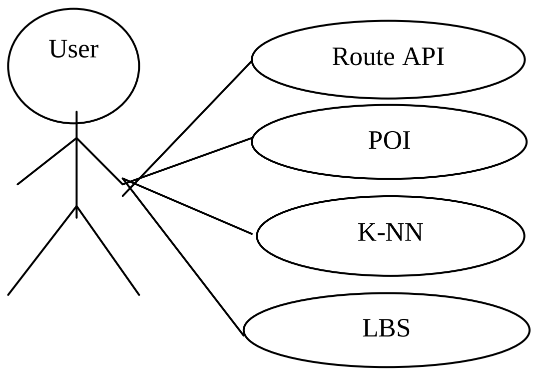
In user module user receives a location map includes locations, user location and route map from user place (source) and possible destination. In our proposed work, the users require accurate results that are computed with appreciate to live traffic information. The entire works require the LBS to know the weights (travel times) of all road segments .Considering that the LBS lack the Infrastructure for monitoring road traffic, the above works are inapplicable to our problem. Some works try and model the entire works require the LBS to know the weights (trav*el times) of all road segments.* Considering that the LBS lack the infrastructure for monitoring road traffic, the above works are inapplicable to our problem. Some works try and model the travel occasions of street segments as time-various features, which may also be extracted from historical traffic patterns. These services may just capture the consequences of periodic events (e.g. rush hours, weekdays). Nevertheless, they nonetheless cannot reflect traffic information, which can be effected by sudden events, e.g. congestions, accidents and road maintenance. The LBS module is responsible for accumulating the specified data from consumer and LBS generate optimized information which includes consumer's present area and route log to the destinations. Then this information is transferred to the Route-saver. Route-saver utilizes the contemporary traffic understanding bought from traffic provider and calculates the journey time and most beneficial path to source and destinations by using Nearest Neighbour queries. To reduce the number of route requests while providing efficient results, we combine information throughout a couple of routes within the log to derive tight lessen/higher bounding journey times. We also propose effective strategies to compute such bounds efficiently.

Additionally, we compare the influence of exclusive orderings for issuing route requests on saving route requests. And we learn the best way to parallelize route requests in order to reduce the query we present our Route-Saver algorithm for processing a range query . It applies the travel time bounds discussed above to reduce the number of route requests. To guarantee the accuracy of returned results, it removes all expired routes. The algorithm first conducts a distance range search to obtain set of candidate points. It also consists of two phases to process the candidate points in the query results in the set of exact results for user query. K-NN Based Route Analysis mainly focus following three steps, Online Route API.

Examples are: Google/Bing route APIs. Such API computes the shortest route between two points on a road network, based on live traffic. It has the latest road network G with live travel time information. Mobile User using a mobile device (User), the user can acquire his current geo-location q and then issue queries to a location-based server. In this project, we consider range and K-NN queries based on live traffic.

Location-Based Service/Server: It provides mobile users with query services on a data set P, whose POIs (e.g., restaurants, cafes) are specific to the LBS's application. The LBS may store a road network G with edge weights as spatial distances, however G cannot provide live travel times. In case P and G do not fit in main memory, the LBS may store P as an R-tree and store the G as a disk-based adjacency list.

UML DIAGRAM:



VIII. CONCLUSION

This work proposes the concept of location-based spatial queries for mobile computing environments. When a client issues such a query, the server returns, in addition to the result, a validity region for which this result is valid. Thus, before the client issues a new query at another location, it checks whether it is still in the validity region of a previous query; if yes, it can re-use the result. The experimental evaluation confirms the applicability of the proposed approach and shows that the computational and network overhead with respect to traditional queries is small. We believe that this work is a first but important step towards an important research area. Although spatial queries have been extensively studied, to the best of our knowledge, there exists no previous work that studies validity regions. This concept can be extended to other types queries; for instance, region queries (e.g., find all restaurants within a 5km radius). In this case, the problem is more complex, conceptually and computationally, since the validity region is defined by arcs resulting from cycle intersections. The incremental computation of the query result based on validity regions is another interesting topic for future work. Consider that a mobile client sends a query to the server immediately after it exits the validity region. It is likely that the new result has significant overlap with the previous one. The incremental computation of the query results and the transfer of the delta (i.e., the new objects added into the result and the objects removed from it) can dramatically reduce the transmission overhead. In summary, location-based queries will play a central role in numerous mobile computing applications. We expect that research interest in such queries will grow as the number of mobile devices and related services continue to increase.

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