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SYSTEMATIC CLUSTERING APPROACH FOR ROAD SIDE NETWORKS

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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, variety). 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
Whole trajectory clustering, trajectory embedding, distance measurement, road network trajectories.

INTRODUCTION

A mobile ad hoc network (MANET), also known as wireless ad hoc network or ad hoc wireless network, is a continuously self-configuring, infrastructure-less network of mobile devices connected wirelessly. Each device in a MANET is free to move independently in any direction, and will therefore change its links to other devices frequently. Each must forward traffic unrelated to its own use, and therefore be a router. The primary challenge in building a MANET is equipping each device to continuously maintain the information required to properly route traffic. Such networks may operate by themselves or may be connected to the larger Internet. They may contain one or multiple and different transceivers between nodes. This results in a highly dynamic, autonomous topology. MANETs are a kind of wireless ad hoc network (WANET) that usually has a routable networking environment on top of a Link Layer ad hoc network. MANETs consist of a peer-to-peer, self-forming, self-healing network. MANETs circa 2000–2015 typically communicate at radio frequencies (30 MHz – 5 GHz).The growth of laptops and 802.11/Wi-Fi wireless networking have made MANETs a popular research topic since the mid-1990s. Many academic papers evaluate protocols and their abilities, assuming varying degrees of mobility within a bounded space, usually with all nodes within a few hops of each other. Different protocols are then evaluated based on measures such as the packet drop rate, the overhead introduced by the routing protocol, end-to-end packet delays, network throughput, ability to scale, etc.

VEHICULAR ADHOC NETWORKS

The Vehicular Ad-hoc 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 [26]. 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 [1] that provides data to drivers and passengers virtually. 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 [1] that provides data to drivers and passengers virtually. The basic communication architecture of VANET is shown in Figure 1.1. Here we classify our work into five sections. In Section 1, a brief introduction about the importance of RSU is given. Section 2 tells about the related works. Section 3 is about the different routing protocols based on V2V communications. Section 4 is about the different routing protocols based on V2I communications. Finally, Section 5 ends with conclusion of the work and the future works that can be done. 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 [5, 6] and Chrysler became the first car manufacturer to include Internet access in a few of its 2009 line of vehicles [7].

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.

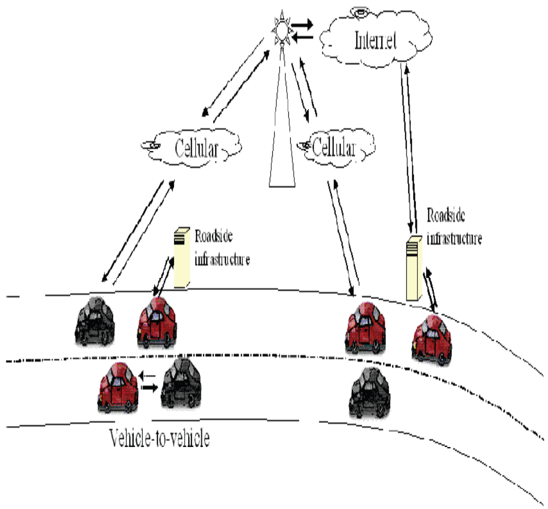

Fig.1 .1Vehicular networks.

Problem Statement

This proposed work addresses the problem of efficient routing and forwarding in VANETs. VANET is selected 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 satisfy the throughput and delay requirements of applications deployed on these networks.current forwarding protocols enough or can they be optimized for VANET characteristics.

Characteristics of Vehicular Ad Hoc Networks

VANET is an application of MANET but it has its own distinct characteristics which can be summarized as:

•High Mobility:

The nodes in VANETs usually are moving at high speed. This makes harder to predict a node's position and making protection of node privacy [2].

•Network topology:

Due to high node mobility and random speed of vehicles, the position of node changes frequently.

•Unbounded network size

: VANET can be implemented for one city, several cities or for countries.

•Frequent exchange of information:

The ad hoc nature of VANET motivates the nodes to gather information from the other vehicles and road side units.

•Wireless Communication:

VANET is designed for the wireless environment. Nodes are connected and exchange their information via wireless.

•Sufficient Energy:

The VANET nodes have no issue of energy and computation resources. This allows VANET usage of demanding techniques such as RSA, ECDSA implementation and also provides unlimited transmission power.

•Protection:

The VANET nodes are physically better protected. Thus, VANET nodes are more difficult to compromise physically and reduce the effect of infrastructure attack.

DRAWBACKS:

- It is especially difficult represent linear features depending on the cell resolution. Accordingly, network linkages are default to establish.
- Processing of associated attribute data may be cumbersome if large amounts of data exist. Raster maps inherently reflect only one attribute or characteristic for an area.
- Most output maps from grid – cell system\ms do not conform to high – quality cartographic needs.
- Data can be represented at its original resolution and form without generalization.
- Not Clear Results.
- Poor Service based on latency and Accuracy.

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.

ADVANTAGES:

- Our Location Based Spatial Query Result shows that our solution is three times more efficient than previous works, and yet achieves high result accuracy (above 98 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.
- Improved Performance.
- Better Accuracy. This can able to store user history to reveal the information about user search.

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. 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 (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 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 helps for accumulating specified information from consumer; 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 Neighbor 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 (Smartphone), 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.

MODULE DESCRIPTION

- Multiple peer simulation Module
- Server Module
- Sharing-based nearest neighbor query visualization Module
- Online Route API Nodule

Multiple peer simulation:

The multiple peer simulation modules concurrently models a predefined number of mobile hosts. It implements all the functionality of a single mobile host and provides the communication facilities among peers and from peers to remote spatial database servers.

Server Module:

The server module is responsible for storing points of interest indexed by an R-tree structure. It performs NN queries from peers with pruning bounds and records the I/O load and access frequency of the spatial database server.

Route Saver based nearest neighbor query visualization Module:

The sharing-based nearest neighbor query visualization Module provides a rendering of the verification process of a sharing-based NN query in a step-by-step manner. Users can arbitrarily select a mobile host and launch a location-based NN query within the simulation region. It provides mobile users with query services on a data set, 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.

Online Route API Module:

This module is to 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 (Smartphone), the user can acquire his current geo-location q and then issue queries to a location-based server. In this module, we consider range and KNN queries based on live traffic.

CONCLUSION

This paper 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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