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Leveraging Route Maps by Partial queries with Cache-Support

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ABSTRACT: In many mobile devices road network navigation was most common because of wide availability of the global positioning system (GPS) and digital mapping of roads. A route between the specified start location and destination is achieved by Path planning. The challenging task of mobile users on roads are due to various dynamic scenarios, such as a sudden change in driving direction, unexpected traffic conditions, lost or unstable GPS signals, and so on. In these scenarios, the path planning service needs to be delivered in a timely fashion. In this paper, we propose a system, namely, Leveraging Route Maps by Partial queries with Cache-Support, to answer a new path planning query in real time by efficiently caching and reusing historical queried paths. Unlike the standard cache-based path planning systems, wherever a queried-path in cache is employed only it matches absolutely with the new query, Path planning and control leverages the part of matched queries to answer part(s) of the new query. As a result, the server only needs to compute the unmatched path segments, thus significantly reducing the overall system workload. Comprehensive experimentation on a real road network database shows that our system outperforms the state-of-the-art path planning techniques by reducing 32 percent of the computation latency on average.

KEYWORDS: Path Planning and Control, Cache-Support, Global Positioning System

I. INTRODUCTION

With the advance of the global positioning system (gps) and the popularity of mobile devices, we have witnessed a migration of the conventional internet-based on-line navigation services (e.g., mapquest) onto mobile platforms (e.g., google map). In mobile navigation services, on-road path planning is a basic function that finds a route between a queried start location and a destination. While on roads, a path planning query may be issued due to dynamic factors in various scenarios, such as a sudden change in driving direction, unexpected traffic conditions, or lost of gps signals. In these scenarios, path planning needs to be delivered in a timely fashion. The requirement of timeliness is even more challenging when an overwhelming number of path planning queries is submitted to the server, e.g., during peak hours. As the response time is critical to user satisfaction with personal navigation services, it is a mandate for the server to efficiently handle the heavy workload of path planning requests. To meet this need, we propose a system, namely, path planning by caching (ppc), that aims to answer a new path planning query efficiently by caching and reusing historically queried paths (queried-paths in short). Unlike conventional cache-based path planning systems where a cached query is returned only when it matches completely with a new query, ppc leverages partially matched queried-paths in cache to answer part(s) of the new query. As a result, the server only needs to compute the unmatched path segments, thus significantly reducing the overall system workload. Figure 1 provides an overview of the proposed ppc system framework, which consists of three main components (in rectangular boxes, respectively): Ppattern detection, (ii) shortest path estimation, and (iii) cache management. Given a path planning query (see step (1)), which contains a source location and a destination location, ppc firstly determines and retrieves a number of historical paths in cache, called ppatterns, that may match this new query with high probability (see steps (2)-(4)). 1 the idea of ppatterns is based on an observation that similar starting and destination nodes of two queries may result in similar shortest paths (known as the path coherence property [1]). In the component ppatern detection, we propose a novel probabilistic model to estimate the likelihood for a cached queried-path to be useful for answering the new query by exploring their geospatial characteristics. To facilitate quick detection of ppatterns, instead of exhaustively scanning all the queried-paths in

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cache, we design a grid-based index for the ppattern detection module. Based on these detected ppatterns, the shortest path estimation module (see steps (5)-(8)) constructs candidate paths for the new query and chooses the best (shortest) one. In this component, if a ppattern perfectly matches the query, we immediately return it to the user; otherwise, the server is asked to compute the unmatched path segments between the ppattern and the query (see steps (6)-(7)). Because the unmatched segments are usually only a smaller part of the original query, the server only processes a "smaller subquery", with a reduced workload. Once we return the estimated path to the user, the cache management module is triggered to determine which queried-paths in cache should be evicted if the cache is full. An important part of this module is a new cache replacement policy which takes into account the unique characteristics of road networks. Through an empirical study, we find that common road segments in various queried-paths usually have road types of higher importance and capacity

II. RELATED WORK

Path planning needs to be delivered in a timely fashion. the requirement of timeliness is even more challenging when an overwhelming number of path planning queries is submitted to the server, e.g., during peak hours. as the response time is critical to user satisfaction with personal navigation services, it is a mandate for the server to efficiently handle the heavy workload of path planning requests. jung and pramanik propose the hiti graph model to structure a large road network model. hiti aims to reduce the search space for the shortest path computation. while hiti achieves high performance on road weight updates and reduces storage overheads, it incurs higher computation costs when computing the shortest paths than the hepv and the hub indexing methods. to compute time-dependent fast paths, demiryurek et al. propose the b-tdfp algorithm by leveraging backward searches to reduce the search space. it adopts an area-level partition scheme which utilizes a road hierarchy to balance each area.

III. MODULE IMPLEMENTATION

ADMIN

In this module, the Admin has to login by using valid user name and password. After login successful he can perform some operations such as view and authorize users, Adding Places with details, Listing all Added Places and its documents with rank, images and distance with Disktra Algorithm, View all Caching Links for all Retrieved Places with ranks, viewing all Transaction, Viewing all Time delay between New Search and Cache Links, Viewing Cache link Score in Chart and View all Place Ranks in Chart.

VIEWING AND AUTHORIZING USERS

In this module, the Tweet Server views all users details and authorize them for login permission. User Details such as User Name, Address, Email Id and Mobile Number.

ADDING PLACES WITH DETAILS

In this module, the admin add places with details such As, place name, place title, place description, place uses, place images, place document and distance with center point name of that place.

LIST ALL PLACES AND ITS DOCUMENTS

In this module, the admin View all his added place details (place title, place name, description, uses, distance, document and image) along with rank, images and distance with Disktra algorithm (the shortest distance place will be shown first).

VIEW ALL CACHING LINKS FOR ALL RETRIEVED PLACE WITH RANKS

In this module, the admin can view all Caching links that is the keywords which are used by users for searching more than once. The rank (number of times the particular keyword is searched from the cache) of Caching links will be shown along with the found places for caching link while searching.

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VIEW ALL TIME DELAY BETWEEN NEW SEARCH AND CACHE LINKS

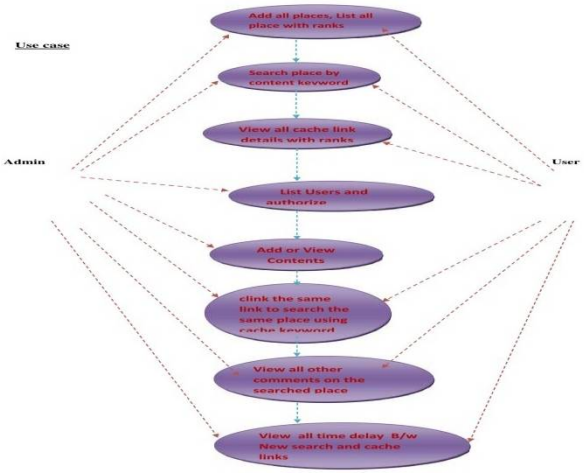
In this, the admin can view all the Time delay between new search (searching from original places database for first time) and the Cache Links Search (Searching in Cache Links that is previously searched and stored in cache).

VIEW CACHE LINK SCORE IN CHART

In this, the admin can see all the Scores of Cache Links in Chart. The Score is based on Number of times the particular link is searched in cache link database.

VIEW ALL PLACES RANKS IN CHART

In this, the admin can see all the Ranks of all places. The Rank is based on number of users viewed the places details.



USER

In this module, there are n numbers of users are present. User should register before performing any operations. Once user registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password. Once Login is successful user can perform some operations like viewing their profile details, Searching Places by content keyword and place name, view shortest path in GMAP, View all Cache Links details, View all other comments on User Searched Place, and View the Time Delay between New Search and Cache Link.

VIEWING PROFILE DETAILS

In this module, the user can see their own profile details, such as their address, email, mobile number, profile Image.

Search Places by content keyword and place name

In this, the user search for places by content keyword and by place name and view the shortest path of that Place in GMAP from your location point. Meanwhile this search would be store as cache link (the searched keyword and the searched content would be stored into cache).

VIEW ALL CACHE LINK DETAILS WITH RANKS

In this, the user can view all the cache links details (cache keyword and searched places for that keyword) with rank (number of times this keyword is searched from the cache). The User can click (mean while the rank of that particular cache link's rank will be incremented) on the same link if the user wants to search the same place using cache keyword.

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VIEW ALL OTHER COMMENTS ON THE SEARCHED PLACE

In this, the user can view all other comments on searched (by current user) places. The comment details include comment by name, comment and date of comment.

VIEW THE TIME DELAY BETWEEN NEW SEARCH AND CACHE LINKS

In this, the user can view all (current user searched and found result's time delay) the Time delay between new search (searching from original places database for first time) and the Cache Links Search (Searching in Cache Links that is previously searched and stored in cache).

IV. SIMULATION RESULTS

LIST ALL PLACES AND ITS DOCUMENTS

In this module, the admin View all his added place details (place title, place name, description, uses, distance, document and image) along with rank, images and distance with Disktra algorithm (the shortest distance place will be shown first).

ID	Place Image	Place Title	Place Name	Description	Uses	Center_Point	Distance	Rank	
1		Nandhi Hill Station	Nandhi Hills	This Nandhi Hill describes the height of an Hill.	It is used as a tourist Place.	Chikkabalapur	40	7	View / Download
2		Kolar Gold Field	KGF	The place KGF describes the land of gold.Its name itself kept as Gold Field.	This Gold Field is used to dig to get gold.	Kolar	50	18	View / Download
3		Mysore Palace	Mysore	It is about the palace.It contains zoos.Chamundi Hill.	It is mainly famous as a tourist place	Mandya	80	14	View / Download

VIEW ALL CACHING LINKS FOR ALL RETRIEVED PLACE WITH RANKS

In this module, the admin can view all Caching links that is the keywords which are used by users for searching more than once. The rank (number of times the particular keyword is searched from the cache) of Caching links will be shown along with the found places for caching link while searching.

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View all Time Delay b/w New Search & Cache Link..

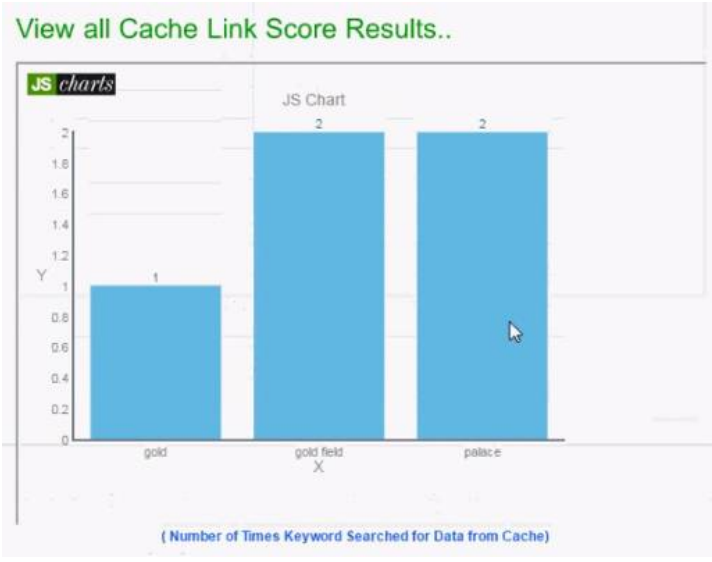
ID	User Name	Keyword	New Search Time	Cache Search Time	Date
1	anil	gold	120	31	29.5.2017 12:48:50
2	anil	gold field	86	3	29.5.2017 12:50:59
3	anil	palace	60	2	29.5.2017 12:55:03

VIEW CACHE LINK SCORE IN CHART

In this, the admin can see all the Scores of Cache Links in Chart. The Score is based on Number of times the particular link is searched in cache link database.

VIEW ALL PLACES RANKS IN CHART

In this, the admin can see all the Ranks of all places. The Rank is based on number of users viewed the places details.



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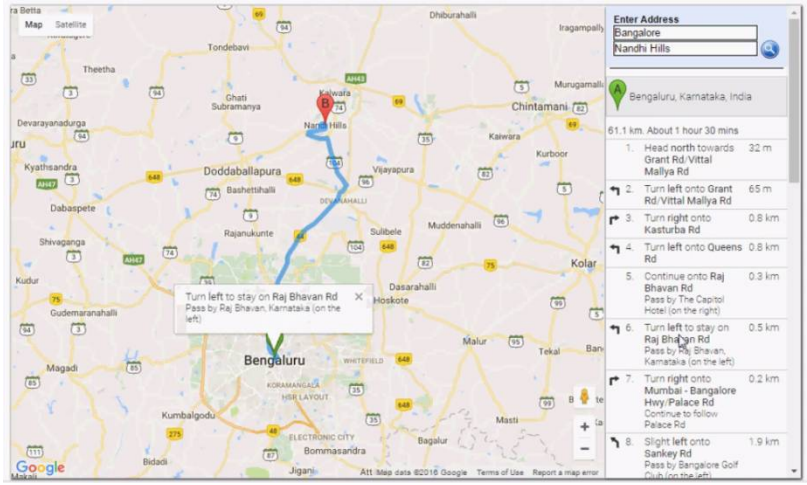
DETAILED ROAD MAP



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BIOGRAPHY

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