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RESEARCH ARTICLE

Performing Fast Spatial Query Search by Using Ultimate Code Words

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ABSTRACT

When a query includes a keyword term or its synonyms the corresponding results are displayed. Spatial queries involve conditions on objects geometric properties. Closest keyword search is the query objects called keyword cover a set of query keywords that have the minimum object distance. Spatial keyword query focus on keyword searching using best keyword query .It operated on spatial objects sorted in spatial databases and comes with algorithms that can retrieve the results in fast manner. Best keyword cover query aims to find object associated with keywords. The method proposed considers keyword relevance and spatial relevance. It is general that the objects in a spatial database are associated with keyword(s) to point out their businesses/services/features.

Keywords: Image Databases, spatial mining, spatial databases, spatial query, spatial pruning etc.

INTRODUCTION

Typing keywords as an input in a search engine has rotate out to be the generally used method to find information on the Web. The ease of search interfaces, i.e. the fact that users need neither any knowledge about database languages (e.g. SQL) nor information that describes the schemes of the data sources to be queried are the main reasons for the approval and recognition of keywords-based search.

Knowledge mining from Image Databases can be analysed as a case of spatial data mining. DATA mining in universal is the search for secret patterns that may be present in large databases. Spatial data mining is a unique kind of data mining. The main distinction between data mining and spatial data mining is that in spatial data mining tasks we use not only non-spatial attributes, other than also spatial attributes. Spatial data mining is the application of data mining methods to spatial data. The intention of spatial data mining is to find patterns in data with respect to geography. until now, data mining and Geographic Information Systems (GIS) have be present as two separate technologies, each with its own methods, traditions, and approaches to visualization and data analysis.

In spatial data mining, queries focus on objects only on geometric properties, for example whether a point is in rectangle or how two points are close from each other. Some new application allows users to surf objects based on both of their geometric coordinates and their related texts. Such type of queries called as spatial keyword query. For example, search engine can be used to locate nearest hotel that recommends facilities such as pool and internet at the same time. From this query, we could first obtain the entire hotel whose services contain the set of keywords, and then find the nearest one from the retrieved restaurant. The major disadvantage of this approach is that, on the complex input they do not give real time answer. For example, from the query point the real neighbour lies quite far away, while all the closer neighbours are missing at least one of the query keywords.

Spatial keyword queries are not broadly explored. In the past years, the group of people has showed interest in studying keyword search in to multidimensional data [5] [6]. The best method for nearest neighbour search with keywords is because of Felipe et al. [5]. They combine the spatial index R-tree [7] and signature file [8]. So they developed a structure called IR2-tree. This tree has the capacity of both R-tree and signature files. Like R-tree it stores the spatial proximity of object and like signature file it filters those objects that do not include all query keywords.

Spatial objects involve spatial data along with longitude and latitude of location.Spatial data mining aims to automate a knowledge discovery process. Thus, it plays an important role in

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1. Extracting interesting spatial patterns and features,
2. Capturing intrinsic relationships between spatial and non-spatial data.
3. Present data regularity concisely and at higher conceptual levels, and
4. Helping to reorganize spatial databases to accommodate data semantics, as well as to achieve better performance.

The core goal of a spatial data mining project is to distinguish the information in order to build real, actionable patterns to present, excluding things like statistical coincidence, randomized spatial modelling or irrelevant results. One way analysts may do this is by combing in the course of data looking for "same-object" or "object-equivalent" models to give accurate assessment of different geographic locations. [14]

A spatial database is a database that is optimized to store and query data that represents objects defined in a geometric space. Spatial databases allow demonstrating simple geometric objects such as points, lines and polygons. Some spatial databases handle more complex structures such as 3D objects, topological coverage's, linear networks, and TINs. [2]Spatial data-Also recognized as *geospatial data* or *geographic information* it is the data or information that identifies the geographic location of features and boundaries on Earth, such as natural or constructed features, oceans, and more. Spatial data is usually stored as coordinates and topology, and is data that can be mapped. Spatial data is often accessed, manipulated or analyzed through Geographic Information Systems (GIS).[3]A spatial query is a unusual type of database query carry by geo-databases and spatial databases. The queries differ from non-spatial SQL queries in several important ways. Two of the most important are that they allow for the use of geometry data types such as points, lines and polygons and that these queries consider the spatial relationship between these geometries. [4]Spatial data is in the form of graphic primitives that are usually either points, lines, polygons or pixels. Non-spatial data is independent of all geometric considerations. Spatial data are multidimensional and auto-correlated. Non-spatial data are one dimensional and independent.

IRTree: An proficient index for geographic document exploration [5] is a geographic query that is composed of query keywords and a location, a geographic search engine retrieves documents that are the most textually and spatially relevant to the query keywords and the location, respectively, and ranks there retrieved documents according to their joint textual and spatial relevance's to the query. They require of an well-organized index that can all together handle both the textual and spatial characteristics of the documents makes existing geographic search engines uneconomical in answering geographic queries. In this paper, efficient index is proposed, called IR-tree, that together with a top-k document search algorithm facilitates four major tasks in document searches, namely,

1) spatial filtering,
2) textual filtering,
3) relevance computation, and
4) Document ranking in a fully integrated manner.

In addition, IR - tree allows searches to adopt different weights on textual and spatial relevance of documents at the runtime and thus caters for a wide variety of applications. A set of comprehensive experiments over a wide range of scenarios has been conducted and the experiment results demonstrate that IR-tree outperforms the state-of-the art approaches for geographic document searches.

Retrieving top-k prestige-based relevant spatial web objects [6] for the location conscious keyword query returns ranked objects that are next to a query location and that have textual descriptions those equal query keywords. This query occurs inherently in many types of mobile and traditional web services and applications. Efficient retrieval of the top-k most relevant spatial web objects [7] from the Internet is acquiring a geospatial dimension. Web documents that are geo-tagged, and geo referenced objects such as points of interest are being associated with descriptive text documents. The resulting fusion of geo-location and documents allows a new kind of top-k query that takes into account both locality proximity and text relevancy. Location-aware type ahead search on spatial databases: emetics and efficiency [8] is a search in search spatial databases like yellow page data using keywords to and businesses near their current location. Such searches are gradually more being performed from mobile devices. Like keyword search on spatial data, type-ahead search needs to be location aware i.e. with every letter being typed, it needs to revisit spatial objects whose descriptions are suitable completions of the query string typed so far, and which rank highest in terms of proximity to the user's place and other static scores.

Locating mapped resources in web 2.0 [41] is a Mapping mash-ups are emerging Web 2.0

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applications in which data objects such as blogs, photos and videos from different sources are combined and marked in a map using APIs that are released by online mapping solutions such as Google and Yahoo Maps. These objects are typically connected with a set of tags capturing the embedded semantic and a set of coordinates indicating their geographical locations. Traditional web resource pointed strategies are not of use in such an environment due to the be short of the gazetteer context in the tags .As a substitute, a better choice move towards is to put an object by tag matching. However, the number of tags connected with each object is typically small, making it complicated for an object to confine the absolute semantics in the query objects.

Application of spatial data mining

- Find cancer clusters to locate hazardous environments
- Prepare land-use maps from satellite imagery
- Predict habitat suitable for endangered species
- Find new spatial patterns
- Find groups of co-located geographic features

Characteristics of spatial data mining

- Auto correlation
- Patterns usually have to be defined in the spatial attribute subspace and not in the complete attribute space
- Longitude and latitude (or other coordinate systems) are the attach that link different data collections together
- People are used to maps in GIS; therefore, data mining results have to be summarized on the top of maps
- Patterns not only refer to points, but can also refer to lines, or polygons or other higher order geometrical objects
- Large, continuous space defined by spatial attributes
- Regional knowledge is of particular importance due to lack of spatial heterogeneity) global knowledge in geography.

AN IMAGE-BASED MODEL FOR DOCUMENT RERANKING

The authors Bo Gengti et al [42] discussed how to rank the visual content by using 3 techniques like Ranking SVM, Random Forest. Gradient Boosted Regression Trees (GBRT).

Mining in Image Databases

Knowledge mining from Image Databases can be viewed as a case of spatial data mining. There have been studies, led by Fayyad et al. [9, 10, 11], on the automatic recognition and categorization of astronomical objects.

Spatial Data Mining Query Language:

This query interface can be supported by Graphical User Interface (GUI) which can make the process of query creation much easier. The user interface can be extended by using pointing devices for the selection of objects of interest. The analysis of the results from the query may give feedback for refinement of the queries and show the direction of further investigation. The language should be powerful enough to cover the number of algorithms and large variety of data types stored in spatial databases.

Spatial pruning

Lian et al[15] proposed a spatial pruning. In this technique they propose a novel spatial pruning method to reduce the search space for k-PRank queries

Lemma(Spatial pruning).Given an uncertain database D, a monotonic preference function f(.) and an integer k,let p1,p2....and pk be the k uncertain objects that we have obtained .Assume that LB-f(pk) is the smallest lower bound of score among these k objects. The spatial pruning method Can safely filter object o with score interval LB-f(o),UB-f(o),if UB-f()<=LB-f(pk)holds. [15]

PROBLEM DEFINITION

The content used for querying takes in the form of spatial database. Spatial keyword query takes form of keywords or objects. For example, college. Given a spatial database P, which consist of set of points. For a query q, where q belongs to set of objects, it search for nearest neighbour within the object by searching its importance in that data and then perform nearest neighbour search to obtain the answer to the query. For improved decision making, conception of keyword rating was initiated along with its features other than distance. For such search, query will take form of feature of objects. It explore for nearest neighbour sand on a new similarity appraise, named weighted average of index rating which unite keyword rating, keyword search and nearest neighbour search.

RELATED WORK

X.Cao and others [16], [18], [19], [20] presented that an object is selected based on the keyword in query and its location. As we know that no objects in the database can have all query keywords associated with It, it is difficult to locate a object that is true for every keyword in a query. D.Zhang, B.Ooi and others discussed in the paper [22] regarding selecting objects that together cover the every keyword mentioned in query. The problem here is the objects satisfying this condition should have geometric relationship. The authors x.Cao and others in the research paper [17] uses a method to select a spatial objects that satisfy 3 three following conditions. 1. Selects an object if it covers every keyword. 2. Select the object with small inter object distance. 3. Select the object with close to query location. The problem discussed by the authors of [20], [21] will retrieve the objects with low inter object distance and associated with query keywords. What we can observe here is that space is not a constraint for searching. In the research papers, [4] and [9] the authors G. Cong and et al use an access methods called inverted index. This method checks whether node is equal to set of query keyword or not. Zanng and Chee proposed an access method called hybrid indexing that is bR*-tree and bit map is used to index so that m-closet keyword query results in objects that matches m keywords. It uses previous knowledge for searching. It reduces space required for searching and proposes important constraints like distance and keyword mutex. This helps in pruning

Cao et al. [23] proposed collective spatial keyword query, they presented the new problem of retrieving a group of spatial objects, and each associated with a set of keywords. They build up approximation algorithms with incontestable approximation bounds and exact algorithms to solve the two problems.

Lu et al. [24], combined the notion of keyword search with reverse nearest neighbour queries. They propose a hybrid index tree called IUR-tree Intersection Union IR-Tree) to answer the Reverse Spatial Textual k Nearest Neighbour (RSTkNN) query that effectively combines location proximity with textual similarity. They aim a branch-and-bound search algorithm which is based on the IUR-tree. To further increase the query processing, they proposed an improved variant of the IUR-tree called cluster IUR-tree and two corresponding optimization algorithm

Zhang and Chee[25] bring in hybrid indexing structure bR*-tree, that come together the R*-tree and bitmap indexing to process the m-closest keyword query that proceeds the spatially closest objects matching m keywords. They utilized a priori based search strategy that successfully reduce the search space and also proposed two monotone constraints, distance mutex and keyword mutex to help effective pruning.

G. Cong, C.S. Jensen, and D. Wu [26] proposed an approach that computes the relevance between the documents of an object and a query. This relevance is then incorporated with the Euclidean distance between object and query to calculate an overall similarity of object to query.

Yufie Tao and Cheng Sheng[27], developed a new access method which is called as spatial inverted index. It extends the conventional inverted index to lay hold on multidimensional data, and uses the algorithms that can answer nearest neighbor queries with keywords in real time. They considered an alternative of inverted index called spatial inverted index that is optimized for multidimensional points. This access method successfully includes point coordinates into a conventional inverted index with small space.

Keyword augmented nearest neighbour search has recently sparked interest among researchers. Ke Deng [29] comes with algorithms to find nearest neighbour using keywords. Joao B Rocha [30] proposed spatial inverted index, a variant of inverted index to store keywords. Xin Cao [31] proposed the concept of collective spatial keyword querying. The central idea is to search for collective objects that collectively satisfy a query. Nearest neighbour search also appeared under category of searching process. With this concept in mind, Gisli R [32] proposed distance browsing algorithm in spatial databases. Ronald Fagin [33] dealt with optimal aggregation algorithm which helps in fast keyword search. Yufei Tao [34] proposed method for finding nearest neighbours using tree structure as index. Lisi Chen [45] provide a survey of indices to store keywords as well as spatial location. Xin Cao [36] dealt with various spatial keyword queries. The concept of Boolean range query fall under the category of spatial keyword query. DongXiang Zhang [37] proposed scalable integrated inverted index for storing spatial data. Bolin Ding [38] provides method to efficiently process keyword queries. Shuyao [39] proposed the concept of keyword query. Jianhua [40] considered a form of index named keyword pair based structure for finding top k answers using keyword search.

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PROPOSED SYSTEM

Usual nearest neighbour search calculate nearest neighbour by taking into account distance as feature. In this circumstance, nearest neighbour search focus on finding nearest neighbours where keywords and spatial data plays a major impact. Contrasting, queries in languages like SQL users do not usually give the required schema elements for all query term. Results indicate that even with structured data, finding the desired answers to keyword queries is still a hard task. More interestingly, looking closer to the ranking quality of the best performing methods on both workshops, we notice that they all have been performing very poorly on a subset of queries.

NNE Algorithm:

Step 1. One query keyword k 2 T is selected as the principal query keyword;
Step 2. For each principal object o k 2 O k, lbkc ok is computed;
Step 3. In O k, GBKC k is identified;
Step 4. Return GBKC k. [1]

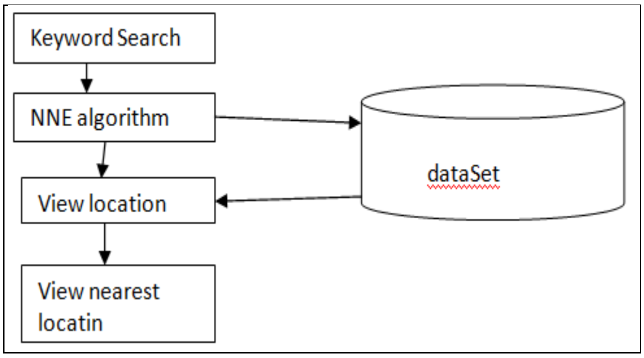

Fig 1: Proposed system

EXPERIMENT EVALUATION

For example, a tourist who plans to visit a city may have particular shopping, dining and accommodation needs. It is desirable that all these needs can be satisfied without long distance travelling. Due to the remarkable value in practice, several variants of spatial keyword search problem have been studied. The works aim to find a number of individual objects, each of which is close to a query location and the associated keywords (or called document) are very relevant to a set of query keywords (or called query document).. For instance, a vacationer who arrangements to visit a city may have specific shopping, feasting and convenience needs. It is attractive that every one of these necessities can be fulfilled without long separation voyaging. Because of the astonishing quality basically speaking, a small number of variations of spatial keyword explore issue have been examined. The works mean to locate various individual protests, each of which is near a query location and the associated keywords (or called document) are exceptionally important to a set of query keywords (or called query document)

There are people who plan to visit a place or city and would like to visit the famous places around. Without wasting much time and without travelling for longer distance it is possible to cover all the famous places around a city by using the application that uses keyword-nne.in spatial database each object is stored along with keywords they associated e.g. services/features. Spatial objects locating and accessing their service is worldwide. The importance of spatial keyword search is to find spatial objects which are very near to query location and keywords and will have spatial relationships. Spatial keyword searching technique gaining popularity because of digital map app is easily available and also satellite imaginaries.

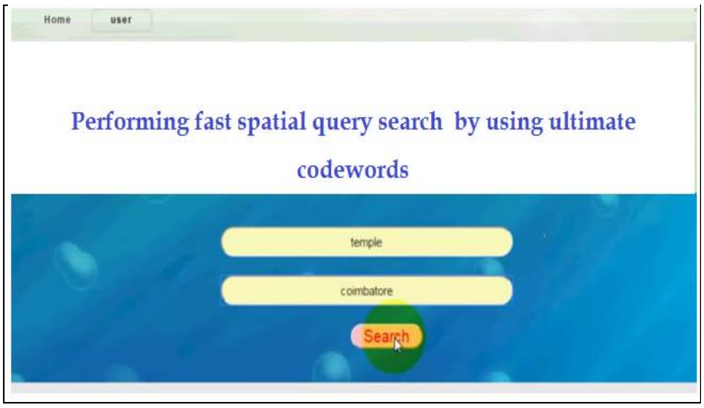

Fig 2: Query with specified keywords

In the given above screen search for the particular spatial object i.e museum or park or movie theatre in a specific location is taken as input from the user.

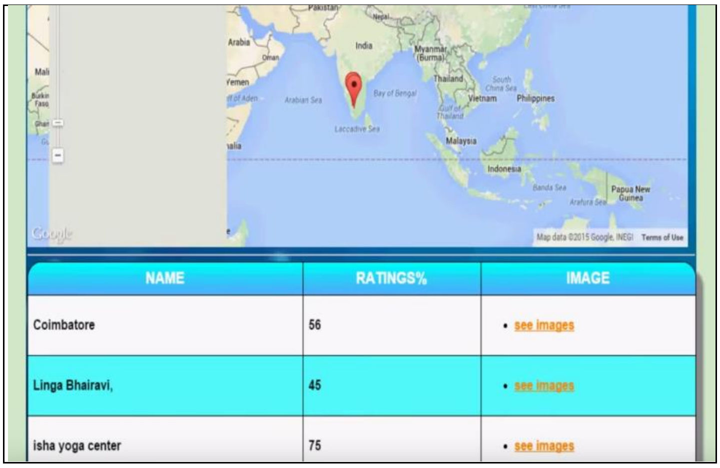

Fig 3: The result for the above query.

Based on the user input taken from the above screen search for a spatial object is taken place in the nearest location of that specific place.

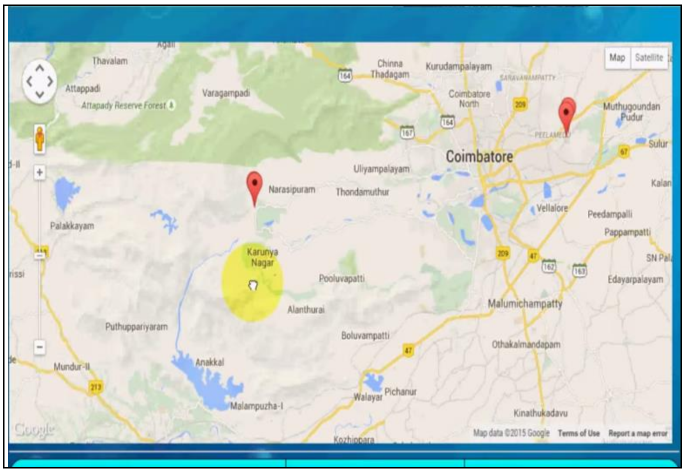

Fig 4: Full Image view for fig:3

Detailed map view is showing for the above screen.

Fig 5: Giving feedback for a Image view that was searched in fig:3

The user can give feedback and rating for the specific search. In this particular screen the user is giving the feedback for the particular place dhnyalinga as “nice place to see” and rating as 56 to the specific search.

The Spatial Query Performance

First, the efficiency and effectiveness of our proposed query procedure using data sets that have different radius ranges is evaluated and is shown as a bar graph and is shown in the below screen.

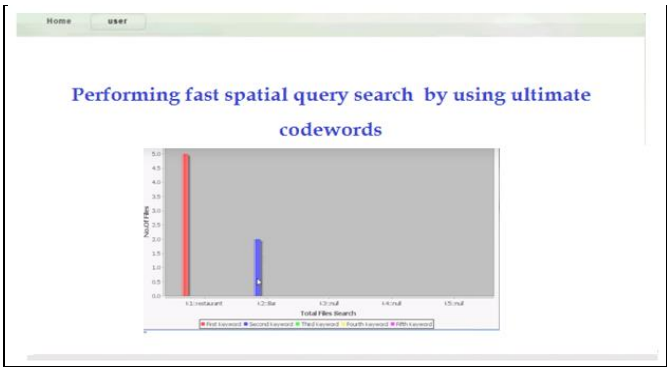

Fig 6: Performance is evaluated based on the keywords.

CONCLUSION

Spatial query aims to get the results from the spatial objects with respect to the user’s search .The algorithm NNE gives more description about the spatial object. A detailed report for fast performance is presented. The proposed method searches for the local best solution. Future work is keyword privacy and unbound storage**.**

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