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Efficient Fuzzy Type-Ahead Search in XML Data

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Abstract:

Keywords are suitable for query XML streams without schema information. In current forms of keywords search on XML streams and rank functions do not always represent users" intensions. This paper addresses this problem in another aspect. In this paper, the skyline Top-K keyword queries, a novel kind of keyword queries on XML streams, are presented. For such queries, skyline is used to choose results on XML streams without considering the complicated factors influencing the relevance to queries. With skyline query processing techniques, two techniques, are presented to process skyline Top-K keyword single queries and multi-queries on XML streams efficiently. Extensive experiments are performed to verify the effectiveness and efficiency of these techniques presented in this paper. According to the experimental results, the algorithms are not sensitive to the parameters such as the number of keywords, the number of results, the number of queries, and the runtime is approximately linear to the size of document.

In conventional keyword based search system over Xml data, user takes a query, submit it to the system and getting relevant answer. User has limited knowledge about the data when issuing queries, and has to use a try and see approach for finding information. This paper focus on the survey of fuzzy type-ahead search in XML data which is a new information access paradigm in which the system search XML data on the fly a user type in query keyword. XML model capture more semantic information and navigates into document and display more relevant information. The keyword search is alternative method to search in XML data, which is easy to use, user doesn't need to know about the XML data and query language. In this paper focus on the techniques used to retrieve the top-k result from the XML document more efficiently. Top-k relevant answer identify examine effective ranking function and early termination techniques achieves high search efficiency and result quality.

Index Terms— ***Keyword Search System, Query, XML, Fuzzy.***

INTRODUCTION

A keyword search looks for words anywhere in the record. It is emerged as most effective paradigm for discovering information on web. The advantage of keyword search is its simplicity-users do not have to learn complex query language and can issue query without any knowledge about structure of xml document. The most important requirement for the keyword search is to rank the results of query so that the most relevant results appear. Keyword search provides simple and user friendly query interface to access xml data in web. Keyword search over xml is not always the entire document but deeply nested xml.

Xml was designed to transport and store data. It does not do anything, it is created to structure, store, and transport information.xml document contains text with some tags which is organized in hierarchy with open and close tag.xml model addresses the limitation of

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html search engine i.e. Google which returns full text document but the xml captures additional semantics such as in a full text titles, references and subsections are explicitly captured using xml tags. For querying xml data keyword search is proposed as an alternative method. In traditional approach to query over xml data it requires query languages which are very hard to comprehend for non database users. It can only understand by professionals. Recently database community has been studying challenges related to keyword search over xml data [1]. However the traditional approaches are not user friendly. To solve this problem many systems introduced various features. One method id Auto complete which predicts the words the user had typed in. More and more websites support these features example Google, yahoo. One limitation of this approach is it treats multiple key words as single key word and do not allow them to appear in different places. To address this problem other method is proposed complete search in textual documents which allows multiple keywords to appear in different places but it does not allow minor mistakes in query.

Recently fuzzy type ahead search [1] is studied which allows minor mistakes in query. Type ahead search is a user interface interaction method to progressively search for filter through text. As the user types text, one or possible matches for text are found and immediately present to user. The fuzzy type ahead search in xml data returns the approximate results. The best similar prefixes are matched and returned. For this edit distance is used. Edit distance is defined as number of operations (delete, insert, substitute) required to make the two words equal. For example user typed the query ‖mices‖ but the mices is not in the xml document it contains miches ed(mices, miches) is 1 so therefore the best similar prefix is miches it is displayed.

TRADITIONAL XML QUERY TECHNIQUES

Xpath and Xquery these two types are used in Xml. Xpath is query language for XML that provide a simple syntax for addressing part of on Xml document. Xpath collection of element can be retrieved by specifying a directory like path with zero or more condition place on the path.

In Xpath we have XML document as a logical tree with nodes for each element, attribute text, processing instruction, comment, namespace and root reference [17]. The basic of the addressing mechanism is the context node (start node) and location path which describe a path from one point in an XML document to another. Xpointer can be used specify on absolute location or relative location. Location of path is composed of a series of step joined with ―/‖ each move down the preceding step. Xquery is incorporate feature from query language for relational system (SQL) and Object oriented system (OQL).

Xquery support operation on document order and can negative, extract and restructure document. W3c query working group has proposed a query language for XML called Xquery. Values always express a sequence node can be a document, element, attribute,text, namespace. Top level path express are ordered according to their position in the original hierarchy, top-down, left-right order [14]. The important parts are Data-Centric document and Document-Centric document. Data-centric document Xpath are complex for understand. It can originate both in the database and outside the database. These documents are used for communicating data between companies.

These are primarily processing by machine; they have fairly regular structure, finegained data and no mix content. Document- Centric are document usually designed for human consumption, they are usually composed directly in XML or some other format(RTFPDF, SGML) which is then converted to XML. Document-Centric need not have regular structure, larger gained data and lots of mixed content [13].

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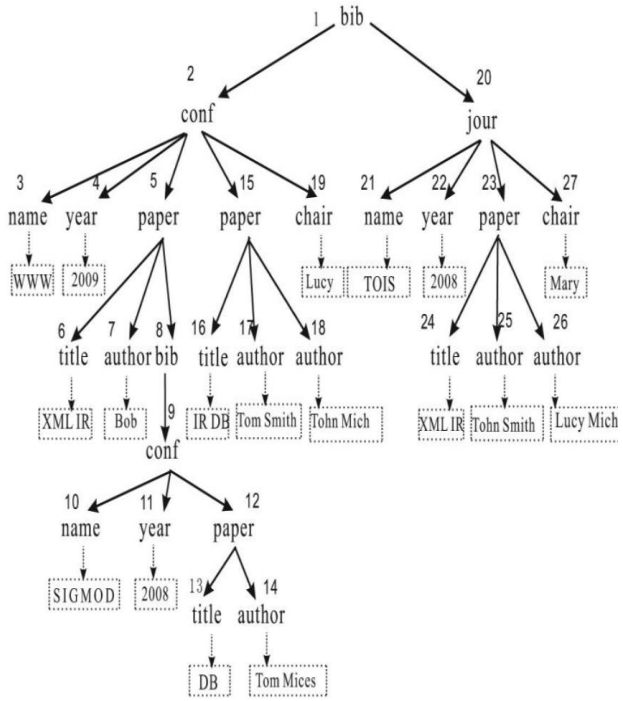

Fig 1 XML Document

DISADVANTAGES:

One limitation of Auto complete is that the system treats a query with multiple keywords as a single string; thus, it does not allow these keywords to appear at different places. For instance, consider the search box on Apple.com, which allows Autocomplete search on Apple products. Although a keyword query "iphone" can find a record "iphone has some great new features," a query with keywords "iphone features" cannot find this record (as of February 2010), because these two keywords appear at different places in the answer.

PROPOSED SYSTEM:

In this paper, we propose TASX (pronounced "task"), a fuzzy type-ahead search method in XML data. TASX searches the XML data on the fly as users type in query keywords, even in the presence of minor errors of their keywords. TASX provides a friendly interface for users to explore XML data, and can significantly save users typing effort. In this paper, we study research challenges that arise naturally in this computing paradigm. The main challenge is search efficiency. Each query with multiple keywords needs to be answered efficiently. To make search really interactive, for each keystroke on the client browser, from the time the user presses the key to the time the results computed from the server are displayed on the browser, the delay should be as small as possible. An interactive speed requires this delay should be within milliseconds. Notice that this time includes the network transfer delay, execution time on the server, and the time for the browser to execute its Java- Script. This low-running-time requirement is especially challenging when the backend repository has a large amount of data. To achieve our goal, we propose effective index structures and algorithms to answer keyword queries in XML data.

MODULES:

- Index Structures
- Answering Queries with a Single Keyword
- Fuzzy Search
- Answering Queries with Multiple Keywords
- Minimal-Cost Tree

MODULES DESCRIPTION:

Index Structures

We use a trie structure to index the words in the underlying XML data. Each word w corresponds to a unique path from the root of the trie to a leaf node. Each node on the path has a label of a character in w. For each leaf node, we store an inverted list of IDs of XML elements that contain the word of the leaf node. For instance, consider the XML document in Fig. 1. The trie structure for the tokenized words is shown in Fig. 2. The word "mich" has a node ID of 10. Its inverted list includes XML elements 18 and 26.

Answering Queries with a Single Keyword

We first study how to answer a query with a single keyword using the trie structure. Each keystroke that a user types invokes a query of the current string, and the client browser sends the query string to the server. We first consider the case of exact search. One naive way to process such a query on the server is to answer

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the query from scratch as follows: we first find the trie node corresponding to this keyword by traversing the trie from the root. Then, we locate the leaf descendants of this node, and retrieve the corresponding predicted words and the predicted XML elements on the inverted lists.

Fuzzy Search

Obviously, for exact search, given a partial keyword, there exists at most one trie node for the keyword. We retrieve the leaf descendants of this trie node as the predicted words. However, for fuzzy search, there could be multiple trie nodes that are similar to the partial keyword within a given edit-distance threshold, called active nodes. For example, both nodes "mices" and "mich" on the trie

Answering Queries with Multiple Keywords

Now, we consider how to do fuzzy type-ahead search in the case of a query with multiple keywords. For a keystroke that invokes a query, we first tokenize the query string into keywords, k1; k2; . . . ; k'. For each keyword ki (1 _ i _ '), we compute its corresponding active nodes, and for each such active node, we retrieve its leaf descendants and corresponding inverted lists Minimal-Cost Tree. We use the semantics of ELCA to compute the corresponding answers. We use the binary-search-based method to compute ELCAs. We will introduce an effective ranking function in considering fuzzy search

Minimal-Cost Tree

In this section, we introduce a new framework to find relevant answers to a keyword query over an XML document. In the framework, each node on the XML tree is potentially relevant to the query with different scores. For each node, we define its corresponding answer to the query as its subtree with paths to nodes that include the query keywords. This subtree is called the "minimal-cost tree" for this node. Different nodes correspond to different answers to the query, and we will study how to quantify the relevance of each answer to the query for ranking

CONCLUSION

This paper presents the keyword search over the XML data which is user-friendly and there is no need for the user to study about the XML data. This paradigm gives the relevant result the user want fuzzy search over XML data is studied which gives approximate result. We studied the problem of fuzzy type ahead search in XML data. We proposed effective index structure efficiently identify the top-k answer. We examine the LCA-based method to interactively identify the predicated answer. We have developed a minimal-cost-tree based search method to efficiently and progressively identify the most relevant answer. We have implemented our method achieves high search efficiency and result quality.

The min-max heap structure is based on the idea of alternating the relations "greater than or equal to all descendants" and "smaller than or equal to all descendants" between consecutive tree levels; the order relation implied is herein referred to as min max ordering and can be applied to a number of structures implementing priority queues, such as P-trees, leftist-trees.

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