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MODULAR APPROACH FOR XML TREE PATTERN MATCHING QUERIES WITH XPATH

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ABSTRACT

Now a day's database sharing over internet use XML pattern. It required less space to store data and provide fast access of data. XML has become a defacto standard to store, share and exchange business data across homogenous and heterogeneous platforms. Due to the business application and for the purpose of portability enterprises are storing data in XML format. This has become a common practice as XML is portable and irrespective of platforms in which applications were developed, they can share information through XML file format. Such XML files are also validated using DTD or Schema. XML parsers are available in all languages that facilitate the usage of XML programmatically.

The interoperability is possible though XML. As enterprises are generating huge amount of data in XML format, there is a need for processing XML tree pattern queries. The existing holistic algorithms for XML tree pattern matching queries exhibit sub-optimality problem as they consider intermediate results before taking final results. This causes suboptimal performance. This sub-optimality is overcome by using TreeMatch algorithm. This paper describes the use of dewey labeling scheme to overcome sub-optimality. Our observation has revealed that the proposed algorithm is better than the existing algorithms.

Keywords: Dewey Labeling, Holistic Algorithm, Wild Card, Negation, Sibling, Sub-Optimality And XML tree.

I INTRODUCTION

There is an increasing need of XML data for data transporting in B2B1 increasing popularity of XML, more and more information is being stored, exchanged and presented in XML format. The ability to efficiently query XML data sources, therefore, becomes increasingly important in application. With rapidly The eXtensible Markup Language (XML) has emerged as a standard for data representation and exchange over the Internet, as many (mostly scientific, but not only) communities adopted it for various purposes, e.g., mathematics with MathML, chemistry with CML, geography with GML , and e-learning with SCORM, just to name a few. As XML became ubiquitous, efficiently querying XML documents quickly appeared primordial and standard XML query languages were developed, namely XPath and XQuery. Research initiatives also complemented these

standards, to help fulfill user needs for XML interrogation, e.g., XML algebras such as Tree Algebra for XML (TAX) and XML information retrieval [2][3].

Efficiently evaluating path expressions in a tree-structured data model such as XML's is crucial for the overall performance of any query engine. Initial efforts that mapped XML documents into relational databases queried with SQL induced costly table joins [4]. Thus, algebraic approaches based on tree-shaped patterns became popular for evaluating XML processing natively instead. Tree algebras indeed provide a formal framework for query expression and optimization, in a way similar to relational algebra with respect to the SQL language.

In this context, a tree pattern (TP), also called pattern tree or tree pattern query (TPQ) in the literature, models a user query over a data tree. Simply put, a tree pattern is a graphic representation that provides an easy and intuitive way of specifying the interesting parts from an input data tree that must appear in query output. More formally, a TP is matched against a tree-structured database to answer a query.

II WHAT IS XML

Extensible Markup Language (XML) is markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable. XML is a text-based markup language that is fast becoming the standard for data interchange on the web. As with HTML, you identify data using tags (identifiers enclosed in angle brackets: <...>). Collectively, the tags are known as markup. The design goals of XML emphasize simplicity, generality, and usability over the Internet. It is a textual data format with strong support via Unicode for different human languages. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures [3].

2.1 Use of Xml

There are several basic ways to use XML:

- Traditional data processing, where XML encodes the data for a program to process
- Document-driven programming, where XML documents are containers that build interfaces and applications from existing components
- Archiving--the foundation for document-driven programming--where the customized version of a component is saved (archived) so that it can be used later
- Binding, where the DTD or schema that defines an XML data structure is used to automatically generate a significant portion of the application that will eventually process that data.

2.2 XML Tree

Due to the business collaborations and for the purpose of portability enterprises are storing data in XML format. This has become a common practice as XML is portable and irrespective of platforms in which applications were developed, they can share through XML file format. Such XML files are also validated using DTD or Schema. XML parsers are available in all languages that facilitate the usage of XML programmatically.

Moreover XML is tree based and it is convenient to manipulate easily using DOM (Document Object Model) API. XML tree pattern queries are to be processed efficiently as that is the core operation of XML data. Recently many researchers developed various methods or algorithms [5], [6], [7], [8], [9], [10] for processing. XML Document XML is known to be a simple and very flexible text format. It is essentially employed to store and transfer text-type data. The content of an XML document is encapsulated within elements that are defined by tags. XML documents have a hierarchical structure and can conceptually be interpreted as a tree structure, called an XML tree. XML documents must contain a root element (one that is the parent of all other elements). [11][12]All elements in an XML document can contain sub elements, text and attributes. The tree represented by an XML document starts at the root element and branches to the lowest level of elements.

- The terminology used in the XPath Data Model
- The terminology used in the XML Information Set.

XPath defines a syntax named XPath expressions that identifies one or more internal components (elements, attributes, etc.) of an XML document. XPath is widely used to accesses XML-encoded data. The XML Information Set, or XML infoset, describes an abstract data model for XML documents in terms of information items. It is often used in the specifications of XML languages, for its convenience in describing constraints on constructs those languages allow. An Example XML Document, XML documents use a self-describing and simple syntax [6].

With the rapidly increasing popularity of XML for data representation, there is a lot of interest in query processing over data that conforms to a tree-structured data model. Since the data objects in a variety of languages (e.g. XPath [13], XQuery [14]) are typically trees, tree pattern matching is the central issue. For example, the following query: “Q=//book [author=``jhon"]//chapter/title” can be represented as a twig (small tree) pattern. Intuitively, it returns the title of chapter for a book that has an author named by “john".

```
<book>
<title> XML < =title>
<all authors>
          <author> jane < =author>
          <author> john < =author>
< =all authors>
<year> 2000 < =year>
<Chapter>
          <head> Origins < =head>
          <Section>
                    <head> ...< =head>
                    <section> ...< =section>
                    < =section>
                    <section> ...< =section>
                    < =chapter>
                    <chapter> ...< =chapter>
                              < =book>
```

Fig 1: Sample XML document

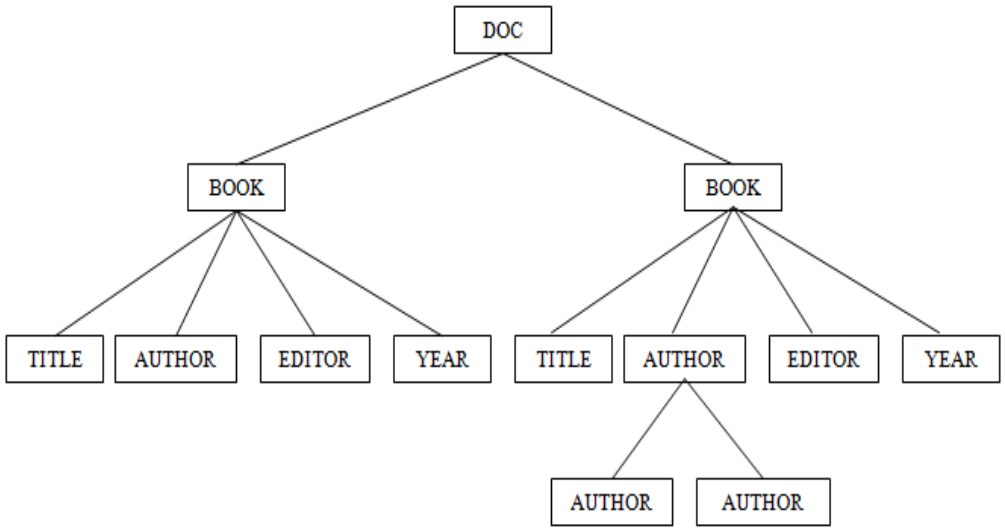

Fig 2: Tree Representation

From the sample XML document of Figure 1 and its tree representation is shown in Figure 2. Queries in XML query languages like XQuery and XML-QL make fundamental use of node labeled tree patterns for matching related portions of data in the XML database. The query pattern labels which consists of element tags, attribute-value comparisons and string values, and the query pattern edges which include the parent-child edges. This query pattern would match the document in Figure1. In general, at each node in the query tree pattern, that specifies the node predicate on the attributes e.g., tag, content of the node [17][18].

III IMPLEMENTATION OF ALGORITHMS

XML tree pattern queries are to be processed efficiently as that is the core operation of XML data. Recently many researchers developed various methods or algorithms for processing XML tree queries [20]. A stack based algorithm was proposed by Khalifa et al. that matches relationships such as A-D, and P-C. TwigStack is another algorithm proposed by Bruno et al. for the purpose of XML tree pattern queries. However, the drawback of these algorithms is that they take unnecessary intermediary nodes while processing the query thus causing more time to process. To overcome the drawbacks indexing concept is used by algorithms provided in and. Some other algorithms use labeling schemes. In industrial and academic applications these algorithms have proven to be highly promising.

2.3 Algorithm for Wild Cards

```
read book_data
while (//* end(noderoot)) do//loop for execute all
nodes
fact =getNext(firstnode);//search subnode
```

```
if ( fact is return node);
   display allNode();
      display allSubnodedata();
//display all sub-node   of  parent node book
updateSet(fact);
emplty AllSets(root);
```

Algorithm of getNext(n)

```
if (isLeaf(n)) then
 return n
else
for each ni 2 NDB(n) do
fi 1⁄4 getNextðniÞ
if ( isBranching(ni) ^:empt)
return fi
 for each ni 2 NDB(n) do
if
 return fi;
endif
```

Wild card is text query to search and display the complete data base of the table. it was pitfalls of previous twingstag algorithm that does not work with wild card. Here we implement the algorithm for wild card. In the above algorithm "//* " is the notation that use in Xpath to retrieve the data from database. It works as similar to the select All clause of SQL. It find the complete database from the database server and display the root node on screen [19].

GetNext node method moves the cursor to next row of database and display the content of database whenever the cursor move next row. The method allNode() in algorithm is used to display the all node and sub node. The data from the data base retrieved from dataset which provided by user. UpdateSet method calls the fact method that updates the dataset every time whenever the user enters data and display all data while executing node root.

2.4 Algorithm for negation

```
read book_data
fact =getNext(topnode);
while(//not subnode(node)) do
if ( fact is return node);
```

```
  display allNode();
      display allSubnodedata();
updateSet(fact);
 empltyAllSets(root);
```

Negation is text query that display the data from the database where any data is missing. It reduces the searching patterns of empty data from database system. it was not implemented with previous algorithms[19][22]. "//not" is used in Xpath while displaying data from the database which don't have data of any field in data base. Negation sub optimality problem is more commonly occurred while entering huge amount of data in data base.

Here we implement two algorithms that's work with Xpath to improve searching time.

2.5 Algorithm for Sibling

```
locateMatchLabel (Q);
 while (notEnd (root)) do
 fact= getNext (topBranchingNode);
 if (node not in database a return node) then
addToOutputList (NearestAncestorBraching)
// read the next element in Tfact
locateMatchLabel (Q); // locate next element with
 matching path
 emptyAllSets (root);
```

"//*[sibling[category]]" is use to find the sibling entry in database by using Xpath.it display the out putlist in which all elements having same two entry for data sets. Matchlabel () function find the entry in database of elements having multiple data for one record. addToOutputList display the data of such record that having multiple record. EmpltyAllsets() function call when no record in database having multiple entry. That means display root element with dwelly labeling zero.

IV CONCLUSION

From the literature survey its observed that the all implemented method does not solve the problem of suboptimality. The interoperability is possible though XML. As enterprises are generating huge amount of data in XML format, there is a need for processing XML tree pattern queries. The existing holistic algorithms for XML tree pattern matching queries exhibit sub-optimality problem as they consider intermediate results before taking final results. This causes suboptimal performance. We have introduced a notion of matching cross to address the problem of the suboptimality in holistic XML tree pattern matching algorithms. That is wild card,

negation and sibling. Here we implement algorithms for wild card and negation and sibling. This three sub optimality reduces the problem of searching patterns.

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