# "STUDY OF EFFICIENT PERFORMANCE IN XML TREE WITH CLIENT DATABASE"

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**ABSTRACT:** *In Recent days exchange XML data more often in organizations and business sectors, so there is an increasing need for effective and efficient processing of queries on XML data. XML has also become industry standard for transferring and storing data over the internet. As enterprises are generating huge amount of data in XML format, there is a need for processing XML tree pattern queries. There are lots of tree matching algorithms implemented to provide fast data retrieval and storing data efficiently. XML tree matching algorithm previously defined having some problems like suboptimality. When it works with Xpath or Xquery technology with XML it has problem like wildcard, negation and sibling. In this paper we are going to study the xml database and also providing some background in holistic approaches to process of xml tree pattern and then introduce different algorithms for pattern matching.*

***Keywords***: XML data, Xpath or Xquery, xml tree pattern, XML tree matching

## 1. INTRODUCTION

A Markup Language can be used to annotate text with meaning. The Standard Generalized Markup Language (SGML) was adopted by the ISO in1986 [1]. Contrary to what the name suggests, the SGML itself is not a markup language, but rather, a specification for defining markup languages. The best known application of SGML is the Hypertext Markup Language (HTML), which is used to annotate text in a way that web browsers understand. The finite number of tags used in HTML soon became an issue because users wanted more control over web page rendering. Therefore, HTML was extended to include additional tags and reference competition between Microsoft and Netscape fragmented the HTML standard. Hence, a new webpage markup language was needed. At the time however, SMGL was considered too complex and therefore unsuitable for specifying the new webpage markup language [2]. To overcome this issue, the eXtensible Markup Language (XML) was introduced in the late 1990's. Similar to SGML, XML is a specification language for defining markup languages. However, contrary to SGML, XML is human readable. Therefore, the development of applications that process XML data is easier. One of the first applications of XML was XHTML (a reshaped web page development language). However, XML generated wider interest because it provided a format in which any type of data could be stored and a common format in which heterogeneous systems could communicate. For these reasons, XML is today generally accepted as the de-facto standard for information interchange. XML data is semi-structured, which means that each datum in an XML database has its individual structure attached. This is in contrast to structured (e.g. relational) databases, where a generic structure (i.e. a schema) must be designed first, and all of the data that one wishes to store, must conform to this structure. Making changes to this generic structure, for example to insert data that has an unsuitable structure, is often a time consuming task, and it can make applications that are dependent on the data function incorrectly.

## 2. BACKGROUND

An XML database is usually modeled as a forest of unranked, node-labeled trees, one tree per document. A node corresponds to an element, attribute or value, and the edges represent immediate element sub element or element-value relationships [3]. In xml tree the elements appear in the document is not relevant, conforming to the semantics of XPath [3]. Moreover, we concentrate on tree-pattern queries with descendant edges. Queries with child edges are generally answered using the same methods augmented with a post processing step, which filters out results that are not in accordance with the child constraints.

## 3. LITERATURE REVIEW

Kamala Challa et. al. [1] proposed the problem of XML tree pattern matching and surveyed some recent works and algorithms. Two algorithms TreeMatch and TJfast are introduced. TreeMatch has an overall good performance in terms of running time and the ability to process generalized tree patterns.

Mirella M. Moro et. al. [2] attempt to fill this gap by integrating all existing tree-pattern query processing methods over stored XML data in a unified environment. We assume tree-pattern queries with XPath semantics, and we target environments where XML data are physically stored within data management systems and can be indexed at will. They also propose a method categorization based on two main features that differentiate the techniques: the data access patterns, and the matching process. In particular, our main contributions are summarized as:

- They introduce a clear categorization of methods for tree-pattern queries processing. We describe techniques proposed so far, discuss their characteristics, place them within our classification.
- They set up a unified environment under a common storage model and describe the integration of all methods within it. We employ a storage model that is simple but versatile enough to capture the access characteristics of each method, and permit clustering of data with the aid of off-the-shelf access methods (e.g. B+-trees).
- They propose novel variations of methods that can use existing index structures to their advantage, when such structures exist. We also show how to adapt methods not directly applicable to tree-pattern query processing in order to handle tree-pattern queries as well.
- They perform an extensive comparative study with synthetic, benchmark and real datasets. To our knowledge, this is the first complete performance study. Our results identify the behavior of each method under varying circumstances. Furthermore, they allow us to make generalizations and decisions in the applicability, robustness and efficiency of each method.

M. Muthukumaran et. al. [3] presents a wide analysis to identify the efficiency of XML tree pattern matching algorithms. Previous years many methods have been proposed to match XML tree queries efficiently. In particularly TwigStack, OrderedTJ, TJFast and TreeMatch algorithms. All algorithms to achieve something through these own ways like structural relationship including Parent – Child (P-C) relationship (denoted as '/') and Ancestor-Descendent (A-D) relationships (denoted as '//') and more. Finally, we report our results to show that which algorithm is superior to previous approaches in terms of the performance.

J. T. Yao M et. al. [4] finding all distinct matching of the query tree pattern is the core operation of XML query evaluation. The existing methods for tree pattern matching are decomposition matching-merging processes, which may produce large useless intermediate result or require repeated matching of some sub-patterns. We propose a fast tree pattern matching algorithm called Tree Match to directly find all distinct matching of a query tree pattern. The only requirement for the data source is that the matching elements of the non-leaf pattern nodes do not contain sub-elements with the same tag. The Tree Match does not produce any intermediate results and the final results are compactly encoded in stacks, from which the explicit representation can be produced efficiently.

## 4. 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 pro grammatically. 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.

## 5. XML QUERY PROCESSING

The W3C recommend two query languages, XQuery and its fundamental subset XPath, as a standard means of retrieving data from an XML database. One of the most widely documented query performance issues is associated with hierarchical relationships that is, the time it takes to resolve parent/child and ancestor/descendant relationships. In XPath, these relationships are specification to the ancestor, ancestor-or-self, descendant, descendant-or-self, parent and child axes, which we collectively refer to as the hierarchical XPath axes. As XML database systems cannot perform at the same level as their structured counterparts, many of those who rely on XML for reasons of interoperability are choosing to store XML data in relational databases rather than its native format. The advantages of semi-structured data (e.g. schema-less data storage) are therefore lost in the structured world of relational databases, where schema design is required before data storage is permitted. The result of this is that many domains, such as sensor networks, are using rigid data models where more edible and dynamic solutions are required. Over the last decade, many research groups have developed new levels of optimization.

## 6. XML PATTERN MATCHING ALGORITHMS

In the context of semi-structured and XML databases, tree-based query pattern is a very practical and important class of queries. Lore DBMS [8] and Timber [9] systems have considered various aspects of query processing on such data and queries. XML data and various issues in their storage as well as query processing using relational database systems have recently been considered in [6, 7]. The recent papers (e.g. [10,11]) are proposed to efficiently process an XML twig

pattern. In paper [10], a new holistic algorithm, called Ordered TJ, is proposed to process order-based XML tree query. In paper [11], an algorithm called TwigStackListNot is proposed to handle queries with negation function. Chen et al [12] proposed different data streaming schemes to boost the holism of XML tree pattern processing. They showed that larger optimal class can be achieved by refined data streaming schemes. In addition, Twig2Stack [13] is proposed for answering generalized XML tree pattern queries. Note the difference between generalized XML tree pattern and extended XML tree pattern here. Generalized XML tree pattern is defined to include optional axis which models the expression in LET and RETURN clauses of XQuery statements. But extended XML tree pattern is defined to include some complicated conditions like negative function, wildcard and order restriction.

## 7. HOLISTIC ALGORITHMS FOR XML QUERY PROCESSING

In this section, we propose two algorithms to evaluate an XML tree query. The following illustrates data structures and notations for query class Q / //, *:
There is an input list Tq associated with each query node q, in which all the elements have the same tag name q. Thus, we use eq to refer to these elements. Cur(Tq) denotes the current element pointed by the cursor of Tq. The cursor can be advanced to the next element in Tq with the procedure advance (Tq). There is a set Sq associated with each branching query node q (not each query node). Each element eq in sets consists of a three-tuple (label, bit Vector, output List). Label is the extended Dewey label of eq. bit Vector is used to demonstrate whether the current element has the proper children or descendant elements in the document. Specifically, the length of bit Vector (eq) equals to the number of child nodes of q. Given a node qc2 children (q), we use bit Vector (eq)[qc] to denote the bit for qc. Specifically, bit Vector (eq)[qc]= „„1"" if and only if there is an element eqc in the document such that the eq and eqc satisfy the query relationship between q and qc. Finally, output List contains elements that potentially contribute to final query answers.

## 8. CONCLUSION

In this paper we are going to study the xml database and also providing some background in holistic approaches to process of xml tree pattern and then introduce different algorithms for pattern matching.

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