A Queue based Reconstruction Algorithm for Reconstructing XML Tree from Relational Storage

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ABSTRACT
Storage of XML documents in relational databases is a wide area of research for researches now days. Reconstruction of an XML tree from storage of relational databases is an important topic in this area. In this paper, we propose a Queue Based reconstruction algorithm to reconstruct an XML tree from relational storage of XML documents. This Algorithm uses queue Based approach to reconstruct an XML tree.

Keywords
XML, Queue, Relational Databases.

1. INTRODUCTION
XML has emerged as a standard for data exchange over the internet. Relational data bases provide a mature way to store and Query these documents. Storage of XML documents in relational database has two kinds:

- Structured mapping storage
- Model mapping storage.

In structured mapping storage, XML schema is associated with the documents and based on Schema, relational schema is generated. Several work has been done in this area [4][5][6][7]. While in the case of model mapping storage, XML schema is not associated. In this case, an XML tree is created and nodes of the tree are stored in data base.[1][2][3].In this paper, we presents an algorithm which is used to reconstruct XML tree that is stored in database. This algorithm uses a Queue based approach to reconstruct an XML tree stored in relational database.

2. RELATED WORK
Atay[8] Proposed a stack based reconstruction algorithm to reconstruct an XML tree. This algorithm used a stack based approach to create a tree. A structure Encoded Sequence was described in this work. Frederick[9] Proposed nested based approach to reconstruct an XML tree. This approach used nested trees and a stack Based Algorithm to create a tree. Lee[10] Proposed an extraction Algorithm to extract tree from schema less storage of XML documents. Cherti[11] Proposed a relational to data base Algorithm for mapping of relational data base in to XML.

3. MODEL MAPPING STORAGE
A well-defined database system is based on a well-defined database model. XML data model is often simplified into an XML tree .Suppose an XML tree consists of four kinds of nodes. Elements Attributes, text and Root. In [12], we proposed a model mapping schema which consists of two tables.

Node (id, name), Data (Doc id, Node id, Parent id, Node type, Node value, Node Pos) .

Table node stores all node id's with their name in it. In data table Doc id is used to the id of the particular XML document. Node value the value of the Node. Parent id is the id of the parent Node. Node type is used to specify the position of the nodes among its siblings[12]. In [12], We proposed an algorithm for mapping of XML documents in relational databases. We discussed that how nodes of XML tree are to be stored in relational databases. Two Tables are used in this schema and structure of tables is described above. Figure 1 represents an example of XML document and figure 2 represents its corresponding XML tree.

```
<Customer id=1>
<Name>
     <first name>Sam </first name>
      <last name>Smith</last name>
</Name>
<Date>October 15,2001</date>
<Orders>
<Item>
      <Product>Tomato</Product>
      <Number>8</Number>
     <Price>$1.25</Price>
</Item>
<Item>
      <Product>Potato</Product>
      <Number>7</Number>
     <Price>$11.50</Price>
</Item>
</Order>
</Customer>
```

Fig. 1: An example XML document

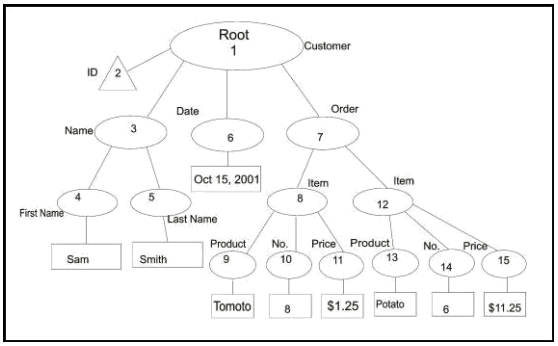

Fig. 2 : XML Data Graph of XML document in fig. 1.

4. RECONSTRUCTION ALGORITHIM

```
1.  List = Select * from node n, data d where n.node id=d.parent id ORDER by Node ID.
2.  Root = List.next()
3.  Queue Q = Empty Queue()
4.  String t ,s
5.  t. Append("<$root.name")
6.  For each attitude ai of Root do
7.  t. append ("root.name"= $root.value)
8.  EndFor
9.  t.append(">")
10. Q (REAR) = t,
11. REAR = REAR + 1
12. e = list next ( )
13. While is not Null do
14. If Q [REAR] .id < e. id then
15. t. append ("$ e .name")
16. for each attribute ai of e do
17. t.append("$e.ai.name=$e.ai.value")
18. endfor
19. t.append(">")
20. Q (REAR) = t,
21. REAR = REAR +1
22. end if
23. While Q is not empty do
24. s = Q (FRONT)
25. FRONT = FRONT + 1
26. Return s
27. end while
```

At first SQL query will generate tuples contains all the elements and there elements are stored in list. Root element is extracted from the list and also stores its values. Then we process all of its attributes then we compare the top elements of the queues with the element id of the list, if it is less, then the element is a child element and we store its value and attributes to the Queues. In the similar manner all the elements are being processed. At last, we pop the elements from the Queue.

5. CONCLUSION

In this paper, we proposed a Queue based Reconstruction Algorithm which uses a Queue based approach to reconstruct an XML tree. We use this algorithm in Schema less storage of XML documents in relational database. In future, we will work on schema based reconstruction of the XML tree.

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