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Expression of Query in XML object-oriented database

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Abstract: Upon invent of object-oriented database, the concept of behavior in database was propounded. Before, relational database only provided a logical modeling of data and paid no attention to the operations applied on data in the system. In this paper, a method is presented for query of object-oriented database. This method has appropriate results when the user explains restrictions in a combinational matter (disjunctive and conjunctive) and assumes a weight for each one of restrictions based on their importance. Later, the obtained results are sorted based on their belonging rate to the response set. In continue, queries are explained using XML labels. The purpose is simplifying queries and objects resulted from queries to be very close to the user need and meet his expectation.

Keywords: Object Oriented, disjunctive queries, conjunctive queries, object-oriented database, XML.

1. INTRODUCTION

Upon paying attention to the data existing around ourselves, we understand that plenty of these data may not be stored to the same existing form. For storage of this type of data as well as combined and complex data existing around ourselves, we have no option but to use the new type of database that can record complex and combined data, therefore we approach to object-oriented database.

Contrary to the relational database (classic) that availability samples in certain perceptual level are exhibited by table records, in object-oriented database, objects are observed; in other word, queries in this type of database are similar to classic database, but responses are different.

Database queries are analyzed in this paper as simple and combined modes. In combined mode, disjunctive and conjunctive queries were used. In continue, queries are explained by XML labels. In second part of paper, background and in third part, Related Works and in fourth part, Proposed Method was presented. The queries are explained by disjunctive and conjunctive predicate, in addition can be stored by XML labels. Fifth part was allocated to Case Study and sixth part to Conclusion.

2. BACKGROUND

The background of this study includes object-orientation concept, object-oriented database and XML.

2.1 Concept of object-orientation

Object-orientation emphasizes on the objects, in the object-oriented programming, the objects are propounded abstractly. Object-oriented programming is a modern style therein components may be created and used in different programs. Readability of programs written in this method is high and their testing, fault detection and amendment is easy. Object-orientation is formed based on several principles, as follows:

- Inheritance: In object-oriented programming, the concept of inheritance is used frequently. There are classes that inherited their attributes from main classes referred to as super class. Reusability of code is one of main advantages of inheritance.
- Encapsulation: it is referred to as placing implementation in a capsule so that external user is not aware of implementation procedure and only knows that this capsule performs a specified work.
- Polymorphism: Assume that you inherit the characteristics of father and his works, but do it in another manner. It is just the same thing that is called polymorphism.
- Abstraction: abstracting! It is referred to an abstract class that methods are implemented therein.
- Interface: it shows the relationship between objects.

2.2 Object-oriented database

The weaknesses of relational model caused the experts to think of make new models that one of their best types is object-oriented model. Maximum object-oriented power is arising out of its ability in real world modeling phenomena. Object-oriented databanks model combines the power of object-oriented languages and data storage and retrieval systems and converted to very powerful systems. Definition of concepts such as class, inheritance and polymorphism etc. has empowered it extraordinarily. In the object-oriented databank model, the data is stored only as shape and includes the relationship between data, attributes, restrictions and time and place problems. In the object-oriented model, each phenomenon is related to a class and output of queries may be a part of an object or combination of a few objects.

2.3 XML (extensible markup language)

Extensible Markup Language (XML) is a language for showing data that was standardized by consortium web W3C [1]. Within recent years, XML has been taken into consideration as a standard language and structure for exchange and exhibition of data on various applied program particularly in web-based applications. Following web integration and continuous production of a great volume of electronic data, XML has been converted to a standard for electronic exchange of information documents. The XML can be used in the following:

- Exchange the data between disparate applications, businesses and databases.
- Enable a model to display the same data on various devices with different purposes and readers.
- A suitable format for storing data.

3. RELATED WORKS

Upon upraising the demand and need to new methods for working with the data and relationships between these data and applied programs focusing on enormous volume of data, it was proved that object-oriented databases are better than relational database and other databases.

Fong [2] proposed a reengineering engineering methodology for transfer of an EER model to object modeling technique (OMT) for production of object-oriented database plan. In this paper, a series of mapping rules from EER model to general object-oriented model were provided.

In [3], a language was presented that one of its characteristics is defining classes that differ from other classes in a few aspects. It is possible through separating the concept of "type" and "class" and allows queries compilers to detect the type errors even at the presence of objects contrary to the definition of classes.

In [4], an independent query language with high class range was introduced for visual and alphabetic database management that is called PICQuery.

In [5], XML in the most specific state is assumed as database and XML documentations are self-defined, means that structure and name of types are specified at the use time. In addition, data may be presented in two tree and graph forms.

In [6], a software was offered for direct use of Query languages on XML. Whereas for exchanging the data between XML and database, it is required to establish a correspondence between documented XML schema and database schema, relevant software for data exchange is founded in high level of this correspondence.

In [7], use of XSLT was presented that allows the user before data exchange to convert the data to respective format.

Two XQuery and XPath languages are accepted more extensively for whom working with XML. In XPath language, to select each data, a XML document of Path Expression corresponding thereto is used [8] and XQuery language is mostly similar to SQL and more familiar for programmers [9].

4. THE PROPOSED METHOD

Our proposed method is mapping queries by XML, designing an object-oriented database and applying on the queries. In this paper, the queries can be stored with XML labels. So, labels in XML may be presented for support of object-oriented database.

4.1 Definition of class structure in XML document

To define class structure in XML, respective class must be shown in XML schema. For this purpose, class exhibition must be mapped to DTD schema.

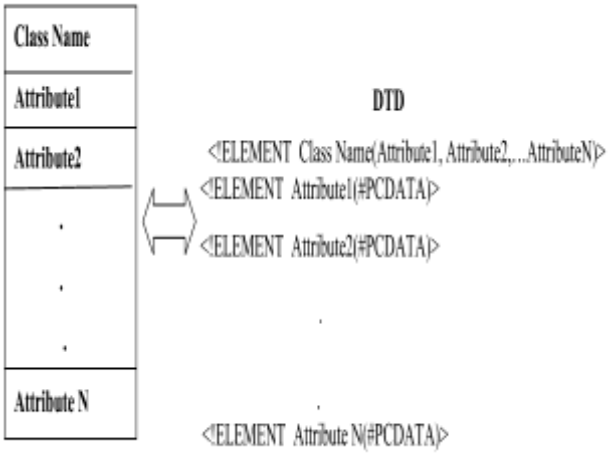

Figure 1. Class mapping by DTD

4.2 Exhibition of samples of class in XML document

Whereas class was formed based on XML schema, at this stage, the defined samples of class may be easily shown in XML document as below:

Object Class Name	<Object Class Name>
Attribute1=Value1	<Attribute1>Value </Attribute1>
Attribute2=Value2	<Attribute2>Value </Attribute2>
.	
.	⟺ .
	<AttributeN>Value </AttributeN>
AttributeN=ValueN	
	</Object Class Name>

4.3 Query procedure

Query processing in the object-oriented database refers to a process therein objects of classes are selected that meet the

designated condition. In the method proposed by Zung Ma, it was not possible for the user to prioritize his assumed attributes and only membership rate of each object in the relative class (μ) was analyzed. In the proposed method of this paper, upon allocating weight to queried attributes, setting the priority of each attribute in the query is assigned to the user. Therefore, syntax rule of a SQL query based on object-oriented database will be as follows:

SELECT <attribute list> FROM <$class_1$,…, $class_m$> WHERE <query condition >

In above relation, attribute list includes the attributes that are going to be appeared in the output and related to the objects that meet the user condition. The classes that are written in front of FROM include classes that query operation in performed therein. Query condition is a condition that user expected to be met. Queries related to object-oriented database may be written in XML format that a sample thereof is shown in figure 2:

```
<Query Name = "SELECT">
    <AttributeList>
      <Attribute> Value1</ Attribute>
      < Attribute>Value2</ Attribute>
        .
        .
      < Attribute> Valuen</ Attribute>
    </AttributeList>
  <FROM>
    <Class> Name1</Class>
    <Class> Name2</Class>
  </FROM>
  <WHERE>
   <ConditionAttribute Name= "Value1" Operand="Value2" Operatore ="Value3" >
    <Operator></Operator>
   </ConditionAttribute >
  </WHERE>
</Query>
```

Figure 2. Schema of Select query using XML

5. Case study

In this part, the book information registration system is used for evaluation of proposed method. In this system, the books information is registered so that different books can be searched based on different fields. In addition, considering proposed method, insert , delete, select and edit operation of XML object-oriented database is carried out.

The classes related to book information registration system include two classes in the name of book and Author with the below-mentioned particulars:

```
Class Book {
Int ID;
String Title;
String ISBN;
String Publisher;
Date Date;
double Price;
Float Weight;
String Subject;
Author Author; //Object as Data in Object Oriented Database
}
Class Author{
String FirstName;
String LastName;
}
```

According to the defined classes and proposed method, a mapping to DTD model must be applied to obtain XML document related to respective system, easily.

<!ELEMENT Book(ID, Title, ISBN, Publisher, date, Price, Weight, Subject, author)>

<!ATTLIST Book ID CDATA #REQUIRED>

<!ELEMENT Title (#PCDATA)>

<!ELEMENT ISBN (#PCDATA)>

<!ELEMENT Publisher (#PCDATA)>

<!ELEMENT Date (#PCDATA)>

<!ELEMENT Price (#PCDATA)>

<!ELEMENT Weight (#PCDATA)>

<!ELEMENT Subject (#PCDATA)>

<!ELEMENT Author(FirstName, LastName)>

<!ELEMENT FirstName (#PCDATA)>

<!ELEMENT LastName (#PCDATA)>

6. Conclusion

In this paper, a method was presented for showing samples of class in the XML database and so the concept of XML object-oriented database was defined. Furthermore, different queries related to XML object-oriented database was defined and showed. Consequently, the concepts of object-oriented database and its relevant queries can be shown by XML labels.

7. REFERENCES

[1] B. Tim, P. Jean, C. M. Sperberg, M. Eve," ExtensibleMarkup Language (XML)1.0", World Wide Web Consortium (W3C) , (2006), http://www.w3c.org/TR/REC-xml. Fourth Edition, 29 September. (Visited on 2008-02-09).

[2] J. Fong, " Mapping Extended Entity Relationship Model to Object Modelling Technique", SIGMOD, (1995), Record 24.PP.18-22.

[3] A. Borgida, " Modelling Class hierarchies With Contradictions", Proc of ACM SIGMOD International Conference on data management Chicago,US,Vol.17,no.3,(1998), pp.434-443.

[4] A. F. Cardenas, I. T. Leong, R. K. Taira, R. Barker, C. M. Breant, " The Knowleadge Based Object Oriented PICQuery+ Language", IEEE Transaction on Knowledge and Data Engineering, Vol.5, no.4, (1993), PP.644-657.

[5] R. Bourret, " XML Database Products", WWW.rpbourret.com/xml/XML And Databases.htm, (2003).

[6] J. E. Funderburk, " XTABLES:Bridging Relational Technology and XML", IBM Systems Journal, Vol.41, (2002).

[7] J. shanmugasundaram, " A General Technique for Querying XML Documents Using a Relational Database System", Special ISSUE: Special Section on advanced XML data Processing, (2001).

[8] A. Berglund, S. Boag, D. Chamberlin, M. F. Fernández, M. Kay, J. Robie, J. Siméon, " XML Path language (XPath) 2.0", World Wide Web Consortium (W3C), (2007), http://www.w3.org/TR/xpath20 ,. (Visited on 2008-03-17).

[9] S. Boag, D. Chamberlin, M. F. Fernández, D. Florescu, J. Robie, J. Siméon, " XQuery 1.0: An XML Query Language", World Wide Web Consortium (W3C), (2007), http://www.w3.org/TR/xquery, January 2007. (Visited on 2008-03-17).