

Examining analysis and evaluation system based on XML

Chen Hua^{1,2}, Lv Qingli², Cao Yan¹, Liu Baolong², Yuan Li¹, Zhao Rujia^{3,4}, Joan Lu⁵

¹ School of Electromechanical Engineering, Xi'an Institute of Technology, Xi'an, Shaanxi
710032 P.R.China

² College of Computer and Information Engineering, Shaanxi University of Science
&Technology, Xian Yang, Shaanxi 712081, P.R.China

³ Xi'an Jiaotong University, Xi'an, Shaanxi, 710049, P.R.China

⁴ Jiangsu Teachers University of Technology, Changzhou, Jiangsu, 213001, P.R.China

⁵ School of Computing and Engineering, The University of Huddersfield, Huddersfield, UK

Abstract: *Examining analysis and evaluation system is an important means to achieve teaching process modernization. XML is adopted to develop an examining analysis and evaluation system. Based on current researches on examining analysis and evaluation systems, its system architecture is put forward based on XML. Its processing subsystem composed of five subsystems is discussed. All the five subsystems are used synthetically to analyze and evaluate examination data objectively and roundly. Consequently, the quality of teaching and learning can be ensured.*

Keywords: *Examination; Evaluation, XML, Translator, Architecture*

1 Introduction

With the enlargement of computer application and network application, and construction and development of computer tele-education network, we prepared to develop examining analysis and evaluation system based on Internet using network and database technology. Currently, statistical analysis of examination results is an important ingredient of teaching evaluation. Examining analysis and evaluation system is a subsystem of examining system^[1]. Using the examining analysis and evaluation system, some problems are resolved, such as mass calculation workload, management complexity, etc. Work quality is ensured and subjective experiential errors are eliminated. It is propitious to get objective impartial results, enhance teaching quality, and manage teaching process scientifically. Examining analysis and evaluation system is an important means to achieve teaching process modernization.

Current internal examining systems based on network are generally based on HTML. HTML has become a general language on Web since developed. But it pays attention to information representation format. Its data and format description are mixed, so it cannot describe the semantics of data properly. It does not suit other application except typesetting and display because there is no uniform standard.

Research personnel of IBM summarize three rules to solve this problem. Firstly, document-processing program must support the same common document form. Secondly, the common form must provide different signs for different applications. Thirdly, the validity of a HTML document need to be verified. With the application of network, the limitations of HTML become obvious and it cannot act as the tool of information exchange and expression on Internet. There are some problems in network examining system based on HTML.

1) The sharing problem of media resources. In the system, network system realize the entire test question database is shared, but each test question cannot be shared separately.

2) Information extraction problem. HTML cannot only memorizes the logical structure of data but its outer character because HTML signs pay attention to the outer form of data. So, if one wants to extract some test questions from different test question databases, he has to do it manually. When the quantity of data is very large, manual labor cannot satisfy the demand.

3) Distributed management problem. Distributed resources result in management problem.

4) Representation limitation. Because HTML cannot be extended, its representation is limited.

The reason of all the above problems is that HTML is a language aiming at the outer representation of data, but not the connotation of data.

In 1998, World Wide Web Consortium proposed XML 1.0 and recommended XML as the new representation criteria of Web data. Although XML is proposed as a data representation criteria, XML becomes the new standard of Web because it has powerful and agile expressing capability, mutually operational capability, data exchange capability, and its support to other criteria, such as XSL^[2-4]. Various products and schemes are developed based on XML. XML is a language that can memorize data connotation, which is different from HTML. Apparently, the researches on XML can promote the information course of enterprises as well as e-commerce.

Thus, XML is adopted to develop the examining analysis and evaluation system.

2 System architecture

Nowadays, there are two methods to store and inquire XML data. One is extending the corresponding functions of existing relational database to support the processing of XML data^[5-6]. The strongpoint of this method is that it takes full advantage of existing database technology and integrate all the existing data stored at the database. The other one is design a Native XML Database for XML data. But the second method needs a long time to realize. So, the first method is adopted to develop the examining analysis and evaluation system. Its system architecture is shown in figure 1.

The system applies bottom-up method, distributes data from the bottom information and then forms a XML view, which becomes an interface for data sharing. Traditionally, there are two methods to translate the data into an XML document.

1) Translate the record inquired by SQL into the XML document one by one. This method is simple

and coarse, and cannot fit for complex applications. For example, it cannot represent the logical and nesting relationship among multiple tables.

2) Construct a new mapping language criterion. One can define a mapping file for every translating unit according to the mapping criterion that defines the mapping relationship between a database unit and its XML document.

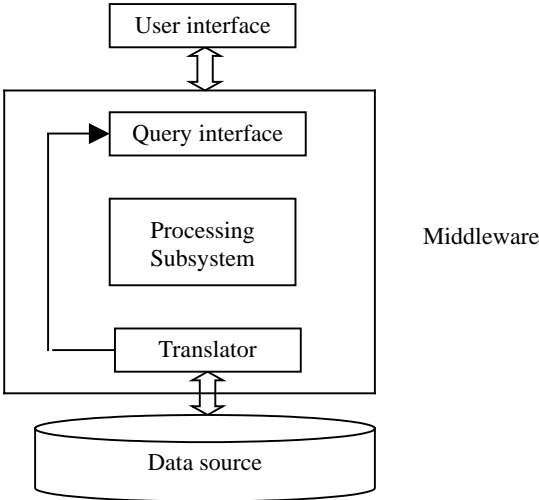


Figure 1 The system architecture based on XML

In the paper, the second method is adopted and a translator is developed to realize the translation according to the criterion. By defining a mapping file according to the mapping criterion, the translator will translate the database-pattern to the XML pattern. So, there are two steps to realize the translation from database to XML, namely defining the mapping criterion and developing the translator. After the data from different databases are translated into different XML documents, they are different in format and logic. So they need a set of XML translation to become uniform XML documents. A converter executes such converting function by Xslt mode table. The XML documented generated by the translator and converter may need further abstraction or combination to form a new XML document that satisfies more complicated demands. An integrator uses Xpath language to inquire and distill a source XML document, and then organize XML snippets to form a new XML document by DOM. Thus, the global XML view is founded. The following work is to manage and define views. The output of the translator, converter and integrator is a complete XML document. The translator may be defined as an independent view. It also may be defined as the input of the converter and integrator. The converter and integrator may be defined as other views, and their output may be defined as the input of other groupware. The principle of the translator is shown in figure 2.

When using J2EE, there are two methods to resolve XML, namely DOM and SAX. J2EE provides JAXP programming interface, which includes DOM interface and SAX interface. Developers can use them to resolve and handle XML data. Also, they can use certain document models, such as JDOM.

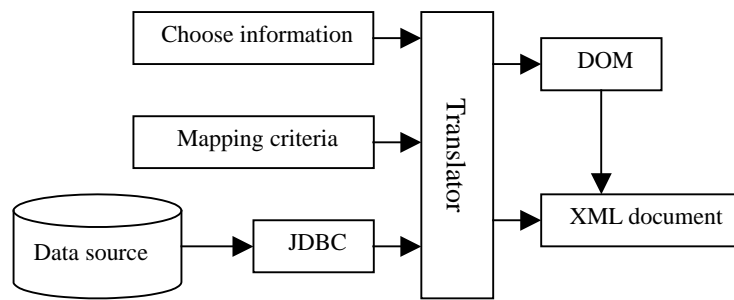


Figure 2 The principle of the translator

3 Processing subsystem

The processing subsystem is composed of five subsystems as below. All these five subsystems are used synthetically to analyze and evaluate examination data objectively and roundly. Consequently, the quality of teaching and learning can be ensured.

1) Examining analysis and evaluation subsystem

It evaluates the quality of examination and emphasize the review of whole examination. After examination, it analyzes the reliability and validity of the examination, reviews the fairness, accuracy and quality of the examination. Only if the examination is valid and credible, the results can be regarded as the evidence to evaluate teaching quality and studying status.

2) Teaching effect evaluation subsystem

The intention of teaching effect evaluation subsystem is to judge whether students achieve preconcerted learning aim, to seek the best teaching approach and method, and to compare different teaching methods.

3) Test question database interface

The standard test question database interface is developed based on XML to support the analysis, accumulation and optimization of test questions in the database. Using the interface chronically, the quality of the test questions will be improved, and then more effective test papers can be generated.

4) Test paper analysis and evaluation subsystem

This subsystem analyzes the validity and reliability of test papers. The reliability means the credibility and stability of examination results. The validity means whether the grade distribution, degree of difficulty and so on are appropriate. Statistical analysis is helpful to improve test paper quality according to information feedback.

5) Test question analysis and evaluation subsystem

To examine the validity of a test, the difficulty and validity of test questions will be analyzed and evaluated.

4 Conclusions

Examining analysis and evaluation system is a subsystem of examining system. Using the examining analysis and evaluation system, some problems are resolved, such as mass calculation workload, management complexity, etc. Work quality is ensured and subjective experiential errors are eliminated. It is propitious to get objective impartial results, enhance teaching quality, and manage teaching process scientifically. In the paper, XML is adopted to develop the examining analysis and evaluation system.

To take full advantage of existing database technology and integrate all the existing data stored at the database, the corresponding functions of existing relational database are extended to support the processing of XML data.

Based on current researches on examining analysis and evaluation systems, the system architecture is put forward based on XML. Its processing subsystem is composed of five subsystems, namely examining analysis and evaluation subsystem, teaching effect evaluation subsystem, test question database interface, test paper analysis and evaluation subsystem, and test question analysis and evaluation subsystem. All the five subsystems are used synthetically to analyze and evaluate examination data objectively and roundly.

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