

Design and Implementation of an e-Catalog using XML

Yi Wen Liu*, Jin-Gwon Geum**, Byeong-do Kang***, Young-Jik Kwon***

*Computer Information Engineering, Daegu Univ., dutmath@hotmail.com

** Computer Information Engineering, Daegu Univ., k2crunch@hanafos.com

*** Department of Computer IT Engineering, Daegu Univ., bdkang@daegu.ac.kr

*** Department of Computer IT Engineering, Daegu Univ., yjkwon@daegu.ac.kr

Abstract

E-commerce and business information systems are being introduced in most of enterprises with the development of internet recently. Meanwhile the introduction of enterprise portal concepts and the enterprise informatization provide a necessary premise for insuring a competitive power. Therefore, it became necessary to research on the project of reusing the data of e-commerce. In this paper, we make a domestic maker the subject and implement a XML based electronic catalog(e-catalog) system for electronic commerce(e-commerce) based on web. The implemented XML based e-catalog system can reduce time and expenses needed for making, keeping and distribution in paper catalog systems. It also can correct the data reuse problems in the e-catalog systems implemented by HTML. Exchanging and reusing data used in e-commerce is essential to the integration between business information systems and points to the enterprise portal.

1. Introduction

There are many problems in traditional catalog systems, such as the shortage of the saving space, the augmentation of time and expenses and the decline of enterprise competitive power, etc. To solve these problems, e-catalog systems appeared. However, the existing HTML based e-catalog systems also have a problem that it is difficult to reuse the data in them. According to this, we implemented a new e-catalog system based on XML. We detail our research goals in the following.

Firstly, we plan to introduce the e-catalog system in order to reduce and minimize the making cost and time.

Secondly, we make the real-time update possible by implementing a web based e-catalog system and thereby supplying accurate and quick information for many unspecified customers so raising competition ability of enterprises to response a quick fluctuation of the business enterprise market.

Thirdly, we implement such an e-catalog

system as the ability of reusing data and then apply it to the various services in enterprises, hence strengthening the connection among information systems.

Fourthly, we attempt to establish the foundation for integrating the data and the services of the enterprises, outside and inside the enterprises by implementing a XML based e-catalog system, provide the latest and diverse information in real time for customers and also provide a wider search scope.

Fifthly, we implement our proposed web based e-catalog system and make it possible to exchange and reuse the data.

This research is focused on reducing time and money consumed by remaking an e-catalog when specifications of the enterprises, which produce small amounts of various products, change, making the web-based products information systematized and the data within the enterprises reused. Hence, it paves the way for automatic business running and enables the information on internet to achieve the expected effects, so that enterprises can adapt quickly to a fluctuation of

market, with competition ability reinforced.

2. Related research

2.1 Background

Just as the farm developing in America, Catalogs boom rapidly all over in every field within the nation. To meet the supply and demand of seeds, paper catalogs appeared. With paper catalogs, farmers don't need to go for a long distance to book goods, therefore removed the obstacle of distance, providing farmers with convenience. Paper catalogs are the Original form of catalogs. Owing to the exposure of paper catalogs' drawbacks and the development of information technology, e-catalog appeared.

2.2 Definition and characteristics of e-catalog system

2.2.1 Definition

Existing e-catalogs are widely applied in the field of e-commerce, for instants, pictures, images and sounds data did for advertizing in shopping malls.[5].

We refer to e-catalogs as "electronic documents(e-documents) containing goods' information". Regarding "goods", "information", and "e-documents", goods which are called "objects of transaction" include material, immaterial, commodity, service. Generally, information includes descriptions about goods themselves, data needed for transactions, and relationship among documents. E- documents, as a bundle of data stored in a computer, are abstract documents which cannot be dissected to specific units[3].

2.2.2 Characteristics

In order to comprehend the characteristics of e-catalogs, we compared e-catalogs with traditional paper catalogs. Through compare, we concluded several advantages of e-catalogs as follows:

① Renew goods information in time

② Provide the function of searching

③ Easy to compare with similar goods

④ Can be integrated with payment systems during shopping

⑤ Customers can get familiar with detailed information from suppliers.[2]

2.3 Components of an e-catalog system

Components of an e-catalog can be separated into two parts, the basic components and the additional components. The basic components contain the most important information about goods, while the additional components contain goods related other information. [3,5].

Table 1. Components of e-catalog systems

Classification		Content
Basic components	Identifications(ID)	Brand names, Product names, Model names
	Basic attributes	Categories, unit attributes, price information
Additional components	Additional attributes	Products description and elements related advertisements
	Display elements	Visual information which effects purchase, such as pictures ,images.

2.4 Structure model of an e-catalog systems

An e-catalog system consists of the following four models, which are Single Server model, Virtual Catalog model, Mediator model, Central Repository model. [5].

(1) Single Server model

Single Server Model is the form that the existing shopping malls are taking now. Softwares to implement e-catalog systems of this model include LiveCommerce, developed Open Market, StepSearch of SAQQARA and so on.

(2) Virtual Catalog model

Virtual Catalog Model is proposed in the Collaboration of Center for Information Technology (CIT) in Stanford College and Catalog

Working Group of CommerceNet. It can abstract products information by using catalogs of wholesale merchants as catalog connections among many producers. That is, the e-catalog is constructed by each producer, It always keeps up the latest information, shows information on the virtual catalog platform of wholesales according to information retrieval of customers and executes payment processes. In other words, databases of e-catalog systems are dispersed and they show information to customers using single access point.

(3) Mediator model

Mediator Model, similar to Virtual Catalog Model, is the definition derived from digital library. It has a mediator, which integrates electronic catalogs, as suggested by the Information Management Research Institute in St.Gallen College, Sweden in 1996.

(4) Central Repository model

Central Repository Model is what has a catalog repository in center. It is possible to upload and download information about each shopping mall and product makers. It is the form that manufacture industries remotely register and modify products in server, management enterprises of electronic shopping malls operate e-catalog systems to download products information, personal buyers search e-catalogs through internet. The most important features are as follows: one is operating systems to manage e-catalogs in the center while the other is researching in division systems of network at the time shopping mall is being operated.

3. A XML based e-catalog design

3.1 System design

The e-catalog used in enterprise S was made by HTML. However, there is a problem in such kind of catalogs, which is, the catalogs are very difficult to be expanded. To correct such kind of problems, we decided to design a XML based

e-catalog system.

3.1.1 Structural model and diagram of the e-catalog system

Figure 1. shows the Hybrid model of our proposed system. It consists of three kinds of models, which are a Single Server model, a Mediator model and a Central Repository model.

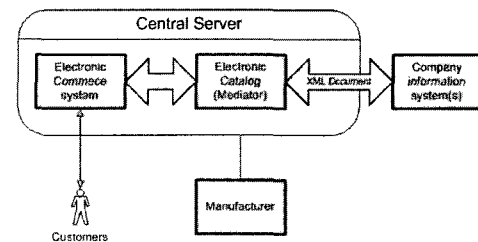


Figure 1. A Hybrid Model

Here, The Single Server Model is used to offer interfaces which enable the users to see the products in general shopping malls or something and also to provide web services.

The Mediator Model, just as its name implies, makes e-Catalog system to act as a mediator that integrates all kinds of products information between e-commerce systems and enterprise information systems.

The Central Repository model is used to enable all the information on the website and in the e-catalog system be converged within a central server.

<Figure 2> shows our implemented system using the above Hybrid model.

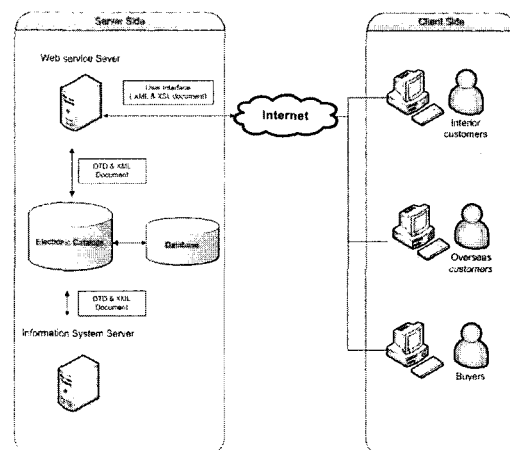


Figure 2. Architecture of the System

As depicted in the figure, we store products and elements data into the database, which should be involved in the e-catalog system. The e-catalog system provide the data of products which are obtained from the database to web server in the format of XML. DTDs are used to verify whether XML documents are valid or not. User interfaces are provided on web server. The formats of XML documents which are got from e-catalog systems can be transformed by XSL, and then be provided to users.

3.1.2 DTD and XSL design for the e-catalog

The goal of the e-catalog which we attempt to implement in this paper is that the inside data can be reused. Hence we decided to use XML documents instead of HTML documents. In order to structure the XML documents, From two ways of defining the structure of XML documents, DTDs and XML schema, we selected the former. DTDs(Document Type Definitions) define all the element and attribute names that may be used. Also they define the structure, such as, what values an attribute may take and which elements may or must occur within other element, etc. Figure 3. shows our DTD design.

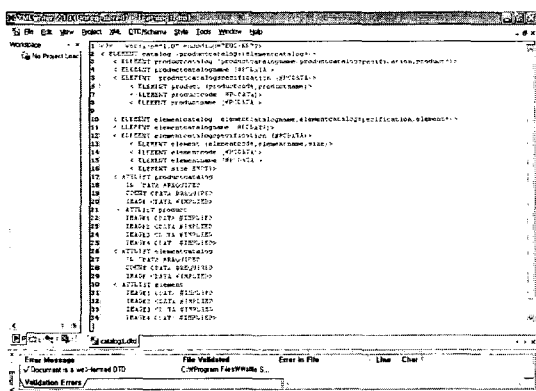


Figure 3. A design of DTD for Electronic Catalog

We designed XSL(extensible stylesheet language) to provide interfaces for users. XSL includes both a transformation language (XSLT) and a formatting language. Each of these is, of course, an XML application. XSLT specifies rules with which an input XML document is transformed to another XML document, an HTML document, or plain text. so XSLT is a tool that

can be used for machine-processing of content without any regard to displaying the information for people to read, according to which, XSL can provide interfaces for users.[7]

<Figure 4> shows our XSL design for the e-catalog.



Figure 4. Our XSL design for Electronic Catalog

4. Implementation of the XML based e-catalog

We applied our implemented e-catalog system in our paper to the portal site of the enterprise S. (see Figure 5.)

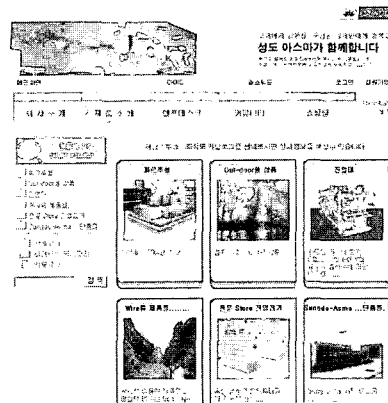


Figure 5. The implemented Electronic Catalog

Looking at the images and instructions for the products(see Figure 5),. Users can gain detailed information (see Figure 6.) by clicks of corresponding buttons.

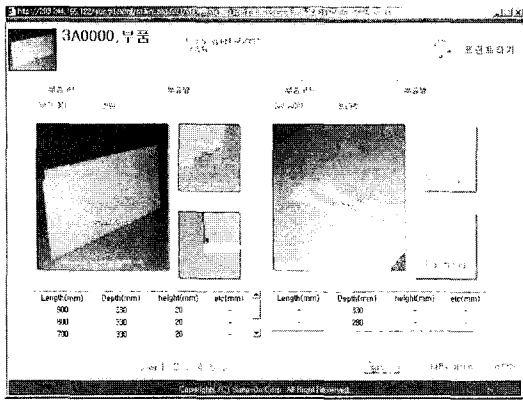


Figure 6. A detailed display of the Electronic Catalog

Picture 7. shows the data used in our designed e-catalog Picture 7. Besides, our designed DTD can also be referred similarly to other Information systems, therefore the data can be easily reused.

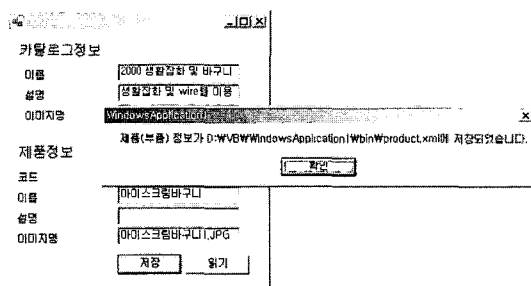


Figure 7. The formation of data in XML documents

5. Conclusion

Owing to the flourish of e-commerce , the use of e-catalog system is rising. But in e-commerce and Information systems, documents with different formats are being used, as a result, Integration is hard to be satisfied. Therefore, it becomes significant for enterprises to use catalog documents formats which have the ability of reusing data.

In this research, in order to realize the plan of reusing the data which has been used in e-commerce, we implemented a XML based e-catalog system. Compared with HTML based e-catalog systems which were used before, it has a better expansibility. The superiorities of this system are as follows:

Firstly, It can react rapidly to real time data input, modification and deletion on web pages.

Secondly, The latest information can be delivered to consumers.

Thirdly, It's easy to manage and modify XML based e-catalog systems

Fourthly, Stored data can be reused owing to the use of XML format

By implementing our proposed model, We can gain the ability of searching any documents in the e-catalog systems so that getting the products information and hence reinforcing the connection among enterprises, also, we can, in market places, easily change our e-catalog systems correspondingly with the required formats transformation.

Our future research will concern an extension processing of documents structure that is used in e-catalog system, which may describe information of corporations and industrial products synthetically, so for sure partition transformation processing of e-catalog formats detailedly which are required in digital market environment. For the development of Information systems that use data in e-catalog systems and the connection between inside and outside of a enterprise, we will also focus on the implementation of the e-catalogs which support XML standards.

References

- [1] Young-Shin Kim 「Study of construction strategy to enterprise portal: Laying stress on domestic enterprise example」, Hongik University, Master's thesis, 2002.
- [2] Il-Hyeon Kim, 「Study of problems of electronic catalog and its improvement plan」, Hanyang University Department of Business Administration, Master's thesis, 2002.
- [3] Sang-Gu Lee, "Present condition of electronic catalog standard and application guideline", 「E-commerce standardization integration forum」, 2001.
- [4] Jae-Gyu Lee, Gyeong-Jeon Lee 「E-commerce and a distribution revolution」, Probus

publishing company, 2000.

- [5] Eon-Ju Hong, 「Electronic catalog related technology, present condition analysis of the enterprises and improvement plan」, National Computerization Agency, 1999.
- [6] Jin-Gwon Gim, Eun-Gyong Shin, Changhai Jim, Seong-A Lee, Young-Jik Kwon, 「Design of electronic catalog system by dynamic changing environment of products」, Korea Industrial Information System Society, 2004.
- [7] Grigoris Antoniou and Frank van Harmelen, 「A Semantic Web Primer」, 2004