

Research on Education and Computer Management Applications Based on Topology

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ABSTRACT

In a word, this paper introduces the Semantic Web research background and current research condition. We make a research in the realm of ontology representation and the Semantic Web model. This paper puts forward a method to represent ontology in XML. This method has a good result and a general purpose. Based on this method, we realize the ontology layer in the Semantic Web model. We design and realize the Semantic Web model system based on the ontology. We use the ontology as the semantic information layer in the Semantic web. Thus we can share the semantic information to improve the automation and intelligence of information service. A further purpose of the work is to add more support of reasoning functions and research the control mechanism of the ontology in Internet.

Keywords: species, variables tested, integration technology, the major response criteria

1. The Whole Framework of System

This section will discuss the overall framework of the Semantic Web, first discuss the system architecture of the Semantic Web, then discuss the distribution of the main function of the Semantic Web at the application layer and the structure of the ontology layer, and finally introduce how to achieve the Semantic Web by precluding the use of the Web three-tier structure.

1.1 Semantic Web system architecture

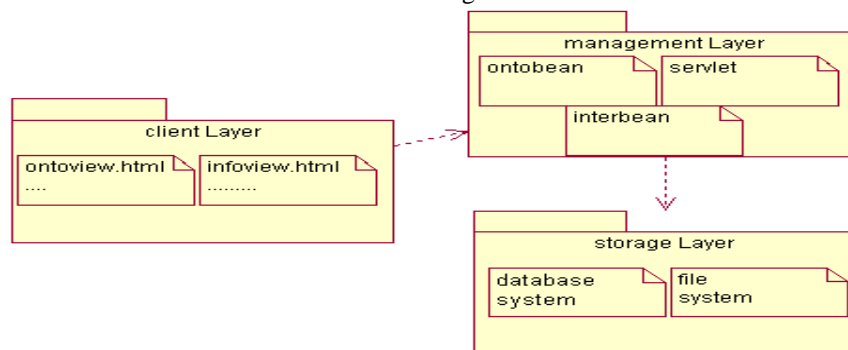


Figure 1 Semantic Web system architecture

This article precludes the use of Java server-side programming techniques to achieve the model of the Semantic Web, Ontology Service joined in the general information service model. In addition to the general three-layer structure containing the business logic in the application layer, including the ontology layer. Ontology layer services introduced by the form of a JavaBean, the ontology information in the form of an XML file stored in the data storage layer, obtained ontology information parsed internal representation is stored in a JavaBean, while defining the external interface of the ontology layer. Access should be through the body of administrators and ordinary users of the ontology layer and repository layer. Access the ontology and information library, the user does not need to consider the information is stored, and the body layer access to the repository will have to have different access to different storage. This requires different access design interface. Using JavaBean technology to implement this interface means through the development of a component of the conceptual model of the Semantic Web ontology layer and information layer interface.

The semantic network model presented in this paper for the three-tier structure, in the realization of the model, the functionality of the Semantic Web rational distribution of the three levels; you can get the semantic network model given below:

As shown in Figure 1, the design of the Semantic Web model, according to the three-tier architecture to deploy the required functionality of the Semantic Web. The presentation layer through the rational design and layout of the pages, data is displayed through a Web browser parsing the page files to achieve, thus reducing the difficulty of implementation. The application layer to achieve impress with Java server-side programming techniques, through the JavaBean and the servlet implements the functions to achieve the application logic. Implementation of either of the storage layer to use the database system can use the file system. The user interface presentation layer to access the application layer. Application layer contains the information services business logic and ontology service ontology layer, ontology layer preclude the use of the JavaBean technology, users can realize the ontology layer, said layer

of access contain components that call the Ontology layer functionality ontobean visit. Join interbean as the access interface between the application layer and storage layer, application layer access to the storage layer by calling interbean to get access to different storage interface. In this way, the Semantic Web model impress the three-tier structure to achieve better reflects the design ideas of the presentation layer, business logic, and data storage layer separation.

1.2 Application Layer architecture

The application layer in the Semantic Web model contains the information services business logic and ontology to provide semantic information services layer, is a core part of the Semantic Web features, Figure 2 shows the structure of the application layer:

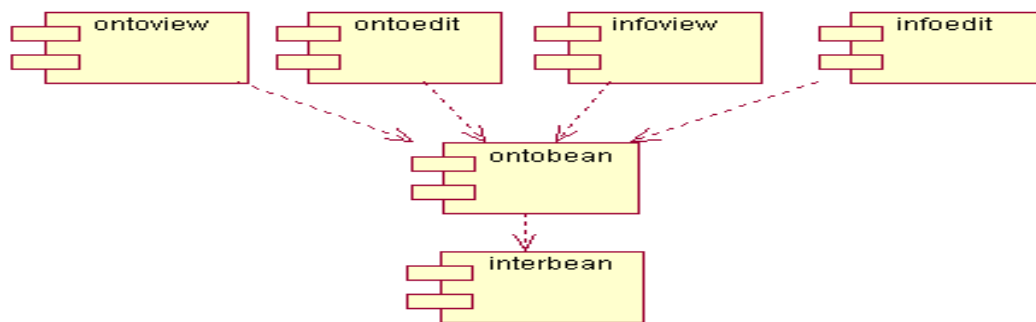


Figure 2 Application Layer Architecture

The system key is the application layer, shown in Figure 4-2, the application layer, application layer required to achieve the functionality is built on the basis of the ontology layer. The realization of each function is relatively independent, but they need to call the ontology layer functions. In this way, in the semantic network application layer functions are related to the ontology layer service calls, and thus the ontology layer is the core of the application layer. Ontology layer is implemented as a JavaBean component ontobean, which encapsulates the ontology model and the operation of the ontology model for the function of the application layer service interface. The application layer on a body of information operations and the operation of the repository are called the ontology layer components. Access interface of the application layer and storage layer, as well as the form of JavaBean component interbean are in the application layer. This implements the interface components, access to the repository interface component; you can give a consistent interface to the ontology layer. So to access the repository,

you do not have to take into account information is stored. Preclude the use of this modular way, implementation can be of various functions to achieve, and then each module together can achieve the functionality of the entire Semantic Web.

1.3 Ontology-layer architecture

In the system architecture presented in this paper, reflecting the status and role of the ontology layer in the Semantic Web, but did not give the ontology layer of the introduction, this section will illustrate this problem. The ontology layer created by parsing an XML file that there are ontological information to generate ontoBean stored ontology model and package model operation. The loading of the ontology information service is completed by a load at system startup. The introduction of ontology in the ontology layer can use a separate module to realize the system structure shown in Figure 3:

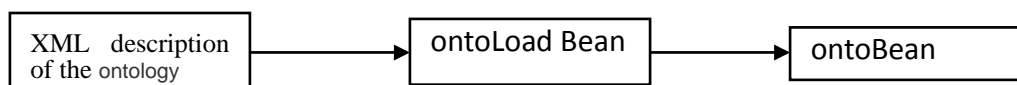


Figure 3 Ontology layer structure

1.4 Web application of three-tier structure

Achieved, we impress with a typical Web application three-layer structure shown in Figure 4:

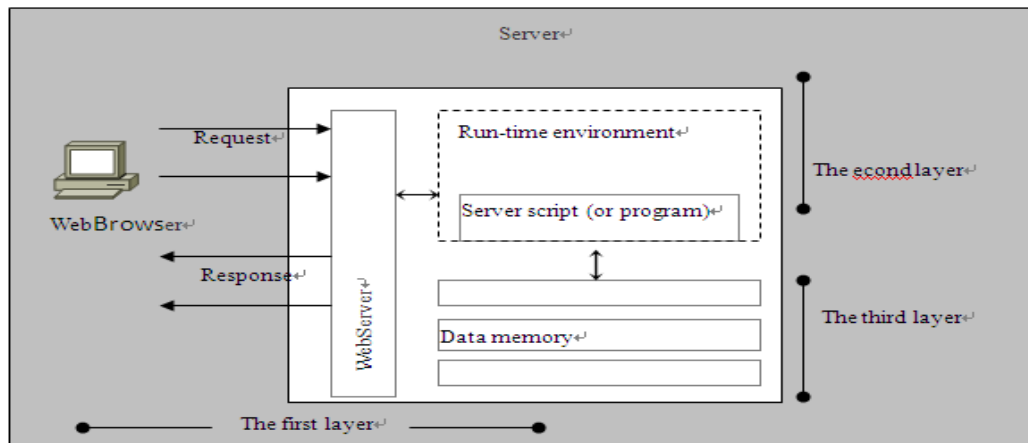


Figure 4 Web Three-tier Application Architecture

The first layer consists of the presentation layer, is responsible for data formatting for the display format, preclude the use of the Web browser as a client, to give a specific user interface through an html file. The second layer is the application layer, including the server-side programs written in Java, this layer contains the code that users need to call in order to obtain data, to impress in this layer ontology layer, each function in the JSP JavaBean technology to call a JavaBean component. The third layer contains the application of the required data can be a database, can also be a set of documents. Due to the different ways of data storage on the third floor of the operation require different interfaces, these interfaces is encapsulated in a JavaBean component.

In this way, preclude the use of Web applications to achieve the Semantic Web model; we can effectively

2. System in the Main Techniques

This section will Semantic Web to discuss the main techniques, including Java2 technology in the system, the application of the MVC pattern implementation, ontology modeling and ontology model Java parsing process.

2.1 The Java 2 Technology.

Java 2 Platform, including a series of related technologies, and to compile a portable, object-oriented, secure Internet application provides a fast and mature way. This semantic

apply the three-tier architecture model. , We can see from the above-mentioned three-tier structure, the end user is not directly the data of the operating system layer, data layer of security can be a certain degree of protection. The same time, the system also has good scalability and can be extended to any layer in the three-according to the circumstances of the actual system operation. Rational function of the Semantic Web to a Web application for deployment, the semantic network model to better use the advantages of three-tier structure, the system has a higher security with scalability. Moreover, this three-tier architecture of Web applications is a thin client mode; the user simply by machine with a Web browser can access the semantic web system. In such a way to achieve the Semantic Web system to facilitate the concrete implementation of the Semantic Web system

network system, preclude the use of JSP, JavaBeans, servlets, and Java technology.

Servlet is a Java server-side technology developed by Sun, it is very efficient, because it is a thread-based model In this model, each request takes up less resources thread to handle; servlet platform-independent , because it is through a standard set of interfaces and the Java virtual machine to a particular server architecture

JSP is based on the Java dynamic web technology that will set the markers and Java code together, and used to

create support for cross-platform Web server pages, each page request for the first time the JSP engine automatically compiled into a servlet, then run it. JSP provides a variety of ways with Java servlet, JavaBean communication. Using JSP Web application functionality into several clearly defined public interface components, these components are connected together by a JSP. One of the features of JSP technology is the separation of presentation layer and business logic, preclude the use of JSP technology can achieve the design intent of the semantic network system proposed in this paper.

MVC is an advanced design patterns, it will be a program split into three parts: model, view and controller. Model represents the data and manage the data access and update business rules; view to deal with the contents of the model, it is to access the data through the model, and specify how to represent data; controller will be converted and the interaction between the view of the grounds of the operation of the model execution.

System through JSP technology to achieve the implementation of the MVC pattern is shown in Figure 5:

2.2 The MVC (Model-View-Controller) pattern.

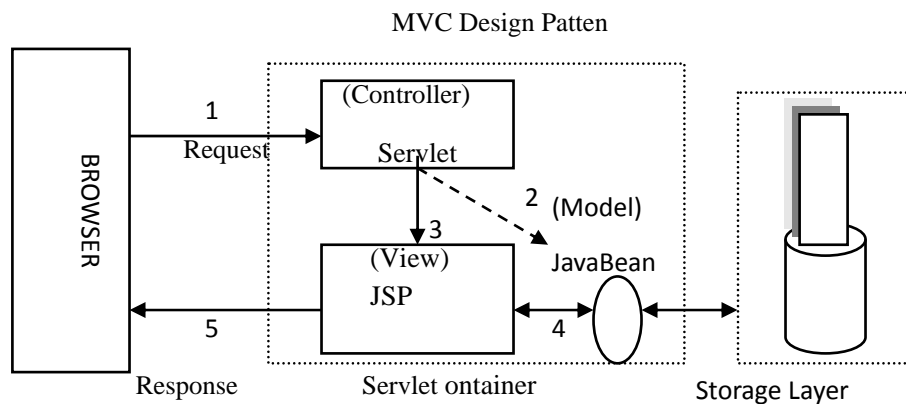


Figure 5 .JSP MVC pattern

Preclude the use of the MVC model of JSP applications can choose the business model and display, depending on the request

, the controller according to the input selection of different models and display, control the entire Web application process.

Through the realization of the MVC pattern, the multiple views you can use the same model, the Semantic Web system has repeatedly used the MVC pattern. Taking the ontology as a model, different access requirements corresponding to a different view, so even if the realization of system functions, but also to ensure the integrity of the information. Shown in Figure 6

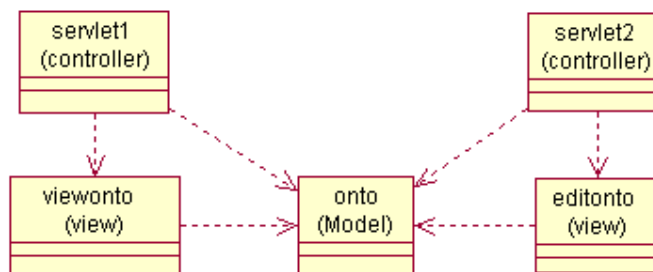


Figure 6 Ontology as a model of the MVC pattern application

Ontology query features and editing functions, you need access to the ontology model. Ontology model is implemented as a JavaBean component, loaded the statement of its life cycle as the Application type can exist

in the entire application is running. Thus, once the load the module to start the JSP page can call the components of the ontology model. Query capabilities through viewonto.jsp editing features by editonto.jsp achieve. JSP

implementation can be divided into data representation and two parts of the business logic of these two parts is implemented as a controller and view, the two can share one onto the model.

To be able to use ontoBean component in JSP, you need to add the following code in which the statement: Tag in the code for use ontoBean in JSP can call ontoBean provide the model for the controller, the controller according to user requests the view from the model results, select the JSP set the view to display. The JSP the ontoBean use, the parameter configuration requirements will be different, which requires when calling ontoBean, its parameter configuration to get the right parameters. Shown in Figure 6, the ontology editing and browsing capabilities should call ontoBean, just browsing capabilities of the ontology model in ontoBean editing features you need to change the ontology model

```
<jsp: useBean id="onto" class="ontoBean" scope="application">  
<% - Here is the bean configuration code -%>  
<% - This call required configuration parameters -%>  
</ Jsp: useBean>
```

stored in ontoBean object. Can both use the parameter configuration when the call controls, to achieve the required application effect.

The process of ontology parsing of the following paper will discuss the Java implementation of the process and gives the body resolved. This process draws on open source projects XlinkFilter resolution process in which the added processing for XML ontology characterization. Figure 7 shows the body resolution process to indicate.

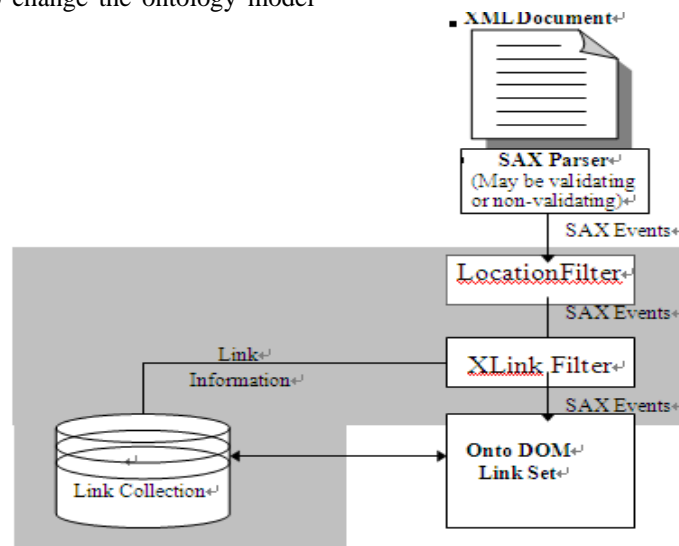


Figure 7. Ontology in Java parsing process

First of all, by the SAX parser for XML documents to analyze, detect the form of rationality and effectiveness. XLink element in the XML document, the body of the XML description may have regarding the effectiveness of error is negligible, but the other error messages to give the handle prompt. The resulting series of events to the next layer are of processing.

Second, LocationFilter class to receive information about XLink element, record the location information of the current element, XlinkFilter class to receive all events, and isolated from the link information and the element information will mean that the concept of elements stored in the DOM model, all links to information stored in LinkSet class.

Finally, two pieces of info as ontology model ontoBean components, and the operation of the ontology model encapsulated in ontoBean. At this point, ontology parsing, and generates of ontology layer components ontoBean the, for the other function module calls.

3. System Features

The Semantic Web system preclude the use of a number of advanced design concepts and implementation techniques, has the following characteristics:

Modularity: the inner workings of separation of service interface and service in the design and implementation process. Better reflects the idea of modular separation of client service and service implementation.

Scalability: modular design and the application of the MVC pattern, this system has good scalability. By adding a new module in the system can easily line extended on the existing system; add new features without affecting existing systems work

Flexibility: The system is a Semantic Web system for specific areas, ontology information through XML file to describe the ontology maintenance, new areas of knowledge can be increased by adding a new ontology file to achieve for the new field of application.

Semantic level of interoperability: semantic web system, this introduces the concept of the ontology layer, ontology layer on the body of information processing, to achieve the goal of the semantic network semantic information to improve network service automation, intelligent, some semantic level of interoperability.

4. The implementation of the Semantic Web environment

This semantic network system precludes the use of Java Web applications, server-side need to support the JSP Web server. The client only needs to be equipped with a Web browser. In the development process, the system precludes the use of Tomcat4.0 as a Web server, database server, precludes the use of Microsoft SQL Server2000.

5. Conclusions

Semantic Web research is the research focus of the current Internet technology, a large number of projects and applications being carried out

Yahoo (YHOO) Web site: Yahoo's Web site is a well-known business portal. It preclude the use of a lightweight body, the body contains only the hierarchical arrangement of classification. Yahoo to provide hierarchical navigation based on keyword searches, but only to retrieve the entire document. It can only return with the keyword-related documents, the document content and not according to the ontology information processing to get the information of interest to users.

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