Technology Model of ASP.NET-based Computer Program Development

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Abstract

The Internet technology has become more popular and promoted the technology innovation of the increasingly multi-functional Web applications. From the perspective of software engineering development, Web applications are developed through integration and interaction of multiple technologies. Therefore, the project management of Web application design is very complicated. This paper concentrates on ASP.NET technology and designs a technology model of computer program development, aiming to accelerate quality design of the Web application design with an optimized control flow and provide reference for research on automatic generation of Web code.

Keywords: ASP.NET, Program Development, Web Application, Vector Space Model, System Function Construction.

1. BACKGROUND

1.1 Literature review

ASP.NET has all the solutions it takes to develop Web applications, including functions like verification, cache, status monitoring, debugging, and deployments (Yu and Liu, 2014). The coding specialty lies in separating the page logic and business logic, or rather, the coding and contents, which makes the coding even easier (Fang and Liu, 2014). It also makes the coding more readable and orderly. Using ASP.NET to optimize the Web applications also needs to fully consider the timeliness of the Web’s operation environment in model design and whether the program functions meet the needs of users (Wang and Wang, 2014). As the Internet technology develops and expands, the major issue of programming development and application is how to develop higher quality Web applications to satisfy users needs for multiple functions.

1.2 Purpose

Based on previous research, this paper designs a ASP.NET-based computer programming technology model, in which the ASP.NET platform could automatically generate coding, providing technology support for the function output and parallel use of multiple application programs (Li and Song, 2013). Therefore, the paper analyzes several Web application architectures and the key technology, based on which it designs the architecture and function modules of automatic coding generation. To prove its feasibility for a practical angle, the prototype supports the Web application automatically generated under two templates (Wang and Wang, 2011). The designing and development as well as the related discussion on technology done by this paper have some reference value for automatic generation of Web coding in different fields and can be used as technology reference for expanding research on ASP.NET.

2. ANALYSIS OF ASP.NET-BASED COMPUTER PROGRAM DEVELOPMENT MODEL

2.1 Features of ASP.NET operation program

There are three features of Web system in its application and development: first, current Web programs extensively apply B/S architecture technology, related survey shows a growing demand for Web server and client to develop from static to dynamic following the rising demand for information application (Yang et al., 2011); second, users have higher demand for Web functions and operation stability, and lay more emphasis on maintenance and expandability once it starts operating, to achieve effectiveness in various stages; third, part of enterprise platform
applying J2EE, JSP, Servlet, EJB, etc. creates a favorable condition for exploring Web programs. The operation environment of .Net in Microsoft, improvement in coding language like VB.NET and C#, and compatibility with ADO.NET, .NET Server Control, Web Form, etc. provide basis for multiple functions such as transaction processing, data encapsulation, and transaction control.

2.2 Code generation and procedures

Designing ASP.NET functions should be completed within Web’s development framework, which is based on Java programming environment and a widely accepted application base, for instance, Struts, JSF, WebWork, EasyJWeb, Turbine, Hibernate, SpringMVC, Tapestry, and so on (Yang et al. 2011). Similar development framework follows the software development paradigm and overemphasize past experience when designing relevant functions, so innovation in development technology is lacking though it exhibits a notion of hierarchical design. Therefore, applying the popular application Web, the following problems should be addressed; first, the complicated maintenance for most Web programs does not meet the demand for fast system response. Faced with the constant increase in data volume and user number, the Web program is further restricted in multi-function expansion mechanism and application. Second, based on learning curves, partial development framework is hard to be applied and mastered in practical designing, so the integration effect of the calculation is at a disadvantage. Therefore, understanding the framework and its strength is the precondition and basis for improving current system operation. Third, the Web development framework cannot directly supply or reuse the system designing result, so there is a lengthy development period, in which the development charges and quality become major obstacles in system application (Chen and Guo, 2011). Besides, operation errors are inevitable in the application, or cannot be corrected in time, which also restrict the coverage of the application. Based on these restraining factors, the paper proposes the theoretical framework of automatic coding generation, whose workflow of system template in generating code and verifying operating conditions of system can be seen in Figure 1:

![Figure 1. The Workflow of the System Template in Generating Code and Verifying the Operating Conditions of the System](image)

2.3 System function analysis

As shown in Figure 1, improving the application of Web program code requires a full consideration of the basic elements of code operation. For one, the process of automatic code generation should be convenient and follow certain code rules. For another, code is generated in modules and could encapsulate the partial application, to ensure the integration of multiple functions. Based on these, this paper targets ASP.NET program and designs software tool that could automatically generate Web application code, with the following functional requirements: first, select a template for program function design in the initial stage and create a template-driven Web page (Li
and Bao, 2011). Second, automatically generate code, introduce related technology according to profiles, generate code for operating program, and simplify the Web controls which are used as objects’ extensible function. Finally, code generation mechanism should be fully compatible with the automatic generation and operation of SQL sentences, and use Web code as the support system to improve application effectiveness of verification function and error notification function.

3. FRAMEWORK OF COMPUTER APPLICATION PROGRAM UNDER WEB

3.1 System function module architecture

ASP.NET-based Web application has three framework design considerations: first, as ASP.NET could display, run in the background, and control event handling, the design focuses on building a multi-functional database in the operation program; second, Web page files can be divided into HTML and CSS, with the former responsible for content editing and the latter parameter setting, which are also the focus of the page module monitoring (Lu et al., 2010). Finally, the key of database processing lies in backend integration information, but developers need to use background application to identify function designing before turning over to the front module to integrate data resources and specific tasks. Based on these three designing considerations, Web applications in the ASP.NET architecture requires an overall design of the Web page to achieve a fast operation model. Meanwhile, a template mechanism should be provided to HTML and CSS coding to copy, and the ASP.NET design should include functions as backend code copying and integration.

![Figure 2. The System Function Module Running the process in this Architecture](image)

In automatic coding, providing coding standards and paradigm to developers helps create a favorable environment for fast program editing. Generated coding needs further verification and correction to optimize the output effect of ASP.NET. The system function module running the process in this architecture can be seen in Figure 2.

3.2 Vector space model
The gradual rise in the information amount on the ASP.NET application expands the needs in data processing, so in the design of Web application, exploiting data types needs to be considered. This paper bases on the vector space model of cluster theory and identifies the initial vector characteristics as well as the function requirements of ASP.NET. The vector space model, first proposed by Gsalton, sets the involved function requirement units for reference in the unified space and identifies the changing pattern of related variables in the space model in the way of calculating similarities, to conclude the function requirements (Chen et al., 2010). First, suppose the function requirements is D, enter the vector characteristics T in the content box and describe space vector as D (T1, T2, …, Tn), eigenvector weight of individual space vector is W, and constrain the function importance. The calculation model is:

\[
W(T, D) = \frac{tf(t, d) \times \log(N / n_j) + 0.01}{\sqrt{\sum_{t \in D}[tf(t, d) \times \log(N / n_j) + 0.01]^2}}
\]  

In this formula, W (T, D) represents the direction of function design of ASP.NET in which the weight of T in the vector D constrains the designing direction. After N times of calculation, the result that follows the designing standard comes out, with the denominator as the normalized factor (Ye and Yao, 2016). When reference variables of the additional functions are introduced, superimposed multiple function can be calculated to obtain a plan. The calculation model is:

\[
W(T, D) = \frac{1 + \log2tf(t, d) \times \log(N / n_j)}{\sqrt{\sum_{t \in D}[1 + tf(t, d) \times \log(N / n_j)]^2}}
\]  

When discarding the function-oriented need, the reference vector of information sequence will have support points in the space as the comprehensive plan design for the parallel multiple functions. The calculation result could be used to assess how the ASP.NET designed functions meet actual needs, to develop and improve the process for model building.

4. TECHNOLOGY MODEL DESIGN OF ASP.NET-BASED COMPUTER PROGRAMMING

4.1 Class library of code generation and interface application

Class library of code generation integrates component templates, provides multiple function budget, support retrieving information on user interface, and allocates application types to generate the ASP.NET code, which provides an operation base for multiple ASP.NET resources to promote the application of the generator, like generating HTML logo or ASP.NET and Web parameters (Liu and Zhong, 2017). Besides, applications on the user interface is a guidance for users to directly enter interactive information, and designs the most perceivable parameter setting and adjusting functions in this module. Therefore, this module function of the desktop application is designed through C#.net programming, using Windows to display the data and operate. Then background of the interface resources is utilized to set corresponding functions, which is followed by related operation and generation with the functions of calling code in the class library.

4.2 Core template library and template library for database code generation

Core template library supports the function output of ASP.NET code and expands interface definition for multiple data types, which is an optimized solution for the fundamental integer, floating point data, and string type. The definition of Basic Type can be identified in the core template, and as for the fundamental data types, Single Value and Multiple Select One data types are also mentioned. The Property Value Description includes the information of ASP.NET’s corresponding types and data property, which is also defined as Property Name. Its Property String Value matches its Property Value, and therefore supports the selection and allocation of data types.

Initial code of the raw data types can be retrieved through component template library, which could be further generated in the database code. The template library functions as defining the database operations, including database connections, script generation, and basic operations of database object like object selection, inquiry, correction, and delete. In handling scripts of IDb Script Builder Base, researchers could identify the operation class with SQL sentences and identify the parameters in the script definition, for example, the application types in the
operations Build Fields, Build Foreign Keys, or Build Primary Keys (Shi et al. 2015). As for the basic operations of database objects, the template Simple Db Operation could be used to define. In practice, function selection is based on data type to complete the coding process. For instance, operating the database MySQL requires function code of MySQL database in this module before knowing the computing structures and proceeding with the operation to acquire the result.

4.3 Template library of generating interface component code

To achieve the multi-functions configuration setting on Web page, researchers gain support from relevant code library when ASP.NET is automatically generated. When researchers use component code library to optimize the interface components, template library could be generated by code to get the interface components provided by code generation class library, thus supporting the design and optimization of code generation of Web page. Therefore, in the interface component code generation of template library, Web controls could be equipped with special functions and guide the generation controls to enhance the details. Suppose Ajax Ctrl Base generates the interface control unit of Web page, then in the more abstract units, subtypes also have the function of data processing that corresponds with elements of Ajax interface (Zhang and Chang, 2016). For instance, when Single Field Query Bar is generated based on Ajax, while a field could be entered in the text box, setting it on a single Web interface with one click to complete the query component facilitates users to apply it. Similarly, Data Query Dialog and Code Table Text Control have the technical support for controls in the function design and provide designing standards and direction for the system aid, hence they could gain more compatible designing elements in the template library of interface component code generation, and enhance support and solutions for the system functions.

5. CONCLUSION

In conclusion, in developing ASP.NET-based computer program functions, researchers should fully consider the core elements of code copying system, i.e., module of code generation. In addition to the generation function, designing the major template library functions involves user interface application, core template library, template library for database code generation, class library for code generation, and template library for interface component code generation. These functions could support the code output of ASP.NET, set the type for Web controls, enhance controls configuration on the Web page, and realize automatic code generation. Thus it could serve as the core technology for developing computer application and provide a better operation environment for Web application with higher technology value.

REFERENCES

platform of Beijing emergency shelters based on ArcGIS Server and ASP.Net Ajax, China Security Production Science and Technology, 7(07), 52-56.