Design and Implementation of University Competition Integrated Management System based on EXT.NET

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Keywords: EXT.NET, competition management, MVC

Abstract: Mainly used to create the front-end user interface, EXT. NET is a basic front-end AJAX framework technology and has nothing to do with the background. Whether its beauty of the interface, or the power of the function, EXT form controls are at the top. System is based on EXT.NET technology and makes use of the form development components provided by the Visual Studio, which contributes to completing the University Competition Integrated Management System. The design mode of the system and the main application of the key technology are expounded in this paper.

1. Introduction

Students' science and technology competition is one of the main activities in the university students practice. The registration, arrangement and organization of competition is a big and tedious work. The development of computer technology and the Internet make people's life and work more convenient. Making full use of advanced network technologies and resources, we can achieve students’ competition management informationalization, and make students’ competition management to be free from heavy, simple, repetitive work, toward the networking, humanization, and intelligent direction. University Students Competition Management System based on EXT.NET not only makes competition work-based networking and automatic, reduces the workload of managers and the errors of work, improves efficiency and effectiveness, but also solves the most the participators’ registration, query and other matters.

2. The Analysis of Demand and the Design Framework of System

Students Competition Management System of NEDU (Northeast Dianli University) through investigation and analysis of the academic competition held process and the detailed rules for the implementation to determine the competition system mainly includes the following five links:

a) race organizers issue a competition notice, race schedule and other information;
b) participants sign up;
c) official staff take qualification examination;
d) participants entry competition;
e) official staff review and announce competition results.
Combined with the competition process and links, Competition Management System based on EXT.NET consists of two main modules: one is competing platforms, including race information; another is integrated management platform, including the Dean and College ends. The main function is shown in Figure 1.

Corresponding to the system diagram, the main function of each block is as follows:

Participating User Platform Modules. The modules provide platform for users to see race information, entries, and students are free to register an account. Only registered account can view race information and entry the contest. Besides race team can edit its own team information and track their team performance, which will not only facilitate the enrolment of students, but also facilitates the work of organizers.

Integrated Management Platform Modules. Integrated management modules are divided into the Dean and College ends. The Dean end has the highest administrative authority and is responsible for website maintenance, system security management, participating department management, registration management, schedule management, results management, and so on. The College end has the general authority, in which the college can apply for the participating students’ management, as well as information, management and print..

3. Design and Implementation

3.1 Operation Platform

Server-side: Windows XP (or higher), IIS6.0, Microsoft.NET Framework, Ext.net, SQL Server 2012.
Client-side: Chrome, Internet Explorer and other Web browsers.

3.2 Technical Solution

According to the competition management system features and functionality analysis, systems development model is based on WEB B/C (Browser/Server) model. Compared with the C/S model, the B/S structure has the following advantages.

a) Unified interface, easy to use;
b) Easy to maintain;
c) Good extensibility, effective protection of investment;
d) High degree of information sharing;
e) Good support and high security for WAN.

System is based on EXT.NET, which is an open source ASP.NET (WebForm + MVC) component and perfectly integrates cross-browser JS script library Ext JS. System based on EXT.NET is not only more powerful on the function, but also beautiful in the appearance. And the project needs to add EXT.NET.dll and EXT.NET.Utilities.dll assembly references. It is configured relevant parameters in the Web.config, and main parameters configuration is shown in Table 1.
Table 1: Main parameters configuration of Web.config

| configSections | section name="extnet" type="Ext.Net.GlobalConfig" requirePermission="false" |
| system.web     | compilation debug="true" targetFramework="4.0" |
| httpHandlers   | add path="*/ext.axd" verb="*" type="Ext.Net.ResourceHandler" validate="false" |
| httpModules    | add name="DirectRequestModule" type="Ext.Net.DirectRequestModule,Ext.Net" |
| pages          | controlRenderingCompatibilityVersion="3.5" clientIDMode="AutoID" |
| controls       | add assembly="Ext.Net" namespace="Ext.Net" tagPrefix="ext" |
| validation     | validateIntegratedModeConfiguration="false" |
| modules        | add name="DirectRequestModule" preCondition="managedHandler" type="Ext.Net.DirectRequestModule,Ext.Net" |
| handlers       | add name="DirectRequestHandler" verb="*" path="*/ext.axd" preCondition="integratedMode" type="Ext.Net.ResourceHandler" |

Also, it needs to add the following code in the page:

```csharp
<%@ Register Assembly="Ext.Net" Namespace="Ext.Net" TagPrefix="ext" %>
<ext:ResourceManager runat="server" />

System is based on the thought of three-tier framework. System adopts three layers framework design, respectively for the presentation layer, business layer, data layer, in this way, the system structure is clearer and division of labour is clearer, which is conducive to the late maintenance and upgrade.

The presentation layer: Encapsulated client provides access to applications, namely EXT.NET page system, and the client only need Internet Explorer.

The business layer: The business function of the encapsulated system is that provides the function calls for user interface layer through using C# Language. The business layer is the data exchange between the data layer and the presentation layer as well as the layer of the business logic control, which can prevent the presentation layer directly through the data layer, and reduce the direct data exchange with the database. Business layer section of the increase, delete, change, check code examples are presented.

```csharp
static public bool DeleteStudentByStudentID(int studentID) {
    Student st = StudentServer.GetStudentByStudentID(studentID);
    return StudentServer.DeleteStudent(st);
}
static public List<Student> GetStudentByTeamID(int teamid) {
    return StudentServer.GetStudentByTeamID(teamid);
}
static public bool InsertStudent(Student student) {
    bool IsAllow = true;
    List<Student> listStudent = StudentServer.GetStudentByTeamID(student.TeamID);
    foreach (Student s in listStudent) {
        if (s.StuNo == student.StuNo) {
            IsAllow = false;
            break;
        }
    }
    if (IsAllow) {
        StudentServer.InsertStudentReturnID(student);
        return true;
    } else {
        return false;
    }
}
```
The data layer: The data access function of the encapsulated system, which achieves various operations on a table in the database, and provides services for the business logic layer. This layer is the direct communication with the database layer and the basis of the entire project.

Advantages of using three-layer or multi-layer structure are obvious, mainly in several aspects: data access is significantly reduced the number of connections through middle-tier; maintenance is improved and process more flexible. But there are disadvantages: data transfer takes layer that makes the data transmission efficiency lower. But for the real-time demand is not high, like the competition system, we pay more attention to its convenient maintenance, expansion.

3.3 The detailed design of the system

3.3.1 The login and registration

The module of login and registration is simple, but it plays a very important role. That is an important guarantee of data security and system management requirements, and more importantly can manage the users. Login module’s primary function is to validate the relevant user information. After verification through system analysis on the user's permissions, record user information and generate a URL path, jump to the corresponding permissions page, register module is targeted at entry user, participating the user to understand competition through registration information, sign up for the race. Register and login module are shown in Figure 2.

Figure 2 The module of login and registration

Login module ensures the safety of the system by using the MD5 encryption algorithm to encrypt the user's password. And this module builds the data exchange for user and system. Interface is shown in Figure 3.

Figure 3 Registration
3.3.2 Participating users' management platform

Participating users management platform is the competition management module for the contestants, whose main function is to contact the players and the platform. And platform style similar to Window's desktop that includes open contests, account basic information, change passwords, team lists, awards lists, and other functions, and register for event included in the list of available professional students of the sport where participants can add a group to perform. This interface information is comprehensive, convenient entry of user action, greatly facilitates the registration process.

In the registration page, participants can learn the available competition, and can be entered for the corresponding competition, add their own information, even can edit operations on their own team information after finished registration, instead of directly to the appropriate Department, the Senate changes. So that not only facilitates the participants, but also facilitate the corresponding competition Department.

After the contest completed and contest results announced, participants can query online awards.

3.3.3 Management Platform

Integrated management platform is divided into dean end and college end. Dean end has the highest authority whose the main task is to race management, team management, category management, create reports, account management and higher authority management information, and institute the function is on the team management and award management, as well as exporting reports, and has the general authority. The integrated platform of work flow diagram is shown in Figure 4.

![Figure 4 The work flow diagram integrated platform](image)

Screenshot of integrated management platform system is shown in Figure 5:

![Figure 5 The integrated management platform](image)
3.3.4 Strategy of the management system security

Science and technology competition management system of NEDU is based on the network management information system, and related to the normal development of group competition management and the vital interests of the participating departments, so the security problem is particularly important. In order to ensure the security of the system, some measures have been taken. According to the needs of the actual situation, the users of the system are divided into three types: the teaching affairs department, the college and the participants where each type play a role and each role gives the appropriate authority. Access to or maintenance of the module can be performed only with a module's access or operating authority. The user's name and authority can be modified and maintained, which not only improves the security of the system, but also avoids the privilege of each system user, which improves the efficiency and flexibility of the system.

4. Conclusion

Science and technology competition management system of NEDU has practical significance to strengthen and implement the network management of the group competition in our school, and improve the scientific level of the school competition management and the work efficiency. With the rapid development of the Internet and information technology, and the need to build a conservation-minded society, Competition Management System will be widely used in various competitions. Meanwhile, there will be some problems in the process of use and some aspects not mature enough. We will adapt to the development of advanced science and technology and improve Competition Management System.

References