

## Design of a Web-based English Teaching Assistant Platform using SSH Framework

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**Abstract** — With the continuous growth of Internet users, the network based online traditional teaching has a great potential. Because a network teaching platform can play a vital role in the teaching of information technology, it has become a focus of modern educational reforms dealing with important issues such as: i) the leading teaching philosophy, and ii) making up deficiencies in the traditional teaching model. An online teaching platform is realized according to criteria including: i) the actual design of College English teaching, ii) has the function of online learning, iii) acts as a repository of published teaching resources, iv) capable of conducting online examination and download of test material, v) online discussion and Q & A, vi) must have good security, interoperability and portability, vii) help teachers to produce effective teaching material, and viii) promotes students' autonomous learning online in an environment of self-assessment. We propose ideas in this paper for a system with good maintainability and reusability using: i) the Java development environment, ii) My Eclipse as the development tool, iii) SQL Server 2005 as the database of the system, iv) through the Tomcat server, v) using SSH as the architecture of the system.

**Keywords** - English Network English teaching; auxiliary platform; SSH framework.

### I. INTRODUCTION

With the continuous growth of Internet users, the network to the traditional teaching of a great impact. The network teaching platform is able to play the advantages of information technology in English teaching, can reflect w students into dominant ideas of English teaching to make up for the deficiency of the traditional English teaching mode, the w network English teaching become the focus of modern education reform. [1-3] In order to adapt to the development of modern education, most colleges and universities in China completed the construction of campus network, due to the lag of the development of network English teaching software, campus network and some application in network English teaching, w based on campus network English teaching platform development and design has become an important task for the development of high school education. Slices of the tension. [4, 5] This article through the research proposed English network teaching platform in assisting English teaching application of h a problem, for these problems and the actual situation, carries on the conformity to the existing English teaching resources, developed a network teaching platform, in the campus network and multimedia environment and related auxiliary course in Colleges and universities English teaching provides support services, realize the resource sharing and information exchange [6].

### II. SYSTEM ANALYSIS AND MODELING

#### A. Feasibility Analysis

Feasibility analysis is an essential step in the realization of software engineering. Its main task is to clear the necessity and feasibility of the application of project

development. The necessity of the new system to replace the old system is urgent, by the above user demand analysis shows that the development of the system is necessary and urgent. Feasibility of the system is ultimately decided to run the environment and put into the new system development of the resources and conditions, mainly from the economic input, technical route and operational needs of these three aspects of the analysis [7].

#### (1) the feasibility of the economy

Economic feasibility mainly refers to the total amount of funds invested in the development of new system projects and the return of the development units after the operation of the new system. The system development is simple, the application object is single, the cost is low and the efficiency is high [8].

#### (2) Technical feasibility study

The rapid development of computer technology, an endless stream of new technology, web technology after decades of development has on the stabilization and perfect, in a large number of web technology, launched by Sun Company of JSP technology is particularly conspicuous, has won the praise of the developers. The topic of this paper is based on the SSH framework, which is not a problem in the development and implementation of this framework, and the author also has some experience in project development.

#### (3) Operational feasibility analysis

Due to the early demand analysis has done better, but also the system to deal with and capture a lot of abnormal processing, so the latter part of the system development and maintenance is relatively easy. On the one hand, does not have a very complex business processes, follow-up system maintenance and operation people just daily management and monitoring of the system, especially in the modern computer technology, the popularity of the era, the requirements are not very high, after a short-term training can adapt. In addition, the main business processes of the

system design are more familiar with the traditional staff, the operation is handier. Therefore, the operation is not a big problem.

**B. System role design**

And the system related to the users and roles include: system administrator, user management system, distribution user roles and permissions, management system within the English video, document type, resource, data backup system to ensure the normal operation of the system. English teacher: publish the relevant learning resources (such as video courseware, etc.), online answering. Student: but through registration or administrator dynamically add become system users and valid login can watch a video of English teaching, various teaching resources (movie soundtrack, lesson plans, audio, etc.), download English auxiliary studying software (word pronunciation correction, dictation, etc.), online test and Q & A, exchange and interaction teaching mode, the system role use case diagram as shown in Figure 1.

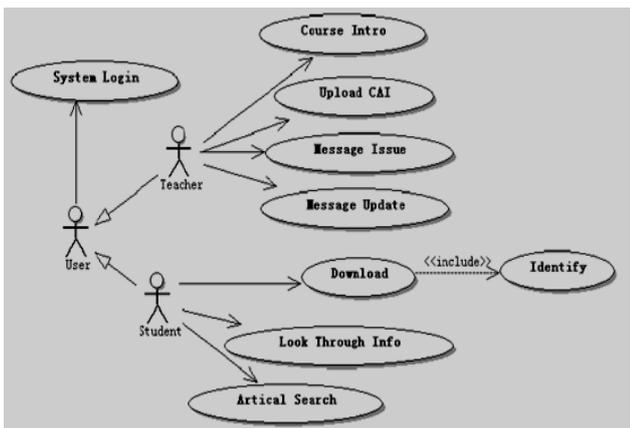


Figure 1. System role assignment use case diagram.

**C. Teaching System Modeling**

**1) System class model design**

Object oriented analysis method is based on the data from the system more core, through the data attributes to the abstract, it is packaged as an entity class to describe the system. Compared with the method of data flow graph analysis, the entity class has stronger stability, so the system model can be used to map the problem domain model. Next, it describes the application of object-oriented analysis method to analyze and model the junior middle school English network teaching support system.

Oriented object analysis is the process of extraction and finishing the needs of users, through the establishment of some classes and between them the relations to establish the precise model of the problem domain, thus the objects in the problem domain is the overall analysis. In this system, the main users of the system are first identified (abstract

from the actual use cases). Obviously, the main users of the system for students, teachers and system administrators, the relationship between the system class as shown in figure 2.

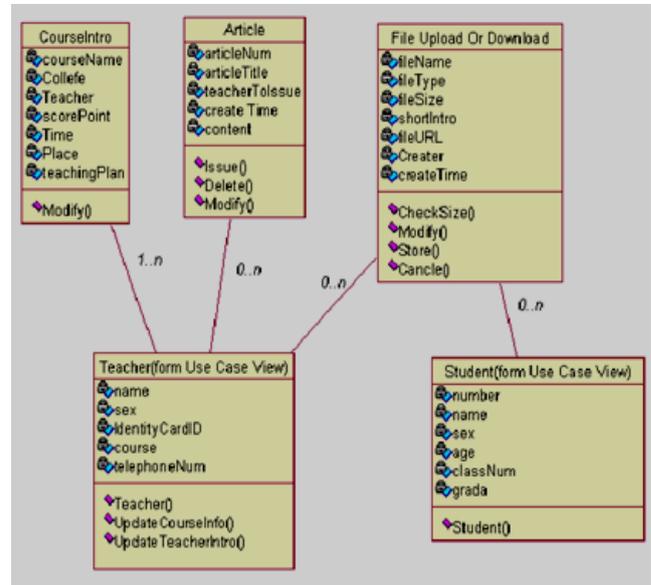


Figure 2. System class diagram.

**2) System timing model design**

Using time sequence diagrams can clearly describe the data exchange between different objects and classes in the network teaching assistant system and how to cooperate with the time in some behavior. System administrators through the authentication of system background management interface, complete the teaching resource management, update the CAI courseware, add or delete article, add or delete users, modify user permissions, the preparation of basic parameters of the system etc. function, operation interface are achieved through the backstage management system management system interface, and timely display the results of the operation, gives the corresponding prompt, system administrators timing diagram as shown in Figure 3.

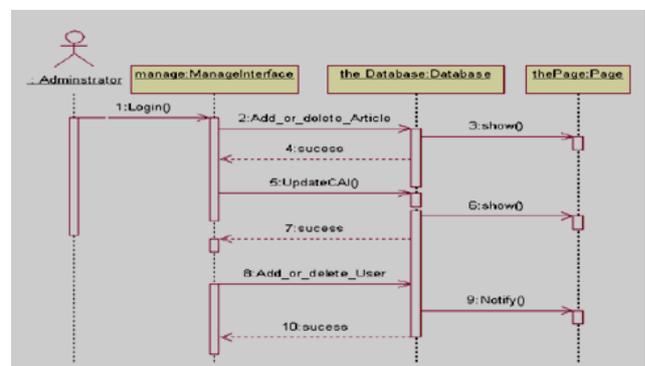


Figure 3. Timing diagram of management personnel.

3) state model

In this system, teachers upload educational resources and documents of the state model is more complex, it involves components and function more, in different period of time will change. First of all teachers need into the resources and file upload interface through the authentication and submitted to the resource file by file upload component and function, upload the file in file storage state. File after the submission of the temporarily stored in the database resources, after passing through the system administrator audit to the corresponding page show that need to refresh the page, users can query and download operation, if did not pass the audit, the corresponding page resource information maintenance does not change. The state model as shown in Figure 4.

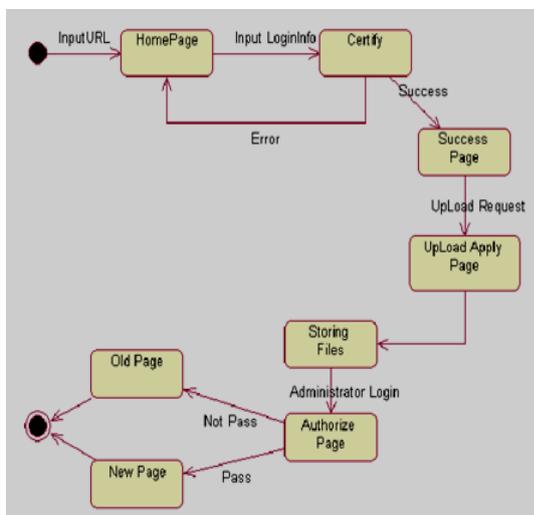


Figure 4. System upload courseware state diagram

III. SYSTEM DESIGN

For each color component, the JPEG image format uses a discrete cosine transform (DCT) to transform successive  $8 \times 8$  pixel blocks of the image into 64 DCT coefficients each. The DCT coefficients  $F(u, v)$  of an  $8 \times 8$  block of image pixels  $f(x, y)$  is given by Eq (1):

$$f(u, v) = \frac{1}{4} c(u)c(v) \sum_{x=0}^7 \sum_{y=0}^7 \cos \left[ \frac{\pi(2x+1)u}{16} \right] \cos \left[ \frac{\pi(2y+1)v}{16} \right] \quad (1)$$

For  $x=0, \dots, 7$  and  $y=0, \dots, 7$

$$where C(k) = \begin{cases} 1/\sqrt{2}, & \text{for } k = 0 \\ 1, & \text{otherwise} \end{cases}$$

Afterwards, the following operation quantizes the coefficients as in Eq (2):

$$P(u, v) = \frac{F(u, v)}{Q(u, v)} \quad (2)$$

Where  $Q(u, v)$  is a 64-element quantization table. We can use the least-significant bits of the quantized DCT coefficients as redundant bits in which to embed the hidden message. The modification of a single DCT coefficient affects all 64 image pixels.

Before starting the process of embedding, in JPEG image all  $8 \times 8$  blocks are converted to the frequency domain using DCT and then uses DCT to transform each block into DCT coefficients. In a request for the values that will be displayed whole numbers, each  $8 \times 8$  block is quantized according to a Quantization Table. Two types of coefficient could be seen on every  $8 \times 8$  block: DC and AC. It is known that value at the top left of each  $8 \times 8$  block refer to DC coefficient. It contains the mean value of all the other coefficients in the block, referred to as the AC coefficients. DC coefficients give a good estimate of the level of detail in the block because it is very important for each block. Therefore cannot manipulating or changing the value coefficients DC because it will lead to change many of the values of the AC coefficients, this will lead to a visual discrepancy when the image is converted back to the spatial domain and viewed normally.

A. System Architecture design

The software function design is based on the strict definition of the system, and also is the most important and most complex part of the design of the software system. The main description of the software in a variety of possible conditions of the input and output as well as the relationship between each other constraints. The users of this system are administrators, teachers and students, according to each role of the system to be designed to use the function. According to the last chapter English network teaching system system analysis and modeling design, the network teaching learning platform based on B / S (Browser / server) mode, technology architecture from the traditional browser Web service provided for the two layer system structure expansion into web browser Web service is +Java of the application server database server three layer system structure, this structure not only the client liberated from the heavy burden and will continue to improve the performance of the requirements, the technical personnel from the heavy maintenance and upgrading of free and good scalability, but also facilitate the development of distributed and dynamic update. The development of technology using SSH (Struts +Spring+Hibernate) architecture development, combined with Struts, Spring, Hibernate three can build multi tier Web application flexible and easy to extend. Implement interface through the JSP page, responsible for transmitting HTTP requests and receive responses; Struts layer, front controller according to the received request of ActionServlet assigned to the corresponding Action; Spring service layer, inversion

of the Spring controller (Ioc) is responsible for the provision of business model components and data processing components control the application process to Action. The model state and update; the Hibernate persistence layer, database access using DAO mode, and through the JDBC package, to shield the underlying database operations, depending on the object mapping and database interaction with DAO components to request data, and return the result. The main function of the system module structure design as shown in figure 5.

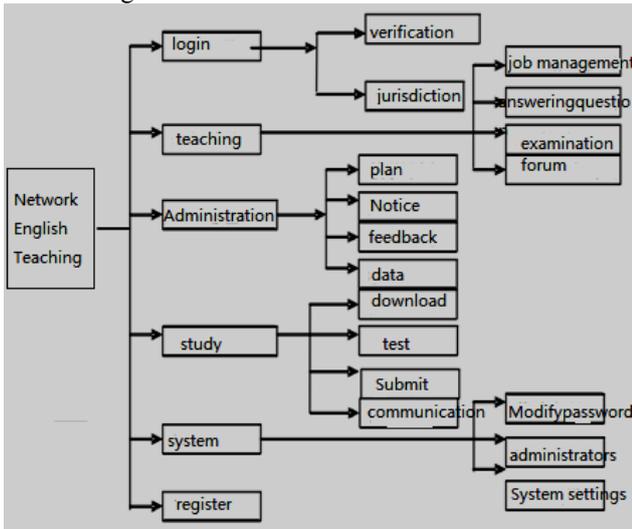


Figure 5. System upload courseware state diagram

**B. Database design**

Database design is the core task of the whole network teaching system design. This paper based on the Microsoft SQLServer2005 relational database to manage the data and information in the teaching process. The core problem of the database design is to design the main data entity relationship according to the system data requirements and definition, and the E-R diagram of the system is shown in Figure 6.

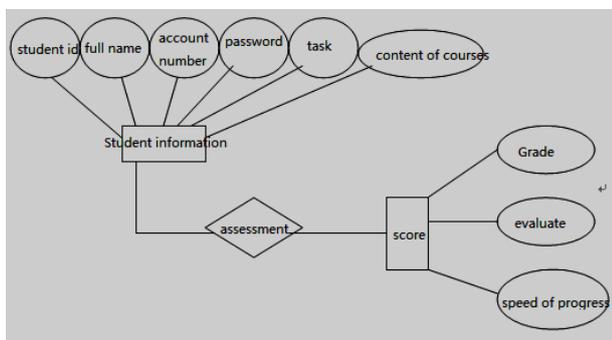


Figure 6. System E-R diagram

**C. VFP table desig**

Database structure design is the process of turning database logical structure into an optimal physical structure,

which determines the final storage structure and access method of the data model. After summarizing and analyzing the logic design, it can reach the third normal form, and create a network teaching system backstage database. The name is: EnglishTeacing. Set up the following main tables (using MySQL 5.045 to establish the database and table). Data sheet design based on relation model based on, but the system in order to facilitate the management system, students, teachers, administrators user information incorporated in the user information data in the table, the system data table as shown in Table 1.

TABLE I JOB TABLE

Field name	type	Keyword
id	int	
title	Varchar	
link	varChar	
date	datetime	
type	char	
Course_code	varchar	
User_site	varchar	
Course_note	char	

TABLE I I FIELD INDEX TABLE

Refs.	DB	Sample	Pre.	Methods	Accuracy (%)
Medium database					
[3, 4]	Griffith University	50 envelopes	t, sl, sk	FB, ANN	78.66
[35]	CEDAR	300	-	FB, 3ANN, CE	84.87
[36]	CEDAR	317	-	FB, 3ANN, MDF, CE	95.27
[37]	CEDAR	317	-	EBH, ANN	84.19
[45]	IAM	724	t, sl	FB, SOFM	76.52
[41]	CEDAR	850	t, sl, sk	FB	86.9
[42]	English	750	-	FB, LP	92
Large database					
[40]	Postal	1,119	t, sl, th	FB, GB	85.7
[39]	CEDAR	1,200	-	FB, RB	81.08
[44]	Arabic + Latin	1,383	-	CFA	93.5
[44]	Arabic + Latin	1,383	-	FB	99.3
Uncategorized					
[4]	CEDAR	-	T	FB, ANN	76
[5]	CEDAR	-	t, sl	FB, ANN	81.21
[38]	CEDAR	-	-	EBH, NA, ANN, MDF	85.74
[13]	CEDAR	-	-	FB, 3ANN	91 (RR)
[34]	CEDAR	-	-	FB, ANN	78.85

**D. Key function design**

In the network teaching platform, you can upload and browse, delete and teaching courseware graphic work, here using the smart file component, just write a simple JSP file, in a file constructed courseware storage path can be achieved. Upload files can also be set upload restrictions, such as file length, type, etc.. The following is a pseudo code upload courseware:

```

Su SmartUpload = SmartUpload new ();
Su.initialize (pageContext); // set the upload limit
(su.setMaxFileSize); // the maximum length for each
file upload
(su.setTotalMaxFileSize); // limit on the total length of
data transmission
("su.setAllowedFilesList"); // through the extension
limit allowed to upload files
("su.setDeniedFilesList"); // through the extension
limit setting prohibited uploaded files
(su.upload); // upload files
O M J C s p s m a r t u p l o a D F I l e f i l e s = .
    
```

```

Su.GetFiles (.GetFile) (0); // get the need to upload file
FileName String = String new (files.
(getFileName)); // // get upload file name
Path String = "path" +fileName// storage path
Files.saveAs (path, files.SAVEAS_VIRTUAL); // /
upload
    
```

#### IV. CONCLUSION

The network teaching platform can effectively promote the sharing of teaching resources, and supplement the classroom teaching, and realize the integration of synchronous learning and asynchronous learning after class. Students can according to their actual situation of arbitrary choose the time, place and content of self learning and testing, conducive to the students autonomous learning ability cultivation; and teachers by students of the courseware evaluation message can be first time to understand the students, so as to strengthen the teaching communication and interaction between students and the teacher, the teacher and the teacher, but also conducive to the curriculum reform.

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