Design of Business Administration Professional Shared Whiteboard Teaching System Based on BS Data Mining Architecture

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Abstract. This paper is based on efficient background data support, the application of Ajax framework and B/S architecture and other advanced technologies. During the implementation of online experiment function, for business administration teaching real-time distance education system in the process of using, lecture notes, electronic induction whiteboard and other data content of large-scale broadcast and free preservation method. The purpose is to make full use of the advantages of the network in real-time distance teaching, and to display diversified teaching contents; The use of electronic whiteboard module can not only make teachers and students interact better, but also greatly enhance the interest and efficiency of teaching; The construction of business administration scene completed in the online experiment is an important innovation of traditional teaching methods, and the resulting teaching system can make users experience more real and effective visual effects.

Keywords: B/S framework · Sharing whiteboard · Teaching system design · Business administration

1 Introduction

With the continuous and rapid development of social economy, the world has entered the era of rapid progress of information technology. The strong information technology has impacted the traditional education, which makes the present education work have changed greatly both in the teaching methods and the teaching composition [1]. To do a good job in the education modernization and improve the quality of teaching work, we need to enhance the information of teaching process. According to the relevant investigation, the focus of the web technology support of distance education is to deal with the interaction between teaching work, resource reserve and quality management. With the development of computer network technology, especially the realization of individual interaction function led by Web2.0 technology, the operating efficiency and service quality of the new system which provides various technical services for education work are rapidly improved. The effect of teaching interaction between teachers and

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students in the network situation is more remarkable, These are in line with people's expectations of the development of modern education.

B/s architecture refers to the "browser/server" architecture, which is a network architecture mode. It can concentrate the core part of the system function realization into the server, and simplify the development, maintenance and use of the system. It can run through the browser without installing other clients.

B/s architecture (browser/server Architecture) is a network architecture mode, which centralizes the core part of the system function implementation into the server and simplifies the development, maintenance and use of the system. It can run through the browser without installing other clients.

B/s architecture is a browser server architecture. With the continuous development of new technologies, it is a change or improvement of c/s architecture.

B/S structure refers to the browser/server structure, that is, only one server needs to be installed and maintained, and the client uses the browser to run the software. With the development of Internet technology, it is a change and improvement of C/S structure. It mainly uses the WWW browser technology, combined with a variety of script languages and new technologies, centralizes the core part of the system function realization to the server, and simplifies the development, maintenance and use of the system. Is a new software system construction technology. It only needs to install a browser and database, so that the browser can interact with the database through the web server.

Advantages of B/S architecture:

(1) This architecture does not need to install the client and can run directly in the web browser
(2) B/s architecture can be directly placed on the Internet network, so as to achieve the purpose of controlling multi client access and interaction mode through some privileges.
(3) The b/s architecture does not need to install clients, so there are no problems such as updating multiple clients and upgrading servers

Disadvantages of B/S architecture:

(1) B/s architecture is not the most satisfactory architecture in cross browser
(2) It takes a lot of effort to reach the level of CS program
(3) In terms of speed and security, it still needs to spend a huge design cost, which is the biggest problem in b/s architecture.
(4) The client server interaction is a request response mode, which usually needs to refresh the page, which is unwilling to see the client. But this shortcoming has been alleviated to some extent after Ajax became popular. Figure 1 shows B/S data mining architecture.

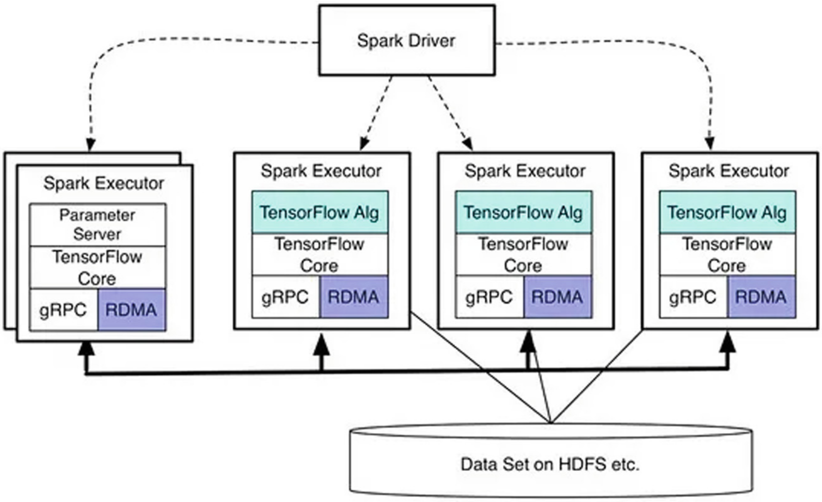

Fig. 1. B/S data mining architecture

2 Theoretical Basis and Technical Points

2.1 Browsing of Online Courseware for Business Administration

This operation can help users to browse the courseware effectively without downloading the courseware according to their own needs. Its function implementation involves three aspects: client part, network system part and service end part, as shown in the following figure. At this time, users can use the network system to realize the outgoing of courseware browsing request, then the server part will find and process the courseware, and finally build the information flow path of the contact server part and the client part, which is shown in Fig. 2.

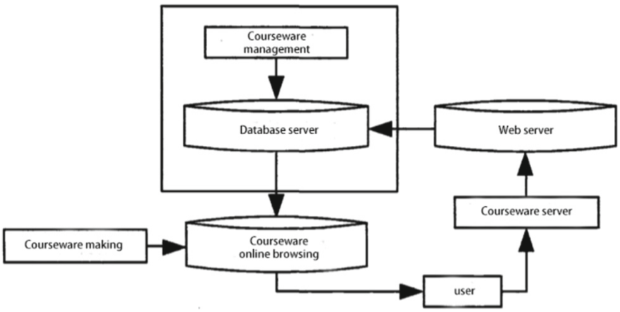

Fig. 2. The process of browsing Business Administration online courseware

The key point of this operation technology is to transform the online courseware effectively, so as to get the resource form which is convenient for users to consult in time. At this time, office programming interface is involved, but these interfaces are all existed by work card. No matter what kind of program, it can complete relevant operations by calling office COM components Net framework is a development platform that can realize high-speed development and processing, network service content layout, etc. it is a brand-new platform with revolutionary value for Microsoft to easily complete the program Net framework can complete the construction and operation of Web programs and windows programs. It uses the standard content given by the Internet to achieve integration. With the help of standard communication protocols such as XML and soap, it can realize the integration of programs and components under the control of various environments. The whole program only needs to call a single. Net assembly to process the COM component.

2.2 Shared Whiteboard Design

To develop a set of shared whiteboard teaching system with independent copyright, which is suitable for the current teaching environment, so that it can meet the needs of modern distance education. The shared whiteboard teaching system is based on the network and WCB. It uses handwriting electronic induction whiteboard writing, handwriting pen input, material introduction and web courseware synchronous browsing as a variety of teaching means. Through the same shared whiteboard, it provides all students in all classrooms with synchronous or asynchronous teaching content sharing. Each student can see the teaching content on the PC in front of him, take notes online and save the content he cares about. Through the way of server group distribution and cascade connection, it can support large-scale users online at the same time. It has the main characteristics of many concurrent numbers, display synchronization, stable operation, security, expandable function and so on. The composition is shown in Fig. 3, which is the flow of the operation of the electronic whiteboard.

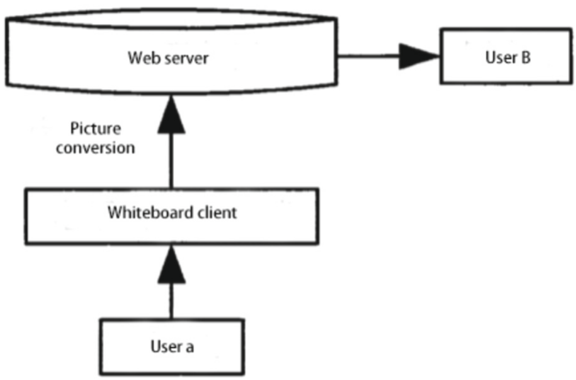

Fig. 3. Implementation process of whiteboard operation

As can be seen from the above figure, during the interaction between user a and user B relying on the electronic whiteboard, first of all, user a needs to make the graphics to be displayed by the client where the whiteboard is located. When the sending is selected, the client can display the complete data stream in the form of pictures. At this time, the PNG encoder plays a role; Then, with the help of Base64 encoding, it completes the encoding processing in order to get better transmission effect. The electronic whiteboard here will use JavaScript given by fabridge technology to complete the acquisition operation of the generated complete picture information, and then use ajax technology to convey the obtained information to the server. At this time, the server needs to complete the decoding process with the help of Base64, and then get the PNG image that can be recognized, and finally deliver it to user B, and the whole communication work is completed.

3 Business Administration Teaching System Design

3.1 B/S Framework

The structure of business administration course involves three aspects: background database, web server and user browser. At this time, the browser can complete the interactive processing with the database in the background with the support of the web server. There are many differences between B/S structure and CIS structure. The most important thing is that the former does not need to maintain the client's browser after updating. The requests from the client can act on the server with the help of the browser, and the processed information can be fed back to the client. The following figure shows the operation structure of this model (Fig. 4).

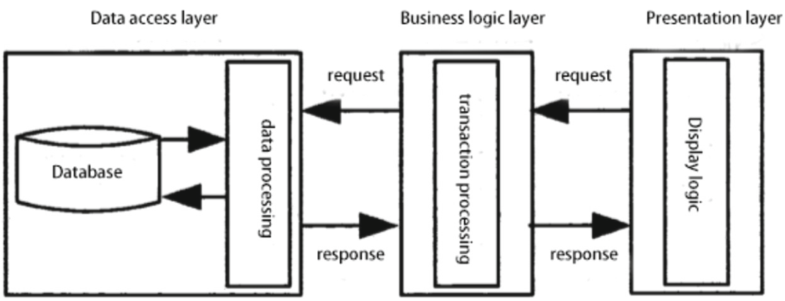

Fig. 4. B/S framework

As is easy to know from the above figure, the implementation of this structure involves the following three levels:

(1) The presentation layer, which is located at the outermost position of the whole system, has the smallest spacing with the user, and can display and receive the information input from the user, and facilitate the user to perform interactive processing operation page [2];
(2) Business logic layer, which is in the middle of the whole system, plays an extremely important role, and can relay the data involved in the system. Only because of the poor coupling effect here, the mutual information can only be reflected to the lower

level, but can not process the information from the upper position. Therefore, in the case of considering all aspects of factors, the drawer architecture which can be inserted instead of processing is used here, which is convenient to realize the efficient transformation of two types of roles.

(3) Data access layer: complete the access control of database, and access to common binary information and text information.

All business processing in b/s structure is implemented in the server location, so it is better than CIS structure in the aspect of maintenance and upgrade. And the efficient interconnection with web technology makes the program based on this completion have stronger extension effect. So here the system design chooses b/s architecture to complete the mode construction.

3.2 Demand Analysis

First, the technical aspect of the implementation of the system implementation requirements analysis. In the aspect of pattern, we choose the more widely used b/s architecture, and combine with the anthem.net which is implemented in Ajax framework by asp.net to build a better performance model. The online experiment part is realized by compiler and Microsoft, which ensures that the system users can display the various teaching contents well without installing the compiler; The introduction of electronic whiteboard module can make the whole teaching work more interesting and improve the teaching efficiency; The scene construction of business management completed in online experiment is an important innovation to the traditional teaching method. The resulting teaching system of business management can make users experience more authentic visual effect. Overall, the teaching system of business management based on Web technology has good implementation effect in its technical strategy [3].

Then, the economic aspect of the implementation of the system implementation requirements analysis. The tools involved in the system implementation and development are open source. The input only needs to be equipped with common PC, and the development investment is not much. And the system can be used in the teaching practice of business management, and the input of maintenance in the later period is low. Therefore, the teaching system of business administration based on Web technology has a good development effect in its economic investment.

Finally, the implementation requirements of the system are analyzed from the operation aspect. The analysis shows that the contents of the system are extremely simple, the early installation and the later maintenance and operation. As long as the instructions given can be well executed by the personnel, both the teachers and the teachers can perform the operation in a very short time. Therefore, the teaching system of business administration based on Web technology has good implementation effect in its operation and implementation.

The b/s layered model is selected in the system architecture of the teaching system for business administration. It can support the system to build online services such as video and experiment for users, and also help teachers and students realize real-time interaction in online situations, so as to facilitate users to get better service. The system combines the breakthrough of Web2.0 visualization technology, which can make the teachers and students more effective in the implementation of communication and interaction, facilitate the realization of instant interaction function, and provide the auxiliary functions such as electronic whiteboard, teaching management and resource display, so as to improve the interest effect and interaction process of the whole teaching period, and the user can feel more clear visual effect. The introduction of online experiment function can make the whole system display more diverse contents. With the help of online experiment operation, it is convenient for all users in the system to complete the editing of language practice without equipping programming program in advance at any time, and enhance the flexible effect of students' learning tasks, and improve the practical level. Moreover, the system can achieve a significant functional with the help of this operation, users can get more authentic visual experience, business management teaching work more practical effect.

The overall goal of the implementation and development of the business management teaching system is to build a better online learning platform for students by means of online video viewing, courseware browsing, experimental operation and teacher-student interaction.

4 Concurrent Control Under Shared Whiteboard

At present, with the popularization of computers and networks, there are more and more digital devices, such as personal computers, laptops, personal digital assistants (PDA), mobile phones, set-top boxes, MP3 players, digital cameras, digital video cameras, electronic whiteboards, etc.; These devices can provide some services, but may have some limitations in other services; If we can make full use of the advantages of these devices while avoiding their disadvantages, that is, using the service composition of devices, we can create some new, easier to use and more powerful services. For example, the electronic whiteboard can receive the point signals drawn on the whiteboard, and then send these point signals to the computer, which can reproduce the contents of the electronic whiteboard. In this way, the difficulty of meeting minutes can be greatly simplified and the effect of the meeting can be enhanced. However, since the electronic whiteboard can only be used on one computer at present, it is obviously impossible to use it when holding a network conference, or if multiple users can see the contents of the electronic whiteboard on their own computers, mobile phones or PDAs.

In order to solve this problem, it is necessary to establish a software layer between users and different devices. This layer hides the underlying network protocols, devices and operating systems, and only provides electronic whiteboard services in the user range and operating LAN. Users can transparently use the electronic whiteboard devices and services in the network environment, regardless of the device where the electronic whiteboard is located and the operating system of the device.

MCU, a multi-point control unit, solves the problem of data multicast transmission among nodes in different subnets, and on the other hand, it solves the problem of concurrent data transmission among multiple nodes. At present, most MCU is implemented by hardware based on H.320 standard, which is oriented to private network and centralized control mode. The main reason is related to circuit alternating pull mode and physical star topology [4–7].

However, in tcp/ip packet switching, it is not realistic to adopt hardware MCU centralized mode. In addition, hardware MCU has some problems, such as poor scalability, high cost, poor compatibility with tcp/ip protocol, etc. Therefore, in the design of this system, we propose a software MCU implementation technology suitable for tcp/ip packet switching, and adopt the realization method based on COM technology. The specific principle is: in the distance education network, a data server is set up for each subnet, and the distributed multi-point control and management method of tree structure is adopted. In the hierarchical control center, a dynamic IP address table of all data servers in the whole network is maintained, and MCU is dynamically created to connect several data servers to realize the connection and data forwarding between them. Thus, multiple MCU and data servers can jointly complete the receiving and forwarding, converging and switching, addressing and routing of media flows between multiple communication terminals, The utilization of network bandwidth is greatly improved [8, 9].

In the synchronous teaching or synchronous discussion mode, multiple members edit and access the shared whiteboard at the same time, which will lead to access conflicts, which will cause the inconsistency of whiteboard content. Therefore, a certain concurrency control strategy should be adopted. Combined with the characteristics of the distance teaching process, the centralized control mechanism of the chairman system is adopted, that is, through teachers, the normal initiation and implementation of the whole teaching process is maintained until the end. Teachers manage the students' speech right by maintaining the statement status table of Zhang students and allocate the students' speech rights through a priority queue, which is shown in Fig. 5.

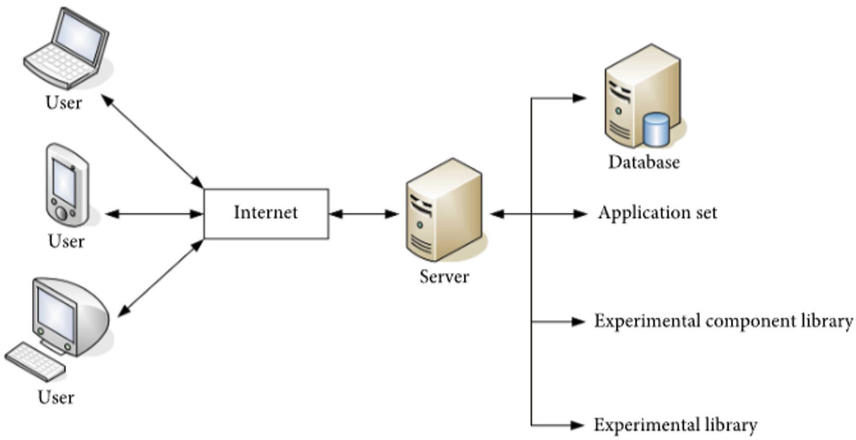

Fig. 5. Architecture used in this article

5 Conclusion

This paper introduces a design of the shared whiteboard teaching system for business management specialty based on b/s architecture. It adopts multi-layer b/s architecture, uses advanced component development ideas, supports synchronous teaching, asynchronous discussion, synchronous recording and other teaching modes. This system is specially aimed at the specific problems encountered in the process of distance teaching of video conference system, which has strong practical significance.

The b/s mode does not require a special client, as long as the browser, and the browser comes with the operating system. Convenience is its advantage. Moreover, b/s is based on Web Language and has nothing to do with the operating system, so cross platform is also its advantage. In the future, with the progress of web language and browser, b/s will be faster and faster in terms of performance and running speed, and its shortcomings will be less and less. Especially with the popularity of HTML5, it has been very powerful in graphics rendering, audio and file processing.

The software system is improved and upgraded more and more frequently, and the products of b/s architecture obviously embody more convenient features. For a slightly larger company, if the system manager needs to run back and forth between hundreds or even thousands of computers, the efficiency and workload can be imagined. However, the b/s architecture software only needs to manage the server, and all clients are just browsers, which do not need any maintenance at all. No matter how large the size of users and how many branches there are, the workload of maintenance and upgrading will not be increased. All operations only need to be carried out for the server; If it is a remote location, you only need to connect the server to the private network to realize remote maintenance, upgrade and sharing. Therefore, the client is becoming thinner and thinner, while the server is becoming fatter and fatter, which is the mainstream direction of information development in the future. In the future, software upgrading and maintenance will become easier and easier to use, which will obviously save users' manpower, material resources, time and cost. Therefore, the way to maintain and upgrade the revolution is "thin" client and "fat" server.

As we all know, windows almost dominates the world on desktop computers, and the browser has become the standard configuration. But on the server operating system, windows is not in the absolute dominant position. The trend of the software is that the application management software using b/s architecture only needs to be installed on the Linux server with high security. Therefore, there are many choices of server operating system. No matter which operating system is selected, most people can use windows as the desktop operating system, and the computer will not be affected. This makes the most popular free Linux operating system develop rapidly. In addition to the free operating system, Linux also has free databases. This choice is very popular.

Since the b/s architecture management software is only installed on the server, the network manager only needs to manage the server. The main transaction logic of the user interface is fully implemented through the WWW browser on the server, and a few transaction logic is implemented in the front browser. All clients only have browsers, and the network manager only needs to do hardware maintenance. However, the data load of the application server is heavy. Once the server "crashes", the consequences will be unimaginable. Therefore, many units have database storage servers in case.

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