

Using Flash Platform to Realize the Video Question Answering System

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Abstract

Video question answering system is designed and developed based on Flash platform technology, belongs of B/S (Browser/Server) structure, is used to meet the needs of specific groups' teaching and studying. This paper describes core codes of database module and the real-time Q&A video module about video creating and video playback, also describes the relevant realization technology and other functional modules of the system. At last, it gives some modified suggestions.

Keywords: flex video Q&A FMS Actionscript 3.0

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1. Introduction

With the rapid development of Internet, informatization construction and reform of the major colleges and universities continue to push forward steadily from scratch, from wired to wireless, from hardware to software. In the case of my school wireless campus network has been put into use, how to make full use of campus network in terms of "soft", in order to improve students' learning efficiency and quality, and gradually strengthen networking, informatization teaching and learning environment, this paper proposes the online video question answering applications based p2p in campus network. In RIA popular Internet era, because of its perfect technology and a high market share, the Flash platform becomes the mainstream, promising development platforms. With the latest RTMFP agreement (Real Time Media Flow Protocol abbreviation), the latest version of the FMS (Flash Media Server) can realize the service such as unicast and broadcast. Other, the system uses the combination of "Tomcat" +"J2EE" as web server.

2. Main Technology

2.1. Flash Platform Technology

The Flash Platform is the world's leading design and development platform, can support a variety of desktop operating systems and expressive applications, content and video. Action Script3.0 is a Flash script language, and a standard object-oriented programming language. Compared with the previous version, the ActionScript3.0 increases a lot of functions, mainly including three aspects :grammar, oriented object and API. ActionScript3.0 is an script language based ECMAScript, is similar to Java, but has its own unique advantages.

FMS (Flash Media Server abbreviation) is one of the important components of this platform, able to deliver the live and on-demand video and interactive applications safely and reliably. From the version of FMS4, it supports the RTMFP protocol. RTMFP, compared to RTMP (Real Time Messaging Protocol abbreviation), is based on UDP protocol, suitable for multicast, and can improve the speed of the video delivery. Not through the server, it can transfer data directly between the terminal users of the Flash player, but also reduce the bandwidth consumption. With the help of RTMFP protocol, video question answering system in campus network realizes the transmission function based P2P (Peer to Peer abbreviations, point-to-point) technology, so can make full use of existing resources. P2P transfers data between nodes within a network, not depend on the server, so nodes in the network is better, it also fits well with the case of students on campus. FMS4.5 enhances the stability of video

streaming and reduces the load time, also it can help users to manage coding and bit rate, improves the final users experience in the aspect of online video.

Flex is another important component of the Flash platform and the solution to the presentation layer and a client development environment for video question answering system. By compiling the MXML and ActionScript into a swf file, Flex application runs in Flash Player environment, and has a rich interface performance, as well as the perfect interface optimization ability. Also its client is a one-time load, without the need for multiple refresh. As an important technology of RIA applications, Flex covers a series of technology portfolio to support development and deployment of RIA. The client's design upgrades from the page-centric to the component-centric, which improves the design of client programs.

2.2. Web Server

Flex development environment can use most of the Web programming platform to access database, the system uses MyEclipse development environment. MyEclipse Enterprise Workbench is an extension of Eclipse IDE, also is a powerful integrated development environment for J2EE. We can greatly improve work efficiency in the database and J2EE development, publishing, and an integration of application server.

Tomcat is not only advanced technology, stable performance, and is free, thus got many Java lovers and has been recognized by some software developers, become current popular Web application server. In the run-time, it occupy small system resources and is good scalability, also support commonly used functions to develop application, such as load balancing, mail service.

3. Function Module

The video system originated in the course, is a network space to multimedia communication and resource sharing between teachers and students, that is to say, it is an important supplement part to class teaching. In order to reflect the focus on the teaching process, the system provides statistical functions, such as the number of question answering, the number of participating in the discussion, the number of download data, etc, which result is a part of students' examination results. As shown in Figure 1, system diagram.

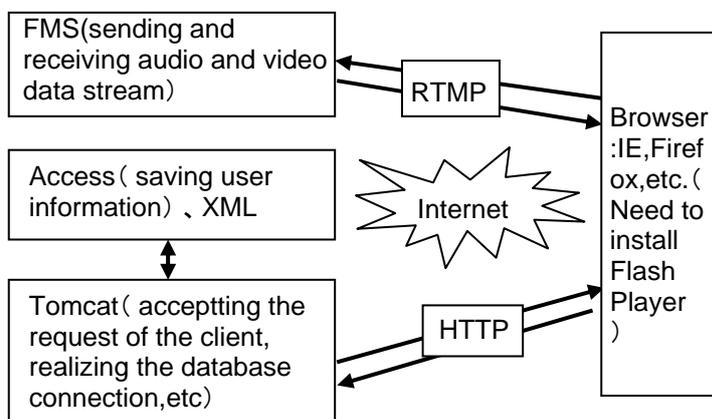


Figure 1. System Diagram

The system includes the following modules.

3.1. User Management Module

The system has three user roles: teachers, students and visitors, each having a different operating privilege. Teachers are part-time administrator. Before course, teachers should complete registration to add own information as well as students of the class. When entering, teachers need by username, password and curriculum, students need by their name and the default password, but the course is optional. If not selecting course, they just enter all

the courses. After entering the system, students can add own information, including change the password. Student accounts are deleted automatically when teachers delete curriculum. Visitors do not need to log.

3.2. Data Management Module

In the system, teachers can provide information for students to download. Note that, uploaded data by teachers is within the confines of the curriculum, students can see different information when entering into different courses. Students must login on to download data, while a visitor can only see the data.

3.3. Online Question Answering Module

After entering the system, Student can see current online teachers and students (through FMS SharedObject to achieve). Students may request video question answering to the teacher, also can choose online students for video communication. Teachers receive student's invitation, just the other students were question answering, can ask whether this students would like to join the video discussion group to discuss. As shown in Figure 2, Q & A flow chart.

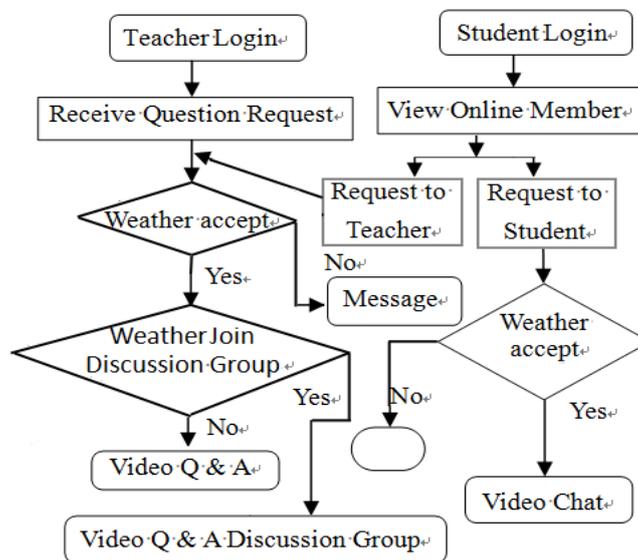


Figure 2. Online Question Answering Flow Chart

3.4. Not Online Question Answering Module

If the teacher is not online, students can choose the line answering through text messages (picture), record video, etc. Of course, students can delete own message. Teacher login and view messages, then reply message one by one. Visitors can view and reply to messages, also obtain learning materials by replying to the message, such as email address, MSN user name, QQ number, etc.

4. The Realization of Partial Modules

4.1. Database Design

Because of user information, data information, message board and so on, the system involves large amount of data, so uses Microsoft's Access database management system. As a web front-end design platform, Flex can't access the database directly, so achieve the data communication by HttpService and WebService components form ActionScript 3.0. The key of database design is the name of course, which is needed when students login, teachers upload data, students download information, etc. The main tables that the system have created are as

follow: students and visitor information, teacher information, course information, data information, online information, not online information, etc.

4.1.1. Using HttpService method

```
<mx:HTTPService id="className" method="GET" result="onResult(event)"/>
outputField.text=event.rusult as String ;// onResultis the body of the function
```

4.1.2. using RemoteObject method

```
<mx:RemoteObject id="remoteObj" destination="sro">
<mx:method name="echoMessage" result="displayMessage(event)"/>
</mx:RemoteObject>
<mx:Button label="click to have information" click="echoMessage()"/>//define the button
to trigger the ' RemoteObject' remote event
Public function echoMessage():void{
remoteObj.echoMessage(input.text) }//define the function
```

4.2. Realization of Online Module

In ActionScript3.0, users can read or storage data in the local or server by the shared object "SharedObject". The class SharedObject can realize real-time data sharing among multiple client files and object,as Cookie in IE browser. In general,Use of "SharedObject" objects includes the maintenance of local persistence, storing data on the server and realizing the data sharing. When using getLocal () or getRemote () to create a local or remote SharedObject, it can use a optional parameters "secure". If this parameter is set to true and the SWF file is transmitted through the HTTPS, Flash Player will create a secure shared object to get a reference.

You must first connect to the FMS server in order to transfer the local audio and video to the other client. The way of connection is through the connect () method which belongs to the NetConnect object.

NetStream opens connection flow between the client and the server. The "NetStream" object is a channel in the NetConnection object.

4.2.1. Establish Link

```
var multi_teacher-nc:NetConnection = new NectConnection();
multi_teacher-nc.connect("rtmfp://localhost:2032/genchvideo");
multi_teacher-nc.addEventListener(NetStatusEvent.NET_STATUS,
multi_teacherHandler);
```

4.2. 2.Establish Group

```
// After a successful connection, need to establish group
this.m_spec = new GroupSpecifier("myGroup");
m_spec.serverChannelEnabled = true;
m_spec.objectReplicationEnabled = true;
lbl1.text = "farID : " + nc.farID + "\nNearID : " + nc.nearID;
m_ng = new NetGroup(nc, m_spec.groupspecWithAuthorizations());
```

4.2.3. Publish Video

```
var camera:Camera = Camera.getCamera();
camera.setMode(320,240,24,true);
camera.setQuality(0,80);
video.attachCamera(camera);
multi_teacherns = new
NetStream(multi_teacher,NetStream.DIRECT_CONNECTIONS);
multi_teacherns.attachCamera(camera);
multi_teacherns.client = this;
multi_teacherns.publish("cam1","live");
```

4.2.4. Play Video

```
multi_teacherns = new NetStream(multi_teacher-nc,"id of the video stream accepting  
from the publishing side");  
video.attachNetStream(multi_teacherns);  
multi_teacherns.play("cam1");
```

5. Conclusion

The system has obtained the very good teaching effect and received praise from teachers and students. At the same time, system promotion of the professional and school is on the agenda. In fact, which is just what the system needs to improve, such as the problems of user management, the need to increase the administrator, the teachers providing question answering who have not the course, the use of resources is not limited to one course. Meanwhile, this system used the FMS developer version which content is completely free, but bandwidth is limited and makes the bottleneck about answering number at the same time.

Combined with own use, this paper introduces the function and the realization of video question answering system based on P2P in campus network, hope more discussion with readers, in order to improve and perfect the system, enhance the experience of users, as a useful supplement to classroom teaching.

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