Research on English Online Video Teaching System Based on Streaming Media Technology

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Abstract. With the rapid development of Internet and digital technology, education methods and learning modes are also changing. Online education has become a trend, so the research of online video teaching system is helpful to the quality of English learning. The existing English online video teaching system mainly uses the spring MVC (model - view - controller) architecture to generate the video teaching interface, which is affected by the code maintenance relationship, resulting in some functions unable to operate normally. Therefore, it is necessary to design a new English online video teaching system based on Streaming Media Technology. The hardware part designs the ARM S3C2440 processor and LCD display, the software part designs the video teaching transmission protocol based on the streaming media technology, develops the core streaming media online teaching program, and designs the English online video teaching function module, thus realizing the English online video teaching.The system test results show that each functional module of the designed online English video teaching system based on streaming media technology can operate normally, which proves that the designed online video teaching system has good performance, reliability, and certain application value, and has made certain contributions to improving the quality of online English teaching.

Keywords: Streaming Media Technology · English · Online Video · Teaching · System Study

1 Introduction

Under the trend of globalization, English as the main language of international communication has become more and more important [1]. However, there are some limitations in traditional English teaching methods. The rapid development of Internet and digital technology provides new opportunities for online education [2]. Therefore, it is of great significance to study the background of English online video teaching system. The system can provide flexible learning methods. Regardless of geographical location and time constraints, learners can learn anytime and anywhere [3]. At the same time, personalized learning and teaching are also possible. The system can provide personalized

G. Gui et al. (Eds.): eLEOT 2023, LNICST 543, pp. 217–232, 2024.
https://doi.org/10.1007/978-3-031-51465-4_15

learning content and teaching methods according to learners' level, interest and learning style [4]. In addition, the system can integrate rich and diverse learning resources and expand learning opportunities and resources. Through multimedia, interaction and practice, English online video teaching system can improve the learning effect and results [5, 6]. To sum up, the background and significance of studying English online video teaching system is to explore and develop a flexible, personalized and efficient English learning method, promote the development of English education, improve the English level of learners, and promote the fairness and popularization of education.

Reference [7] proposes an English online video teaching system based on cloud platform. Firstly, the framework of the English online practice system of cloud computing platform is designed. The infrastructure layer is used to provide users with all facility services, and the platform service layer is used to provide users with application development, testing and custody functions. The software service layer evaluates users' English learning status according to the scores of users' knowledge points and question types. Reference [8] proposes an English online video teaching system based on mybatis framework. Combined with statistical information analysis and big data regression analysis, it carries out big data mining, and combines with relevant information feature matching to carry out the sharing and scheduling design of multi terminal interoperability online teaching resources. Build a multi terminal interoperability online teaching resource scheduling model and resource sharing design, and carry out the software development and human-computer interaction design of the multi terminal interoperability online teaching platform under the mybatis framework. Although the above two systems can realize the online teaching function, there are still some deficiencies in improving learning performance.

In order to solve the problems existing in the existing teaching system, a new English online video teaching system based on streaming media technology is proposed. From the two aspects of hardware and software, the hardware is designed to meet the online video teaching function of the system and improve the stability of system operation. The software part improves the security and reliability of system resource transmission through the design of transmission protocol, and designs the online teaching program to complete the online video teaching function of English.

2 Hardware Design

It is necessary to design an English online video teaching system from both hardware and software aspects. From a hardware perspective, reasonable selection and configuration of hardware devices can ensure the operational requirements and user experience of the system, such as servers, network devices, cameras, etc. At the same time, the performance of hardware devices and network bandwidth directly affect the implementation of video quality and interactive functions. From a software perspective, designing a simple, intuitive, and easy to operate user interface can provide a good user experience. At the same time, it is necessary to provide rich and diverse teaching content and resources, and achieve personalized teaching support through learning analysis and data mining technologies. In summary, designing an English online video teaching system from both

hardware and software aspects can ensure the improvement of system functionality, performance, and user experience, providing a good video experience, interactive functions, and personalized teaching support to meet the needs of learners.

2.1 ARM S3C2440 Processor

For an embedded system application, the selection of CPU is very important.Embedded microprocessors generally need to have the following characteristics:

(1) High reliability and integration.The chip integrates as many interfaces or controllers as possible to meet user needs, and expands off chip resources as little as possible.
(2) The overall cost of the product is low, and processors and peripherals that are cheaper, more widely used, and have a long life cycle are selected.
(3) Low development cost, short development cycle, using operating system, driver and other software to support perfect processors can effectively reduce the risks and uncertainties in development.At present, there are more than 1000 kinds of processors with embedded features in the world [9]. The popular architecture includes more than 30 series such as MCU and MPU, with faster speed, stronger performance and lower price.Compared with industrial control computers, embedded microprocessors have the advantages of small size, light weight, low cost and high reliability. At present, such embedded processors include ARM, MIPS, Am186/88, 386EX, PowerPC, 68000, etc. The performance comparison table is shown in Table 1 below.

Table 1. Processor Performance Comparison Table

Processor Type	Processor price	Main performance and application
ARM	low	Low power consumption, suitable for personal portable devices
Dragon Ball	low	Low speed, mainly used in PDA
Power PC	high	Communication, network and other equipment;High unit added value and small market;Especially for It is applied to high-end embedded systems when there are high performance requirements

It can be seen from Table 1 that, considering the application field, cost, development difficulty and other factors, the embedded processor selected in this paper is ARM, which is widely used in 16/32 bit embedded RISC solutions, has become the standard processor on mobile phones, PDAs and other portable devices, and is the most representative architecture of embedded processors.At the beginning of 2007, ARM's 32-bit RISC processor market share exceeded 95%.The kernels provided include the following series: ARM7, ARM9, ARM9E, ARM10, SecurCore, StrongARM, InterXScale, etc.The time of each series of products should follow the principle of high performance and low power consumption to meet the increasingly complex application needs of users[10]. ARM microprocessor with RISC architecture generally has the following characteristics:

(1) Small size, low power consumption, low cost and high performance;
(2) It supports Thumb (16 bit)/ARM (32 bit) dual instruction set, and can be well compatible with 8-bit/16 bit devices;
(3) Using a large number of registers, the instruction execution speed is faster;
(4) Most data operations are completed in registers;
(5) The addressing mode is flexible and simple, and the execution efficiency is high;
(6) The command length is fixed.

According to the system requirements, this paper selects the S3C2440 processor based on ARM9 core produced by SAMSUNG Company.

S3C2440 is a 32-bit RISC processor based on ARM920T core produced by Samsung, and a CMOS standard macro cell and memory unit with 0.18 um process. It provides a solution of low-cost, low-power, high-performance small microcontroller for handheld devices and general type applications. The highest frequency reaches 533 MHz, and it is cheaper than other manufacturers' products of the same type,Therefore, S3C2440 is used as the embedded processor in the implementation of this system, and its main structure is shown in Fig. 1 below.

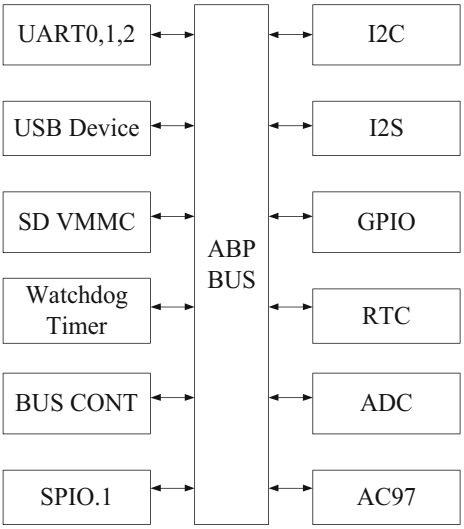

Fig. 1. Main Structure of S3C2440 Processor

It can be seen from Fig. 1 that the S3C2440 processor contains a 16/32-bit RISC architecture and a powerful instruction set of the ARM920T core. It contains MMUs, can use virtual storage systems, and can support WINCE, EPOC 32, and LINUX operating systems.Instruction high-speed storage buffer, data high-speed buffer, write buffer and physical address TAG RAM reduce the impact of main memory bandwidth and responsiveness, and reduce the loss caused by cache loss;Support ARM debugging architecture;Internal Advanced Micro Control Bus (AMBA) architecture;Support large/small end mode;1G addressing space in total;Support 8/16/32 bit data bus bandwidth;From

bank0 to bank6, fixed bank start addressing is adopted;Bank7 has a programmable bank start address and size.

The S3C2440 processor has: independent 16 KB instruction cache and 16 KB data cache, MMU, TFT capable LCD controller, NAND flash memory controller, 3-channel UART, 4-channel DMA, 4-channel Timer with PWM, I/0 interface, RTC, 8-channel 10 bit ADC, Touch Screen interface, IIC-BUS interface, IIS-BUS interface, 2 USB hosts, 1 USB device, SD host and MMC interface, and 2-channel SPI.Up to 533 MHz.

S3C2440 is the internal 32-bit address, the external 27 bit address, and the data bus width is 32 bits.400 M main frequency, 100 – 133 MHz bus speed.If the peripheral chip with 8-bit or 16 bit data width is connected to the CPU, the data bus width of the core board is configurable, which can be configured as 32-bit, 16 bit or 8-bit modes respectively.The setting is implemented in BW bit of BWCON.When assigning a slice selection to a peripheral, set the two bits in its BWCON, and change the data width when accessing its address.For 16 bit data width, the lowest 16 bit data line is valid;In 8-bit mode, the lowest 8-bit data line is valid. The interface connected to the processor is shown in Fig. 2 below.

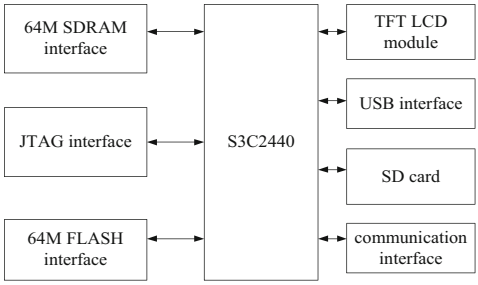

Fig. 2. S3C2440 Processor Connection Interface

It can be seen from Fig. 2 that the S3C2440 provides 8-way chip selection. Each chip selection has a fixed address, and each chip selection has a fixed interval of 128M bytes.This is invalid for CSO during startup, because CSO is a memory chip for storing startup code, which is generally FLASH. When the CPU is just powered on, the data width cannot be set with BWCON, and it is only implemented by hardware.The width of data is determined by the hardware configuration after reset. The default value for reset is 0x000000000.

2.2 LCD Display

At present, the display equipment of portable multimedia player mainly adopts LCD (Liquid Crystal 1 Display) display, which is a kind of display that uses T liquid crystal to control the transmittance technology to achieve color.Compared with CRT display, LCD has obvious advantages.The light and dark are controlled by controlling whether the light is transmitted. When the color is unchanged, the liquid crystal also remains unchanged, so the refresh rate need not be considered.For LCD with stable picture and

no flicker, the refresh rate is not high but the image is also stable.The LCD display also uses the technical principle of liquid crystal to control the light transmittance to make the bottom plate glow as a whole, so it is truly completely flat and has no radiation. Even if you watch the LCD display for a long time, the screen will not cause great harm to your eyes.In addition, its power consumption is relatively small, so it is very common in portable devices at present.

At present, LCD used in media player mainly includes TFT and STN.TFT liquid crystal display technology adopts the "active matrix" mode to drive. The method is to use the transistor electrode made of thin film technology, and use the scanning method to "actively" control the opening and closing of any display point.When the light source irradiates, it first passes through the lower polarizing plate and transmits light with the help of liquid crystal molecules.When the electrode passes through, the liquid crystal molecules will change like the arrangement state of STN liquid crystal. The purpose of display is achieved through refraction and light transmission. It seems that this is similar to the principle of STN.But the difference is that since TFT transistor has capacitive effect and can maintain the potential state, the liquid crystal molecules that have been exposed to light will remain in this state until the TFT electrode is powered up again next time to change its arrangement, while STN liquid crystal does not have this characteristic. Once the liquid crystal molecules are not applied with electric field, they will return to their original state immediately,This is the biggest difference between TFT liquid crystal and STN liquid crystal display principle.TFT liquid crystal is equipped with a semiconductor switch for each pixel, and its processing technology is similar to large-scale integrated circuit.Because each pixel can be directly controlled through the dot pulse, each node is relatively independent and can be continuously controlled. This design not only improves the response speed of the display screen, but also can accurately control the display grayscale. Therefore, TFT LCD has more realistic, smoother, more delicate, and stronger sense of hierarchy. TFT LCD is more expensive in terms of price.Since TFT screen will be the mainstream of future application, 5.7 inch TFT digital LCD CLAA057VA01 produced by Shydar Company is selected in this paper. Its basic parameters are shown in Table 2.

Table 2. LCD Display Parameters

parameter	Specifications	Company
Screen size	5.7	Inch
Display Format	640*(R,G,B)*480	Dot
Display Color	262, 144	\
Effective area	140(H)*100(V)	mm
Pixel spacing	0.1815(H)*0.1815(V)	mm
Outer frame size	127(W)*100(H)*7(D)	mm
weight	TBD	g
response time	30	ms

Table 2 shows that the LCD controller of S3C2440A chip is used to transmit image data located in the video buffer in the system memory to the LCD driver and generate necessary LCD control signals (VFRAME, VLINE, VCLK and VM).The LCD controller uses the time jitter algorithm and frame rate control method to support monochrome, 4-level grayscale (each dot occupies 2 bits), 16 level grayscale (each dot occupies 4 bits) display on a gray white LCD, and also supports up to 256 colors (each dot occupies 8 bits) display on a color LCD.The LCD controller can support LCD with different horizontal and vertical points (1024 * 768, 640 * 480, 320 * 240, etc.), different data line widths, different interface timing and refresh rates through programming, support 4-bit dual scan, 4-bit single scan, 8-bit single scan LCD displays, and support horizontal/vertical scrolling to support larger screen displays (such as 1280 * 1280),Some internal connection structures of the display are shown in Fig. 3 below.

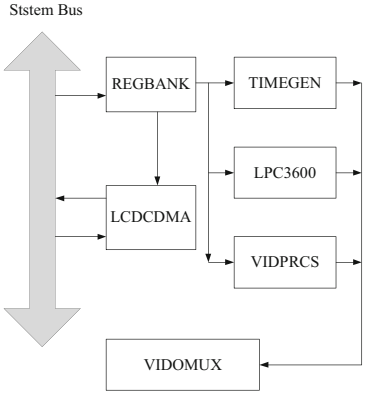

Fig. 3. Internal Structure of LCD Display

It can be seen from Fig. 3 that the flow of LCD controller transmitting image data is as follows: when the FIFO memory area in the LCDCDMA (LCD dedicated DMA, which is used to automatically transmit the video data in the video buffer to the LCD driver without the participation of the CPU) is empty or partially empty, LCDCDMA requests to prefetch data from the video buffer (using burst transmission mode, prefetching 4 words at a time, and bus control transfer is not allowed during transmission). Its interface is shown in Table 3 below.

It can be seen from Table 3 that when the request is accepted by the bus arbitration in the memory controller, the data of four consecutive words will be sent from the video buffer to the FIFO storage area of the LCDCDMA.The total size of the FIFO storage area is 24 words (12 words belong to FIFOL and 12 words belong to FIFOH, which are used to support double scanning. In the single scanning mode, only one FIFO is available).The S3C2440A supports TFT/STN type LCDs, but cannot be directly connected to LCDs. It needs an interface board to drive LCDs.

Table 3. LCD Display Connection Interface

Symbol	explain	function
VCLK	Refresh clock	Provide clock signal for data transmission
VLINE	Horizontal synchronizing pulse	Provide line signal, i.e. line frequency
WFRAME	Frame synchronization signal	The frame displays the effective control signal, after the complete frame is displayed
VM	AC control voltage	Change of polarity controls the display of liquid crystal molecules
VD[3:0]	data line	Data input, high 4-bit data input in double scan
VD[7:4]	data line	Data input, high 4-bit data input in double scan

3 Software Design

3.1 Design Video Teaching Transmission Protocol Based on Streaming Media Technology

The key technology of streaming media is streaming transmission.Streaming is widely defined, and now it mainly refers to the technology of transmitting media (such as video and audio) through the network.There are two ways to realize streaming transmission: sequential streaming transmission and real-time streaming transmission.Sequential streaming is a sequential download. Users can watch online media while downloading files. At a given time, users can only watch the downloaded part, not the first part that has not been downloaded.The sequential streaming mode is suitable for high-quality short fragments, which are placed on standard HTTP or FTP servers, easy to manage, basically independent of firewalls, and does not need other special transmission protocols. It is often called HTTP streaming.Sequential streaming is useful for publishing short clips through modems, allowing video clips to be created at higher data rates than modems.Despite the delay, it is possible to release high-quality video clips.However, it is not suitable for videos, lectures, speeches and demonstrations with long clips and random access requirements, nor does it support live broadcasting.

Real time streaming transmission is always real-time transmission, especially suitable for on-site events. It also supports random access. Users can fast forward or backward to view the content in front or behind.It ensures that the bandwidth of the media signal matches the network connection so that the media can be viewed in real time.Theoretically, the real-time stream will never stop once played, but in fact, periodic pause may occur.Real time streaming must match the connection bandwidth, which means poor image quality when connecting at modem speed.Moreover, because the information lost due to errors is ignored, the video quality will be poor when the network is congested or there are problems.To ensure video quality, sequential streaming may be better.In addition, real-time streaming transmission requires specific servers, such as

QuickTime Streaming Server. For the advantages of streaming media technology, this paper designs an effective streaming media transmission protocol. The implementation diagram of this protocol is shown in Fig. 4 below.

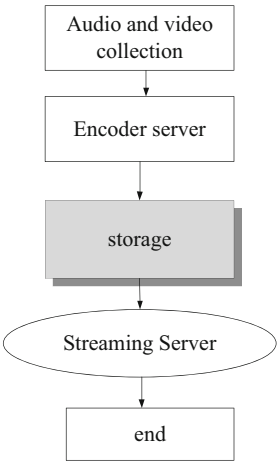

Fig. 4. Schematic Diagram of Streaming Media Video Transmission Protocol Implementation

It can be seen from Fig. 4 that after encoding and compression, the original audio/video stream is stored as a media file or directly transmitted to the streaming media server, which transmits the live media stream (or media file) to the streaming media player at the user's request.In the middle of media transmission, proxy servers can also be used to distribute or forward media content.The remote client can see the video data as long as it logs in to the server using the streaming media player.

Real time Transport Protocol (RTP) is defined as a transport protocol for transmitting real-time data such as audio, video and analog data.Originally designed for multicast of data transmission, it is also used for unicast.Compared with the traditional transport layer protocol that focuses on high reliability data transmission, it focuses more on the real-time nature of data transmission.The services provided by this protocol include time load identification, data sequence, time stamp, transmission control, etc.RTP usually uses UDP to transmit data, but RTP can also work on other protocols such as TCP or ATM.When the application starts -- RTP sessions, two ports will be used, one for RTP and one for RTCP. RTP itself cannot provide a reliable transmission mechanism for sequentially transmitting data packets, nor does it provide flow control or congestion control. It relies on RTCP to provide these services, which can generate video teaching resource combination u_i, as shown in (1) below.

$$u_i = p_b - p_{ij} \tag{1}$$

In formula (1), p_b represents the matching degree of video resources, and p_{ij} represents the resource combination coefficient. Based on the above video teaching resources, the operating occupancy rate u_s can be estimated, as shown in (2) below.

$$u_s = u_i \bullet otherwise - p_j^s \tag{2}$$

In formula (2), *otherwise* represents the occupancy rate of video resources after the transaction ends, and p_j^s represents the total occupancy rate of video resources. At this point, the transmission utility u_0 of the video transmission protocol is shown in (3).

$$u_0 = \sum_{b \in w} p_j^s - \sum_{b \in w} p \tag{3}$$

In formula (3), p represents the scale set. Combining the transmission utility calculated above, the scale difference can be obtained to obtain the user node weight MR for obtaining video teaching resources, as shown in (4) below.

$$MR = M \setminus (u_0 + u_s + u_i) \tag{4}$$

In formula (4), M represents the number of user nodes, and different users have different preferences. To effectively provide teaching services to them, it is necessary to calculate the comprehensive satisfaction v, , as shown in (5) below.

$$v = w_k \bullet \frac{1}{MR} \tag{5}$$

In formula (5), w_k represents the minimum standard for video resource transmission, and resource synthesis can only be carried out after meeting the above satisfaction standards. At this time, the resource synthesis scale bs is shown in (6).

$$bs = \sum_{k=1}^{c} r_k w_k \tag{6}$$

In formula (6), r_k represents the transmission basis coefficient, and combined with the resource comprehensive scale mentioned above, an effective transmission decision variable Q can be generated, as shown in (7) below.

$$Q = \max bsS_i \tag{7}$$

In formula (7), S_i represents the matching coefficient. According to the above decision variables, the streaming Media Transfer Protocol operation model LD can be generated, as shown in (8) below.

$$LD = \frac{Q}{bs} w_k \bullet v \setminus u_0 + u_s + u_i \tag{8}$$

Combined with the above transport protocol operation model, traffic control and congestion control can be carried out.Send some RTCP packets periodically between RTP sessions to transmit monitoring quality of service and exchange session user information and other functions.The RTCP packet contains statistics such as the number of sent packets and the number of lost packets.Therefore, the server can use this information to dynamically change the transmission rate, or even change the payload type.The combination of RTP and RTCP can optimize the transmission efficiency with effective feedback and minimal overhead, so it is particularly suitable for transmitting real-time data on the network.

3.2 Develop Core Streaming Media Online Teaching Program

The system is developed by Dreamweaver MX2004, combined with ASP technology to generate dynamic web pages, to achieve remote management of the system and learners' remote video learning.Dreamweaver MX2004 is a "what you see is what you get" web page editing tool produced by Macromedia, which can be used to design, code and develop web sites, web pages and web applications. ASP is the abbreviation of Active Server Page, which is launched by Microsoft.ASP is not a pure technology, more accurately, it is a server script environment in which users can realize dynamic interactive WEB page design.ASP script can be written together with HTML, VBScript, JavaScript and other script languages, which greatly enriches and expands the functions of ASP applications.ASP has the following four important features that make it very versatile.ASP can include server-side script;ASP provides some Built in objects, which can be used to receive and send information from the browser; ASP can be extended with other elements. ASP itself is derived from a considerable number of standard server ActiveX elements. These components allow pages to display different contents according to browser capabilities, etc.;ASP can easily connect with the database. By using some special object set ADO (Active Data Object), you can use SQL language in ASP. The execution process of this program is shown in Fig. 5 below.

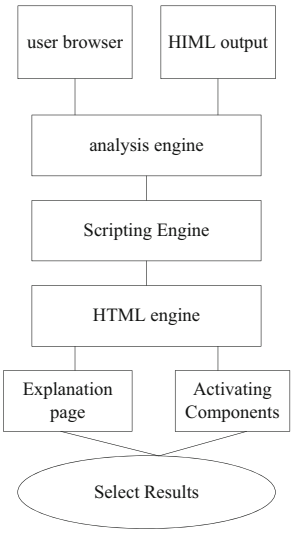

Fig. 5. ASP Program Execution Process

It can be seen from Fig. 5 that ASP provides five built-in objects: Application object: an application level object, which is used to share information among all users and can maintain data persistently during the running of the Web application.Request object: The Web page (. htm file) used to connect the client and the server can obtain client data or exchange data between them.Response object: used to send data from the server to the client. It can be displayed in the client browser, redirected to browse the page,

and created cookies on the client.This function is the opposite of that of the Request object.Serve: Object: It is used to complete many advanced functions: it can create instances of various Server objects, and provide methods and properties to access the Web Server.Session object: it provides an identifier for each visitor. Session can be used to store some preferences of visitors and track their habits.

Each page of the system is generated dynamically, and the displayed content of the page is extracted from the database in real time.The system adopts ADO mode for database connection and access.ADO (ActiveX Data Objects) is a database access technology, which is actually a connection mechanism providing access to various data types.ADO is designed as a very simple format, which is connected to the database interface through ODBC.Users can use any ODBC data source, which is not only suitable for database applications such as SQL Server 2000 and Oracle Access, but also suitable for Excel tables, graphic files and unformatted data files.

3.3 Design English Online Video Teaching Function Module

The student module mainly introduces the seven function points of English proficiency test, course appointment, course cancellation, course viewing, student class, card purchase and recharge, and account management.The homepage of the website includes various functions such as registration, login, online customer service, novice guide and proficiency test for tourists to use. At the same time, the website will also post corresponding announcement information about the company, news plate and other dynamic information for tourists to understand the website and the services provided by the company.

The English proficiency test function is used to test the level of students' English proficiency, so that teachers can have a general understanding of students' current English learning, and facilitate teachers to provide students with corresponding curriculum programs.After students log in, they enter the evaluation system. At this time, the system randomly selects test questions from the question bank. After students finish answering, they submit their answers. After scoring, the system displays the results to students, and saves the test results in student files.Teachers can view the test results of students through the system and customize the learning scheme for students. The business flow chart is shown in Fig. 6 below.

It can be seen from Fig. 6 that the function of course reservation depends on the function of viewing the reservation schedule. After students view the teachers who can be reserved in a certain day, they can click the teacher's name to enter the detailed schedule that can be reserved by the teacher that day. The space displaying the word "reservation" in the schedule is the time when students can book courses, and students can click to enter the reservation details,At the top of the timetable, there is a specific introduction about the teacher for students to refer to.After logging in, students can view the teachers who can make an appointment within their expected time, and then make an appointment for courses.If the balance in the student account is insufficient, the system will prompt the student, on the contrary, it will prompt that the appointment is successful, and save the information in the student and teacher files.

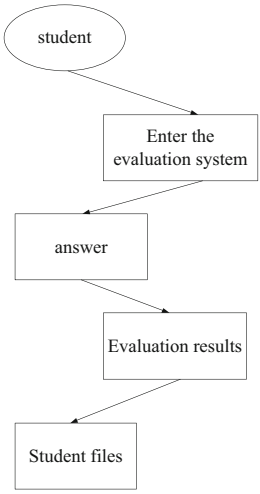

Fig. 6. Business Flow Chart

4 System Test

In order to verify the running performance of the designed English online video teaching system based on streaming media technology, this paper builds a test platform, runs the design system, and conducts system testing, as follows.

4.1 Test Preparation

From the perspective of application systems, testing generally includes functional testing and performance testing.Function test is to test the functions required by the developed application system one by one; The testing of web applications has its own characteristics. In addition to the different contents of performance testing and function testing, it also needs to test from the aspects of UI and security.General web application testing includes user interface, function, interface, compatibility, strength and security testing.

User interface test: referred to as UI test, it tests whether the style of the user interface meets customer requirements, whether the text is correct, whether the page is beautiful, whether the combination of text and pictures is perfect, and whether the operation is friendly.Function test: to test whether the function of the software system is correct, which is based on the requirements documents, such as the Requirements Specification.Since correctness is the most important quality factor of software, functional testing is indispensable.Database test: in web application technology, database plays an important role. Database provides space for the management, operation, query of web application system and the realization of user's request for data storage.In a web application system that uses a database, two types of errors may occur in general, namely data consistency errors and output errors.Data consistency errors are mainly caused by incorrect form information submitted by users, while output errors are mainly caused by network speed or program design problems. For these two cases, tests can be conducted separately. The test environment built at this time is shown in Table 4 below.

Table 4. Test Environment

equipment	main parameter	explain
application server	processor	IntelP87002, 53 GHz
	Hard disk	2TB
	Memory	8GB
	network card	100\1000 M
	operating system	Windows Server
	processor	Intel P87002, 53 GHz
	Hard disk	2 TB
database server	Memory	8 GB
	network card	100\1000 M
	data base	SQL Server 2012
	operating system	Windows Server2012
	processor	Intel P87002.53 GHz
Client computer	Hard disk	1 TB
	Memory	4 GB
	network card	100\1000 M
	operating system	Windows 10

It can be seen from Table 4 that subsequent system performance tests can be carried out under the above preset test environment.

4.2 Test Results and Discussion

Under the above test environment, the system test can be carried out, that is, run the English online video teaching system based on streaming media technology designed in this paper, and record the operation effect of each functional module. The test results are shown in Table 5 below.

Table 5 shows that all functional modules of the online English teaching system based on streaming media technology designed in this paper have passed the test, proving that the designed system has good performance, reliability and certain application value.

In order to further validate the teaching performance of the system in this paper, the average final English score of 50 students in a class was used as an indicator to compare and verify the system with the reference [7] system and the reference [8] system. The average final grades of students under the three systems are shown in Table 6.

From the comparison results of average grades shown in Table 6, it can be seen that the system in this article can improve students' English learning performance, and students' average English scores are higher than the two comparison systems. Therefore, it indicates that this system has high practical application value.

Table 5. Test Results

process	Expected test results	test result
Log in to the network video teaching system	Successful login	Test passed
Upload teaching video	Display upload success	Test passed
Select the video file to learn	Prompt that the video is uploaded successfully	Test passed
Update resource description information	Update succeeded	Test passed
Submit video resource modification	Modified successfully	Test passed
Select the client server and log in	Login succeeded	Test passed
Watch teaching resources	Successfully opened the viewing interface	Test passed

Table 6. Student average score

Systems	Score
This paper system	86.85
Reference [7] system	70.49
Reference [8] system	75.63

5 Conclusion

The so-called online learning refers to a series of learning processes in which students watch the teacher's online teaching live broadcast in real-time through a computer network, or access the course related knowledge data previously released by the teacher. The course related knowledge data mentioned in this learning process can be divided into teaching videos, teaching plans, teaching documents, teaching test questions, etc. Online course teaching in the network environment can improve the pertinence of teaching and the sharing of teaching resources. Therefore, this article designs a new English online video teaching system based on streaming media technology and conducts system testing. The results show that the designed system has good performance, reliability, and certain application value, making a certain contribution to improving the effectiveness of English teaching. However, the issue of maximum user concurrency in the system was not considered in this study. When there are too many students, further verification is needed in future research to ensure the system can continue to operate stably.

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