Design of English Practice System Based on Cloud Computing Technology

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Abstract. With the development of information technology, the field of education has gradually used information technology as an important tool to improve teaching efficiency and teaching quality. Nowadays, schools have relatively high requirements for students' self-learning ability. In order to meet the students' self-learning needs, this paper constructs an English practice system based on cloud computing technology. The system is self-adaptive, can screen and sort the topics, and provide users with an efficient and practical English practice system.

Keywords: Cloud Computing · English · System · Platform

1   Introduction

In the traditional teaching method, the students in a class receive the same education, but the students' comprehension ability is very different, which causes the students' learning effect to be different. In order to allow more students to choose the difficulty and time of study according to their own situation and promote the development of education field, information technology has become the best way to solve this problem. The English practice system based on cloud computing technology constructed in this paper allows students to choose the difficulty of the topic according to their own needs, which is more suitable for the students' learning situation. Students can make their own study plans in the system and choose appropriate study content. This article provides a more intelligent platform for English learning.

2   Cloud Computing Technology

Cloud computing technology is to decompose the huge data computing basic program into countless small programs through the Internet, and then process and analyze it through a system composed of multiple servers, and return the results to the user. The emergence of cloud computing has greatly improved the efficiency of computer operations and fully utilized the spare servers [4]. Due to the scalable high-performance computing capabilities of cloud computing, cloud computing technology has been widely used in society today. Cloud computing technology integrates distributed computing, utility computing, parallel computing, network storage, hot backup redundancy, virtualization and other computer technologies [3].

Cloud computing technology is mainly composed of four parts, namely data access and processing, system security, resource allocation and sharing, and flexible application of services [8]. These four parts correspond to data center technology, cloud security technology, software-defined technology and mobile cloud computing technology [16]. The data center of cloud computing is mainly hardware equipment, which is responsible for organizing, processing, storing and transmitting data. In the data center, platform providers provide software and hardware infrastructure for cloud computing, while service providers use websites and collection apps to serve end users. End users refer to us who use the software [11].

Nowadays, the applications that people are facing are becoming more and more intelligent, and more and more operations can be realized in the software, all of which rely on cloud computing technology [6]. Applying cloud computing technology to the mobile terminal can give full play to the computing and storage advantages of cloud computing technology, break through the resource limitations of the mobile terminal, and improve user experience. Cloud computing technology has also brought software development to many people [5]. Today, even if there is no server, it is possible to use cloud computing technology to build a platform framework to provide services for users. The English practice system constructed in this paper uses cloud computing technology, virtualizes the server, reduces the cost of developing the system, improves the software efficiency, and can provide users with better services [1].

3   Framework of English Practice System

According to the needs of students and teachers, the functional modules of this system are designed as shown in Fig. 1.

The main function of the teacher terminal is to search for questions in the question bank, and then combine these questions to form a whole paper. Teachers can also upload test papers directly and distribute them to students [10]. After the students complete the answers, the system will automatically mark the multiple-choice questions, and the teacher will mark other questions. When teachers see a test paper with a high degree of completion and excellent grades, they can share the test paper. Teachers can also view and answer questions from students [15].

The main function of the student terminal is to choose the test paper. The system will sort the papers according to the difficulty of the papers, and students can choose papers according to their abilities. After completing the test paper, students can ask questions to the teacher [13].

The system uses a three-tier architecture, and puts business rules, data access, legality verification and other work in the middle layer for processing. In the general case of the system, the client does not directly interact with the database, but establishes a connection with the middle layer through COM/DCOM communication, and then the middle layer sends the request to the database [12] (Fig. 2).
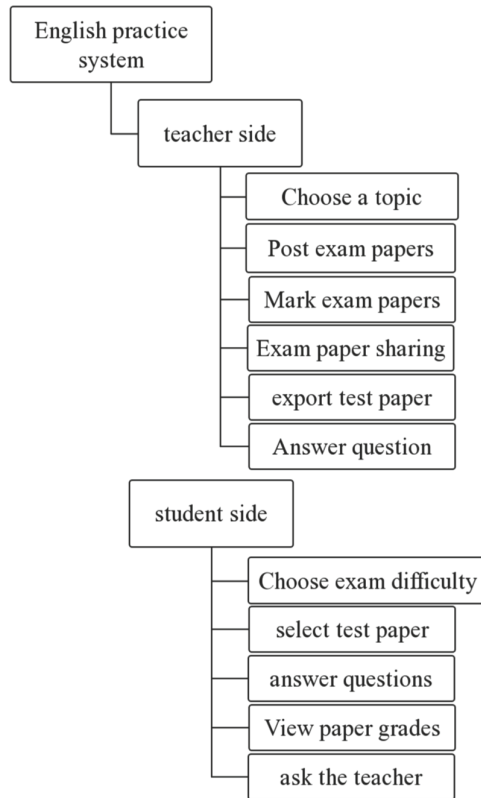
Fig. 1. System function modules.

4   System Database

A complete English practice system needs to be supported by a question bank with a large number of questions. Question bank is the core part of this system, which is related to the practicability of the whole system [9]. To establish a question bank, we must first determine the theoretical model, and let the question bank follow the mathematical model of the classical test theory for development and management [2]. Then it is necessary to set and measure each attribute of the topic, so that the system has a complete standard for the judgment of the topic. Finally, the questions should be collected to make the question bank more scientific and standard. There are two sources of questions, namely, excellent test questions on the Internet and invited experts to make propositions. When setting up the question bank, we should also pay attention to the dynamic maintenance of the question bank. The question bank should be dynamic and change according to changes in the situation. The maintenance of the question bank can only be carried out by the administrator, and this function cannot be opened to all users [14] (Table 1).

The attributes of the title are divided into basic parameters and specific descriptions. The basic parameters of the question are mainly the number of the question, the unit to which it belongs, the knowledge point of the investigation, the difficulty, the degree of
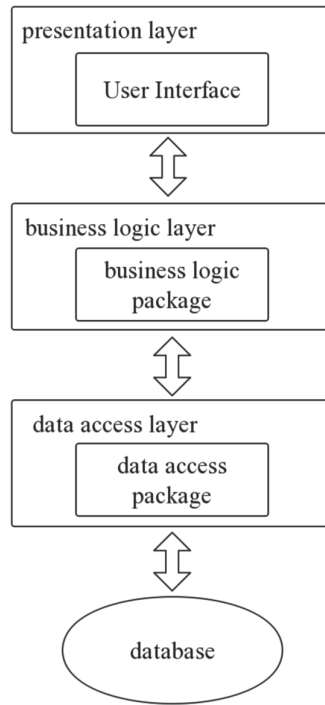
Fig. 2. The three-tier structure of the system.

Table 1. Tables in the database describing topics.

| property name	Property description	type of data	Data length	Is it allowed to be empty
ItemID	Question number	char	10	no
ItemDesc	Stem	ntext	16	no
ItemA	Option A	ntext	16	yes
ItemB	Option B	ntext	16	yes
ItemC	Option C	ntext	16	yes
ItemD	Option D	ntext	16	yes
Answer	reference answer	char	10	yes
ItemAna	Topic Analysis	ntext	16	yes
Diff	difficulty	float	8	yes
Div	distinction	float	8	yes
KPID	Corresponding to the main knowledge ID	char	10	yes
Switch	it's usable or not	char	10	yes
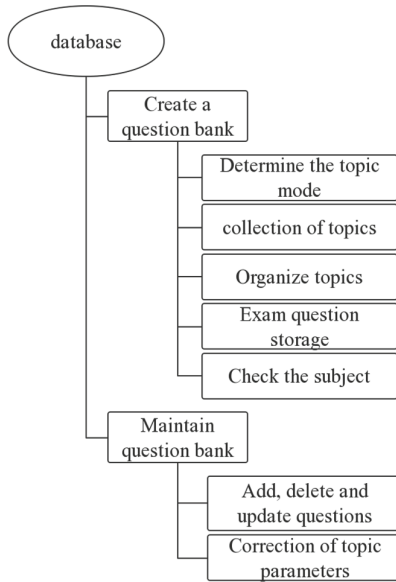
Fig. 3. Database Structure.

distinction, and so on. The specific description of the topic includes the stem, options, standard answers, and topic analysis.

The calculation of the difficulty of the question is the focus of the question bank. The calculation method is as follows:

$$DIFF = 1 - \frac{\overline{S}}{S}$$

In the formula, $\overline{S}$ is the average score of the question, and S is the score of the question. Although this formula can roughly get the difficulty of the question, it is not rigorous enough. The revised formula is as follows:

$$DIFF_n = 0.382 \times DIFF_{n-1} + 0.618 \times \left(1 - \frac{\overline{S}}{S}\right)$$

The initial value of the difficulty coefficient in the formula is given by a number of experts and teachers based on experience. After many experiments, it can be confirmed that the formula is effective. This formula can eliminate chance to the greatest extent, and the obtained score is close to the real difficulty of the question [7].

In order to simplify the system, teachers can also score the questions and make corrections (Fig. 3).

5 Optimize Audio Resources

Audio and video resources are indispensable in the English teaching system. There are many audio and video resources on this platform for students to learn, but most of the
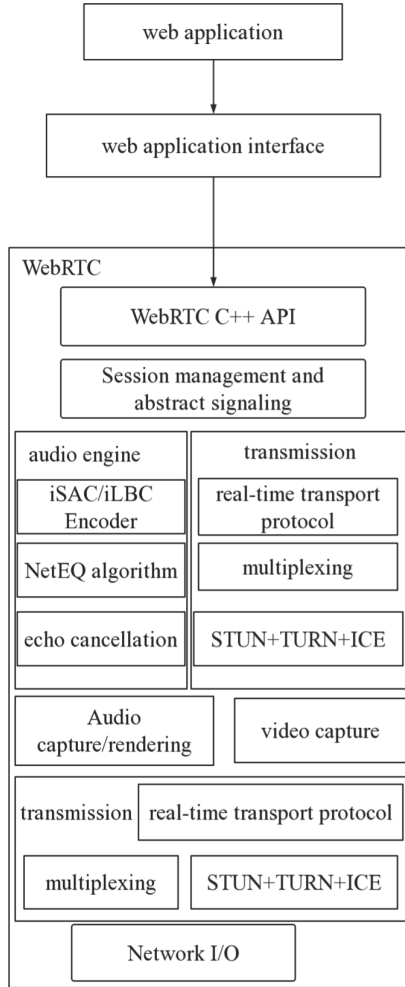
Fig. 4. WebRTC Architecture.

resources are filmed by teachers relying on mobile devices, and there will be a certain degree of loss of image quality after uploading to the platform. In order to provide students with better audio and video resources, this platform uses RTP transmission to optimize audio and video.

This platform uses WebRTC technology, which is a real-time audio and video communication technology based on Web browsers. There are audio modules, video modules and transmission modules in WebRTC. The transport module in WebRTC is responsible for the RTP/PTCP protocol. RTP can provide information such as payload type, synchronization source, timestamp, serial number, etc. for audio and video. WebRTC will package and send the collected information in the system. The receiver will unpack after receiving the message. After an RTP painting is started, the communicating parties

of Caiyu's painting will periodically send RTCP messages, which contain the specific statistical information of the data sent and received by the communicating parties. The feedback of the RTCP protocol in WebRTC can ensure the data security and integrity in the audio and video transmission process, and improve the audio and video transmission quality (Fig. 4).

6 Conclusion

The development of network technology provides information support for the informatization of education. This paper uses cloud computing technology to build a database-based English practice system. In this system, students can contact anytime and anywhere according to their own needs, and can communicate with teachers, which can effectively meet the needs of students for English practice and mock tests, and has high application value.

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