Design of Personalized Recommended English Assisted Teaching System in Big Data Environment

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Abstract. According to the information needs of English learning and the problems existing in current English teaching, this paper proposes an English teaching system based on personalized recommendation. In order to realize the system, the business process of the system is analyzed to provide a reference for the follow-up function design; then, combined with the above requirements, the function, physical architecture, technical architecture of the system are designed, and the login module and personalized recommendation module of the system are designed, and the interface implementation code is given. The above-mentioned auxiliary learning interface not only provides a better idea for the promotion and improvement of current English information teaching, but also provides a reference for the application of Intelligent Recommendation Algorithm in English teaching.

Keywords: Collaborative filtering algorithm · English assisted instruction · MVC architecture · B/S mode · Physical structure

1 Introduction

With the application of computer information technology in teaching, all kinds of English assistant teaching system emerge as the times require. These assistant teaching management systems not only promote the application of information technology in teaching, but also promote the sharing of English teaching resources. Relying on the campus network and adopting the idea of network layering, this paper builds an auxiliary teaching system which can be used for English learning, so that college students can complete their English learning through the campus network; designs and constructs an English auxiliary teaching system with C++ development language, which has the characteristics of simple and practical; takes English writing as the breakthrough point, This paper constructs a special English teaching software for writing, which greatly improves students' English writing ability; Li Feng and others introduce big data inverted index technology into the writing assistant teaching system, whose purpose is to improve the efficiency and accuracy of writing model search [1].

2   System Requirement Analysis

The main requirements of the system focus on the following aspects: first, as a system, the basic information of the system should be maintained and managed, which is the basis; second, as an English auxiliary teaching system, various English teaching resources can be managed and stored, so as to facilitate the majority of users to download and consult resources; third, real-time online English examination can be carried out, It includes daily basic English knowledge, CET-4 and CET-6 question bank, final exam, etc., and the backstage administrator can manage and intelligently generate test papers; fourthly, through the system, in order to stimulate the learning initiative, it also provides an interactive discussion area, so as to facilitate the communication between teachers and students; fifthly, through the system, it actively provides learning recommendation content for the majority of students, In order to improve the intelligence of the system. In this paper, intelligent recommendation is a highlight of this paper.

3   System Design

3.1   System Function Design

In the system function module, the whole module function is divided into six parts [2].

(1) User login and registration. This part is mainly for users to log in to the system with their own user name and password. After the login comparison is passed, they can directly enter into different user function interfaces. For users who are not registered, they can log in to the corresponding function interfaces after registration and audit.
(2) System management. This part of the module is mainly to manage the password, and divide the function permissions of different users of the system.
(3) Students learn. This part is mainly to improve the learning interface for English learning students, including the learning of materials, courseware, etc. at the same time, it also includes the test of different knowledge points, chapters and professional public English grades through this module, and the communication with teachers.
(4) Teachers teach. This part is mainly for teachers to manage the examination questions, evaluate the students' examinations online, and answer questions online.
(5) Personalized recommendation module. This module is mainly combined with the database system to complete the personalized recommendation of students' different knowledge points and writing model articles, so as to provide reference learning content according to students' interests.

3.2   System Architecture Design

Combined with the actual situation of the English auxiliary teaching system, this paper decided to rely on the traditional campus network to build the network topology of the system. In this regard, from the logical structure, the whole system is divided into

three parts: client, server and transmission. Among them, the transmission of teaching resources relies on the campus network, which aims to maximize the security and transmission efficiency of English resources transmission, and prevent the invasion of viruses outside the school; at the same time, the construction of virtual teaching platform is based on offline technology, that is, teachers can upload their teaching content to the system server by recording videos, And students can view the teaching content through virtual teaching classroom to make up for the lack of learning in class.

3.3 System Technology Architecture Design

For the construction of the system, the quality of its architecture is directly related to the operation of the system. Considering the current system development technology, this paper chooses B/SMVC + Dao development mode. In the aspect of system layering, the system is divided into three layers: page display layer, business layer and data management layer. The page display layer mainly provides interactive interface for users through. ASPX web page. In the business layer, it includes server and business module. In order to improve the logic of the whole system, this paper adopts the mode of model + view + controller, When the user clicks the page, the script embedded in the page triggers the response, that is, the view interface. The view interface interacts with the controller, and then the controller allocates different business functions to different applications. Finally, through the Dao interface, the interaction with the data is completed, and the results are directly transmitted to the view interface and displayed to the user. Through this way of deployment, it has two advantages: one is convenient access, users only need to click the page to complete the access to the system, without updating and installing; the other is the stable operation of the system. Through the logic processing of MVC, the whole auxiliary learning system runs more stably. The specific architecture is shown in Fig. 1 [3].
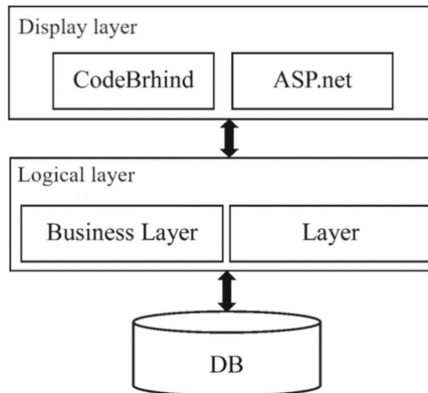

Fig. 1. Overall architecture design of the system

3.4   Design of Intelligent Recommendation Module

For English learning, the most important part is to combine the user's interest, to give students relevant recommendations, in order to expand the students' knowledge, but also progress and improve the intelligence of the system. In this regard, combined with the current intelligent recommendation algorithm, this paper proposes a collaborative filtering of English learning content.

Calculate the similarity, as shown in formula (1).

$$sim(x, y) = \frac{\sum\limits_{m \in m_{xy}} (g_{x,m} - g_x)(g_{y,m} - g_y)}{\sqrt{\sum\limits_{m \in m_{xy}} (g_{x,m} - g_x)^2 \sum\limits_{m \in m_{xy}} (g_{y,m} - g_y)^2}} \tag{1}$$

Where $x \in L$, $y \in L$.

Then, the score value of the non scored video m by the learner x is predicted, which is described as formula (2).

$$g_{x,m} = g_x + \frac{\sum\limits_{a=1}^{k} (g_{a,i} - g_a)sim(x, a)}{\sum\limits_{a=1}^{k} sim(x, a)} \tag{2}$$

Where, denotes the number of nearest neighbors of learner x.

4   Environment Development and System Simulation

This system takes. Net system as the development foundation, and uses ASP.NET The database is developed by SQL Server 2012. In terms of hardware, the memory size is 4 GB, the hard disk size is 512gb, and the processor is core 5; in terms of software, the server adopts iis7.0 version [4] (see Fig. 2).
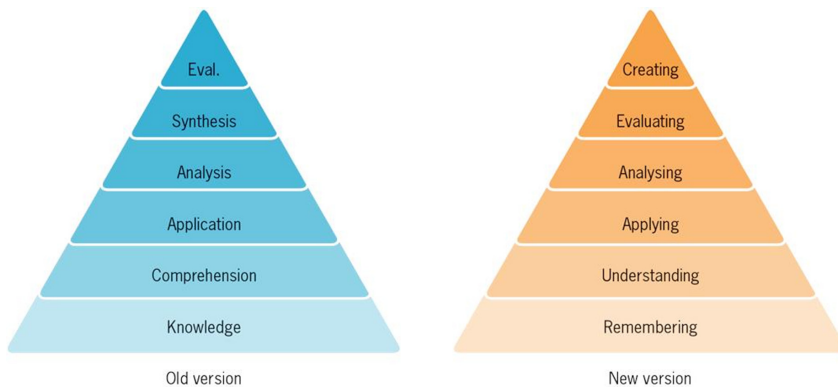

Fig. 2. Critical thinking: from theory to teaching

The idea and method of mathematical modeling require students to solve the practical engineering problems by using the mathematical knowledge they have mastered. Students need to simplify and assume the practical problems through positive thinking, seek a reasonable mathematical model to solve, analyze and evaluate the results, and then use a variety of mathematical software, such as MOSEK APS MOSEK, to create a suitable mathematical model, And to improve and optimize the mathematical model, simple understanding is to use computer to transform engineering problems into learning problems. When using mathematical modeling to solve problems, students not only need to actively use the required professional knowledge, but also need to use mathematical thinking, creative ability and problem-solving ability. Mathematical modeling can overcome the defects of traditional higher mathematics teaching, stimulate students' interest in learning mathematics, improve students' mathematical literacy, improve students' ability to use and operate mathematical software, and help students improve the speed and efficiency of solving problems through computers (see Fig. 3).
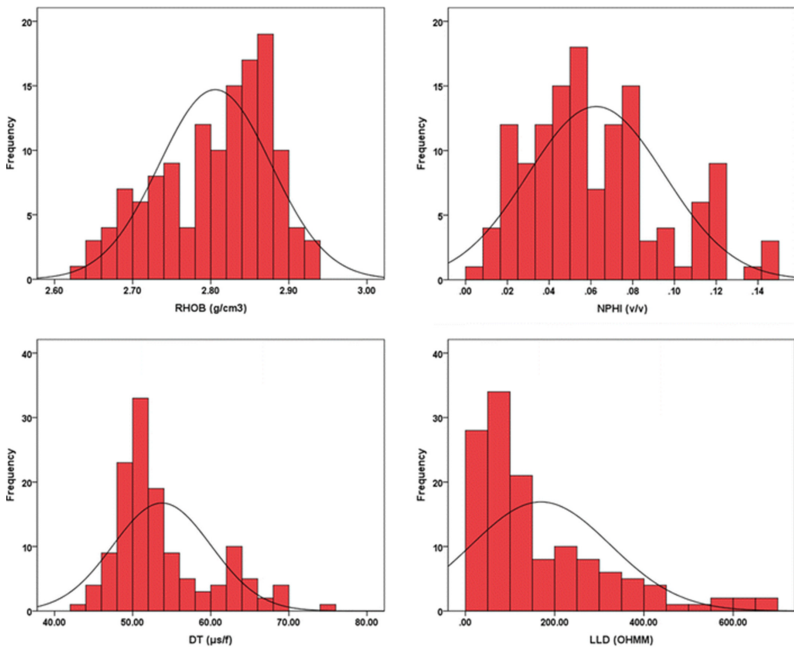

Fig. 3. Study time with students

5 Conclusion

Through the above design, we can see that this system and recommendation algorithm can provide more scientific and intelligent English learning recommendation for the majority of students. Through the design of this paper, we can see that in terms of

system construction, B/S + MVC + Dao technology architecture has good advantages in terms of system stability; in terms of intelligent recommendation, collaborative filtering algorithm is widely used. Test or trial run can verify the feasibility of the design. The above two technologies also provide reference for the application of other courses.

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