Digital Combination Prediction Model for Online English Teaching at the University of Iowa in the Context of Big Data

Ying Huang(✉)

Wuhan Institute of Design and Sciences, Hubei 430200, China

Abstract. For many years, effectiveness English teaching, a large number of educators and front-line College English teachers have been working hard, and have made achievements, but also exposed some problems. The ecological teaching mode based on cloud computing platform combines cloud computing and ecological teaching concepts, which can help teachers abandon the traditional "filling" teaching mode, support autonomous learning, achieve the balance of educational resources, and inject new vitality into the traditional audio-visual teaching methods.

Keywords: Cloud computing · College English · Ecology

1 Introduction

Traditional teaching methods are. On one hand, the classroom capacity is limited, on the othe hand, the utilization of teaching resources is seriously insufficient. These deficiencies are particularly obvious in the teaching practice and experiment. In recent years, cloud computing has developed rapidly because of its service-oriented resource delivery mode and dynamic and easy access to expand and integrate online resources. The combination of cloud computing and online teaching, especially practical teaching, will bring opportunities [1].

2 Design of Online Teaching Practice Platform

2.1 Object Model Design of Online Teaching Practice Platform

The object model of online teaching practice platform provides a flexible and extensible object model for online teaching practice scene, which is the basis of subsequent online teaching practice platform design. The design of the object model of online teaching practice should be based on two considerations. First, the model can achieve rapid response and complete efficient interaction between users and platforms. Second, the model can customize different component capabilities to meet the diverse needs of users.

M. A. Jan and F. Khan (Eds.): BigIoT-EDU 2021, LNICST 392, pp. 233–237, 2021.
https://doi.org/10.1007/978-3-030-87903-7_30

2.2 Recommended Function Design

The learning resource recommendation module will first split the professional training requirements, and cooperate with the user management module to obtain three key information of users, namely, school, major and grade. Through the three keywords to refine the user profile, through the text analysis of professional training requirements to extract the current user keyword list, the keyword list will also be used as the classification navigation of Learning Resource Recommendation page. Users can click different keywords to filter out the recommended content list under the corresponding keywords (Fig. 1).

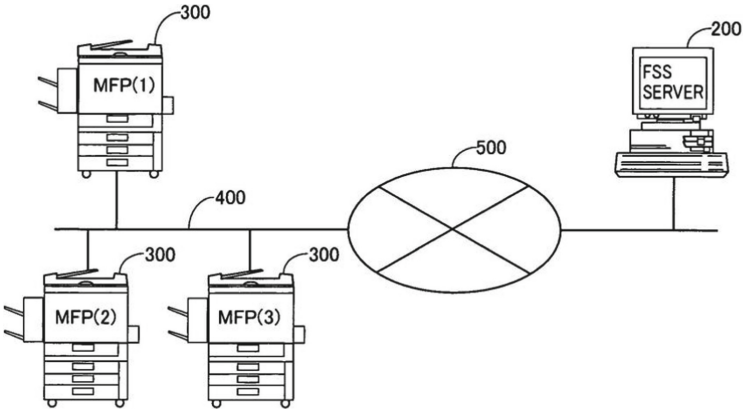

Fig. 1. Recommended function design

Keyword extraction here is based on the recommended content list. Text is similar to page rank algorithm. It is a graph based sorting algorithm [2].

Page links between web pages. Through a voting mechanism, links between web pages are interpreted as votes between pages to determine the importance of pages. Therefore, the implementation formula of page rank algorithm is as follows:

$$S(V_i) = (1-d) + d \times \sum_{j \in In(V_i)} \frac{1}{\left|Out(V_j)\right|} S(V_j) \tag{1}$$

coefficient, which is generally taken as 0.85. Since the page rank value of the web page is not zero, it is necessary to introduce the damping coefficient. The text rank algorithm takes words as nodes, establishes the connection by establishing co-occurrence relationship between word nodes, and introduces the concept of weight for edges. When the algorithm is used to extract keywords, we regard words as nodes, so there is no similarity between two words. Generally, the weight between words is set to 1 by default, so the algorithm is basically similar to page rank algorithm. The principle of text rank algorithm can be explained as that the importance of word I is determined by the sum of the weight of word I and the word J before word I and the weight between word J and other words. The implementation formula of text rank:

$$WS(V_i) = (1-d) + d \times \sum_{V_j \in In(V_i)} \frac{\omega_{ji}}{\sum_{V_k \in Out(V_j)} \omega_{jk}} WS \tag{2}$$

The text rank algorithm first splits the given text into whole sentences. After the split sentences are segmented, the stop words are filtered out. composed of the keyword candidates generated in the previous step. Then, the connection between nodes is constructed by co-occurrence relationship. The weight of each node is initialized by the formula to measure the importance in page rank, and the iterative calculation is continued until convergence. The weights of the converged nodes are arranged in descending order to get the T words with the highest weight and generate the initial candidate keyword pool. Finally, the words are marked in the original text, and added to the keyword sequence.

There is no significant difference between the experimental class and the control class. In the case of no significant difference in the success rate of serve, the students in the experimental class mastered the details of serve better than the students in the control class, and the deduction points in the technical score were significantly less than those in the control class: in the batting action, most students in the control group lacked the action of pressing wrist and pushing at the moment of batting, which made the ball spin; only with the help of the strength of the arm, the students in the control group did not have the action of pressing wrist and pushing at the moment of batting, The students in the experimental class mostly use the power brought by kicking and turning to close the abdomen, and then cooperate with the coordinated force of the whole body, so that the ball is easier to cross the net, but also increases the power and aggressiveness of the service.

Implementation of online teaching practice platform.

2.3 Overall Implementation Scheme of the Platform

The overall architecture scheme and functional module division of online teaching practice platform have been introduced in detail [3]. Based on the previous introduction, this section will first introduce the overall implementation scheme of online teaching practice platform. The platform code implementation structure is shown in Fig. 2.

2.4 The Concrete Level Division of Code Realization of Online Teaching Practice Platform

1) Web page presentation layer
Through the web page and the user direct interaction, based on JSP, and using strust2 tag to complete the page data loading and rendering. The data comes from the action layer, and at the same time, the data input by the user will be transmitted to the action layer for subsequent business logic processing.

2) Dao layer
It is mainly responsible for the specific operation of entity objects, which can also be understood as the direct data interaction with the underlying database, mainly including data search, addition, editing and deletion.

3) Model layer
It is mainly responsible for data persistence, mapping data entity and database data by mapping relationship, and realizing interaction with database through object-oriented

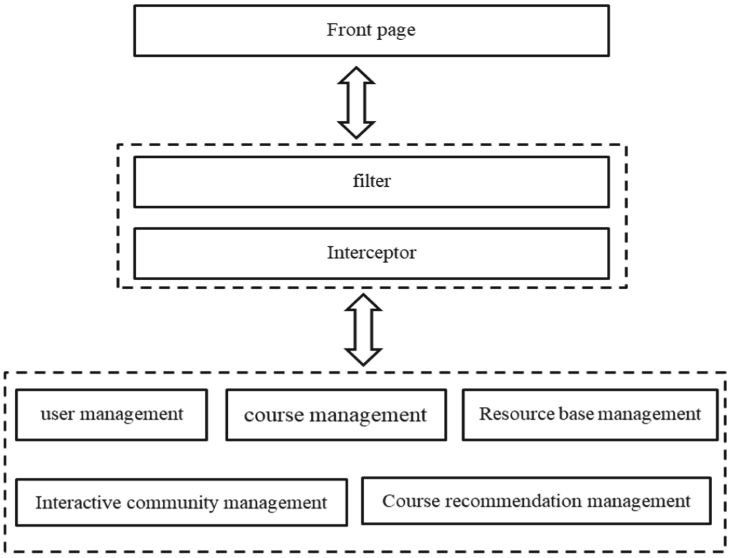

Fig. 2. Code implementation structure of online teaching practice platform

idea [4]. JPA is used as O/R mapping framework, and Hibernate is used to implement. The following sections will introduce the specific function module implementation.

The user management module provides three main functions: user login, user management and group management, including user login page, user management page (user list, new user, search user) and group management page (group list, group member list and group edit). This section will focus on these three main page implementations in detail.

As an important function module of online teaching practice platform, learning resource recommendation module selects the most suitable content for current users from the massive content through the aggregation of learning content, so as to realize module include three aspects: keyword extraction based on professional training requirements, content aggregation based on keywords and text similarity calculation of keyword content.

Professional training requirements come from the training programs of different majors. The are generally set according to the major and grade. Each major is required by different academic objectives, and there are differences in curriculum requirements in different grades of each major. The platform first carries on the text analysis to the university training plan, obtains the preliminary training plan keyword list. In the process of user registration, the platform will require users to fill in three information: school, major and grade, which can be modified at any time. Through these three key information platforms, the relevant content of professional training requirements will be positioned as the source of keyword extraction. Based on the textrank algorithm, the keyword list obtained from the keyword extraction of the training requirements will be used as the classification navigation of the Learning Resource Recommendation page. The navigation will change dynamically according to the modification of the school, major

and grade recommended content under different keywords by clicking the navigation keywords.

In the teaching experiment, because the students in the experimental class learned MOOCS before class, they can quickly establish the initial movement representation in the initial stage of each technology. Teachers only need to explain the movements a little, students can quickly understand the essentials of the movements and practice, no longer need teachers to repeat in the classroom, for students to save learning time in the classroom, leaving more time to carefully polish their own movement technology, at the same time, it also increases the opportunity and time for teachers to guide students one-to-one. In the classroom practice of students, correct each student's movement, and provide guidance for students to further improve their movement skills, and flexibly master various sports skills in volleyball. Compared with the students in the experimental class, the students in the control class need teachers to repeatedly emphasize the basic essentials of the action in the classroom. Teachers also need to spend more time explaining the details of the action and demonstrating. At the same time, students need to spend more time in the classroom to practice in order to grasp the action essentials of various techniques. Class time is limited. Facing all students, teachers spend enough time on explanation and demonstration, and the time left for students to practice independently is correspondingly reduced. Teachers can not take into account the learning situation of each student.

3 Conclusion

The ecological English teaching based on cloud computing interaction, and sharing. It can break the dependence of traditional E-learning on computer technology, break through the limitation of time and space, bring students a new learning experience, stimulate students' learning autonomy, and form a teaching ecological chain of "teaching, learning, evaluation and reform". College English teachers should always bear in mind that students are the most important ecological subject. College English teaching should not only pay attention to students' language knowledge input, but also regard students as an organic life body. Therefore, more their emotions and complete life education should be given to students, so that the ecological English teaching can develop in a positive and healthy way.

References

1. Dai, W.: Building a high-level teaching reform exchange platform to promote foreign language teacher education and development. Foreign Lang. (5) (2010)
2. Wang, D.: A study on the validity of college English assessment. Chin. Foreign Lang. (2) (2010)
3. Wang, C., et al.: Technical Manual of Waste Gas Treatment Engineering. Chemical Industry Press, Beijing (2012)
4. Zhang, Z.: Photocatalytic oxidation/absorption process for treatment of malodorous waste gas from waste incineration power plant. Energy Environ. Protection (5) (2012)