Design of Intelligent Cloud Computing Platform for English Writing Assisted Teaching System

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Abstract. In order to solve the problems caused by the heavy load of the traditional embedded software development teaching platform server, such as slow response speed and poor experience of users, an intelligent English writing auxiliary teaching system based on the cloud service platform was proposed [1]. Based on the cloud platform, the system manages the computer resources scattered in the server and the client in a unified way, so as to improve the efficiency of resource retrieval. In addition, based on the fuzzy logic model, the system can evaluate and evaluate students' knowledge and learning outcomes according to their cognitive and knowledge acquisition preferences [2]. The real analysis results show that the proposed system has good performance and can play a positive role in improving students' performance. Simulation results further verify the effectiveness of the proposed method [3].

Keywords: English writing · Intelligent assisted instruction · cloud service platform; Fuzzy logic

1 Description of the Overall System Architecture and Basic Knowledge

1.1 Overall System Architecture

With the rapid development of computer network and multimedia technology, digital teaching and networking in English teaching will be the main teaching methods in the future. At the same time, a large number of teaching resources on the cloud service platform can also be used to carry out English teaching online, so as to achieve the purpose of English writing teaching. Cloud computing platform [4, 5] provides users with a convenient way to acquire knowledge and information. English writing teaching resources are scattered on the Internet. The cloud service platform is used to realize the knowledge sharing of online encyclopedia and online literature, and the literature knowledge is distributed on the Internet based on the Web server. The intelligent design of English writing assisted teaching system is to improve students' initiative and interest in English writing and promote the sharing of information resources[6].

Therefore, many scholars have carried out a lot of research in intelligent assisted teaching, and achieved good results. Gu Haozhang et al. discussed the advantages and
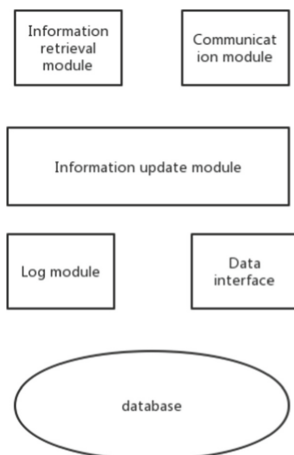
Fig. 1. Architecture of intelligent English writing teaching system

composition of intelligent assisted teaching system by taking intelligent self-learning system for students as an example. Aiming at the problems of poor compatibility, weak load capacity and long time, Zhang Tingguan and other 7 people proposed and designed a set of physics multimedia assisted teaching system based on concept network. Wang Xiaoru [8] introduced a personalized recommendation system for English assisted instruction, and designed the function and architecture of the system. Jin Hongdi et al. [9] analyzed the design requirements of English teaching system, combined it with CAI technology, and developed a set of intelligent auxiliary foreign language teaching system based on arent technology. However, the traditional embedded system has the overlapping situation in teaching content, which is easy to cause the server side load, thus reducing the user's response ability, reduce the user's experience and satisfaction. Figure 1 shows the structure of the English writing teaching system in the proposed basic cloud service platform, in which the user is connected to the cloud-based P2p = application system through the LAN client interface (or browser). The system includes cluster server and end-to-end English writing auxiliary teaching resources.

1.2   Intelligent Cloud Service Platform

In the design of the cloud service platform of the English writing assistance teaching system, shielding the bottom layer of the physical network, displaying the specific implementation details, monitoring and management of English writing teaching resources and the interaction between the databases of English writing teaching resources are adopted to enhance the ability of dynamic switching between different virtual databases, so as to achieve continuous network services.
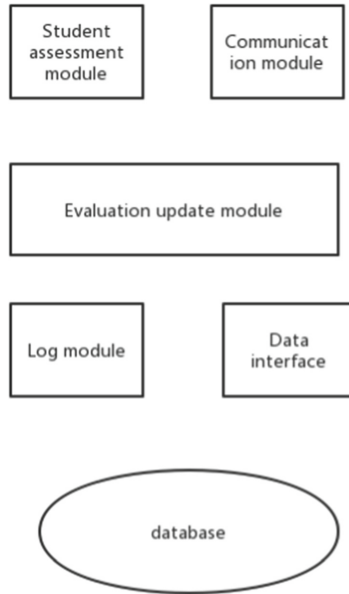
Fig. 2. Architecture of intelligent English writing teaching system

2   Design of System Retrieval Algorithm

Based on the overall design of the above architecture, this paper studies the resource search algorithm in the English writing teaching system, so as to achieve the optimization of the English writing teaching resource library. This paper presents a feature fusion analysis algorithm based on fuzzy clustering. Firstly, an English writing teaching resource database based on node distribution structure is established, and the spatial data is published in the English writing teaching resource database. By extracting data from any node in the network and analyzing its semantic features, data fusion technology and related semantic feature extraction technology are used to analyze the data in the network and search the database. Then, in the English writing teaching resource base, the retrieval conditions are encoded into the database through the retrieval interface, and the information is processed and fed back according to the retrieval conditions. The information exchange between the client and the server is realized by using the Internet, the spatial data is released to the English writing teaching resource base, and the spatial data is queried and retrieved. Finally, the retrieval results of the database are displayed on the client side. Based on the storage structure model of English writing teaching resource database, a retrieval data flow model based on database is established. In English writing teaching, scalar time series is used to express a set of data flow model.

$$X = \begin{bmatrix} x_1, & x_2 \cdots x_j \end{bmatrix}^{\mathrm{T}} \tag{1}$$

Scalar time series is processed by vector quantization of the attribute set of English writing teaching resource library. The vector quantization feature decomposition

function of retrieving semantic feature attribute set is

$$f(k) = \begin{cases} f(k-1) - \frac{1}{n} \\ 1,\ k = n \end{cases} \tag{2}$$

wherein, k represents the feature fusion center of distributed English writing teaching resource library. Through data matching detection, the envelope amplitude of information flow of retrieval data of English writing teaching resource database is obtained.

3   Evaluation of Learning Effect

This paper mainly discusses the learning effect evaluation algorithm of English writing teaching system based on fuzzy logic, so that teachers and students can better understand the English writing ability and teaching level, to achieve targeted ability training and improve writing performance.

3.1   Fuzzy Rules

Firstly, the membership function is designed to identify students' emotional expression. There are six main affective language variables representing students' affective attributes: motivation (u), attitude (u)., introversion (u. Outgoing (u., anxiety (u) and self-esteem (u.. Each emotion variable is fuzzy and divided into 5 levels. The emotion variable set A(x) of the ith student is described as follows.

(3)Where VL means very low. L means low. M means medium, H means high and VH means very high. Similarly, students' grades are blurred and the academic grades of the I-th student are used as C. (x) denotes, then there is.

(4)Where U means unsatisfactory, F means low, G means good, VG means good, and E means very good.

Emotion variable is constructed by Gaussian membership function (4). Furthermore, a rule base based on emotional factors is established to infer student achievement. There are five grades in the system: unsatisfactory, fair, good, very good and excellent.

3.2   Fuzzy Logic System

Fuzzy Language System (FLS) can reflect students' preference in cognition and knowledge acquisition, and evaluate their knowledge and learning results. The box diagram of the Fuzzy logical system is shown in Fig. 2.

The system is composed of fuzzer, rule base, reasoner and unfuzzer. It can be based on digital data or rules given by experts. After the rule is established, you can think of FLS as a mapping from crisp to crisp output.

On this basis, a fuzzy affective reasoning system based on fuzzy logic is presented. This system adopts IF-then rules, fuzzy input and other methods, and adopts the predetermined rule base to simulate the relevant theories in English teaching. With a given rule and input variable, the output of the fuzzy set can be obtained. The unfuzziness mechanism converts fuzzy values into student scores. As shown in Fig. 3, Fig. 4:
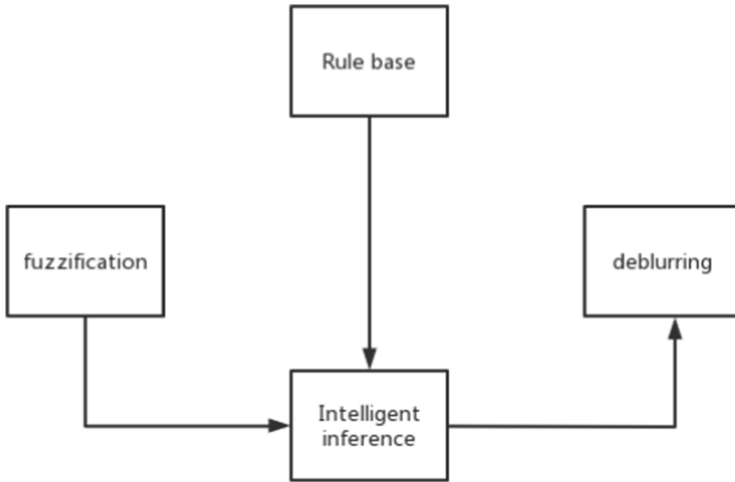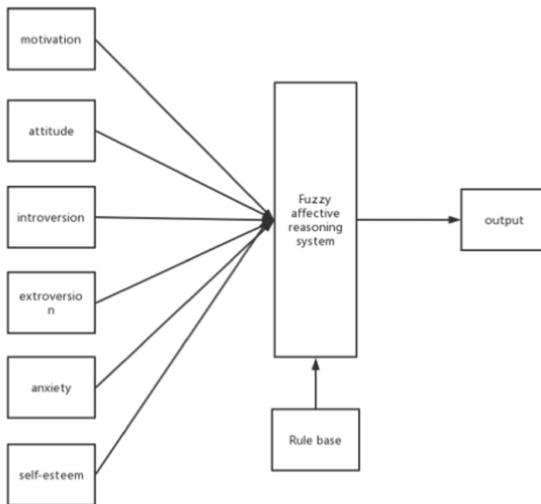
Fig. 3. Fuzzy logic system

Fig. 4. Fuzzy affective reasoning system

The reasoning mechanism used in this study is Mamdani maximum-minimum reasoning method. The method is usually used to simulate human expert knowledge, where the smallest operator acts as a connection in antecedents (rules and implication functions), the largest operator acts as a part of the after factor, and finally is aggregated to the output fuzzy set.

Table 1. System simulation parameters

Parameter	Value
Numberofteachingresources	1035
Inputstringdigit	512
Outputstringdigit	128
Semanticfeaturebandwidth	1000
Simulationtime	100
Numberofsimulations	1000

4   Simulation and Analysis

In order to verify the application performance of the English writing teaching system designed in this paper, simulation experiments are carried out in the embedded Linux kernel development environment.

4.1   Simulation Environment

Hardware: Windows operating system with i3–3220 CPU and 4G memory. The programming environment is VS.NET and Python, and the FrameBuffe graphics library serves as the underlying organization and graphical interface. After installation, Qt/embedded compiler is generated for ARM to develop the environment algorithm and loaded on the intelligent cloud service platform.

4.2   System Performance Test

According to the above simulation environment and the parameter Settings in Table 1, the retrieval performance of the English writing aid teaching system is tested.

5   Conclusion

On this basis, this paper designs a set of English writing teaching system based on cloud computing platform, which can grasp the required knowledge according to the characteristics of different students, and create their own personalized learning environment. The cloud P2P model is used for information fusion of English writing teaching resources. On the database client of English writing teaching resources, the spatial data is extracted from any node in the network, and the semantic characteristics of the original data are analyzed, and the information of English writing auxiliary teaching resources is displayed on the client. This article assumes that all data in the knowledge base is complete without any errors. In addition, due to the limitation of the test environment, the data used in the test are obtained from the simulation data. These defects affect the application of this system to some extent. In the future, the learning performance of the system can be further improved by clearing the data of the knowledge base.

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