A Study of Online English Language Guiding Platform Based on Pattern Recognition and Cloud Computing Simulation

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Abstract — In order to adapt to the rapid development of the network society, schools need to effectively improve college students' comprehensive ability of English application and rapidly improve students' listening and speaking skills. The campus teaching platform based on network regards enhancing students' English learning initiative as the core, enhancing students' autonomous English learning interest and ability as the standard, in order to improve the efficiency of students' English learning, and to better serve the purpose of teaching. In this paper, we briefly describe the main problems that need to be solved, and outline the overall situation of the system, and analyze the functional requirements of the system. On the basis of requirement analysis, and according to constructivism theory, we analyze the requirement data of English learners, and fully apply computer network technology and multimedia technology to establish an open network English teaching platform. The English teaching platform regards the administrator as the main data manager, and teachers mainly go through the system to obtain student learning data. Students can obtain rich video, image, voice, text and other resources through the system. Students can always get help from teachers and classmates, while using the Internet review to consolidate classroom knowledge through computer technology to monitor the learning of students, which has played a role in promoting learning effectiveness and efficiency.

Keywords — English Language Teaching; Campus Network; Teaching Platform; Pattern Recognition; Cloud Computing

I. INTRODUCTION

The influence of digitalization, network and information is huge in the society. How to use the network to study better has become an urgent problem for every university. There is no doubt that the biggest feature of the twenty-first Century is showing the characteristics of the network technology era, the network has been more widely used in Colleges and universities, and colleges and universities have begun to appear campus networks. But the use of network teaching development is still relatively limited. The continuous improvement of network technology provides a new set of ideas for college education and has become a new means and method of teaching [1-5].

With the rising voice of quality education in China, multimedia teaching methods cannot meet the needs of teachers and students, therefore, online teaching has become a hot spot. As a necessary computer network in today's colleges and universities, campus network provides a large number of resources to students and teachers. At present, many colleges and universities campus network have made great progress from the aspects of scale, resource sharing, personnel support, which provides a very favorable network security platform.

English is the most widely used international language at present. However, there are some problems in the motivation or concept of College English learning. These problems also plague most contemporary college students. Therefore, integrating autonomous learning ability and improving learning strategies is an effective way to improve students' English learning ability.

Adding new elements to English teaching can provide more information for teachers and students, and create a better learning platform for students which provide better resources. Network learning platform is also a hot spot of modern education development. However, the development of English online teaching in our country is not very enough, so there are some problems.

China's Internet technology has been rapid developed in recent years, but colleges and universities' Internet technology and internet education allocation are not balanced. The English teaching platform under the network environment is not only the software but also a teaching means and teaching tool. So the design of the platform should consider from teaching itself.

Constructivism theory holds that learners should not only accept knowledge passively, but also construct knowledge actively. Constructivism advocates learners as the center, in other words, not only emphasize the cognitive role of students, but also not ignore the guiding role of teachers.

The rapid development of network technology shortens the space-time distance between countries all over the world and promotes the exchange and cooperation among people of all countries. At the same time, English has become a common language on the network. Therefore, in the new century, English learning has become an important factor in people's lives. Building an effective learning environment is important. The development of the network has provided the massive resources and the new learning form for the learners. Multimedia network technology provides technical support for exploring new teaching models and promoting autonomous learning. How to make the network technology more convenient and effective to promote language learning has become the focus of language research. In order to modernize the teaching methods of English majors, some scholars try to use network technology to develop
Pattern recognition technology has great practical significance in many aspects such as social life and scientific research, which has been widely used in many fields. Pattern recognition is a basic skill of human beings. In daily life, people often do "pattern recognition", for example, people can recognize the surrounding houses, streets, etc. With the appearance of computer and the emergence of artificial intelligence, pattern recognition has become a new research topic.

When people see something or phenomenon, people first collect all the information of the object or phenomenon, and then match their behavior characteristics with the relevant information, if an identical or similar match is found, people can identify the object or the phenomenon. Therefore, the information about an object or phenomenon, such as spatial information, temporal information, etc., constitutes the pattern of the object or phenomenon.

Humans have a strong pattern recognition ability. People can through the visual information to identify text, pictures and the surrounding environment, and through the auditory information to identify and understand the language. Pattern recognition is a basic cognitive ability or intelligence of human beings, and it is an important part of human intelligence. In real life, almost everyone will inadvertently complete the process of pattern recognition easily. However, if you want the machine to do the same thing, I'm afraid not so easy.

To make the machine have human pattern recognition ability, people first need to study the human recognition ability. Therefore, pattern recognition is a mathematical model to study the ability of human recognition, with the help of computer technology. Pattern recognition is to study how to let the machine observe the surrounding environment, learning to identify the mode of interest from the background, and make an accurate and reasonable judgment of the genus of the models. Recognition behavior can be divided into two categories: identifying specific things and identifying abstract things.

Recognition of specific things involves the identification of spatio-temporal information. Spatial information includes fingerprints, weather maps and photographs, and time information includes waveforms, signals, etc. The identification of abstract things involves the identification of a problem solution. The identification of abstract things is to identify those phenomena that do not exist in material form, which belongs to the category of concept recognition research.

Pattern recognition is mainly to identify specific things, such as voice waveform, seismic waves, ECG, EEG, pictures, text, symbols, three-dimensional objects and scenery, and so on.

A complete pattern recognition system consists of 4 parts: data acquisition, data processing, feature extraction and selection, classification and decision making.

A neural network is an information processing system, which consists of a large number of simple data processing units that are connected with each other and work together to achieve large-scale parallel distributed processing. The design and function of neural networks is to mimic the biological functions of the brain and nervous system. Neural networks have the advantages of adaptive learning, self-organization and fault tolerance.
Because of these prominent features of neural networks, neural networks can be used for pattern recognition. Some of the best neural network models are backward propagation networks, high order networks, delay and periodic networks.

B. Pattern recognition method

Template matching is one of the earliest and simplest pattern recognition methods. Matching is a kind of classification operation of pattern recognition, which mainly judges the similarity between two entities (such as points, curves, shapes, etc.). To conduct template matching, we first need to store some known templates, and then consider all possible changes, the template will be compared with known template recognition, so as to draw a similarity measure between the two parts. Known templates are generally obtained by training process. Template matching method is widely used in character recognition, face recognition and other fields.

Since 1960s, statistical pattern recognition methods have been developed rapidly. A series of statistical pattern recognition theories and methods have been published before and after 1970s. So far, the theoretical system of statistical pattern recognition has been quite perfect. Statistical pattern recognition is also called decision theory recognition method. Statistical pattern recognition technology is very useful for solving classification problems. In statistical pattern recognition, Bias decision rule solves the design problem of optimal classifier theoretically, but it must solve the more difficult problem of probability density estimation firstly.

In 1962, R. Narasimahan proposed syntactic pattern recognition method based on primitive relation. Syntactic pattern recognition is mainly based on the structural dependency of features. Image analysis often involves image description rather than classification. A description of the information including the image primitives and the relationship between these information. Syntactic pattern recognition method uses syntactic, syntactic analysis and automatic inference machine theory to describe and analyze the structure of a pattern. The syntactic processing of error information and uncertain information is the current research hotspot. Statistical pattern recognition and syntactic pattern recognition are two main research directions in pattern recognition field [6-15].

In 1965, L. A. Zadeh proposed fuzzy sets. Since then, great progress has been made in the theory and application of fuzzy information processing. Fuzzy pattern recognition is a pattern recognition method based on fuzzy mathematics. In the real world, there are many things or phenomena which are not clear and difficult to describe precisely, while fuzzy mathematics can study and deal with such things or phenomena with fuzziness. The appearance of fuzzy mathematics enables people to simulate the activities of human nervous system and describe the degree of model belonging to a certain kind. Fuzzy clustering analysis is an important branch of unsupervised pattern recognition. In fuzzy pattern recognition, the selection of membership function is the key factor.

In 1950, a simplified mathematical model for simulating human brain recognition is proposed by F. Rosenblatt. He initially realized the training of the recognition system through the individual samples of the given category, so that the system has the ability to correctly classify other unknown categories after learning. In 1980s, J. Hopfield deeply revealed the associative memory and computing ability of artificial neural networks, and presented a new way for pattern recognition technology. In a few years, remarkable results have been achieved in many aspects, thus the artificial neural network pattern recognition method has been formed. Most neural networks have some training rules, such as adjusting connection weights based on existing models. In other words, the neural network directly learns from examples, and obtains the structural features.

Table 1 briefly introduces several pattern recognition methods.

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With the rapid development of computer software and hardware technology, more and more attention has been paid to pattern recognition. Pattern recognition technology is becoming perfect, and it has been applied successfully in more and more fields, such as data mining, document classification, financial forecast, organization and retrieval of multimedia database and so on. Pattern recognition is not only a research field with great scientific significance, but also a key technology in the era of network digitalization.

Pattern recognition is a rapidly developing subject, so it is difficult to make a comprehensive and detailed summary of the latest research in this field. Pattern recognition has developed many effective methods to solve different problems since the 20s of last century, but it has not developed into a unified theory. Therefore, what people need to do now is to put forward a new pattern recognition method.
C. Syntactic Pattern Recognition

Syntactic pattern recognition is also called structural pattern recognition. In many cases, some numerical features can not be adequately described for more complex objects. Syntactic recognition technology decomposes objects into several basic units, which are called primitives. Using these primitives and their structural relationships to describe objects, primitives and the structural relationships of these primitives can be represented by a string or a graph. Formal language theory is used to analyze syntax and determine its category according to whether it conforms to a certain kind of grammar.

D. Recognition based on Maximum Membership Principle

In this section, we introduce membership degree of normal fuzzy sets

For a normal fuzzy variable $x$, the membership degree is denoted as follows:

$$A(x) = e^{-\frac{(x-a)^2}{b^2}}$$

(1)

Where $a$ is mean value, $b^2$ is variance. Therefore, we have:

$$A(x) = \begin{cases} 1 - \frac{x-a}{b}, & x - a < b \\ 0, & x - a > b \\ \end{cases}$$

(2)

$$A_y(x) = \begin{cases} 1, & a_y^{(1)} \leq x \leq a_y^{(2)} \\ \frac{(x-a_y^{(1)})^2}{b_y}, & a_y^{(1)} < x < a_y^{(2)} \\ 0, & a_y^{(2)} + b_y < x \\ \end{cases}$$

(3)

E. Classification according to the principle of selection

Assume we have $n$ types $(A_1, A_2, ..., A_n)$ and $m$ indexes, the corresponding parameters are denoted as follows:

$$a_i^{(1)}, a_i^{(2)}, b_j (i = 1, 2, ..., n; j = 1, 2, ..., m)$$

(4)

Where $a_i^{(1)} = \min(x_i), a_i^{(2)} = \max(x_i), b_y = 2\sigma_y^2$.

Therefore, the closeness degree of each type is:

$$(A_y, B) = \begin{cases} 0, & a_y^{(1)} \leq a_y^{(0)} - (b_j - b_y) \\ 1 - \frac{1}{2} \left( \frac{a_y^{(0)} - a_y^{(1)}}{b_j + b_y} \right)^2, & a_y^{(0)} - (b_j - b_y) < a_y^{(1)} < a_y^{(0)} \\ 1, & a_y^{(1)} \leq a_y^{(2)} \\ 0, & a_y^{(2)} + (b_j + b_y) \leq a_y^{(0)} \\ \end{cases}$$

(5)

III. CLOUD COMPUTING

Cloud computing, which is a novel computing model, is developed based on network computing. The development history of cloud computing and its application situation are introduced in this section. Take Google’s cloud computing technology for example, we analyze the basic techniques of cloud computing, such as file system, data management technology, programming model and task scheduling model and so on.

With the development of computer and network technology, the growth of computer performance will face the bottleneck, and the development of network technology makes it possible to share some computing resources on the global scale. Therefore, we should make use of a large amount of network resources. Grid computing has been dedicated to solve this problem since it was put forward. In order to call grid resources, users must convert their programs into distributed ones, and programmers must understand the internal structure of the grid. These obstacles lead to the difficulty of ordinary users to use grid resources.

In fact, cloud computing is not a new concept. Although the proposed time is not long, cloud computing involves grid computing, utility computing, cluster technology, distributed system technology and some other mature technologies. So from another point of view, cloud computing can also be regarded as an upgrade of these technologies. With the development of related technologies, the commercial application of cloud computing has become a reality.

In this paper, based on existing research at home and abroad, we discuss the main features of cloud computing technology and new applications based on cloud computing technology.

A. Development Background

The sudden rise of cloud computing and transformation of network applications are inseparable. The difficulties of traditional computing models are embodied in the following 4 aspects.

Small and medium-sized organizations lack of the start-up funds needed to build large infrastructure, and even large organizations, it is difficult for them to raise enough funds in the short term. So the ability to start fast is crucial.
High cost of development from the bottom and even if the ultimate need is only the top layer of small services, service providers must start from the hardware to build up, with too much development time and high cost of personnel input.

When services are formed on-line, service providers need to be responsible for maintenance rather than focus on new business development.

Lack of scalable service support platform, which cannot meet the changes in demand, traditional computing models need to be modified, however, with the help of the cloud computing platform, users can quickly build up a system, and hand over infrastructure tasks to professional bodies. At the same time, cloud platform scalability can meet the needs of service business changes, and reduce service costs. Some of these views emphasize the provision of service resources, some emphasize infrastructure virtualization, and some emphasize the concept of network services. They are actually different interpretations of the concept of cloud computing.

The concepts associated with cloud computing are grid computing, cluster technology, supercomputers, which are concepts that differ from each other and have their inherent connections. Cloud computing provides users with computing resources in a service-oriented manner, and its platform may have a larger scale than the grid, traditional clusters. Cloud computing platform provides computing performance is likely higher than supercomputers. On the other hand, the services provided by grid, supercomputing, cluster and other technologies are often used for specific applications.

Cloud computing is sort of the application of services through the Internet for publishing, as well as the realization of these services involved in hardware and system software.

Cloud computing system consists of a large number of commercial computers cluster to provide users with data processing services. As the number of computers increases, the probability of error increases greatly. Cloud computing system can automatically detect the failure node, and exclude the failure node, which does not affect the normal operation of the system. Cloud computing system provides high-level programming model. Users through simple learning write their own cloud computing program.

To ensure high availability, high reliability and economy, cloud computing uses distributed storage to store data. Cloud computing system needs to meet the needs of a large number of users at the same time, providing services for a large number of users in parallel. Therefore, cloud computing data storage technology must have high transmission rate characteristics.

BIGTABLE is a distributed storage system designed to manage structured data. These data can be extended to a very large scale. BIGTABLE optimizes the data read operation, using column storage to improve data read efficiency.

To ensure the high scalability of the data structure, BIGTABLE using three levels of hierarchical manner to store location information, shown in Fig. 5.
Cloud computing system uses Ethernet and other fast network to connect several clusters together. Users get the data processing services provided by the cloud computing system through the Internet. Grid system is a resource sharing model, resource providers can also become resource consumers. Grid focuses on how to combine the dispersed resources into dynamic virtual organization. Cloud computing has broad prospects for development, and the relevant key technologies are also rapidly developing. To ensure the normal operation of the cloud computing system, an efficient cooling system must be used to keep the data center within acceptable temperature range. Finally, although there are many problems cloud computing needs to be resolved, but cloud computing will be greatly developed.

Cluster computing connects a large number of independent computers through high-speed LANs to provide high performance computing capabilities. Grid computing integrates idle resources of a large number of heterogeneous computers to form virtual organizations in order to solve large-scale computing problems. As a bridge between information technology and business services, service computing studies how to use information technology to model, operate and manage business services.

Typically, cloud computing uses computer clusters to form data centers and deliver them to users in the form of services, allowing users to purchase cloud computing resources. But cloud computing and grid computing and other traditional distributed computing also have obvious differences. First, cloud computing is flexible, that is, cloud computing can dynamically allocate resources based on workload size. Cloud computing emphasizes the sharing of large pool of resources, through sharing to improve resource reuse rate, and reduce the use of economies of scale to run into. Finally, cloud computing needs to consider economic costs, so hardware devices, software platform design are no longer blindly pursue high-performance, but to consider the cost, availability, reliability and other factors.

Cloud computing core services can usually be divided into 3 layers: IaaS(infrastructure as a service), PaaS(platform as a service), SaaS(software as a service). IaaS provides hardware infrastructure deployment services of physical or virtual computing, storage and network resources. PaaS is a cloud computing application running environment that provides application deployment and management services. SaaS is developed as application application based on cloud computing platform. The goal of cloud computing is to provide high reliable, high availability, scalable personalized services in such a low-cost way.

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C. Opportunities and challenges of cloud computing

Cloud computing has a wide range of research, and closely integrated with practical production applications. Cloud computing and mobile Internet are closely linked. The development of mobile Internet enriches the outer edge of cloud computing. Due to the particularity of mobile devices in hardware configuration and access, there are many problems worthy studying. Although customized clients for mobile devices can reduce the resource consumption of mobile devices, the cost of mobile devices is relatively high. Therefore, it is necessary to design interactive, small computation and universal access interface for cloud computing.

In the field of scientific computing, we hope to solve scientific problems in an economic way. Cloud computing can provide low-cost computing power and storage capacity for scientific computing. Cloud computing virtualization technology adds a layer of abstraction between physical devices and application requirements, the original application of the underlying physical system must make corresponding adjustment to the deployment in cloud computing environment based on virtualization, which reduces the transparency and controllability of the application system of the underlying system. By summarizing the application and research achievements in the field in recent years, the cloud computing architecture is divided into 3 levels. We review the current research status of key technologies in the system structure, including design and management, Data Center Virtualization, data storage and processing, resource management and scheduling, quality of service and security and privacy protection.
IV. CONCLUSION

Network publishing and teaching are the biggest characteristics of network education systems. We make full use of computer multimedia technology and network technology for teachers to create a distributed, open, interactive English teaching environment. In this environment, teachers can provide a rich text, voice, graphics, video and other media resources for students, in order to mobilize all sensory organs and to learn which can improve students' memory, improve teaching efficiency. Students can make full use of open platform, according to their own development needs to actively build their own personalized knowledge system and the popularization of network teaching platform will make English teaching more vivid and practical, so as to improve the comprehensive application ability of College students.

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