Web Based College Forestry English Resource Construction and Teaching Reform Based on Deep Learning

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Abstract:

Big data and cloud computing is a new computing mode, which has a great role in promoting the education and teaching of forestry majors in colleges and universities. It can realize the efficient integration of all kinds of resources through network information sharing. Under the network environment, students' autonomous learning has become a widespread learning mode and basic requirement of forestry English education. This paper uses deep learning agent to build an English autonomous learning platform to cultivate students' personalized and collaborative ability. This paper expounds the characteristics of Web-based English autonomous learning, and discusses in detail the construction process of the model under the framework of multi-agent driven deep learning. This paper puts forward the advantages and evaluation methods of computer network autonomous learning college English course, which provides theoretical guarantee and experimental basis for the effective mechanism of network English autonomous learning platform. Experiments show that the platform can improve students' learning efficiency and comprehensive practical ability, and the proposed scheme has strong research value.

Keywords: *Forestry English, Big data, network information sharing, deep learning, English autonomous learning platform.*

I. INTRODUCTION

With the rapid development of cloud computing, Internet of things and social network, the types and scale of big data are growing rapidly at an unprecedented speed. From simple object processing to general basic resources, how to better use and manage these data is the key topic of concern [1]. The scale and architecture of big data will bring challenges to users' storage, management and data analysis. The integration and development of artificial intelligence

technology, information network technology and education technology has become an important foundation to promote the reform of science and technology and education industry. Flipped classroom, micro class, MOOC and other new English teaching modes put forward higher requirements for students' English autonomous learning ability. Mining and using big data provides a new technical support for English autonomous learning. In the face of big data, with the help of the Internet, learners' learning is no longer a single classroom learning mode, but the integration of multiple learning modes, including the integration of online learning and offline learning, the integration of autonomous learning and collective teaching, and the integration of teachers' teaching and independent inquiry [2-4]. Learners can determine their own learning content and learning process through the rich multimedia learning materials, personal learning records, course progress information and teacher-student interaction information provided by the online learning system, so as to truly teach students in accordance with their aptitude and personalized learning.

II. BIG DATA PROVIDES ABUNDANT RESOURCES FOR ENGLISH AUTONOMOUS LEARNING

The concept of "big data" was first put forward by Michael Cox and David Ellsworth, researchers of NASA in the United States, aiming at the difficulty of processing huge data stored and generated by supercomputers and local area networks in 1990s [5]. With the development of cloud computing and Internet of Things, the amount of data is increasing rapidly, which has been described as "massive" [6]. However, there is no uniform definition of big data at present, and McKinsey, a famous scholar, defines it as "a data set whose contents cannot be captured, managed and processed by traditional database software tools within a certain period of time" [7]. People get new knowledge and create new value by analyzing and integrating these massive data. Big data is characterized by huge amount of data, various categories (structured and semi-structured), low value density and fast processing speed through cloud platform [8]. It is precisely because big data can produce great social, economic and scientific research value that it has attracted great attention from various fields. In 2012, the United Nations published a white paper on big data, Big Data for Development: Challenges & Opportunities, which mentioned that the emergence of big data will affect all areas of society, as well as education [9-10]. Figure 1 is based on the statistical analysis of different data, in which universities, research institutions or individuals occupy a larger proportion.
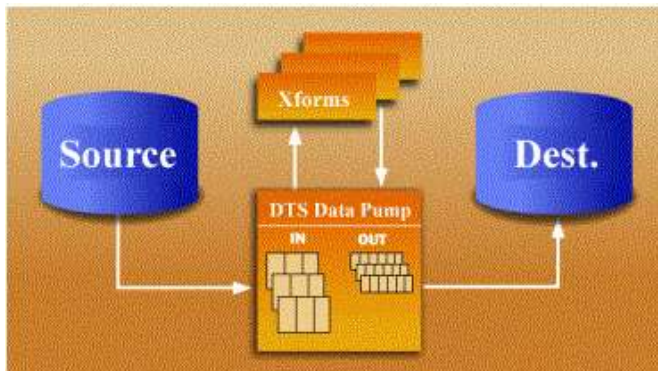
Fig 1: Netease "Digital Reading" Data Source

The era of big data has brought opportunities and challenges to traditional education. In October 2012, the U.S. Department of Education issued a report entitled "improving teaching and learning through educational data mining and learning analysis technology: problem brief". This has become a guiding document on how to use big data in education. At the same time, the world-famous universities have also started the research plan of education big data. At present, in the field of education, education big data is changing the way we teach and learn. Through network online management platform and teaching management platform, learning channels are increased and learning efficiency is improved.

III. THE CONCEPT OF COMPUTER NETWORK AUTONOMOUS ENGLISH LEARNING

3.1 Autonomous learning comes from the theory of constructivist cognitive psychology and humanistic psychology.

Autonomous learning should embody: initiative, interaction, initiative, individual difference and creativity. It is a kind of individualized embodiment, and it is the idea of constructivism that learners create personal meaning on the basis of existing knowledge. Autonomous learning is first of all the learners' active learning, and then the learners can complete their own work goals. No matter what kind of conditions, the environment is also important. Compared with the traditional learning environment, in the network autonomous learning environment, the teaching mode has undergone fundamental changes, especially the application of modern information technology in the network environment. It provides learners with an open, interactive, intelligent and real-time learning environment. Learners can learn the required knowledge no matter when and where they are. In particular, big data teaching information system provides learners with rich, personalized and customized English service information. Learners can

exchange information and learning experience through social networks, ask students and teachers for difficult questions, and teachers can conduct dynamic real-time guidance, feedback and communication online. Learning English through the Internet is helpful for learners to enhance their interest in English learning and develop their learning potential. Learners can choose difficult content according to their own English foundation and individual differences in learning methods.

3.2 The mode of self-study on the Internet

The essence of autonomous learning is to turn the mode of teaching centered to learning as the center, and give full play to the enthusiasm and subjective initiative of the learning subject. The traditional teaching mode is based on teachers, and the teaching activities completed by teachers in the classroom cannot fundamentally solve the needs of learners' autonomous learning. However, through the teaching video, interactive courseware and related teaching materials, computer-aided teaching is to take part of the teaching tasks by the function of computer, that is, to use modern teaching methods to improve the teaching effect. The comparison between self-learning and traditional learning mode is shown in Table 1.

TABLE I. Comparison between traditional teaching and Online Autonomous Learning

TRADITIONAL TEACHING	NETWORK AUTONOMOUS LEARNING
Teacher's role as "actor" teacher	Acting teachers
Students as passive receivers	Active learners
Teaching method blackboard + teacher + Classroom Activity	Network multimedia Autonomous Learning + teachers + Classroom Activities
Teaching form explanation + practice + Multimedia Courseware	Classroom + online and offline learning + student teacher collaboration
Teaching evaluation test + question + homework	Formative assessment
Teachers' quality, basic teaching skills and teaching design	Network information technology + comprehensive knowledge + curriculum integration ability
The ultimate goal is to gain knowledge	Get knowledge + learn to apply knowledge

Network autonomous learning helps to improve learners' subjective initiative. The Ministry

of education of the people's Republic of China has issued the programmatic document of the ten year development plan of educational informatization (2011-2020), which clearly points out that educational informatization leads the modernization of education, gives full play to the advantages of computer technology and network technology, improves the teaching mode in different degrees, and promotes the development of education. At the same time, "College English teaching requirements" also points out that colleges and universities should make full use of modern teaching means such as information technology, improve the existing single teaching mode with teachers as the main body, and develop towards personalized and autonomous learning.

3.3 On the problems of Online Autonomous Learning

Under the network multimedia environment, English autonomous learning helps learners to exchange information, promote the active construction of knowledge, and make learners' interest and potential of active autonomous learning play more effectively. However, the teaching management departments of some colleges and universities do not pay enough attention and investment, English teaching materials are not perfect, and learners are lack of initiative, exploration and creativity. The characteristics of network teaching are the adoption of modern distance teaching mode: 1) students are the main body, and all teaching resources and teaching strategies are designed to meet the learning needs of students; ② Teachers are the organizers of teaching resources, teaching contents and teaching activities; ③ teachers and learners negotiate, discuss, learn and progress together in teaching activities, and teachers also need to supplement new knowledge to solve new problems. Integrate the existing network education and teaching resources, give full play to the advantages of network resources, establish and improve the information interaction platform, and form a diversified network information management system.

IV. THE DESIGN OF NETWORK AUTONOMOUS LEARNING SYSTEM

In modern network education and teaching, learners are the main body in the process of teaching activities. They can choose different learning modes. According to the interaction and response time between learners and teachers, they can be divided into the following two modes.

4.1 Web based network education

It means that the process of General Education (such as class, question answering, homework, examination, etc.) is placed on the network. Whether at school or at home, students

can enter the system through their own permissions, share the services provided by the system, learn online, communicate with classmates, participate in Paperless Examination, etc. Web based network education is a kind of non real time distance education, which needs the support of several subsystems, such as courseware learning system, question answering system, homework system and so on. We should also manage the courseware library, question answering library, homework library and test question library. The system is shown in Figure 2.

Static distance teaching based on web is mainly to realize general learning system. It does not consider the actual needs and habits of learners. Basically, it is the learners' adaptation system rather than the system to adapt to learners, not according to the learning habits and personality education. It does not reflect the interaction, intelligence and autonomy of the system, and the teaching effect is not very obvious. The personalized network system model only adds a personalized processing engine on this basis, which enables users to automatically adjust learners' needs according to information scheduling.
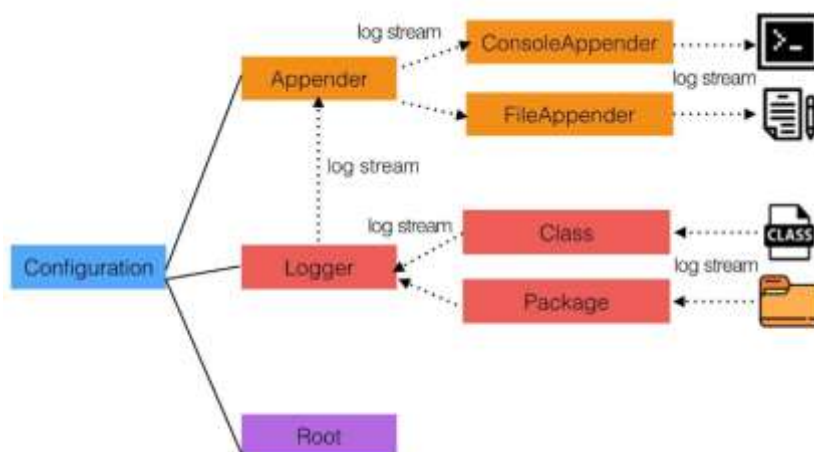

Fig 2: Web based static English teaching system

4.2Agent-based network autonomous learning model

According to Shoham, Agent is a kind of entity, which can be regarded as composed of many mental states, such as belief, ability, choice and commitment. Some people also define Agent as a computing entity that can play its own role in distributed collaborative systems, and it has the characteristics of autonomy, interactivity, responsiveness and initiative. Autonomy: Agent has its own open computing resources and local behavior control mechanism, and can decide and control its own behavior through internal state changes and perceived (external) environmental information without external influence. Interactivity: It can interact with other

agents in various forms, and can effectively cooperate with other agents. Reactivity: Being able to perceive the environment and make timely response to relevant events. Initiative: Being able to follow the promise and take the initiative, showing goal-oriented behavior.

Multi-Agent system is composed of multiple Agents, each agent completes its own tasks independently, or communicates with other agents to cooperate with each other to complete the overall tasks. The efficiency of this cooperation is several times higher than that of a single Agent. A single Agent member often has incomplete information, because the information distribution is scattered and incomplete, and it is dynamically distributed on various servers in the network, and the calculation process is concurrent. Multi-Agent service is to coordinate, arrange and unite a group of autonomous agents to accomplish tasks together. The agent-based network autonomous learning model is shown in Figure 3.

Through the analysis of the design of online English autonomous learning platform, it can be roughly divided into three modules: teacher-student interaction platform; network information management; network curriculum (including test database, case database, literature database and courseware, etc.). On the whole, it can be divided into: ① student model. It is the core of the system, but also more difficult to achieve, because it is necessary to classify and extract data; measure learners' cognitive level, learning tendency, learning interest, etc., through a large amount of information mining, comprehensively and systematically describe learners' status and personality characteristics, but also to analyze learners' psychological state, adjust interest. ② Teacher model. Teachers not only provide friendly web pages for learners, but also publish the teaching content to the platform and store the content of lesson preparation in the teaching resource database. The agent of lesson preparation and the agent of knowledge updating negotiate to perceive the existence of the same and similar teaching content and avoid repeated input. ③ Collaboration model. Collaboration is a kind of strategy to organize students to study in the form of group or team. In the process of cooperation, the new information or a certain achievement is shared with other learners to explore, debate and solve problems together, so as to make the learning process more vivid and interesting.

Fig 3: Self-learning model base on Agent network

V. EXPERIMENTAL RESEARCH ON WEB BASED AUTONOMOUS ENGLISH TEACHING

5.1 Ideas and methods of research

This experimental study is based on constructivist cognitive psychology and humanistic psychology. Autonomous learning is based on these two concepts. It adheres to the combination of theory and practice, and uses qualitative and quantitative research methods. It mainly adopts the methods of questionnaire survey and test to obtain a large amount of data information, and then analyzes and summarizes. The questionnaire survey test is carried out in the normal natural state, with authenticity and reliability.

5.2 Experiment design and process

At present, some people think that the integration of computer network and English teaching course is: the traditional computer-aided English Teaching (computer network is the auxiliary means of English teaching); the other is the real integration of network and English Teaching (learner autonomous learning), using computer technology and artificial intelligence technology to create an ideal English teaching environment. Therefore, in order to improve students' autonomous learning ability, the author uses multimedia network environment to improve the effect of English learning as the starting point, and carries out a semester of teaching and experimental attempt. First of all, in two classes of the same major, one class as an experimental class (32 students in class a), uses the teaching strategy of network autonomous learning; the

other class as an ordinary class (34 students in class B), uses the conventional teaching methods. After the end of the course, the data is compared to verify which teaching mode is more feasible and efficient.

5.3 Experimental results and analysis

The experimental data are shown in Table 2, table 3.

TABLE II. The scores of English autonomous learning ability and the average of each category after the experiment

TOTAL SCORE	LEARNING MOTIVATION	GOAL SETTING	LEARNING STRATEGY	COGNITIVE ABILITY
64.65	2.48	2.76	2.37	2.68
47.33	2.46	2.73	2.26	2.42

TABLE III. The comparison of the mean of the two classes and the study

	LEARNING MOTIVATION	GOAL SETTING	LEARNING STRATEGY	COGNITIVE ABILITY
Experimental class (A)	0.02	0.04	0.13	0.31
Regular class (B)	0.10	0.11	0.02	0.03

Table 2 shows that learning motivation accounts for 2.48% and 2.46% respectively in class A and class B, and goal setting accounts for 2.76% and 2.73% respectively, which indicates that the initial desire and goal selection of the two classes are basically the same, and their classification mean is similar. But the learning strategies are 2.37% and 2.26% respectively, and the difference between them is large, which reflects that the ability of autonomous learning has been greatly improved and the cognitive ability has obvious difference.

VI. CONCLUSION

Under the environment of big data and network, the core goal of English education reform

in China is to train students to be excellent talents with international competitiveness. From this point of view, to connect with the world, modern students need to be able to accurately master English and other foreign languages. English network autonomous learning is to strengthen the practicability of English teaching, students through the network platform and other educational media, improve English comprehensive practical ability, especially strengthen the training and cultivation of English language communication ability. The establishment of online teaching application platform is similar to the classroom in the air, which makes students feel happy from the virtual space, so as to enhance the confidence and desire of learners' autonomous learning. The arrival of big data and the integration of artificial intelligence technology provide the necessary conditions for the construction of online English autonomous learning platform. Online Autonomous Learning is also one of the ways to solve the shortage of teaching resources and English teachers in Colleges and universities. It is also a necessary means to cultivate personalized talents, which has become the development trend of English Teaching in the future. At present, the use of network multimedia teaching is gradually recognized by people, but restricted by the objective conditions of software and hardware, the resource database in the network teaching platform has less information, poor intelligence, incomplete equipment, and students' personalization can not be fully reflected. This puts forward higher requirements for management departments and teachers. Teachers should guide students to actively participate in Online Autonomous Learning and improve their autonomous learning ability, so as to achieve learning objectives, requirements and effects. Based on the research of the effective mechanism of online English autonomous learning platform, this paper applies the student model to the student self-test system, and realizes the self-adaptive process of student self-test.

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