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Analysis and Practical Application of College Network Ideological and Political Education Model Based on Man-machine Collaboration

Qian Haifeng

School of Computer Engineering, Jiangsu University of Technology, Changzhou, Jiangsu, 213001, China

Abstract: *With the in-depth development of Internet information technology, man-machine collaborative learning has the advantages of transcends time and space, open sharing and equal interaction. Man-machine collaborative learning has gradually become an important education model for colleges and universities. College network ideological and political education based on man-machine collaborative learning can effectively overcome the problems of decentralization, fragmentation and virtualization in the process of traditional college network ideological and political education. Based on man-machine collaboration theory, the model of college network ideological and political education was analyzed by this paper. The computer science and technology major was taken as an example, a practical platform for man-machine collaborative network ideological and political education in colleges and universities was built.*

Keywords: *man-machine cooperation; University network ideological and political education; Model analysis; Practical application*

1. Introduction

With the development of the times and the progress of science and technology, the internet has penetrated into every field of people's life and education, providing infinite possibilities for the innovation and development of college network education. In 2015, China issued the “Guiding Opinions on Actively Promoting the ‘Internet Plus’ Initiative”, encouraging schools to use digital education resources and education service platforms to gradually explore new models of networked education, expand the coverage of high-quality education resources, connect online and offline education resources, and explore new ways of providing public education services such as basic education and vocational education. Explore the establishment of online learning credit recognition and credit transfer systems, and accelerate the reform of higher education service models. In this context, many thoughts and achievements about online education in universities have emerged in the academic circle, but few focus on its practical path from a specific perspective [1-3]. Based on this, this paper will analyze and discuss the model of online education in colleges and universities from the theoretical perspective of man-machine collaboration, and put forward some feasible practical paths.

2. The connotation and characteristics of man-machine collaborative learning

China's “New Generation of Artificial Intelligence Development Plan” points out that “intelligent technology will be used to accelerate the reform of personnel training models and teaching methods, and a new education system including intelligent learning and interactive learning will be built”. Man-machine collaborative learning has become an important way of intelligent education practice, and is also an internationally recognized development direction of artificial intelligence in education[4]. Man-machine collaborative learning can be defined as a learning method that utilizes artificial intelligence technology to act on the body and mind of learners, enabling them to acquire qualities such as wisdom, sound personality and operational skills[5]. Human-machine collaborative system is composed of computer and human, including three elements of human, machine and human-machine collaboration, but the understanding of the elements of “collaboration” needs to be defined at different levels according to the intelligence level of technology[6]. The connotation of man-machine collaborative learning mainly includes three aspects. First, cooperative learning, in which human and intelligent terminal cooperate to solve problems and achieve results by sharing knowledge, resources and

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feedback; Second, complementary advantages: the advantages of humans and intelligent terminals complement each other. Humans can provide advantages such as domain expertise, creativity and intuition, while intelligent terminals can provide advantages such as large-scale data analysis, real-time feedback and personalized learning. Third, learning iteration, through continuous interaction and feedback, humans and intelligent terminals can gradually improve and optimize the learning process, and realize the evolution and growth of knowledge.

Man-machine collaborative learning has four characteristics. The first is personalized learning. Man-machine collaborative learning can customize learning according to individual learning needs and characteristics, and provide personalized learning materials, topic selection and learning paths to better meet the needs of learners. The second is instant feedback, intelligent terminal can monitor the behavior and performance of learning in real time, and provide timely feedback and guidance, to help learners correct mistakes, deepen understanding, and improve learning results; The third is the application of big data, man-machine collaborative learning uses big technology to collect and analyze the data, from which the rule pattern is mined to optimize the teaching design and personalized learning recommendation; The fourth is intelligent assistance, intelligent terminal can undertake the corner of teaching assistance, such as providing problem solving strategies, automatic homework correction, intelligent recommendation and so on. At the same time, it can also better understand and interact with technology such as machine learning and natural language. Figure 1 shows a schematic diagram of human-machine collaborative learning.

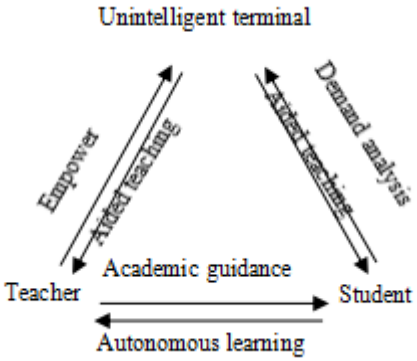

Figure 1 Schematic diagram of man-machine collaborative learning

3. The modeling process of university network ideological and political education based on man-machine collaboration

With the help of artificial intelligence and other technologies, a more comprehensive, diverse and personalized curriculum system can be built for college network education based on man-machine collaboration. Through big data analysis, intelligent recommendation and other means, students' interests, hobbies, discipline literacy and other factors can be comprehensively evaluated and matched, so as to provide students with educational content and forms that are more in line with their needs and actual conditions. Colleges and universities can use a variety of new teaching means, such as virtual reality technology and holographic projection technology, to enable students to watch, experience and participate in ideological and political education, expand the scope of education through human-computer interaction technology, and better understand students' learning situation and feedback, so as to timely adjust educational strategies and content. Stimulate students' learning interest and participation, and improve the quality of education[7-9].

This study believes that the modeling of man-machine collaborative network ideological and political education should take actual problems as the starting point, and summarize into specific signal elements through big data analysis and intelligent terminal combing, so as to carry out man-machine collaborative learning. The man-machine collaborative learning modeling process can be designed and implemented according to specific research objectives and scenarios. The specific modeling process is shown in Figure 2.

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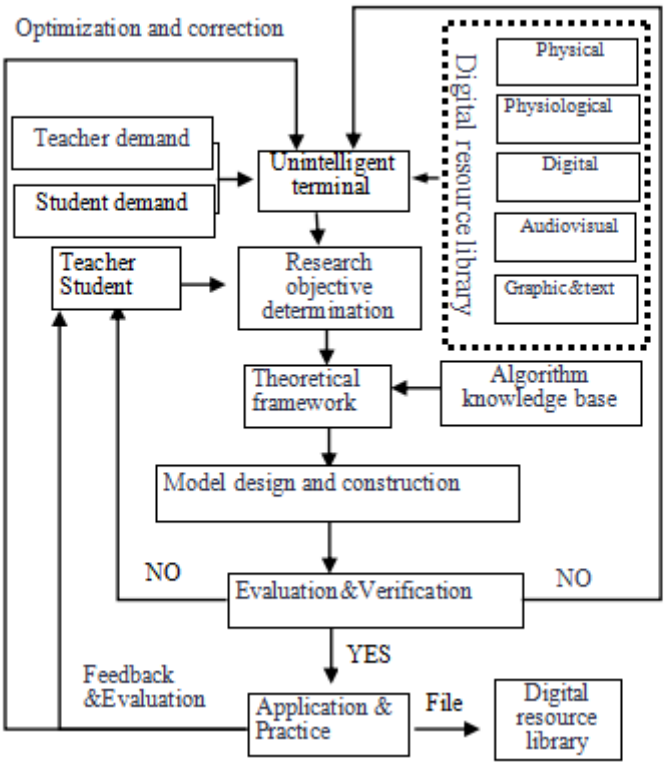

Figure 2 Human-machine collaborative learning modeling process

Determine the research objectives: Define the research objectives of man-machine collaborative learning, such as improving the learning effect, optimizing the learning experience or designing intelligent auxiliary tools.

(2) Data collection and preparation: collect relevant data for modeling and analysis. This may include background information on learning tasks, personal characteristics and needs of students/teachers, learning behavior data, machine-supported interaction data, and raw data from resource databases. The data is cleaned, collated, and pre-processed for subsequent analysis.

(3) Theoretical framework selection: According to the research objectives, select the appropriate human-machine collaborative learning theoretical framework, such as social cognitive theory, constructivist learning theory, distributed cognitive theory, etc. The theoretical framework provides the conceptual model and hypothesis to guide the research.

(4) Model design and construction: Design and build mathematical or computational modeling of human-machine collaborative learning based on a theoretical framework of choice. This involves defining relevant variables and factors, constructing relational models, determining parameters or rules, etc.

(5) Model validation and evaluation: Validation and evaluation of the scientific validity of the model established. Appropriate evaluation methods and indicators to test the fit degree and predictive performance between the model and real-world data.

(6) Model application and practice: The established model is applied to the actual situation, involving the design of human-machine collaborative learning environment, optimization of machine support, improvement of learning strategy and other fields, and the effect of the model in practice is evaluated.

(7) Result feedback and correction: analyze and feedback the results of model application. Understand the contribution of the model to the human-machine collaborative learning process, explore the role and influence of various factors, and further optimize the model.

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4. Practical application of college network ideological and political education based on man-machine collaboration

The practical application of college network education based on human-computer collaboration can provide a more effective, personalized and interactive learning experience by combining online education platforms, intelligent auxiliary tools and learning analysis technologies. Taking computer science and technology major as an example, a man-machine collaborative practice platform for online education in colleges and universities(DMTF) was built. D stands for Data, representing the collection of big data resources in multiple fields and dimensions. M stands for Model, indicating the fast modeling that supports man-machine collaboration. T stands for Task, representing the set of learning tasks disaggregated according to educational goals. F stands for Feedback, which means providing evaluation and incentive services for both sides of education and optimizing the learning mode.

4.1 Implementation based on human-computer interactive learning interface

The interface principle of college network ideological and political education system based on man-machine collaboration is shown in Figure 3. As can be seen in Figure 3, teachers of computer science and technology major import course teaching objectives and requirements into intelligent terminals, and students input their own learning behaviors into the system. According to the needs of teachers and students, the system calls the database and generates course digital teaching content through various information means, and provides personalized learning suggestions according to the characteristics of students. At the same time, the system creates a collaborative learning environment to promote the cooperation and communication between teachers and students through online tools. Virtual laboratory and simulation technology are used to provide opportunities for teachers and students to conduct experiments and simulate scenarios online, deepen the understanding and application of theoretical concepts, and thus stimulate students' learning interest and motivation.

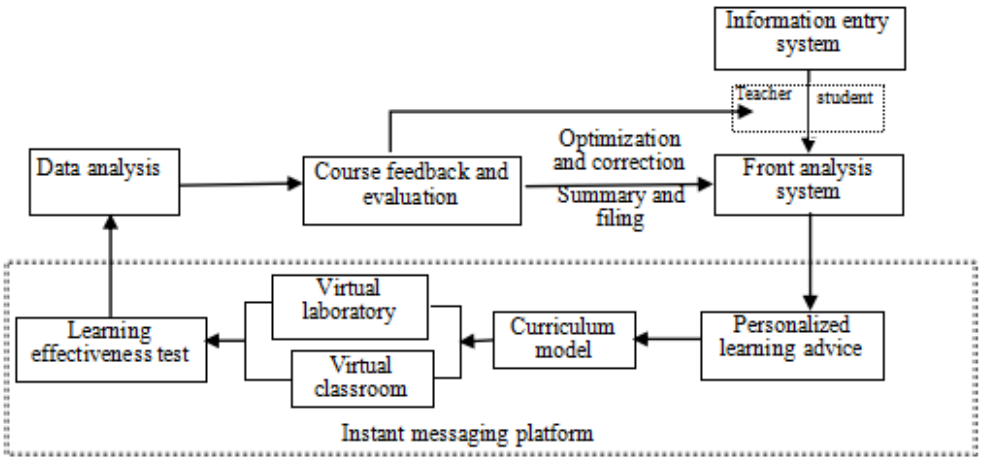

Figure 3 Interface principle of university network ideological and political education system based on man-machine collaboration

4.2 Algorithm model based on man-machine collaborative learning

Based on the theory of human-machine interaction, the Decision for human-robot collaboration(DFC) based on task division decision was selected to achieve human-machine collaborative learning. The interactive algorithm was shown in Equation 1-3[10]. The collaborative objective function(Fk) means that K subtasks are released to students and intelligent terminals respectively, and the system calculates the degree of pressure on students and intelligent terminals to achieve the collaborative goal. The student learning enthusiasm represents the students satisfaction with the assignment result through the total parameter(fk) The smaller the Fk is, the more efficient the target task is been completed. The larger the fk is, the more it the learning needs of students can be met. Then the course tasks can be completed with high quality by computer science and technology major students on the network.

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$$\begin{Bmatrix} J_H^{(DFC)} \cup J_R^{(DFC)} = J(I) \\ J_H^{(DFC)} \cap J_R^{(DFC)} = \emptyset \\ min\{F_k \ \ (\beta^r, \beta^h, g)\} \\ max\{f_k\} \end{Bmatrix} \quad (1)$$

$$\beta_m^r = \begin{cases} 1 & The\ robot\ performs\ subtasks\ t_m \\ 0 & Other \end{cases} \quad (2)$$

$$\beta_m^k = \begin{cases} 1 & Human\ perform\ subtasks\ t_m \\ 0 & Other \end{cases} \quad (3)$$

In the equations, J(I) means a task set composed of several learning subtasks, gm is the calculation factor of Subtask tm (m=1,2,.... ,k), βrm、βkm are execution decision weight value.

5. Conclusion

Man-machine coordinated online ideological and political education in colleges and universities is an important practice method for the wisdom and personalization of higher education in the era of big data. This paper explores the model analysis and modeling process of man-machine collaborative college network ideological and political education. Taking computer science and technology major as an example, this paper builds a man-machine collaborative college network education practice platform DMTF, studies the implementation principle of man-machine collaborative learning interface, and uses DFC algorithm to realize college network education based on man-machine collaborative learning.

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