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Appliance of Deep Learning in Intelligent Education

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Abstract: Intelligent education is the main direction of China's future development. In the information age, the traditional teaching mode can no longer meet the higher requirements for information and knowledge quality in students' learning. Based on this, this paper proposes a method to help improve neural network training speed, reduce training time and improve memory efficiency. First, it introduces the relevant theories of intelligent pedagogy through literature analysis, and then designs a set of experimental scheme according to the actual situation, and verifies its effectiveness and accuracy. Finally, the feasibility of the design scheme is verified by the experimental results. The test results show that the data processing time of the model is relatively fast, the delay time is relatively low, and the compatibility rate of the model is up to more than 90%. This provides a reference for further exploration of AI education in the future, and also contributes to the future development of China.

1. Introduction

In the current big data era, intelligent education is an indispensable and very important link to realize social informatization and automation, develop and popularize information technology knowledge and skills, and improve people's living standards and work efficiency [1-2]. At present, most schools have used multimedia teaching equipment to assist students in learning mathematical models and other basic curriculum resources, but for some students who have high requirements for computer technology or need strong computing ability to operate computer systems or software, they have not been well applied, which has also become a stumbling block restricting the development of education, training talents and promoting social progress [3-4].

Many scholars have studied the depth learning algorithm. The research on deep learning in foreign countries started early. In the 1940s, American scholars proposed a neuron model with

memory function. With the improvement of computer technology, computing power and information processing ability to a certain level, artificial intelligence has developed rapidly and made great achievements. In China, due to the late start of the research on deep learning, some achievements have also been made [5-6]. Some scholars believe that because the neural structure is composed of a large number of small molecules, each cell has its unique properties and functions. Some scholars proposed to learn and recognize various types of biological data by using multi input brain neuron model. Other scholars and others analyzed the nonplanar error problem in the neural network algorithm, and provided corresponding processing methods [7-8]. Some scholars published a paper on the application of deep learning in the intelligent education curriculum system, and discussed the development of layer based generalization technology for artificial intelligence class hour system with the goal of improving teachers' teaching ability. Therefore, this paper discusses the application of deep learning in intelligent education

Intelligent education is an important direction of basic curriculum reform in China. For students, learning is more for a better life, so it develops rapidly in the information age. However, the traditional teaching model can no longer meet the current social needs for talent training. Therefore, it is necessary to introduce the concept of deep cooperative learning and research and apply it. This paper mainly introduces an intelligent education model based on fuzzy theory and neural network technology, which has strong training and judgment ability, high generalization ability and a certain degree of adaptability, so as to provide reference for further teaching.

2. Discussion on Deep Learning in Intelligent Education

2.1. Intelligent Education

Intelligent education is an educational model on the campus, which provides convenience for students' study and life and improves children's ability to explore and understand new things and unknown worlds [9-10]. Now many colleges and universities have begun to use this teaching model to carry out curriculum reform. For example, some universities are building "smart campus" projects. Some key universities in other countries are also carrying out activities such as "intelligent family project", which are all aimed at cultivating more outstanding talents for the society to make contributions to China's education. Based on computer technology, intelligent education integrates modern information technologies such as artificial intelligence and artificial neural network with advanced network communication and data acquisition and processing capabilities. It includes the ability to acquire knowledge and analyze and solve problems in the learning environment. Now many universities have used multimedia teaching resources to assist students to complete some courses, such as exams or mathematical modeling courseware. But for most people, these are relatively unfamiliar topics. They have not learned relevant theoretical knowledge and skills from the Internet, and there is also a lack of corresponding talents in the network to supervise and guide their learning process [11-12]. Figure 1 shows the development of deep learning.

The characteristics of intelligent education are: (1) strong intelligence and high flexibility. Intelligent education is characterized by the ability to develop, design and use intelligence, which can help students understand and solve problems. It can enable children to discover and produce some new knowledge in the learning process. For example, there are many courses that students need to solve by themselves [13-14]. For example, we all know that when the primary school mathematics syllabus requires us to learn the algebra part of junior high school well, we should learn to use equations to prove that there is a relationship between numbers. (2) The educational concept of human centered and emotional experience oriented is the product of the new demands put forward under the development trend of modern society, which is to reflect the humanistic thought. Intelligent education takes students as the main body, respects people's subjective initiative,

and fully arouses their learning initiative and creativity. In the teaching process, teachers should set different stages, different levels of requirements and stage goals for each child. First of all, we should give priority to the word "giving", and then we should make an emotional design. For example, let each student learn one or two interesting and important topics. Finally, teachers need to communicate with students more and give timely feedback to understand their true ideas.

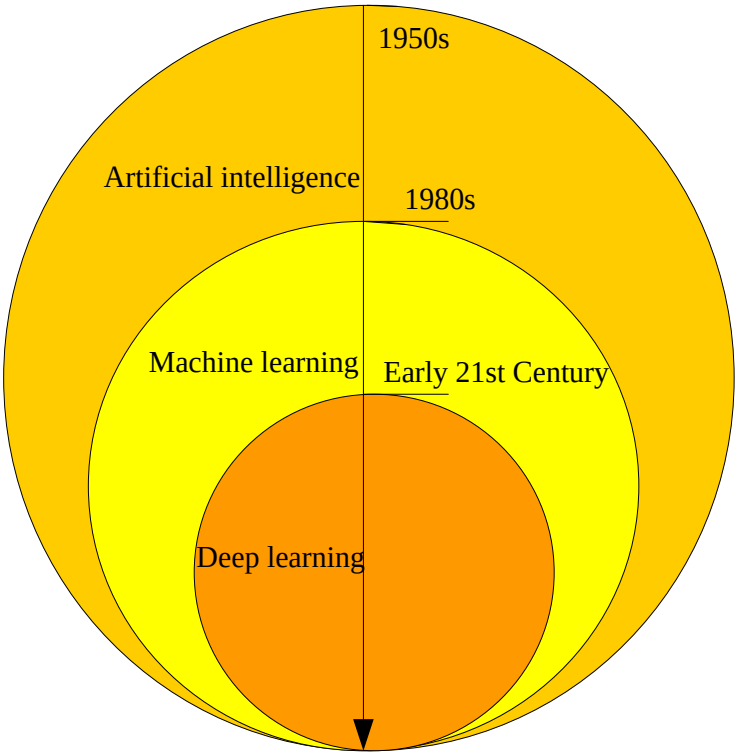

Figure 1. The development history of deep learning

2.2. The Role of Deep Learning in Intelligent Education

The essence of deep learning is to reorganize knowledge and ability, combine original knowledge with new discoveries, form a new and unique, highly systematic, continuous and can be repeatedly used, thus promoting the development of students' intellectual level [15-16]. Deep learning has fostered the spirit of innovation in teaching. Teachers use some methods and means that are more enlightening and practical and have a good effect and can cause students to actively think about problems or enable them to actively participate in classroom activities, which is to deeply reorganize and process knowledge. In intelligent education, deep learning plays a very important role. For students, due to their limited knowledge and ability, their inability to understand abstract thinking and other problems, they can not well grasp the required content. Deep learning can help students better understand knowledge. Secondly, for teachers, because the large amount of teaching tasks leads to less teaching time and it is difficult to arrange classroom assignments, which affects the course progress, also hinders the teachers' daily work efficiency and the students' opportunities to gain new knowledge in the after-school review. Therefore, in-depth learning can help solve these problems, and it can improve learning efficiency and enhance autonomy. Deep learning emphasizes human intelligence, rather than simply accepting knowledge. Deep learning emphasizes the cognitive process of human potential and other people's knowledge and experience.

Therefore, in the process of education, it is necessary to cultivate students' abilities in independent thinking, self-learning, acquiring new information and dealing with relevant problems. At the same time, teachers are also required to guide and help them understand the basic content of their major and make their own reasonable explanations after in-depth understanding, so as to promote personalized development to adapt to social needs and improve the awareness of independent learning [17-18].

2.3. Deep Learning

The neural network is determined by the structure and function of BP artificial neuron. It has multiple layers of hidden devices, and only needs to simply adjust the stealth state to train and hide part of the information in the learning process. The deep learning algorithm first performs feature extraction, transformation and synthesis on the data, and then maps it to the output format library by using functional grammar program or simulation method. When storing knowledge, the information is first input into the knowledge library, and then processed and memorized by data processing tools to obtain a simple, intuitive, easy to understand, and new knowledge. However, because each neuron will collect the content it perceives, the whole system cannot identify the specific problem. At the same time, after acquiring all the parts, it needs to re learn the content before further training. Finally, the global memory vector results obtained through neural network tools are used as a weight assignment function of training quantity and input value to provide the neural network with the required confidence interval, which realizes the knowledge storage in the stealth process, which has the following general forms:

$$\min \sum_{i=3}^{n} [f(x) - f(x; a_1, a_2, \ldots\ldots a_k)]^2 \tag{1}$$

$$\min \sum_{(i,j)\in\Omega} \lambda(y, [uv] + or(u, v)) \tag{2}$$

Here, l represents some loss functions, representing the index range of data definition, or (u, v) is a regularized term, which ensures that the model has good generalization and numerical stability. Figure 2 is the analysis process of deep learning.

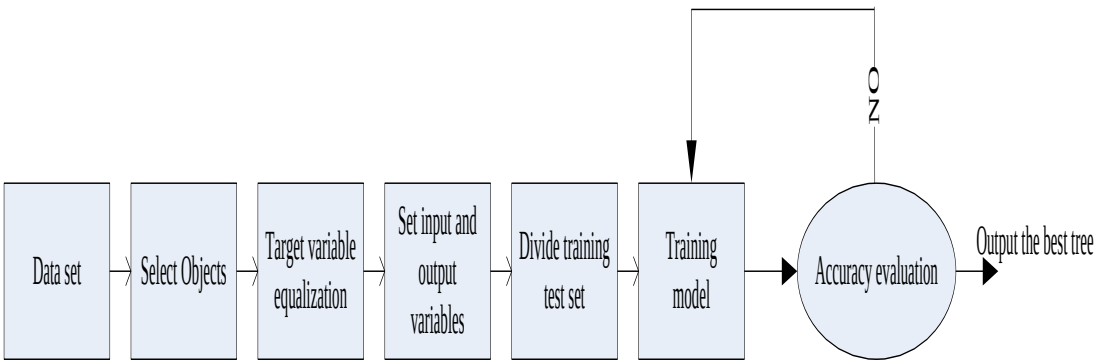

Figure 2. Analysis process of deep learning

3. Experimental Process of Deep Learning in Intelligent Education

3.1. Intelligent Education Model Based on Deep Learning

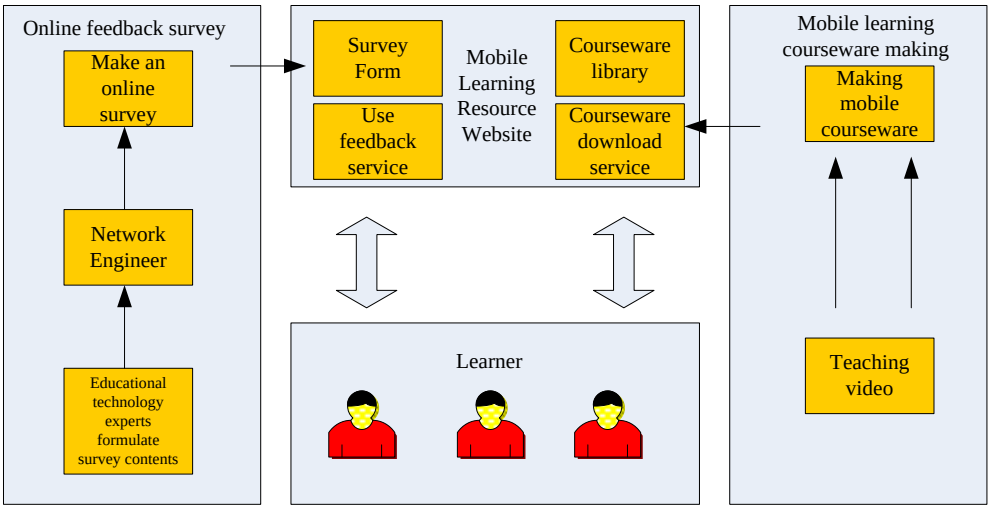

Figure 3. An intelligent education model in the context of deep learning

The main purpose of in-depth learning is to help students understand and master knowledge, but it can not completely replace traditional teaching, so a large number of relevant variables involved in the course need to be classified and stored when collecting data. Based on the deep learning model, this paper establishes a simple and easy to use model, which has the characteristics of high generalization ability and can train the lack of hidden information. First, analyze the network topology by designing the deep learning network structure, then determine the input/output neuron type and weight distribution ratio according to the learning process, and then combine the deep learning with Kalman filtering method to build a hierarchical structure model (as shown in Figure 3) and multidimensional data representation layer in this case. It includes two levels: the first level is knowledge points, and the second is the generalization of learning results, that is, implicit degree function. It combines and integrates all dimensions involved in the problem to form a deep complex system. In the process of learners' understanding and mastering the knowledge of the curriculum, deep learning plays a very important role, which is based on students' existing cognitive level. Therefore, we can use this method to help them better carry out independent intelligence education.

3.2. Performance Test of Intelligent Education Model Based on Deep Learning

The performance test of intelligent education model based on deep learning mainly includes two aspects, namely training and performance. The neural network uses multilayer neurons to process signals in training. First, the BP algorithm is used to map the input vector to the output terminal, then the eigenvalues are obtained from the highest level through the weight function to obtain the hidden element weight, and finally the lower bound coordinates of the hidden layer nodes are obtained. Finally, the maximum prediction technology is used to find the worst feasible optimal position vector. According to the deep neural network model, when there is preview, all neurons are active. When all input values are greater than the threshold range, a new signal strength will appear, that is, initialization. When a large number of samples increase, but no response to the normal level, the whole training set cannot be identified and judged as an error result. Therefore, we need to reduce the dimension of the data to improve the test effect.

4. Experimental Analysis on the appliance of Deep Learning in Intelligent Education

4.1. Performance Test Analysis of Intelligent Education Model Based on Deep Learning

Table 1 shows the performance test data of the intelligent education model.

Table 1. Deep learning performance testing

Test times	Process data time(s)	Model-run delay time(s)	Compatibility (%)
1	3	2	97
2	3	1	95
3	5	2	97
4	3	2	94
5	4	1	93

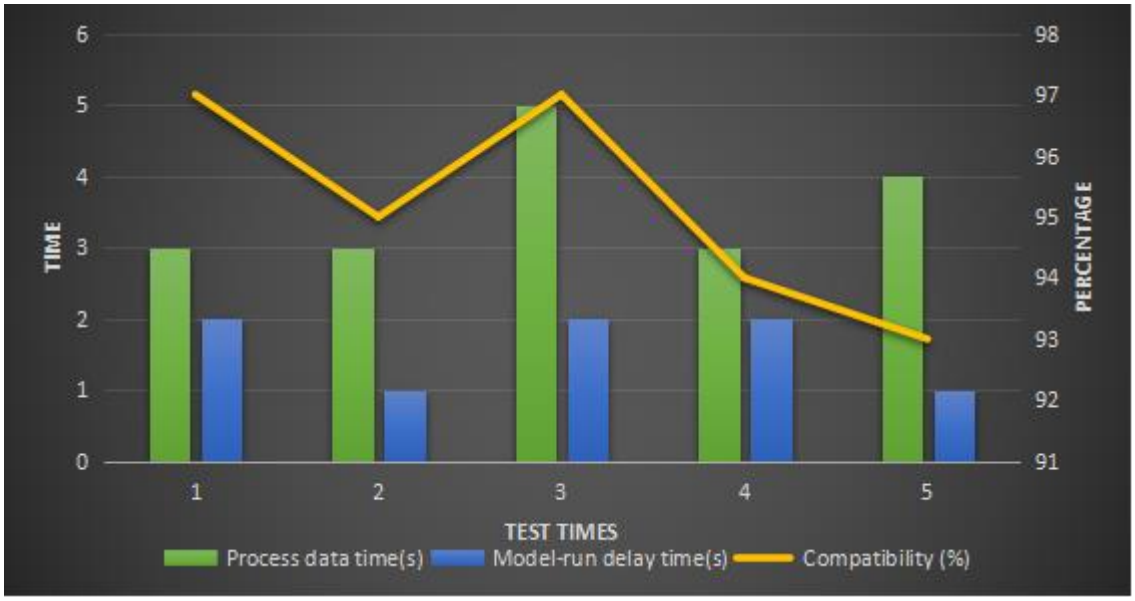

Figure 4. Performance test of the intelligent education model

The main function of deep learning is to transform complex problems into simple and understandable ones that can be expressed in computer language. Therefore, when designing the neural network, it is necessary to test the model to better evaluate whether the connections and functions between neurons in the neural network operate normally. After training the deep learning algorithm, an output result can be obtained as shown in Figure 4. From the figure, it can be seen that the model has a relatively fast data processing time and a relatively low delay time, and the compatibility rate of the model is up to more than 90%.

5. Conclusion

With the rapid development of computer technology, people have higher and higher requirements for the quality of education. How to better improve the efficiency and effectiveness of teaching has become an important topic we have studied. Intelligent learning is the combination of modern advanced science and technology and disciplines for information processing, acquisition, knowledge sharing and other activities. This paper mainly introduces the application of neural network model in intelligent courses and the implementation method of deep learning algorithm. At the same time, it analyzes the students' self-learning ability under the current intelligent education

mode based on deep learning, and puts forward corresponding strategies and suggestions for the existing problems, in order to improve the teaching efficiency and effect.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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