Thoughts on the Application of Artificial Intelligence in Exceptional Child Education

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Abstract. The rapid development of artificial intelligence technology has set off a wave of artificial intelligence in the field of education. In the field of special children's education, the application of artificial intelligence has made little progress. Based on the comprehensive analysis of the current artificial intelligence in the practice of ordinary children's education, the article combined the urgent needs of the current special children's education, and designed the application of artificial intelligence technology in special children's education, hoped to provide new wisdom and methods for the development of special children's education.

1. Introduction

Artificial intelligence has experienced the development of two stages of “rule-based expert system” and “machine learning”, and is currently in the stage of “interpretable and general artificial intelligence technology”[1]. One of the characteristics of general artificial intelligence technology is to break the limitations of past technical applicability. The same artificial intelligence technology can be applied to many similar or different fields, and has been widely used in education, agriculture, finance, law, transportation, manufacturing, marketing and other fields. In the current situation, there is a need to think about the nature of artificial intelligence. The meaning of artificial intelligence has not only included the rapid development of artificial intelligence technology, but also the design of various technical application scenarios. Therefore, a more comprehensive understanding of artificial intelligence technology should be that artificial intelligence can be divided into technical layer and application layer, therefore, the design of the application of artificial intelligence technology has great research value.

Artificial intelligence technology has attracted the attention of researchers in the education industry because of its powerful energy in solving problems related to teaching and learning. Even in a period of time, the education community has paid more attention to artificial intelligence than artificial intelligence experts to artificial intelligence. Special children's education has always been a huge challenge for the education sector. It can be said that special children's education is not only an educational issue, but a social issue with universal social significance. Special children's education is the problem that must be solved to achieve complete fairness and maximum education value. The powerful energy that artificial intelligence technology has developed in solving the problem of ordinary children's education provides new wisdom for the development of special children's education. According to the logical route that artificial intelligence is the sum of the technical layer and the application layer, there are related technologies at present, but the design of the application scenario of artificial intelligence technology in special children's education is lacking. The purpose of
this research is also here, hoping to trigger some thoughts from artificial intelligence experts and special education experts.

2. Artificial intelligence technology in the education of ordinary children

From a technical point of view, education is the field of application of artificial intelligence. From the perspective of pedagogy, the key technology of artificial intelligence is an important foundation for the educational artificial intelligence. Currently, the techniques that have been well practiced in the field of education include the following:

2.1 Knowledge representation method

As one of the core technologies of artificial intelligence and information fusion, knowledge representation determines the availability of domain knowledge, the construction of knowledge base and the validity of reasoning calculation. It affects the efficiency and ability of reasoning of the developed system. It is essentially a kind of Computer-accepted data structure for describing knowledge[2]. The development of knowledge representation method technology is of great significance to improve the intelligence of expert systems, so that expert systems have the ability to solve various complex problems, and appropriate knowledge representation methods can play an important role in the field of education.

2.2 Machine learning and deep learning

As a core area of artificial intelligence research, machine learning allows computers to continuously improve their performance through experience and make correct responses without prior programming[3]. Deep learning is an efficient feature extraction method. By extracting more abstract features in data, it can realize the more essential characterization of data[4]. Machine learning and deep learning have important influences on speech recognition, image recognition, natural language processing and other fields, which is conducive to the further popularization of artificial intelligence in the field of education.

2.3 Natural language processing

Natural language processing is mainly to let computers understand human natural language to communicate with computers in natural language[5]. In the field of education, the original application of natural language processing technology is to carry out grammatical error detection. With the continuous improvement of natural language processing technology and its application research, natural language processing technology is more and more widely used in education.

2.4 Intelligent agent

Intelligent agent is a kind of mobile computer program that automatically completes a set of operations by means of active service. It has the characteristics of distribution, autonomy, initiative adaptability and mobility[6]. With the continuous maturity of intelligent agent technology, intelligent agent technology has been used in the teaching system, which effectively improves the intelligence of the teaching system, its distribution, mobility and other characteristics, so that learning resources can be fully utilized, for students' individuality learning provides conditions.

2.5 Affective computing

Affective computing refers to the ability of humans to identify, understand, process, and simulate human emotions by setting up procedures for the machine [7]. Emotional computing is applied in the field of education, which enables the computer teaching system to capture the emotional state of the learner in real time, and provide incentives and appropriate assistance to students at the right time. Therefore, it is also an artificial intelligence technology that needs attention in the field of education.
3. The problems in the education of special children need to be solved urgently

Exceptional education was born in the 18th century Renaissance, and until the 1920s, special education began to become an independent discipline. After long-term development, in the 1980s, integrated education became the basic trend of international special education development, and special education research ushered in a period of prosperity and development. Although special education has achieved great results, there are still many problems:

3.1 Exceptional education teachers

The issue of teachers has always been an important factor restricting the development of special education. Due to the low level of attention paid to special education, the poor treatment of teachers, and the imperfect training of special education teachers in colleges and universities, the current special education teachers have low general education, fewer employees, lack of professional knowledge, etc. Especially in developing country, the problem is even more serious. The issue of teachers is a problem that must be solved to run special education.

3.2 Lifelong education for exceptional children

Exceptional children are a very big concept. In exceptional children, there are congenital factors as well as acquired factors, children with physical disabilities and children with intellectual development problems. For children with mental development problems, their education is not accomplish at one stroke. More lifelong education is needed. For example, children with autism need long-term intervention. The families of special children are generally unable to bear the cost of lifelong education, especially in developing countries. How to solve the problem of lifelong education for special children and how to provide more cheap and efficient educational resources become another urgent problem in special education.

3.3 Family education for exceptional children

In the education of special children, families often need to take on more responsibilities. The education that learners can receive in special schools and rehabilitation centers is very limited, more because of the cost and educational resources. The responsibility of family education in special education is significantly higher than that of family education in other fields of education. Most parents often do not have the professional knowledge reserves of special education experts. Therefore, family education for special children has always been in a very embarrassing situation. On the one hand, family education needs more responsibility, on the other hand, parents often can do nothing. In this process, some families gradually lose confidence in the education of special children, which is even more detrimental to the development of special education. The problem of family education for special children is also a problem that must be solved in special education.

4. Design of application situation of artificial intelligence in special education

Through the above analysis, we can find that the current artificial intelligence has been widely used in ordinary children's education, and achieved good teaching results. The three problems facing the current special education are similar to the problems faced by ordinary children's education, so it is entirely possible to transfer technology applications to special education.

4.1 Application in teacher training

Artificial intelligence technology can provide two aspects of support for the issue of special education teachers. On the one hand, artificial intelligence technology can be used to design an expert system, and through the expert system, high-quality learning guidance is provided for learners who will become special education teachers, thus obtaining a large number of special education teachers with high quality and high ability. At the same time, for the special education teachers who are already working, they can also use this system to continuously improve their business capabilities, so as to better contribute their own strength to special education. On the other hand, the expert system and
learning partners developed for special children can play the role of replacing teachers. Artificial intelligence technology develops to a certain stage and can replace teachers' work in some aspects, including providing rehabilitation training, companionship learning and providing feedback, etc. In this way, we can greatly reduce the need for special education teachers, and the teacher problems can be solved smoothly. In solving the problem of special education teachers, artificial intelligence technology can currently do at least two aspects of work. On the one hand, it can develop an expert system that helps special education teachers improve their own capabilities, on the other hand, they can develop expert systems or learning partners that support special children's learning.

4.2 Application in lifelong education for exceptional children

The greatest demand for lifelong education for special children is low price and long-term use. Traditional learning resources and human resources, including teachers, cannot reconcile the contradiction between effective and cheap. Although the audiovisual technologies and the computer-supported learning system technology can be reused, the degree of flexibility is poor, and it is impossible to provide the learner with the learning content that is actually needed. The human resources such as teachers can meet the needs of learners with flexibility, but they also impose a heavy burden on special children's families in terms of expenses. Even some teachers' business ability is not high, and the quality cannot meet the requirements. With artificial intelligence technology, we can design learning partners with three modules: domain model, teaching model and learner model to support special children's learning. The learner model can achieve the mastery of the special children's learning characteristics and learning attitudes. The domain model has the educational content that the system can provide for learners, and the teaching model will choose appropriate learning content to present to learners according to the current learning state of learners fed back by the learner model. In addition, we can use other technologies of artificial intelligence to strengthen the monitoring of the changes of special children's conditions and provide partners for special children, all of which are conducive to the healthy development of special children.

4.3 Application in exceptional children's family education

For family education for special children, strengthening the family's resilience is the key. To this end, we need to make two efforts. On the one hand, to constantly give parents confidence, so that they can see hope. On the other hand, we can provide the necessary education for special children's parents, so as to face special children with a correct attitude. Experts system can be designed for parents by means of artificial intelligence technology. Special children's parents can get more information about special children, learn the knowledge of rehabilitation training, and communicate with other parents to achieve common growth. In addition, intelligent assistants can be designed for parents. Only assistants can participate in family education when necessary, to help parents, and to ensure parental participation.

5. Conclusion

Special education has always been less valued in the field of education, so the development of research in the field of special education has also lagged behind the study of education in other fields. There are too many problems in special education, and artificial intelligence technology will be promising in special education. I hope that more research can provide guidance for special children's education.

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