



# Research on AR System of Preschool Science Activities from the Perspective of Artificial Intelligence

Zhufeng Ye<sup>(✉)</sup> and Jirarat Sitthiworachart

Faculty of Industrial Education and Technology King Mongkut's Institute of Technology,  
Ladkrabang 1 SoiChalongkrung 1, Ladkrabang, Bangkok, Thailand  
yzf75337071@163.com

**Abstract.** With the development of the economy and the improvement of living standards, artificial intelligence technology is gradually changing people's lives, and people's cognition of knowledge has undergone a new turn to a certain extent, which is undoubtedly a huge challenge to traditional education. Kindergarten education activities are compatible with the cultivation of young children by artificial intelligence, which promotes a new turn of cultivation goals and new changes in methods. Kindergarten education activities supported by artificial intelligence should be based on the development of young children, based on the needs of young children, and based on the experience of young children, and can use AR technology to realize kindergarten scientific activities.

**Keywords:** Artificial Intelligence · Kindergarten · AR Technology

## 1 Introduction

Artificial intelligence refers to intelligent machines or intelligent systems capable of simulating human intelligent activities. The most prominent feature of artificial intelligence is its similarity to human behavioral intelligence, including elements such as reasoning, learning, goal-seeking, problem-solving, and adaptability [3][5]. The arrival of the era of artificial intelligence has an all-round impact on human production and life. Since the beginning of the 21st century, artificial intelligence has also had an important impact on the development of education. In this situation, how to use artificial intelligence technology to realize the reform of education mode and the innovation of talent training methods has become an important topic and challenge for the world's reform and development. Under the impact of artificial intelligence, the State Council promulgated the "New Generation Artificial Intelligence Development Plan" and the "Thirteenth Five-Year Plan for the Development of National Education" in 2017, aiming to promote the improvement of talent training models and teaching methods. At present, it is not uncommon for artificial intelligence to enter the classrooms of colleges and primary and secondary schools, but the application of artificial intelligence in the field of preschool education is still rare. The development of artificial intelligence is bound to have an impact on the development of preschool education.

© The Author(s) 2023

K. Subramanian et al. (Eds.): CTMCD 2022, ACSR 99, pp. 841–846, 2023.

[https://doi.org/10.2991/978-94-6463-046-6\\_95](https://doi.org/10.2991/978-94-6463-046-6_95)

As an emerging technological science, artificial intelligence aims to try to simulate or even surpass the way humans think and work. Artificial intelligence not only brings unprecedented benefits to human development, but also brings unprecedented challenges to human beings. In this context, where do human beings go has become a global issue. From the perspective of knowledge, the traditional education model is mainly based on the learning of hard knowledge, and these hard knowledge are the data basis for the current development of artificial intelligence. Products under artificial intelligence technology can easily replace humans to complete this part of the content. Therefore, artificial intelligence has made a new turn in the goal of talent training, that is, not only pursuing the hard knowledge level of talents, but also paying more attention to the soft knowledge level of talents, such as information search and processing, problem discovery and resolution, technological improvement and innovation, etc. [7]. Education is the main way for the country to cultivate talents, and the orientation of talent training goals determines the value orientation of national reform and development. Both my country and developed countries have fully realized the importance of talent training goals. Since the beginning of the 21st century, my country has successively issued many policies and regulations to improve and perfect the talent training model and education and teaching methods, the fundamental purpose of which is to cultivate people with new values and knowledge and skills. “One hundred years of life is based on early childhood education”, preschool education is an important part of the national education system, and the training of young children is directly related to the quality of future talent training [2][4]. Therefore, the preschool education stage is the foundational period of talent training. Combining the specific orientation of talent training in the new century, we should cultivate children with curiosity and active exploration ability, cultivate children with soft knowledge and ability, cultivate children with innovative consciousness and ability, cultivate a sense of thinking and problem-solving able children. The advent of the era of artificial intelligence is quietly changing the educational goals of kindergartens.

## 2 Intelligent Education System

The teaching resource processor is to provide children with the required video teaching resources and help them quickly obtain the required resource information, which requires a large amount of video teaching resource data as the basic video teaching resource processor [1][6]. The interface circuit is shown in Fig. 1.

In the interface circuit of the teaching resource processor, the nRF905 chip is used to realize the communication function of the resource processor. This chip not only has super transmission capability, but also has high-speed data transmission capability. At the same time, the chip is equipped with 1024 communication channels, which can meet the integration requirements of English teaching video resources. The processing time of its resource processor is  $\leq 6 \mu\text{s}$ , and the working voltage range is 1.9 V–3.6 V during the working time, and the working current is controlled. Within 12.5  $\mu\text{A}$ , it is a low-power working state and can process multiple search requests at the same time.

Firstly, the video teaching resource processor is used to collect the characteristic information of the teaching resources; secondly, the classification of the teaching

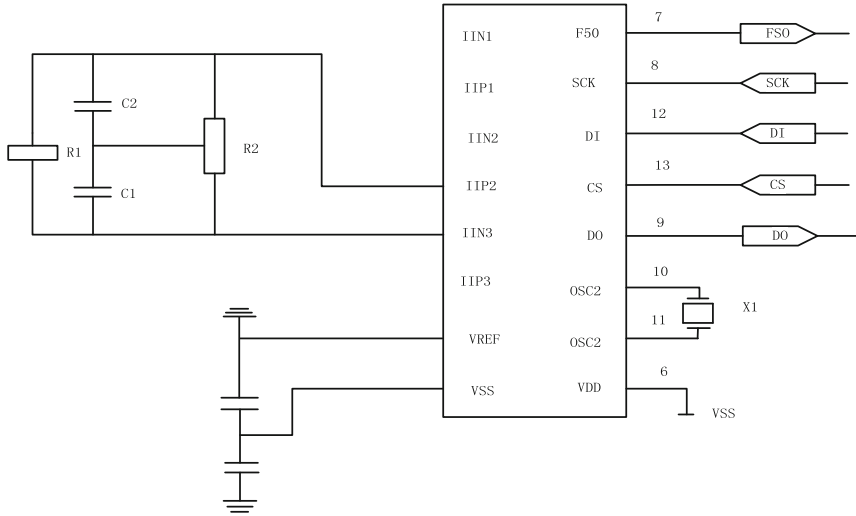


Fig. 1. The interface circuit of the teaching resource processor.

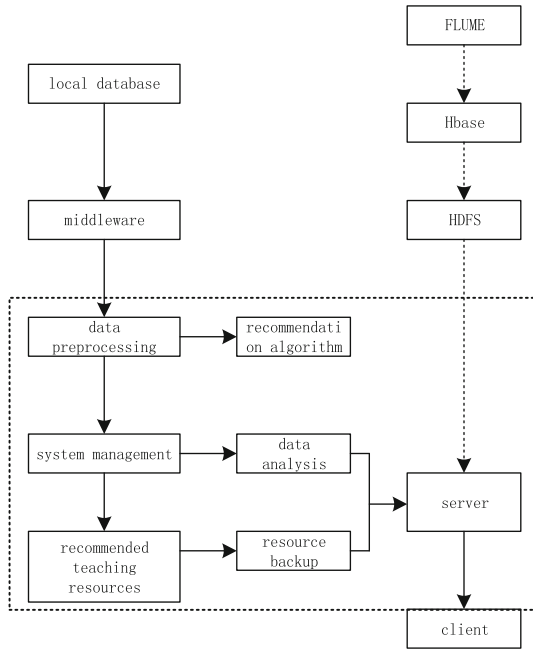
resources is realized through the collaborative filtering rules; finally, the collected characteristic information teaching resources are stored in the database to obtain the association relationship between the teaching resources, and the recommended search results. Mainly based on the overall architecture of the teaching resource intelligent recommendation system based on artificial intelligence, the teaching resource processor and recommender are designed, and the hardware design of the system is completed. The structure diagram of the teaching resource intelligent thruster is shown in Fig. 2.

After completing the calculation of the degree of connection between children’s interest points and teaching resources in kindergarten, use the connection degree of teaching resources to calculate the similarity between children’s interests and video teaching resources. The calculation formula is as follows:

$$\text{Interest}(\xi, \varpi) = \frac{1}{|\mathfrak{H}(\xi)|} * \sum_{j \in \mathfrak{H}(\xi)} \frac{\vec{\omega}_i \cdot \vec{\omega}_j}{|\vec{\omega}_i| \cdot |\vec{\omega}_j|} \tag{1}$$

Among them,  $\xi$  represents the set of user interest points,  $\varpi$  represents the set of video teaching resource keywords,  $\mathfrak{H}(\xi)$  represents the set of historical interest points,  $|\mathfrak{H}(\xi)|$  represents the number of teaching video resources,  $\vec{\omega}_i$  and  $\vec{\omega}_j$  represents the similarity of teaching resources and resources respectively.

Artificial intelligence is also having a huge impact on traditional education methods. In the era of artificial intelligence, more emphasis is placed on an open, diverse and personalized learning system. One-to-one learning guidance, personalized self-learning, and social communication and collaboration have become new trends. The traditional school education, including kindergarten education, adopts a standardized and standardized learning system, and students’ knowledge acquisition is mainly based on the “transmission-acceptance” model. Influenced by artificial intelligence, the educational goals of the current era are constantly undergoing profound changes. Therefore, the talent



**Fig. 2.** Structure diagram of intelligent recommender for teaching resources.

training method should also be changed from “passive acceptance” to “active learning”, emphasizing the sharing, communication, discussion and cooperation between individuals in the learning process. The “Working Regulations for Kindergartens” clearly states: “The educational activities of kindergartens should be purposeful and planned to guide children to be vivid, lively, active, and various forms of educational process.” Children’s learning is not a single knowledge learning, but more is to obtain relevant early experience in the process of personal experience, direct perception, hands-on operation and so on. Different from other educational activities, kindergarten educational activities are mainly determined by the characteristics and laws of children’s physical and mental development. Therefore, the educational activities of kindergartens contain unique inner spiritual essence and advanced early childhood education concepts, and the emergence of artificial intelligence provides more opportunities and platforms for individual development and personalized learning.

### 3 Principles to Be Followed in the Application of Artificial Intelligence in Kindergarten Educational Activities

The characteristics and laws of children’s physical and mental development determine the uniqueness of kindergarten teaching. With the advent of the era of artificial intelligence, how to effectively use and innovate has become a new topic. In order to meet the development trend of the times, many schools and even kindergartens blindly pursue modern

equipment and facilities, which runs counter to the original intention of integrating artificial intelligence and education. Therefore, teachers' understanding of artificial intelligence should be more rational and objective. Specifically, the application of artificial intelligence in kindergarten education activities needs to follow the following three basic principles. With the continuous deepening and improvement of quality education, the better integration of artificial intelligence and education has become the focus of future curriculum reform. In 1999, the "Decision of the Central Committee of the Communist Party of China and the State Council on Deepening Educational Reform and Comprehensively Promoting Quality Education" clearly stated that the implementation of quality education should start from preschool education. Compared with other education stages, the curriculum of preschool education has its own characteristics, and its "life-oriented" is more distinct. As the main form of preschool education activities, games take the overall and harmonious development of children's physical, cognitive, emotional and social aspects as the general goal. Therefore, teachers should fully realize that the deep integration of artificial intelligence and kindergarten educational activities is not static, but a dynamic process of continuous development and change. Regardless of whether and how artificial intelligence is applied to kindergarten education activities, teachers must firmly establish the educational concept of "children's development-oriented" in the process of application and innovation, flexibly apply and innovate artificial intelligence teaching methods, and promote the reform and improvement of kindergarten curriculum. The increasingly mature artificial intelligence technology provides human beings with a fast and convenient way of living and thinking. Educators can enjoy personalized learning that suits them through artificial intelligence, and are no longer confined to a fixed space and time. There are great differences in the development of children aged 3 to 6. Therefore, satisfying individual differences is an important educational concept in preschool education. Artificial intelligence can help in the design and development of early childhood education activities, and help stimulate children's interest in learning. However, the needs of kindergarten education activities and children's own artificial intelligence are quite different. The application should be based on the actual needs of children, and should not blindly pursue "high technology" and "high intelligence". Children's learning is not a process of passively receiving information, but a process of actively selecting, processing and constructing their own knowledge and experience in their own way.

## 4 Conclusion

The era of artificial intelligence will bring a lot of convenience. Artificial intelligence technology can be applied to scientific activities such as kindergarten teaching and training, and the information system can be used to achieve scientific and reasonable technical support.

## References

1. Fan Lina, Shi Dongfang. Reflections on Kindergarten Educational Activities in the Age of Artificial Intelligence [J]. *Journal of Changchun Normal University*, 2018, 37(11): 141-143.

2. Meng Zhenzhen, Li Xiaohan. Kindergarten Sinology Education under the Background of Artificial Intelligence: Integration and Exploration [J]. Science and Education Wenhui (Early Issue), 2021(01): 162-163.
3. Qiao Yingying, Zhou Yan. The connotation and cultivation of information literacy of kindergarten teachers in the era of artificial intelligence [J]. Research in Preschool Education, 2021(11): 58-61.
4. Wu Yun. Artificial intelligence, the future is promising!—The application of intelligent robots in kindergarten activities [J]. Science Consulting (Education and Research), 2020(12): 163.
5. Xu Jing. Exploration of artificial intelligence teaching in kindergartens in the new era [J]. New Curriculum, 2021(42): 157.
6. Yang Weipeng, Zhang Dandan. Promoting STEM Education: Kindergarten Curriculum Construction in the Age of Artificial Intelligence [J]. Early Childhood Education, 2018(15): 9-12.
7. Ye Pinju, Wang Hongwei, Pang Yunhao, Liu Siyuan. Design of a smart kindergarten safety monitoring system based on artificial intelligence [J]. Computer Knowledge and Technology, 2021, 17(18): 196-198.

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

