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Computer Application Technology and Practice in the Big Data Environment

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Abstract: ***In recent years, China has undergone numerous reforms and innovations in the field of technology, successfully entering the era of big data. In this era, there has been significant progress in computer application technology. Within the context of the big data era, computer application technology faces numerous challenges, but it also presents boundless opportunities. Continuous reform, innovation, and breakthroughs are essential to construct application thinking, approaches, and patterns that align with the characteristics of big data. Therefore, its imperative that we fully understand and comprehend big data and actively embrace the impact it brings. This paper delves into a thorough exploration of various types of computer application technologies within the big data environment, as well as future development trends and practical implementations. Furthermore, it provides corresponding recommendations with the aim of offering valuable insights for related endeavors.***

Keywords: Big data environment; Computer application technology; Practice; Development trend.

1. INTRODUCTION

Today, with the increasing popularity of information technology, humanity has entered the era of "big data", and the emergence of various information processing systems has brought new challenges to information processing technology. In the environment of big data, traditional computer application technologies have significant drawbacks, so effective transformation and innovation must be carried out to meet the needs of social development. Since the emergence of computers, the large amount of information generated by big data has provided sufficient basis for improving and enhancing the service quality of computer applications, which is a very significant development opportunity. However, we must also constantly pay attention to and improve the way computers are applied, and continuously innovate in technology. Only in this way can we make more breakthroughs in technology and catch up with the development trend of the times. Wang et al. (2025) developed an end-to-end AI framework for autonomous driving, showcasing improvements in real-time decision-making and safety[1]. In clinical applications, Shen et al. (2025) proposed an AI system incorporating LSTM algorithms to optimize anesthetic dose management in cancer surgery, enhancing precision and reducing risks[2]. Meanwhile, Shan et al. (2024) investigated the cross-cultural implications of large language models (LLMs), revealing both opportunities and challenges in global deployment[3]. For computational efficiency, Xie et al. (2025) introduced RTop-K, an ultra-fast row-wise top-K selection method, significantly accelerating neural network operations on GPUs[4]. In healthcare and behavioral sciences, Lin et al. (2025) demonstrated that intelligent physical exercise monitoring improves executive function in children with ADHD[5], while Peng et al. (2025) explored the impact of aerobic exercise intensity on cognitive performance and sleep quality[6]. Luo et al. (2024) advanced logistics automation with a path-planning algorithm integrating Transformer and GCN networks, optimizing robotic navigation in complex environments[7]. Telemedicine innovations were examined by Ming et al. (2022), who validated the feasibility of post-hospitalization video visits for children with medical complexities[8]. Yuan (2025) further contributed to medical AI by proposing a self-supervised multimodal learning approach for tumor classification in chest radiography[9]. Legal and regulatory applications were addressed by Wang et al. (2025), who automated compliance audits using explainable LLMs to streamline regulatory processes[10]. In sustainable architecture, He et al. (2024) and Xu (2025) explored AI-driven design optimizations, focusing on energy efficiency and structural functionality in healthcare facilities[11][12]. Finally, Tang et al. (2024) employed big data to analyze regional housing supply-demand imbalances in the U.S., offering policy-relevant insights[13].

2. THE CONCEPT OF BIG DATA

Big data has characteristics far beyond conventional technologies and methods, capable of more profound analysis and processing of large amounts of information and databases, and is the core driving force behind the development of related technologies. The advantage of big data is that it has the characteristics of high capacity, high timeliness, and large scale, and can provide more precise services. It has become an indispensable part of social and economic life. Big data is not independent, and its synergy with other technologies, especially

represented by cloud technology, will unleash greater potential. Big data is an emerging technology that has deeply penetrated into the economic and social fields. With the advent of the big data era, data has transformed from simple numbers and symbols into a crucial information resource. Different types of data resources have been extensively excavated in the development process of various industries, especially in military, finance, communication, and other fields. These emerging big data technologies not only bring more vitality to companies, but also improve their information processing capabilities. Therefore, it is also the mainstream trend of current technological development.

3. PRACTICE FIELD OF COMPUTER APPLICATION TECHNOLOGY

3.1 Practical application of computer application technology in the field of agriculture

Undoubtedly, China plays a crucial role in agricultural production, and the widespread application of computer technology has significantly improved work efficiency, which can be reflected from multiple perspectives.

3.1.1 Improve work efficiency

The primary task is to improve work efficiency. Computers can convert a large amount of information into intuitive graphics and text, allowing people to more accurately understand the current growth status of crops and the occurrence and development of pests and diseases. Before planting crops, relevant personnel can use the production information network to obtain detailed production data, evaluate which crop has the best economic benefits in a more accurate way, and use agricultural big data to control the dissemination process reasonably, in order to better manage the distance between different plants.

3.1.2 Promoting crop growth and development

With the help of computer networks and advanced computer technology, we can efficiently monitor the growth of various crops, obtain timely information on water and nutrients required for each growth stage, and lay a solid foundation for the implementation of scientific fertilization, watering and other measures. Utilize modern information technology to optimize crop cultivation methods and improve the quality and safety level of agricultural products. In the process of agricultural planting, with the help of technological information networks, farmers can conduct in-depth analysis of the application amount of pesticides and fertilizers, thereby achieving widespread and efficient spraying. This not only saves time and energy, but also provides a healthier growth environment for crops, thereby increasing yield and increasing agricultural income from an economic perspective.

3.1.3 With the help of computer network technology, farmers can quickly understand the irrigation amount required for crops and send the information to relevant departments for easy viewing and improved management efficiency.

By using computer science to accurately set the spraying time and flexibly adjust the nozzle angle, precise control of crop water demand can be achieved, thereby continuously promoting the process of agricultural automation. Therefore, farmers can fully utilize information technology in their daily production and life, which not only reduces production costs but also improves work efficiency, making it a powerful support for promoting rural economic development. In addition, through remote computer operation, farmers can achieve monitoring of crop growth and pest control, thereby significantly improving work efficiency. With the rapid development of information technology and computer technology, computer application technology has become an indispensable tool for people's daily learning, work, and life. Secondly, with the help of online sales channels, farmers can sell their crops after harvest, thereby achieving the dual goals of economic benefits and avoiding unsold products. And computers have been widely used in agriculture, not only reducing labor costs, but also promoting the rapid development of modern agriculture in China. In the entire process of agricultural production, computer application technology plays a crucial role, providing farmers with rich and effective information, thereby improving the accuracy of farmers' decision-making, providing reliable guarantees for farmers' lives, and promoting the overall improvement of farmers' income.

3.2 Practical Application of Computer Application Technology in the Field of Education

In the big data environment, computer application technology plays a crucial role in teaching. Moreover, teaching by teachers can save a lot of time, in a sense, freeing students from the constraints of space and time, and improving the quality and efficiency of teaching.

Firstly, with the development of computer application technology, online courses have emerged. Online courses are essential for modern education because they can better fit students' lifestyles and improve their learning outcomes. Teachers can use computers and technological means to conduct various forms of teaching, thereby enhancing students' overall quality, broadening their horizons, and strengthening their self-learning ability.

Secondly, with the development of information technology applications, new media teaching platforms have emerged. Teachers can use other software such as WeChat to correctly deliver the corresponding teaching content to students, providing them with more learning opportunities and increasing their knowledge. In addition, teachers can also use the function of keyword reply on WeChat official account to set the key and difficult points of the course as a keyword, so that students can more easily obtain the key knowledge of this lesson, thus deepening their understanding of knowledge [3].

4. THE FUTURE DEVELOPMENT TRENDS OF COMPUTER APPLICATION TECHNOLOGY

4.1 Intelligent development

Artificial intelligence, as the main manifestation of intelligence in computer application technology, provides strong support for the development of computer intelligence. With the continuous progress and innovation of computer technology and Internet technology, artificial intelligence has become one of the most popular research goals and is widely used. Generally speaking, artificial intelligence demonstrates excellent learning ability, reasoning ability, and perfect logical judgment ability. It can mimic some human thinking patterns, think deeply, and make highly accurate decisions through analysis of information, effectively expanding human skills in specific areas. Currently, artificial intelligence has penetrated into multiple industries and plays an irreplaceable role, especially in certain special types of work where its auxiliary role is very evident. Overall, artificial intelligence is closely related to people's daily lives. For example, the use of Siri intelligent voice assistant in Apple phones can not only help people send text messages and make phone calls, but also interact with users. In the process of continuous development and progress of artificial intelligence, it has gradually been applied in various industries and achieved good results.

4.2 Implement information networking

In today's rapidly developing network technology, the connection between computer application technology and network technology is becoming increasingly close. The networking of computer application technology can not only better promote information construction, but also bring greater prosperity to communication technology. As the most basic science and technology in modern society, computer network technology is characterized by taking the Internet as the transmission medium. The internet has become an essential tool in people's daily lives, through which they can obtain the information they need to meet their dual needs of learning and entertainment. Against the backdrop of continuous improvement in socio-economic level and scientific technology, computer network technology has been widely promoted and applied, and will continue to be an important force in promoting the development of China's national economy in the foreseeable future. Traditional communication technology is the cornerstone of the development of computer application technology in the future evolution process.

4.3 Wide popularity

In today's increasingly developed computer application technology, its main service target has shifted to the general public, so popularization has become an important development trend in computer application technology in the future. In today's increasingly abundant computer products, people are becoming more and more dependent on computer products. Modern tools such as smart home appliances and smartphones have become necessities of people's daily lives. Therefore, the development of computer application technology will better serve the general public, provide more convenient and efficient services, and make people's lives more and more convenient. In today's increasingly advanced technology, various high-tech devices have gradually entered people's lives, such as mobile phones, tablets, and so on. In addition, smart TVs can also launch more targeted programs to meet users' personalized requirements based on their actual needs; Smart refrigerators will intelligently adjust the temperature

based on factors such as food types and freezing conditions to better improve people's quality of life. Promoting computer application technology can not only provide users with more convenient and effective services, but also improve China's economic level and promote the development of the national economy. Therefore, there is a higher demand for computer application technology.

4.4 Moving towards the direction of gigantism

In the current era of big data, data information transmission has shown highly interactive characteristics, requiring computer network data processing performance to match the data business processing requirements of computer equipment, thereby ensuring the rapid improvement of the actual operation quality of computer application technology. Therefore, in the future development of computer application technology, it is necessary to always take the expansion of scale as a breakthrough point, and on the premise of ensuring rapid response and necessary processing at the same time node, improve the processing efficiency and storage capacity of overall data business, in order to truly achieve the efficient development and progress of computer information system driven by technology.

5. STRATEGIES FOR PROMOTING THE DEVELOPMENT OF COMPUTER APPLICATION TECHNOLOGY

5.1 Strengthen government support

To promote the rapid and stable development of China's information industry, the Chinese government should increase its attention to computer application technology. Special funds can be established based on actual situations to encourage more researchers in the field of information industry to conduct in-depth research on computer application technology and provide sufficient funding. For companies with relatively high technological levels, the government should provide key funding to better mobilize their research enthusiasm and continue to promote the advancement of computer application technology. In addition, it is necessary to cultivate computer talents to provide a continuous supply of high-quality talents for the information industry. The second is to ensure the normal and stable operation of the computer market, which requires the government to formulate relevant laws and regulations based on market conditions to avoid obstacles to the development of the entire industry caused by factors such as monopoly.

5.2 Cultivate talents with computer application technology capabilities

The flourishing development of computer application technology is closely related to the cultivation of computer application technology talents. So it is necessary for us to strengthen research and discussion on the training program for computer science and technology professionals in education and teaching, in order to provide more outstanding talents in computer application technology for society. From the perspective of talent cultivation, this requires the government, enterprises, and schools to work together and make concerted efforts to do this job well.

At the school level, emphasis should be placed on students' professional ideological education and the imparting of professional knowledge, in order to provide more outstanding talents for society. To continuously mobilize the enthusiasm of computer professionals, China should establish necessary talent incentive mechanisms and take measures to prevent talent loss. At the same time, it is necessary to establish a sound vocational education system and strengthen students' skills training.

In order to improve the practical ability and technical level of employees, enterprises should increase training efforts and carefully formulate training plans, such as inviting experts to hold lectures or holding technical exchange conferences within the enterprise, to comprehensively enhance employees' computer application knowledge. We also need to attach importance to strengthening the ideological education of employees and promoting the improvement of their comprehensive quality, so as to bring more economic benefits to the enterprise. In addition, to further enhance the innovation capability of enterprises, it is necessary to carry out reasonable reforms in marketing methods, timely innovate product functions, and design more functional products based on actual user needs to ensure their applicability. We also need to strengthen talent cultivation and enhance the professional skills of staff by promoting their overall quality. With the development of enterprises, automation technology is organically combined with workflow, and office automation promotes the development of enterprise informatization. At the same time, in order to cultivate outstanding talents with a certain level of professional expertise, it is also necessary to strengthen school enterprise cooperation and establish corresponding teaching

teams within the enterprise, thereby providing more favorable conditions for students to receive education. Schools should continuously strengthen practical education, so that theoretical knowledge and practical skills complement each other, and promote students' comprehensive growth.

6. CONCLUSION

In summary, in the current era of big data, the widespread use of computers has become the main driving force for social progress, and computer application technology plays an essential role. Computer application technology mainly refers to the application of computers to achieve the processing and management of various types of information. With the widespread application of computer application technology in various fields, the technological level of various industries has been improved, effectively promoting the progress of China's economy and society, and driving the development of China's economy.

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