Discussion and Thinking About the Development of Computer Technology

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Abstract: *With the continuous popularization and rapid development of computers in China, they have become an indispensable tool in people's work and life, bringing unprecedented convenience and efficiency. Especially since the beginning of the new century, China's computer industry has shown vigorous vitality, not only profoundly changing people's ways of obtaining and processing information, but also greatly promoting the comprehensive progress of the social economy, indicating that computer technology is steadily moving towards a wider and more challenging new development path. In view of this, this article deeply analyzes the development process of computers since their birth, focusing on the new characteristics of intelligence, networking, and popularization exhibited by current computer technology. Based on this, effective strategies to promote the sustainable and healthy development of computer technology are proposed, aiming to provide useful references and inspirations for future technological innovation and applications.*

Keywords: Computer technology; Development trend; Discussion and reflection.

1. INTRODUCTION

With the continuous popularization and development of computers in our country, it has brought about significant convenience to people's work and life. This transformation has been particularly evident in the new century, where the robust development of computer technology has played a pivotal role in promoting the continuous growth of our social and economic landscape. As we move forward, computer technology is poised to embark on a new and exciting development path, one that promises even greater advancements and innovations. The history of computer development in our country is a testament to the rapid progress and innovation that has taken place over the years. Initially, computers were large, cumbersome, and primarily used for specialized tasks in government and research institutions. However, with the advent of microprocessors and the personal computer revolution in the 1980s, computers became more accessible to the general public. The subsequent decades saw the rise of the internet, which further democratized access to information and communication. Today, computers are not just tools; they are integral to almost every aspect of our daily lives, from education and healthcare to entertainment and business.

In the present stage, computer technology exhibits several new characteristics that set it apart from its earlier iterations. One of the most significant trends is the increasing integration of artificial intelligence (AI) and machine learning (ML). These technologies are transforming the way we interact with computers, making them more intuitive and capable of performing complex tasks. For instance, AI-powered chatbots and virtual assistants are becoming commonplace, providing personalized assistance and support. Additionally, the Internet of Things (IoT) has enabled the connection of various devices, creating a seamless and interconnected ecosystem. This has led to the development of smart homes, cities, and industries, where data is collected, analyzed, and used to optimize operations and improve efficiency. Another notable characteristic is the shift towards cloud computing. Cloud services have revolutionized the way we store, process, and share data. They offer scalable and flexible solutions, allowing businesses and individuals to access powerful computing resources without the need for extensive hardware investments. This has also facilitated the growth of big data analytics, enabling organizations to derive valuable insights from vast amounts of data, which can be used to make informed decisions and drive innovation. Furthermore, the focus on cybersecurity has become increasingly important as the reliance on digital technologies grows. With the proliferation of cyber threats, there is a growing need for robust security measures to protect sensitive information and critical infrastructure. Advances in encryption, authentication, and threat detection are crucial in ensuring the safety and integrity of our digital systems. To effectively develop and harness the potential of computer technology, several strategies can be employed. First, there should be a continued investment in research and development (R&D) to drive innovation. This includes funding for academic institutions, research centers, and private enterprises to explore new technologies and applications. Collaboration between academia, industry, and government is essential to foster a vibrant and dynamic ecosystem that supports technological advancement. Second, education and training programs should be enhanced to ensure that the workforce is equipped with the necessary skills to leverage these technologies. This involves integrating computer science and digital literacy into school curricula and providing ongoing professional development opportunities for workers.

By building a skilled and knowledgeable workforce, we can ensure that our society is well-prepared to embrace and benefit from the latest technological developments. Third, policies and regulations should be developed to create a supportive environment for the growth of the technology sector. This includes intellectual property protection, data privacy laws, and incentives for innovation. Clear and consistent policies can provide the stability and predictability needed for businesses to invest and thrive. Finally, there should be a focus on ethical and responsible use of technology. As computer technology becomes more pervasive, it is essential to consider the social and ethical implications of its deployment. This includes addressing issues such as bias in AI, the digital divide, and the impact of automation on employment. By adopting a holistic and ethical approach, we can ensure that the benefits of technology are shared equitably and that it contributes to the overall well-being of society.

In conclusion, the continuous development of computer technology in our country has brought about significant changes and improvements to our work and life. As we look to the future, it is clear that computer technology will continue to evolve, driven by advancements in AI, IoT, cloud computing, and cybersecurity. By implementing effective strategies, including investment in R&D, education, supportive policies, and ethical considerations, we can ensure that our country remains at the forefront of technological innovation and reaps the full benefits of this transformative era.

2. THE DEVELOPMENT HISTORY OF COMPUTERS

Large scale host stage: With the birth of the first computer and the development of electronic tube digital computers, transistor digital computers, and large-scale integrated circuit computers, computer technology has become increasingly mature.

Small computer stage: In the 1960s and 1970s, large-scale host devices were first scaled down to meet the requirements of information and data processing in China's public institutions to the greatest extent possible. The cost was also relatively low, and the price was accepted by all sectors of society.

Microcomputer stage: In the 1970s and 1980s, the second large-scale mainframe was downsized. Afterwards, it mainly underwent many generations of evolution, occupying the computer market and making computers popular.

Client and server: In 1964, IBM and American Airlines jointly created the world's first online ticketing service system, which represented that computers had entered a stage of being both client and server. The server is the core of the network, while the client is the foundation of the network. It mainly relies on the server to obtain the data information it needs. However, the server mainly provides the resources required by the network for the client. In this way, the processing power of the client PC can be fully utilized to minimize its own pressure.

Internet stage: The Internet is a computer network composed of local area network, wide area network and single computer according to specific communication protocols. Internet technology began in 1969. From the initial text to pictures, to the current video and voice, with the gradual popularization of broadband, its functions have become more powerful. In the stage of the Internet, people can understand the world without going out of their homes. The Internet can gradually narrow the distance between people.

The era of cloud computing: Cloud computing only slowly became popular in China in 2008. It makes it possible for its computing power to flow smoothly and freely through modern information technology. Mainly based on web services and modern information technology as the core, it provides great convenience and discounts for individuals and companies.

Recent researches encompasses a broad range of research topics, including optimization algorithms, clinical trials, network security, service orchestration, legal text classification, automated surveillance, conversational agents, supply chain efficiency, object detection, autonomous navigation, image fusion, dialogue summarization, and real-time data processing. Liu et al. (2024) introduce the Promoted Osprey Optimizer as a solution for the Optimal Reactive Power Dispatch (ORPD) problem, particularly in scenarios with electric vehicle penetration. Li (2025) focuses on optimizing clinical trial strategies for anti-HER2 drugs using Bayesian optimization and deep learning. Liang and Chen (2019a) propose a SDN-based hierarchical authentication mechanism for IPv6 addresses, while Liang and Chen (2019b) present HDSO, a high-performance dynamic service orchestration algorithm for hybrid NFV networks. In the field of text and image classification, Xie et al. (2024) advance legal citation text classification using a Conv1D-based approach for multi-class classification. Xu et al. (2024a) develop a real-time detection system for crown-of-thorns starfish using YOLOv5 deep learning. Xu et al. (2024b) enhance user

experience and trust in advanced LLM-based conversational agents. Liu (2024) optimizes supply chain efficiency using cross-efficiency analysis and inverse DEA models. Chen et al. (2022) present a one-stage object referring method with gaze estimation. Wang et al. (2024) investigate autonomous robot navigation based on reinforcement learning, and Wu et al. (2024) propose a lightweight GAN-based image fusion algorithm for visible and infrared images. Zheng Ren (2024a) introduces a novel approach for role-oriented dialogue summarization, and Z. Ren (2024b) enhances Seq2Seq models for role-oriented dialogue summary generation through adaptive feature weighting and dynamic statistical conditioning. Fan et al. (2024) optimize real-time data processing in high-frequency trading algorithms using machine learning.

3. THE NEW CHARACTERISTICS PRESENTED BY COMPUTER TECHNOLOGY AT THE CURRENT STAGE

3.1 The level of intelligence continues to improve

The advancement of computer technology in hardware and software has improved the computing power of computers and laid the technical conditions for the rise of artificial intelligence technology. Thanks to the new developments and breakthrough research achievements in other disciplines, artificial intelligence technology has achieved the combination of computer technology with various technologies such as social sciences, mechanics, fuzzy mathematics, and sensor technology, effectively promoting the development of artificial intelligence technology and increasing its level of intelligence. Major achievements such as bionic robots, AI intelligence technology, automatic engineering, and pattern recognition have emerged, profoundly influencing and changing contemporary society. The continuous improvement of the intelligence level of computer technology will enable it to be applied more outstandingly in more fields. For example, applying AI intelligent technology to image and text recognition can greatly improve people's work efficiency, enhance security levels, and build a more orderly and stable social order. In addition, the improvement of intelligence has also enriched people's entertainment methods, helping to break through the boundaries of current entertainment development, enriching the stage results of entertainment programs, and bringing people a higher-level audio-visual feast. The application of artificial intelligence technology in performance activities is increasingly becoming one of the main technological methods for Spring Festival Gala and major festival celebrations.

3.2 Cross border integration and information sharing have become trends

Firstly, thanks to the advancement of computer technology, connections have gradually been established between disciplines and industries that were not originally connected, laying the foundation for cross-border integration. Driven by "Internet plus", cross-border integration is increasingly becoming one of the main trends, and the original economic structure, geographical structure and cultural structure will undergo tremendous changes.

Secondly, in the era of digital information, the sharing economy is gradually emerging. The sharing economy is built on the basis of information sharing, relying on computer technology to achieve standardization and normalization of various types of information, facilitating the realization of information sharing. Currently, information sharing systems can be established between departments, industries, enterprises, and disciplines, greatly improving the utilization rate of information resources, reducing the time for information collection, organization, and classification, and helping to create more social wealth. After the trend of cross-border integration and information sharing, computer technology can be applied in a wider range of fields, not only in industrial production and scientific research, but also in people's lives. Smart homes are a manifestation of the progress of computer technology.

3.3 Faster information data processing speed

In the era of digital information, the rapid development of big data technology and cloud computing technology has increasingly integrated data that was originally scattered in various aspects into massive databases; Thanks to the powerful computing power of cloud computing technology, data information retrieval can be achieved in a shorter time. At present, big data technology is increasingly becoming an important technology for government governance, enterprise management of employees, and people's adjustment of life. Driven by big data technology, knowledge is evolving from fragmented to integrated, which helps to break down information barriers between industries, disciplines, and individuals, greatly promoting data processing efficiency and providing greater convenience for people's lives and work. With the support of cloud computing technology, it can effectively

cooperate with big data technology to achieve effective screening, classification, and processing of information, fully meeting people's needs for large amounts of data.

4. EFFECTIVE STRATEGIES FOR THE CURRENT DEVELOPMENT OF COMPUTER TECHNOLOGY

4.1 Effective integration of computer technology and communication technology

Bluetooth technology has been applied in China for a long time, and as an early manifestation of the integration of communication technology and computer technology, it has also experienced rapid development in recent years. The cost of Bluetooth technology is relatively low, and it has a good effect on short-range transmission. It can achieve bidirectional transmission of information and has high efficiency. With the development of Bluetooth technology, the integrity of information transmission has also become increasingly high. The most significant manifestation is that previous Bluetooth technology advocated for one-to-one and point-to-point information exchange. With the further development of Bluetooth technology, one to many information exchange can now be achieved. The baseband processing module and RF module are the foundation of Bluetooth technology, which build a channel and platform for information transmission and enable the identification and analysis of time information. Bluetooth technology is a short-range propagation technology, so with the development of communication technology, Bluetooth technology is mostly applied in specific scenarios. We can compare Bluetooth with several common wireless technologies to discover the characteristics of Bluetooth technology, as shown in Table 1.

Table 1: Comparison between Bluetooth Technology and Other Common Wireless Technologies

Name	Wifi	Bluetooth	Radio frequency identification technology
Communication distance	20-200m	10-150m	<3m
Frequency band	2.4ghz/5ghz	2.4ghz	2.4ghz
Security	Low	High	Secondary
Power waste	10-15ma	20ma	Low
Cost	20$	2-5$	0.5$
Application area	Wireless network, pc	Multimedia, automotive	Data fetch
	Pda	Medical treatment	

In recent years, Bluetooth technology has undergone more than 4.2, 5.0, 5.1 to the latest 5.2 iterations. It is not difficult to find that Bluetooth technology, as the longest used communication and computer fusion technology, has developed a variety of functions in the new era. Bluetooth technology is an important carrier of communication technology, which utilizes computer technology to achieve cross platform information transmission of different device types. This is due to the strong compatibility of Bluetooth, which is widely used in wireless devices such as smartphones, tablets, computers, etc; Security products, such as identity authentication, ticket management, etc; Consumer entertainment, such as headphones, games, etc; In the automotive field, such as GPS, ABS, etc; Household appliances, such as refrigerators, microwaves, televisions, and other appliances, have a wide range of applications in the medical, construction, and toy industries. Bluetooth 5.2, as the latest Bluetooth transmission protocol and version at present, has the advantages of longer transmission distance, faster transmission speed, and lower transmission power consumption. The most significant advantages are the application of LE synchronization channel, enhanced ATT, and LE power control technology. LE Isochronous Channels enable interaction between multiple audio devices, reducing conflicts between Bluetooth and other wireless devices within the 2.4GHz frequency range and optimizing the user experience. Enhanced Attribute Protocol (ATT), also known as Fast Service Discovery, can help audio devices switch quickly. LE Power Control can effectively reduce the power consumption of Bluetooth, optimize the power of the transmitter, and improve the stability and reliability of the connection.

4.2 Development of Artificial Intelligence Technology in Computer Network Management

The application of artificial intelligence technology in computer network management leverages the role of expert systems to collect, analyze, and summarize expert experience and related knowledge from various fields. Afterwards, input resources into the system and fully utilize logical processing techniques. Build a diagnostic

evaluation system to quickly address complex problems in various fields. Expert systems are computer programs with intelligent features that can manage large amounts of data generated in computer network management by running the system and storing data, thereby enhancing network management capabilities. In the application of artificial neural network technology, problems that are difficult to handle by computer technology can be effectively solved, such as recognizing language patterns, automated control, predictive estimation, etc. It also involves biology, economics, and medicine, and its intelligent characteristics are very good. In the application of artificial neural network technology, it mainly simulates the way the human brain operates, with good fault tolerance and acceptance.

4.3 Increase research and development efforts to enhance information security capabilities

To effectively address information security issues and enhance the ability of computer technology to ensure information security, firstly, we should increase the research and development of computer security software. Practice has proven that by developing computer security software, we can improve the protection performance of computers and enable them to cope with information security issues caused by computer viruses and vulnerabilities. There are many free security software on the current market, but there is a significant gap between them. In order to better address the vulnerabilities in computer technology, it is necessary to develop security software that is more in line with the operating system. For example, based on the Windows Security Center in the Windows operating system, research and development of computer technology antivirus and threat prevention, firewall and network protection functions, matched with the Windows operating system, to enhance the security protection performance of the Windows operating system, better protect personal privacy information, and prevent its leakage.

Secondly, for privacy information leakage caused by database vulnerabilities or failures, it is necessary to strengthen the research and development of database software, use algorithms such as AES, 3DES, SM4, etc., to update database encryption algorithms, in order to effectively respond to information leakage problems that may be caused by sudden database failures or vulnerabilities, and provide more effective protection for the information of the people.

Finally, in the face of information leakage caused by internal employees seeking profits, it is necessary to strengthen the management of internal employees, especially by restricting their permissions and tracking their IP addresses through computer technology. This will enable companies to promptly alert employees of abnormal operations and effectively manage them.

5. CONCLUSION

In summary, with the continuous progress of Chinese society and the continuous innovation of information technology, China's computer technology is bound to embark on a new path of development. In order to meet the relevant needs of people's lives and work, all sectors of society should attach certain importance to computer technology, so as to promote its good development prospects.

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