Reflection on the Development Direction of Applied Talents in Computer Majors in the New Era

Jiang Qiongqin[1,2] & Song Wenguang[1*]

[1]School of Computer Science and Engineering, Guangdong Ocean University, Yangjiang, China, 529500
[2]School of Computer Science, Yangtze University, Jingzhou, China, 434023

Abstract: With the new engineering construction requirements and the concept of new quality productive forces put forward, higher and more specific requirements have been put forward for the cradle of innovative new quality talent in universities, especially for the computer science and technology major in the forefront of scientific and technological innovation. The article first introduces the basic concepts and principles of computer science and technology, emphasizing its wide application in modern society. Then it focuses on exploring the modern application of computer science and technology in areas such as artificial intelligence, big data analysis, blockchain technology, internet of things, and cloud computing, along with application cases and future trends. Through exploration, it introduces the current status and future trends of related fields in computer science and technology, providing goals and measures for the development of applied talents in computer science and technology, and offering references for cultivating new quality productivity talents in the field of computer science and technology.

Keywords: Computer Science and Technology Applied Talents; Development Direction; New Quality Productivity Forces

1. Introduction

In 2023, General Secretary Xi Jinping pointed out the need to integrate resources for technological innovation, lead the development of strategic emerging industries and future industries, and accelerate the formation of new quality productive forces [1]. The new quality productive force mentioned here is a productivity dominated by technological innovation, breaking away from the traditional growth path, meeting the requirements of high-quality development, and being a more integrated and connotative productive force in the digital era.

The proposal of new quality productivity forces, combined with the construction requirements of the new engineering disciplines put forward by the Ministry of Education, has put forward new tasks for universities that are the main force in cultivating innovative talents. Technologies such as Artificial Intelligence, big data, blockchain, cloud computing, and Internet of Things, which are in the wave of new digital technologies [2], have become key innovation drivers and also need to consider the development direction of the next stage under the application-oriented talent cultivation mode of computer science [3].

This article takes the major of computer science and technology as an example to explore the development prospects in the fields of artificial intelligence, big data analysis, blockchain, and Internet of Things technology under the background of new quality productivity forces and the construction of new engineering disciplines. Based on introducing the basic concepts and principles of computer science and technology, it focuses on the applications of four modern fields: artificial intelligence, big data analysis, blockchain technology, Internet of Things, and cloud computing. Finally, it summarizes the importance of computer science and technology in modern applications and proposes directions for further research and development. Through exposition, the aim is to deepen the understanding of the specific manifestations and impacts of the modern application of computer science and technology in different fields, as well as the challenges and future development trends.

2. Overview of computer science and technology

2.1 Concepts and principles of computer science and technology

Computer science and technology is the discipline that studies computer systems, algorithms, programming, and data processing, involving the design, development, application, and optimization of computer hardware and software. The fundamental concepts of computer science and technology include computer architecture, operating systems, programming languages, data structures and algorithms. Its principles mainly involve the basic principles of computer operation, information representation and processing, computer networks, and databases. Students majoring in computer science and technology need to systematically master the relevant basic theoretical knowledge[4], and have strong practical and innovative abilities, all of which are the foundation for understanding and applying modern computer technology; understanding the basic concepts and principles of computer science and technology is of great significance for solving practical problems, optimizing the use of computing resources, and creating new technologies and applications.

2.2 Application of computer science and technology

Computer science and technology have a wide range of applications in modern society. From personal life to the business field, from scientific research to social management, relevant applications are everywhere. In terms of personal life, the application of computer science and technology includes personal computers, smart phones, smart homes, etc., which provides convenient ways for information access and communication, and changes people's lifestyles and habits. In the business field, relevant applications are widely involved in finance, e-commerce, marketing, supply chain management and so on. Computer science and technology provide efficient data processing and management tools to support enterprise decision-making and business process optimization, and also give rise to new business models and innovations such as the sharing economy, electronic payments, etc. In scientific research, the application of computer science and technology plays an important role in data analysis, simulation, modeling and scientific computing, etc. It provides powerful computing capabilities and algorithm tools, accelerating the process of scientific discovery and research. For example, in the field of biomedicine, it can help with the analysis of genomic data, assist in disease diagnosis, and drug design research. In social management, its application improves the efficiency and quality of public services. For example, in traffic management, it can optimize traffic flow, provide intelligent traffic systems and navigation services, reduce traffic congestion and environmental pollution. In urban planning and management, it can realize the construction of smart cities, providing intelligent public facilities and services.

3. Applications in the field of Artificial Intelligence (AI)

3.1 Basic concepts and technologies of AI

AI is an important branch of computer science and technology that aims to enable computer systems to simulate and mimic human intelligence. The knowledge system of AI includes machine learning, deep learning, natural language processing, and computer vision. Machine learning is one of the core technologies of AI, which enables computer systems to learn and improve their performance from experience through data and algorithms. Deep learning is a machine learning method based on neural networks, simulating the working mode of the human brain through multi-layered neural network structures. Natural language processing and computer vision respectively involve the understanding and processing of natural language and images by machines.

3.2 Application cases of AI in the fields of healthcare, finance, transportation and energy

AI has a wide range of application cases in various fields such as healthcare, finance, transportation, and energy. In the healthcare field, it can be used for disease diagnosis and treatment plan formulation. For example, medical image analysis based on deep learning can assist doctors in accurately detecting lesions in images such as CT scans and MRIs. In addition, AI can also utilize big data to analyze medical records and physiological data, providing personalized diagnosis and treatment recommendations to doctors. In the financial field, it can be applied to fraud detection, risk assessment, and transaction optimization. By analyzing large amounts of transaction data and user behavior patterns, AI can identify abnormal transactions and risk events, providing real-time alerts and decision support. In the transportation field, it can be applied to traffic management and intelligent transportation systems. For example, AI-based traffic prediction models can accurately predict traffic flow and congestion, optimizing traffic signal timing and route planning. In the energy field, it can be applied to energy production, management, and intelligent development. For example, in the oil and gas exploration and production field, AI technology can

analyze and process massive geological data, helping engineers more accurately locate the distribution and reserves of oil and gas resources, improving the efficiency of resource exploration and development. Furthermore, AI can optimize and control the energy production process, reducing energy losses and pollution.

4. Applications in the field of big data

4.1 Concept and importance of big data analysis

Big data analysis refers to the process of collecting, storing, and analyzing large amounts of structured and unstructured data to extract valuable information and insights, and support decision-making and actions. With the rapid development of the Internet, sensor technology, and digitization, data generated in daily life is growing exponentially, requiring the use of big data analysis to discover patterns, trends, and relationships in the data, thereby driving innovation and growth. The importance of big data analysis lies in its ability to help businesses, organizations, and individuals better understand customer needs, optimize business processes, identify market opportunities, and make strategic decisions.

4.2 Examples of big data analysis in marketing, social media, decision support

Big data analytics has a wide range of applications in marketing, social media, and decision support. In marketing, big data analytics can help companies understand consumer purchasing behavior and preferences, thus enabling precise targeting of markets, optimization of product pricing, and promotion strategies. By analyzing consumer trends, market competition, and sales data in big data, companies can develop more effective marketing plans, increase sales, and market share. In the field of social media, big data analytics can be used to explore users' social networks, interests, and emotions, thereby achieving personalized recommendations, social advertising, and sentiment monitoring. By analyzing users' interactions, content sharing, and comments on social media, companies can understand user's needs and feedback, improve products and services, and enhance user experience. In terms of decision support, big data analytics can provide data-driven decision support for management. By collecting and analyzing internal and external big data, management can make decisions based on facts and insights, optimize resource allocation, improve operational efficiency, and reduce risks. Big data analytics can also help companies predict market changes, optimize supply chain management, and formulate strategic planning.

5. Application in the field of Internet of Things (IoT)

5.1 Basic concept and architecture of IoT

IoT refers to connecting various physical devices, sensors, and objects through the internet to form a network of interconnected devices. The architecture of IoT includes the perception layer, the transmission layer, the application layer, and the management layer. The perception layer consists of various sensors and devices used to collect environmental information and data. The transmission layer is responsible for transmitting collected data to cloud platform or other application systems. The application layer is the core part of the IoT, used for processing and analyzing data, and providing various applications and services. The management layer is responsible for monitoring and managing the operation and security of the IoT system.

5.2 Applications of IoT in smart homes, smart cities, and industrial production

IoT has a wide range of application cases in areas such as smart homes, smart cities, and industrial production. In terms of smart homes, IoT can achieve the interconnection of home devices, such as smart lighting, smart home appliances, and smart security, providing convenient and intelligent home living experiences through remote control and automation. In the field of smart cities, IoT can be used for monitoring and managing urban infrastructure, such as smart transportation systems, smart energy management, and environmental monitoring. By sensing and collecting various data in the city, IoT can optimize urban traffic flow, improve energy utilization efficiency, enhance environmental quality, and improve the quality of life for citizens. In industrial production, IoT can achieve remote monitoring and automated control of equipment, enhancing production efficiency and quality. By connecting various industrial equipment and sensors to the IoT, real-time monitoring of equipment

status and fault prediction can be achieved, thereby reducing downtime and enhancing production efficiency.

In the future, the development of IoT will be more popular and widely used in various fields, including home, cities, industry, healthcare. By mining and analyzing data, IoT can further focus on the value and analysis of data, providing more intelligent applications and services. In addition, IoT will be combined with technologies such as AI, big data analysis, and edge computing to form more intelligent and efficient systems and solutions.

6. Applications in the field of cloud computing

6.1 Basic concepts of cloud computing

Cloud computing is a form of computing based on the Internet, through which shared software and hardware resources and information can be provided on demand to computers and other devices. Cloud computing is a service that pools resources together to provide computing and storage resources as needed. Cloud computing can provide several services: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). IaaS provides computer infrastructure such as servers, storage devices, and network equipment. PaaS provides resources and tools needed for application development and deployment, such as application frameworks, databases, message passing systems. SaaS provides software applications such as email, CRM, and human resources.

6.2 Application cases of cloud computing in enterprise IT and retail industry

In the enterprise IT field, cloud computing can provide a variety of services, including computing, storage, databases, networks. These services can be provided in the form of infrastructure, platform, or software in the cloud, thus eliminating the need for enterprises to build and maintain their own infrastructure. Specific used cases include: Enterprise Resource Planning (ERP): With cloud computing, enterprises can deploy ERP systems in the cloud, reducing the costs of hardware and software purchase, maintenance, and upgrades. Enterprises can use cloud service providers' ERP solutions or migrate their existing ERP systems to the cloud. Customer Relationship Management (CRM): With cloud computing, enterprises can deploy CRM systems in the cloud, allowing employees to access data anytime, anywhere, increasing work efficiency. Additionally, CRM system data can be integrated with other cloud services to provide more comprehensive customer information. Enterprise email and collaboration tools: many cloud service providers offer enterprise email and collaboration tools, such as Google's G Suite and Microsoft's Office 365. These tools can improve employee collaboration efficiency and integrate with other cloud services as well.

In the field of retail, cloud computing can provide various functions to support retail business, including e-commerce websites, inventory management, and logistics. Specific use cases include: E-commerce websites: through cloud computing, companies can quickly deploy and manage their own e-commerce websites, allowing customers to make purchases anywhere and anytime. At the same time, cloud computing can also provide various analysis tools to help companies understand the behaviors and needs of customers, thus optimizing sales strategies. Inventory management: through cloud computing, companies can track and manage inventory in real time to ensure the accuracy and timeliness of inventory. Additionally, cloud computing can provide various analysis tools to help companies predict future sales trends, enabling them to plan inventory in advance. Logistics: companies can use cloud computing to track and manage logistics information in real time, ensuring that goods are delivered to customers accurately and on time. Cloud computing can also provide various analysis tools to help companies optimize logistics efficiency and costs.

In the future, with the continuous development of technologies such as AI, big data analysis, and machine learning, cloud computing will be more deeply integrated and applied with these technologies to provide more intelligent services and applications. Additionally, cloud computing will be more closely integrated and applied with emerging fields such as the Internet of Things and industrial internet to drive rapid development and innovation in these fields.

7. Conclusion

The modern application of computer science and technology plays an important role and has a wide impact on today's society. By introducing computer science and technology, automated, intelligent, and efficient solutions can be achieved, driving innovation and development in various fields. The development of modern applications such as AI, big data analysis, and the internet of things has already achieved great success in energy, healthcare, finance, transportation, and marketing. These applications not only improve production efficiency and service quality, but also bring a more convenient, intelligent, and comfortable life experience.

While leading social innovation and development, there are also many challenges and opportunities. These pose higher expectations and requirements for students majoring in computer science and technology [5]. In order to effectively promote the alignment between the training of applied talents in computer disciplines at ordinary undergraduate colleges and the needs of social enterprises, on the one hand, it is necessary to upgrade the professional construction scheme, revise the talent training objectives, and reconstruct the system of training applied talents; on the other hand, it also requires teachers to improve teaching methods and tools, actively explore diversified teaching modes, and promote the organic unity of theory, application, and practice. Formulate comprehensive talent training objectives guided by the requirements of the construction of new engineering disciplines and the engineering of complex problems, with theoretical knowledge as the foundation, practical ability and innovation ability as tools, national and industry demands as drivers, deep integration, and dedication to creating new productive forces belonging to the field of computer science and technology.

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Corresponding author: Wenguang Song was born in Wuhan，Hubei，P.R. China, in 1979. Now, he works in school of Computer Science and Engineering, Guangdong Ocean University. His research interests include software engineering, petroleum software technology and big data analysis. E-mail: songwg@gdou.edu.cn