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Analysis of the development of computer science and its future trend

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Abstract. Computer science is one of the most influential innovations of the last century, including data structures, computer and network design, modeling data and information processes, and artificial intelligence. With the development of computer science, more and more people begin to pay attention to the importance of computers. This paper tells the history of computer science, and introduces some frontier technology of computer science. Computers have greatly improved people's work and lifestyle, developed modern society, and become an indispensable part of people's lives. Computers have entered the era of artificial intelligence, which has a major impact on the development of human society.

Keywords: computer science, technology, artificial intelligence.

1. Introduction

With the further innovation of science and technology, the functions of computer science and technology played in social production, human life, cultural entertainment and other fields are also increasing. The role of computer in promoting social and economic development will be more significant [1]. The impact of development is crucial both from economic and social perspectives. Enterprises with leading technologies (such as openAi) have a strong competitive advantage in technological competition. What is a computer? What is Computer Science? How does a computer work? This paper explores the history of the computer, including its theoretical foundations, its original inventors, and how it evolved from a clunky machine to the amazingly powerful productivity tool it is today. The development of computer science and technology is not only a technological innovation, but also it is a profound influence on the economy, politics, culture, military and other aspects. In modern society, computer plays an irreplaceable role [2].

Computers are not only used in various fields of economic and social life. However, it fits perfectly with education, military, law and other fields, showing different development trends. Therefore, the development of information technology is of great significance to human society, and almost all innovations today are inextricably linked with information technology. The dissemination and development of information is highly dependent on computers. Enterprises with leading technologies (such as openAi) have a strong competitive advantage in technological competition.

Today, information technology has penetrated into every aspect of productivity and human life. People's quality of life and productivity have been greatly improved. In the social development, computers are becoming more and more popular in daily life, and large-scale computer production

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enterprises began to appear [3]. It will greatly promote social development. With the advancement of information technology, production and human life are inextricably linked with computers. This makes the advantages of digitization even more apparent. From the first mechanical computer invented by German scientist W. Schickard to countless desktop and laptop computers today. People never stop improving their computers. At the same time, we are also exploring the limits of computer imagination with supercomputers and artificial intelligence. In this article, we will review the history of computer development. List its great impact on human society and the expectations for this research. This study helps to better understand the trends in information technology and the increasing standard of living in today's society.

2. Analysis of the development of computer science

2.1. The history of computer science

In 1623, German scientist Wilhelm Schickard (German: Wilhelm Schickard) invented Europe's first calculator - a "counter clock" that could add or subtract six numbers to get an answer. In 1912, young American DeForest invents the first electron tube amplification effect in the small town of Palo Alto, laying the foundation for the electronics industry. Alan Matheson Turing presented "Computability and its application to decision problems". In 1924, the father of Silicon Valley, Terman was a professor at Stanford University and played a decisive role in founding HP and the Stanford Industrial Park. In February, Hollerith's printer company expanded several times, eventually changing its name to International Business Machines Corporation (now his IBM). On December 23, 1947, Shockley (William B. Shockley), Bratton (John Bardeen) and Bardeen (Walter H. Bratten) of the Bell factory create the world's first solid-state amplifier. The device was renamed "Transistor". On April 7th, 1953, IBM released his IBM 701, the first electronic computer. On February 6, 1959, T. I. Kilby unveiled the first radio his transistor at the "Semiconductor Integrated Circuits" Patent Office. In 1968, at the University of California, his Dr. Douglas Englebart invented the world's first mouse. By the way, the code is progressed by the computer and the pointer can be moved around the screen. E. Roberts, a computer science student, releases his own product in 1974. His father, Don Estage, led the development team and completed the research and development of the IBM Personal Computer and IBM PC, His Linux. Torvalds, a Finnish student born in 1991, developed and released his Unix-based Linux operating system. It is the open source movement that spread the source code all over the world through the internet, and Linux itself slowly matured into an operating system after adding countless programs all over the world, and gradually spread all over the world.

2.2. Theoretical basis of computer

In the actual working process of the computer, it mainly performs fast calculation and processing of relevant data automatically according to the relevant instructions set by people in advance, and the presets in the computer are reflected by the relevant instructions. The sequence of instructions is the program. The relevant operations performed by the computer are regulated by relevant instructions, and the computer can complete the overall task according to the stipulations of the program. The set of related instructions that the computer can recognize is called the instruction system, and the instruction system mainly includes single-address and two-address instructions, of which the first byte belongs to the operation code, which mainly stipulates that the computer needs to perform relevant basic operations, and the second byte It is an operand, and its main purpose is to enable the computer to carry out corresponding work according to the instructions. In the actual execution process of the computer, it is necessary to store the relevant program and data in the internal memory. In the actual program execution process, the CPU can take out the instruction according to the content of the program pointer register, and execute the instruction. After completing an instruction afterwards, another instruction is fetched and executed, and the loop continues in this way until the execution is stopped until the end of the instruction. In the actual working process of the computer, it needs to involve many aspects of hardware equipment and software equipment. On the basis of these

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equipment, the computer can be guaranteed to run well, and the functions and functions of various aspects can be better played, so that it can be better applied.

2.3. The future of computer: artificial intelligence

2.3.1. The impact of artificial intelligence on the world. With the popularization and interconnection of various smart terminals, in the near future, people will not only live in a real physical space, but also in a digital, virtual simulated cyberspace [4]. After the idea of artificial intelligence was proposed, scientists and engineers have never stopped exploring technology. Today, artificial intelligence has revolutionized advanced technologies and common applications. Deep learning, natural language processing, and machine learning are the fields of artificial intelligence. Artificial intelligence is already affecting the world. Back in 2016, Alpha Go developed by Google and the world's top Go master. The war of the century, which was taught by Li Shishi, has attracted the attention of hundreds of millions of people. Note, also pushed artificial intelligence technology to a climax [5]. The technology company OpenAi launched its unique product ChatGPT and gained 100 million users at a very fast speed. Artificial intelligence is getting closer and closer to us. Artificial intelligence is a futuristic technology of the 21st century digital age. Enhanced research and the use of artificial intelligence can increase productivity. At the same time, if the society allows artificial intelligence to develop disorderly, it will not only hinder the development of human intelligence, but also very likely cause harm to the society. So AI brings us opportunities and progress, but don't forget the regulation of AI. In fact, how should human beings make proper use of human beings? Artificial intelligence is the real direction of future artificial intelligence. Artificial intelligence and its labor revolution have swept the contemporary social and political economy. The unprecedented furor in every corner of economic life has shown the world a splendid picture of the development of artificial intelligence, but it has also triggered people's core concerns [6]. Human beings have come to a crossroads, face up to the widespread alienation that has been or is coming, and how to respond to the era of artificial intelligence. Obviously, it is no longer feasible to fully use the existing theories and methods formed in the pre-AI era [7].

2.3.2. Deep learning. At present, there is a large amount of data in the Internet, user data, the Internet, financial companies and other directions. BP algorithm has the drawbacks of increasingly sparse gradient for training neural network, convergence to local minimum value can only be trained with labeled data, and so on. The CPU and GPU computing power have been greatly improved, which provides hardware platform and technical means for in-depth learning. The problem of over-fitting and poor generalization ability of early neural network training has been solved on the massive data processing technology. Big data and in-depth learning will support each other and promote the development of science and technology. Speech recognition technology mainly includes feature extraction technology, pattern matching criteria and model training technology. Its applications mainly include voice input system, voice control system and intelligent dialogue query system. Speech recognition greatly promotes the rapid development of artificial intelligence. Cyclic neural network is a neural network specially used for processing time series data. The biggest difference between it and the typical feed forward neural network is that there are ring knots in the network. The neurons in the hidden layer are interconnected and can store the inside of the network State, which contains the history information of the sequence input, and realizes the dynamic behavior of the sequence of description. The time sequence here not only refers to the conceptual order of time, but also it can be understood as the relative position between serialized data, such as the order of pronunciation in pronunciation Spelling order of English words, etc [8].

In 1952, “Davis et al. studied the world's first experimental system to recognize the pronunciation of 10 English numerals.” Large-scale speech recognition research has made substantial progress in the recognition of small vocabulary and isolated words since the 1970s. In 2012, Microsoft Research made a breakthrough in using deep neural networks to reduce recognition error rates by 20% in speech

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recognition. Images are the earliest field of application to learn more. In 1989, LeCun and his colleagues published the work of convolution neural networks. In 2012, Hinton and two of his students took the first place in the ImageNet challenge with a deeper CNN, making image recognition a big step forward.

Since 2012, the application of in-depth learning in image recognition has greatly increased the accuracy, avoided the time consumed by manual feature extraction, greatly improved the efficiency, and has gradually become the mainstream of image recognition and detection methods. The main form of machine learning is supervised learning, whether deep or not. Learn or set up a pattern from the training set and infer new instances based on this pattern. The training set consists of corresponding inputs and expected outputs. The error between the actual output and the expected output is defined as the objective function, and the machine can modify the internal weights to reduce the error. In some typical deep learning systems, there may be millions of adjustable weights and millions of label samples to train the machine. To adjust the weight vector correctly, the learning algorithm calculates a gradient vector. Artificial intelligence will make significant progress, through the performance of learning and complexity Reasoning and learning. The new normal form of operating a large number of vectors replaces the rule-based character expression operation [9]. For each weight, each time a small amount is added, the error increases or decreases by a certain amount. Then the weight vector is adjusted to fit the gradient vector in the opposite direction.

In practice, one of the most commonly used algorithms is called random gradient descent. For many samples, the output error is calculated, the average gradient of the samples is calculated, and the weights are adjusted accordingly. This process is repeated several times until the mean of the objective function decreases [10]. After training, the performance of the system is measured by a series of different samples called test sets, which are also the generalization capabilities of the test machine - the ability to test for reasonable answers to input that you have not seen during training. Of course, it is wrong to be pessimistic about failure because you are at a loss about the possible future of AI. Therefore, facing the new demands of the Intelligent Age, expanding the theoretical horizon of the Intelligent Age, creating friendly and responsible artificial intelligence, and constructing an ecosystem in which a person's labor and intelligent machines co-evolve and coexist become the best choice. Kant equates human with rational existence and fully promotes the power of human reason. It is believed that human beings grow up because of reason and are great because of reason. Manipulate the wildness of smart technology by rational harness, control the negative effects of technology to a reasonable limit, and human will eventually go to a bright future.

3. Conclusion

The continuous development of computer science and technology can further promote the modernization of China. This paper introduces the development of computer science. The invention of computer science and technology has profoundly changed the way of life of human beings. It brings convenience and high efficiency to people, and greatly improves productivity. This highly efficient productivity tool has a huge impact on us. With the deepening of digitization, the role of computers will also increase. Due to the space problem, the introduction of computer history in this article is relatively simple, readers can refer to other papers.

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