Development Strategy Analysis of "Internet Plus" Artificial Intelligence Technology

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Abstract. With the rise of a new generation of information technology represented by cloud computing, big data, and artificial intelligence, the competition in global information technology field has become increasingly keen. In this new wave of technology, we have the opportunity to catch up from behind. The publishment of the "Internet plus" artificial intelligence three-year action implementation has established a strategic position for the development of artificial intelligence technology. This article aims at the development status of artificial intelligence technology and comprehensively analyzes the development background, technical system and development strategy for discussion.

Key words: Internet Plus; Artificial Intelligence; Development Strategy.

INTRODUCTION

Nowadays science and technology changes with each passing day, scientific and technological strength has become an important indicator of a nation's overall strength. With the application of cloud computing and big data technology in recent years, it has played a great role in promoting technological progress and industrial upgrading. As the focus of a new round of scientific and technological revolution, AI technology has become the core of science and technology competition in various countries. China has included AI technology in the national plan which also shows the determination to go beyond in the field of artificial intelligence. If the intelligence possessed by AI is fully integrated with other industries through "Internet Plus", it will promote scientific and technological innovation, create more new industries, lead the technological upgrading, and bring new vitality into China's economic development.

FORMING BACKGROUND OF ARTIFICIAL INTELLIGENCE

In March 2016, as AlphaGo won against Korean Go player Lee Se-dol by 9 to 9, a growing AI fever is sweeping over the world. Artificial intelligence moved from the backstage to the foreground and became the focus. People are curious about how "intelligent" is the AI? and whether it can replace human beings or not. In fact, it has been more than 70 years since the birth of AI, like Figure 1. The development from initial knowledge engineering system to today's in-depth learning is closely related to algorithm optimization, hardware performance promotion, and data volume growth, especially the development of big data and cloud computing technology, which makes it possible from theoretical research to application.

Sufficient data will make AI smarter and let it provide more accurate data models. Nowadays, digital society makes everyone's online records, shopping information and action trajectories digitalized and stored on various platforms which are the basis for user behavior analysis and value exploration. In the information systems every walk of life, a large amount of business data is stored for analysis. With these data available for analysis, it is possible for AI technology explores data value with purpose. And with the development of big data technology, the massive data collection, storage and transform becomes easier and it provides a good basic data platform for the development for AI. What's more, the development of AI also depends on calculative ability. Moore's Law makes the performance of hardware double every 18 months, and the performance of CPU and GPU greatly improved. For example, AlphaGo has used 1920 CPU and 280 GPU to work together, and the computing capacity has reached 2332 trillion floating-point calculation per second. Such powerful computing capabilities make the machine learning analysis model get results in a short time, so that makes it possible to apply AI in practice. With the development of cloud computing, the establishment of virtualized resource pool can conduct flexible management and configuration of computing and

storage resources, which enable to establish large-scale storage analysis and analysis platforms for storing analysis data and training analysis models. Large-scale data and powerful computing platforms can greatly improve the accuracy of machine learning models, and thus have more practical value. Finally, the progress and optimization in theory and core algorithm of AI is also an important factor in the rise of AI technology from classical machine learning algorithms, such as linear analysis, regression analysis, decision trees, support vector machines, random forests, etc., to today's deep learning and reinforcement learning. The combination of theoretical innovation, big data and cloud computing provide more and more imaginable space for the applications of AI in the field of natural language processing, image recognition, intelligent search, and automatic driving.
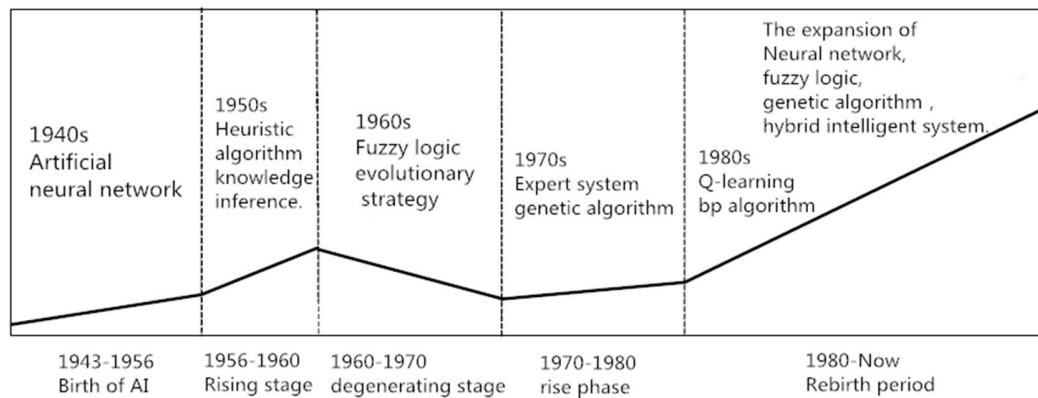

FIGURE 1. Development Process of Artificial Intelligence

TECHNIQUE SYSTEM OF ARTIFICIAL INTELLIGENCE

The concept of artificial intelligence is to let the machine simulate the way of thinking and behavior of human beings, possess the intelligence of human beings, and thus be able to complete complex tasks, which is the extension and expansion of human capabilities. There are three main parts when people completing one task: understanding problems, thinking about problems, and solving problems. If one machine has intelligence, it must have the ability to perceive, think, and act. Therefore, the technological system of AI mainly develops around these three aspects. However, the machine does not have the biological characteristics of human brain after all. Even the neural network technology that simulates the working style of human brain cannot truly think like the human brain. Algorithm is the core to make machine processes identification ability including early rules-based expert system, the neural networks, in-depth learning, and reinforcement learning which develops rapidly, and brain-like intelligence that simulates brain cognitive computing. Today's artificial intelligence technology is an organic integrity that combines hardware, software, algorithms, and applications, forming a complete technique system, like Figure 2.

At the early development stage of AI, the mainstream is that intelligence means to let machines possess inferential capability, so that the machines have to learns more rules and base on that to reason and thus realize intelligence. And on this basis, there are many expert systems which applied sorting algorithms, regression algorithms, Bayesian statistical methods, clustering algorithms, support vector machines algorithms, etc. These algorithms are based on a certain target to get the optimal value, but they do not have self-learning ability. The expert system mainly applies statistical method comprehensively in artificial intelligence systems such as natural language processing. The neural network simulates the working methods of human brain neurons to accomplish learning task through the internet interlinked by several nerve cells. In-depth learning refers to set up several hidden layers network based on neural network to continuously provide feedback for system parameters adjustment, so as to achieve optimal output. Neural networks can self-learn data characteristics, and based on such large amount of data, the accuracy of the results output will be greatly improved. The hot spot of current artificial intelligence is also focused on deep learning. It has achieved remarkable results for neural networks and in-depth learning's brain neurons structure imitation, while brain-like intelligence research simulates the way that human brain integrates information storage with calculation together, and achieves the deep integration of hardware and algorithms, achieving essential breakthrough in system framework.
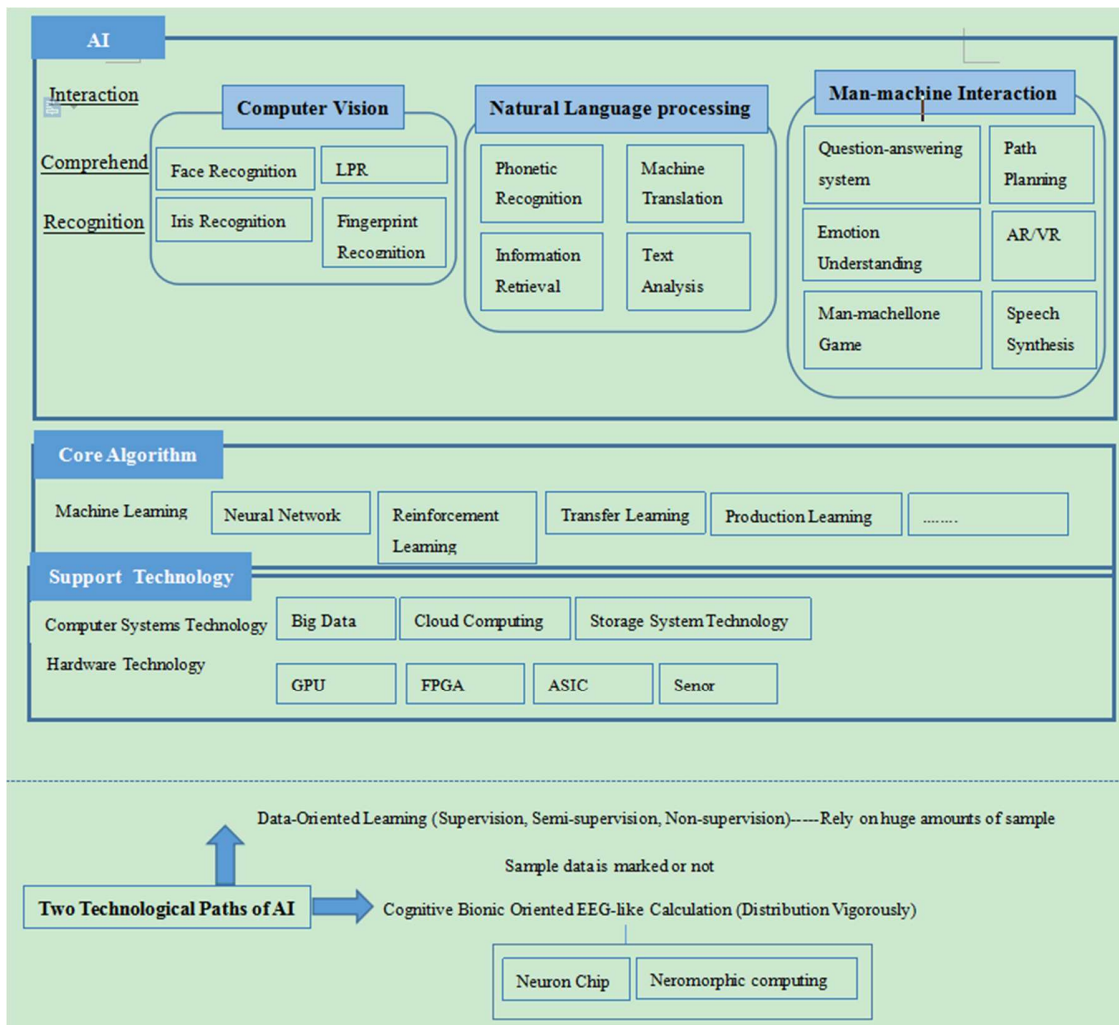
FIGURE 2. Technique System of Artificial Intelligence

Perception

Perception technology is the key for collecting external information, mainly including machine vision, machine hearing, and machine touch. Machine vision is an image recognition technology. It obtains digital signals of an image, and transfers it into pixels, then deals with pixels based on neural networks. According to pixel brightness and color, the image can be distinguished and image recognition technology can be used for face recognition, license detection, etc. which have been widely used in the fields of finance, public security, and transportation. The machine hearing is mainly for speech recognition that is the basis to realize human-machine dialogue. Smartphones, and smart homes all integrate speech recognition modules, and enhances friendliness of human-computer interaction in an intelligent way. Machine tactile technology is a kind of sensory technology. It can use sensors to sense information such as external temperature, pressure, distance, etc., and transform it into information data for analysis.

Thinking Ability

The thinking ability of machine is to learn knowledge based on algorithm, so as to realize artificial intelligence and analyze and understand problems. Thinking ability mainly includes knowledge learning, knowledge understanding and intelligent thinking. Based on collected data, knowledge learning will extract data features, mine

the embedded knowledge and thus form its own knowledge base through clustering algorithm, Bayesian method, decision tree method, neural network, deep learning, reinforcement learning and other algorithms. Knowledge understanding refers to mining data, understanding the meaning of knowledge, including images, sounds, languages, actions, and behaviors, linking data with people and things in practice. Current neural network has been applied in knowledge understanding very well, for example, Recurrent Neural Networks (RNN), and Deep Neural Networks (DNN) are applied in speech recognition; Convolutional Neural Network (CNN) is the most popular algorithm in the field of image processing because of its easy-training and generalization ability which widely used in fingerprint recognition and object detection. Based on obtained knowledge, intelligent thinking refers to seek the optimal solutions by using decision trees, clustering algorithms, and regression algorithm to reason. It is mainly used for aid decision making and automatic planning.

Action Competence

Action competence refers to perceived and learned knowledge output, and behavior performance and control, which mainly includes the output of audio and video, intelligent behavior control, and decision-making system implementation. Image and sound output means to revert digital information to a form that people can easily accept by pixels and frequency synthesis. Taking sound synthesis as an example, the text information is segmented according to semantics, and become symbol flow integrated by vocabulary support library and feature word lexicon. And then according to parameter decoding and tuning rules, speech is synthesized. Current speech synthesis technology has been able to convert textual information into standard and smooth speech in real time and has applied in conference systems and translation systems. Intelligent behavior control is usually combined with a communication system to provide remote intelligent services. For example, the current popular robot technology, including industrial control robots applied in manufacturing field, and sweeping robots used in life, which are all artificial intelligent products. With the development of robot technology, it is the trend to use intelligent robots to replace people for repetitive manual labor. Decision-making system implementation is the results implementation according to the analysis results of intelligent analysis system. For example, the court intelligence decision-making assistance system makes intelligent decision analysis and generate judgement based on crime process, crime results, etc.,

DEVELOPMENT STRATEGY OF ARTIFICIAL INTELLIGENCE

Artificial intelligence involves many technologies and industries and the development of AI is a systematic project. It is necessary to unify the planning from the national strategic level, grasp the trend, seize the opportunities in the new round of technological revolution, strengthen the basic theoretical research of artificial intelligence, promote AI technology's industrialization practice, promote the intelligent upgrading of the industry, and lays a good foundation for the intelligence of the entire society. IT leaders are the core of current development of AI in China, and a large number of Startup companies emerged, becoming more and more multiple. Internet companies such as Baidu, Tencent, Alibaba, take advantage of their existing platforms to develop AI, especially Baidu, who launched "Baidu Brain", "Baidu Unmanned Vehicle", open source artificial intelligence platform Paddle and autonomous driving platform Apollo. Alibaba developed AI computing platform DTPAI based on Ali Cloud. Huawei also announced the Network Mind project, which is the first communication industry network brain based on machine learning, used to optimize the flow control of the communications network. In addition, a large number of distinctive artificial intelligence startup companies have come forth, such as Shang Tang Technology, Vision Technologies, and Horizon Robotics. Their products have already put into commercial use.

The development of artificial intelligence should be based on the overall situation. It should grasp the development trend of science and technology and promote economic and social development from the aspects of innovation system, industrial upgrading, complete facilities, and high-end layout

Establish Scientific and Technological Innovation System

Innovation is the source of artificial intelligence development. It is necessary to focus on the research of cutting-edge scientific basic theory and key technologies, work hard to build a good basic research platform, strengthen the cultivation and construction of high-end talent teams, enhance technological exchanges and sharing, continuously promote innovation capabilities, strive to achieve world-class artificial intelligence technology and lay a solid foundation for the nation's intellectual development.

Promote Industrial Intelligence Upgrade

Accelerating the industrialization of artificial intelligence technology. All industries should in accordance with their characteristics, deeply integrate with AI technology, to foster new industries under the development of science and technology, lead the intelligent upgrade of society, form new intelligent sharing economic ecology based on data and driven by intelligence. At the same time, artificial intelligence technology can be applied to promote social governance, develop intelligent and convenient services, strengthen public security capability, and further enhance the level of intelligence in the entire society.

Complete Intelligent Infrastructure

Completing intelligence infrastructure. The level of intelligence in infrastructure should be improved, basic systems such as basic networks, big data platforms, cloud computing services, Internet of things, and artificial intelligence computing platforms should be strengthened to form an integration intelligence facility system including data collection, transmission, storage, calculation, analysis and application, providing fundamental guarantee for intelligent economy and society.

Arrange High-End Artificial Intelligence Technology

For high-end artificial intelligence technology, the state must make overall plan, set clear objectives, and identify the direction. The domestic top scientific research and technology team deployed by state should absorb foreign and domestic experience, insist self-innovation, and arrange high-end intelligence technology, taking the core of setting AI major scientific and technical project and aiming at urgent development requirements and weak technical environment which will ensure the future national intelligent development.

CONCLUSION

With the integration with big data and cloud computing technologies, AI has become the flash point of the next wave of technology. Every country has proposed AI development plans and increased investment in AI technology research and industrialization. China has fully realized the AI technology has played a significant role in promoting future intelligent development and has determined the status of AI technology development from national strategy. We must grasp the trend, insist innovation, and achieve rapid development in the new round of scientific and technological revolution.

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