China's AI Technology and Policy Implications

Wensheng Li
Beijing University of Posts and Telecommunications, China
E-mail: bupt2018lws@sina.com

Abstract. In recent years, China has made great efforts to develop artificial intelligence (AI), with its application gradually expanding. In the political environment of China, the development of AI is closely related to the direction of the government. AI technologies and their supply models are affected by policy. This paper focuses on summarizing the main applications of China's artificial intelligence market, related technologies and related policy background, and predicts its future market direction based on its upstream and downstream models.

1. Introduction
In current China, artificial intelligence (AI) has been widely used in various aspects, which is the beginning of the digital transformation of Chinese enterprises. In addition to the existing applications, artificial intelligence will also give birth to new industries and new models, thus promoting the step change of social productivity, and then entering a new era of intelligence. Artificial intelligence is the blueprint for China's new technological power.[1]

The concept of "Intelligence +" was first put forward by Premier Li Keqiang when answering a reporter's question at the 2019 NPC and CPPCC Sessions. It was included in the government work report for the first time after artificial intelligence appeared in the premier's report for three consecutive years. In July 2017, the Chinese government released a guideline on the development of artificial intelligence, which set out the goal of becoming a global innovation hub in the field by 2030. The report calls for integrating big data and transmedia into artificial intelligence and developing together with it. In the Report on the Work of the State Council for 2020, it is mentioned to develop the industrial Internet and promote intelligent manufacturing.

The central government has asked relevant departments to adjust their policies to encourage the development of artificial intelligence technology in China. And a lot of policies have been introduced successively, which are shown in Figure 1. China's technology market responded positively. By the December 2020, 53 percent of the 80 IT companies registered on the Science and Technology Innovation Board had disclosed that they had AI core technology or related businesses.

Overall, there is still a lot to explore and imagine in AI in China, with the number of AI applications serving decision-makers, managers and executives far higher than those serving a single user role. Artificial intelligence is often deeply integrated with the industry to unlock its great value. The development of AI is driven by the research and information environment and its accompanying social goals.[2]

Currently, AI algorithms are constantly improving and addressing many previously difficult problems. These methods have greatly improved the latest level of speech recognition, visual object recognition, object detection and many other fields, such as drug discovery and genomics.[3] Artificial
intelligence models can also be used to solve human-related problems such as policy decision-making.[4] Public attitudes towards artificial intelligence are also trending towards approval.[5] As hardware and algorithms evolve, more ideas will be realized.[6]

2. Common AI technology models and policy implications in China

2.1 AI+financial

In 2020, China issued its first top-level document on the development of fintech, clarifying the boundary between fintech innovation and services, and defining the track and boundary of the industry's development.

The main technologies of AI finance include natural language processing, machine vision and speech recognition. Natural language processing and speech processing can build a closed loop of human-computer interaction. Machine vision can provide security verification and identification. The deep learning model is used to form a hierarchical decision model for portfolio construction and risk management, and to reconstruct invisible nonlinear interactions. At the same time, big data is used to develop risk control models, risk decisions are made based on big data, and real-time full-line financial services are provided. Using these technologies can make finance smarter and cheaper.

In the "New Generation Artificial Intelligence Development Plan" issued by the State Council of China, it is mentioned that intelligent financial products and services should be innovated, new financial business forms should be developed, and technologies and equipment such as intelligent customer service and intelligent monitoring should be encouraged in the financial industry to establish intelligent early warning and prevention and control system for financial risks. When reviewing user information, it can be distinguished according to face recognition, voice recognition, micro expression recognition, knowledge graph, etc. After financial services, it can monitor and collect users through knowledge graph and machine learning.

Under the leadership of the State Council, the People's Bank of China has set up a Fintech Committee to strengthen the research, planning, coordination and coordination of fintech work, actively utilize big data, artificial intelligence, cloud computing and other technologies to enrich financial regulatory means, and improve the ability to identify, prevent and resolve cross-industry and cross-market financial risks. In Figure 2, an overview of China's AI technologies and policies is presented.

Therefore, for the model in the Figure 2, the proportion of AI participation in financial services will increase. After the popularization of AI technology, it will become more universal. With the sinking of technology, more and more small and medium-sized enterprises will also use AI financial technology. Problems such as information asymmetry, high customer acquisition cost and uncontrollable risks, which have existed in the financial industry for a long time, will also be reduced. Meanwhile, certain
requirements will be put forward for China's financial supervision in the future.

![Diagram of AI+ Financial technology and policy overview](image)

**Figure 2.** AI+ Financial technology and policy overview.

### 2.2 AI+education

In 2020, due to the epidemic, most regions in China have adopted online education. According to CNNIC, by March 2020, the number of online education users has reached 423 million, accounting for 46.8% of the total number of Internet users.

Online education mimics the real life education scene as much as possible, and give the AI, contains the intelligent measurement and analysis, intelligent knowledge explanation, knowledge map construction, visualization and intelligence teaching function, intelligent tutoring system is composed of five parts: teaching modules, domain knowledge, student model, communication module and expert model [7] the main technology including logistic regression, bayes classifier, machine learning, neural networks, data mining and analysis, evolutionary algorithms, neural network translation, optical character recognition (OCR), speech recognition (ASR), speech synthesis (TTS), and other functions.

The development plan of the new generation of artificial intelligence and the action plan of education informationization 2.0 have vigorously promoted the development of artificial intelligence + education. These are the two most important policies for AI + education. The overall overview of technology and policy of AI+education is shown in Figure 3.

According to iFlytek, a listed AI enterprise in the Asia-Pacific region, and other head manufacturers, the cutting-edge concepts of AI+ education are mostly centered on "learner-centered, focusing on skills and non-intellectual factors", and studying the transformation of thinking from the past intelligent teaching environment to intelligent teaching process. In the future, AI + education needs diversified data mining technologies to support the analysis of group learning behaviors and processes of learners. More sophisticated natural language technologies and machine learning support implicit assessment of learners and prediction of performance. At the same time, other technologies, such as VR, are also needed to create an online education environment that is more realistic and offline.
2.3 **AI+ identify**

AI+ identify is the AI application with the earliest, largest and fastest growing market capacity. It mainly relies on the computer vision technology, to solve the traditional security of a large number of data processing time, effort and lack of analysis ability.

AI+ identify mainly through the automatic processing of video content, provide the target monitoring, tracking, attribute analysis, to search for the image and other functions, plus the extraction of the character identification. From convolutional neural networks to variational autoencoders, various methods have found numerous applications in the field of medical image analysis and promoted its rapid development [8]. The application of medical image recognition direction, which tends to combine image recognition and deep learning, can also improve the diagnostic accuracy and efficiency. Artificial intelligence tools can be used for many diseases, including cancer, neurology and cardiology.

According to the Guidance on the Construction of the National Public Security Organs’ Social Security Prevention and Control System and the Notice on Standardizing the Construction of Public Security Video Image Intelligent Application, the report clearly proposed to improve the proportion of intelligent equipment at relevant intersections, build video image information analysis system and information comprehensive application platform, and view analysis and analysis applications. Figure 4 shows the key technologies and policies for AI+ recognition, with light color represents the main content of the market.

At present, the non-standardized characteristics of the security industry also provide a premium basis for equipment manufacturers and integrators, making the midstream security manufacturers have a higher status and income, but the equipment manufacturing and sales have their development ceiling, in the future for a long period of time, will be affected by the policy. Hardware and software will also tend to standardize development.
2. Intelligent robot

Intelligent robot application scenarios are numerous. It can cut down labor costs dramatically. In recent years, China's State Council, the National Development and Reform Commission and other relevant government departments have issued policies to encourage enterprises to use artificial intelligence technology and products to reduce costs and improve efficiency, with logistics robots being an important direction. Intelligent robots can also be used in agriculture, intelligent manufacturing and other fields, these robots application intensity, intelligence, recognition and production capacity are different.

Deep learning technology learns characteristics through data transmission between hierarchical structures and has good applicability to data generated in logistics activities. Deep learning is not only the core technology to realize the functions of path planning and intelligent scheduling, but also the training method to realize the development and evolution of computer vision, autonomous driving, natural language understanding and other technologies. Machine learning supports unmanned autonomous systems in two ways: it first receives information and then analyzes and controls it, providing perception and control similar to how humans interact with the outside world[9]. Computer vision is responsible for collecting information and realizing recognition, navigation, obstacle avoidance and other functions. Automatic driving technology mainly realizes vehicle detection of obstacles in the surrounding environment, recognition, judgment and decision making through high-precision sensors and deep learning. Natural Language Understanding can be used in intelligent customer service systems to save labor costs.

The New Generation of Artificial Intelligence Development Plan released by the State Council proposes to vigorously develop intelligent logistics, promote the integration and innovation of artificial intelligence and the logistics industry, and improve the level and efficiency of warehouse operation and management. The Opinions on Promoting the High-quality Development of Logistics and Building a Powerful Domestic Market issued by the National Development and Reform Commission put forward the implementation of intelligent transformation of logistics, strengthen the application of information management system and cloud computing, artificial intelligence and other information technologies, and improve the level of intelligent logistics software. An overview of policies and technologies is shown in Figure 5.

At present, the shortcoming of AI robot is that it lacks the ability to understand the scene and cannot adapt to all the scenes. More technologically advanced robots also need smarter chips. On the basis of China's new infrastructure, improved infrastructure capacity and the rolling out of IoT devices, there will be more adaptable AI robots.

![Figure 4. AI+identify technology and policy overview.](image-url)
3. Conclusion

Artificial intelligence has become the core driving force of the new round of scientific and technological revolution, and the progress of technology has brought positive impact on the economy, society and life. It is of great commercial value to help the industry upgrade intelligently.

Artificial intelligence has stronger computational information processing capabilities and analytical methods, which can extend human's cognitive ability to deal with complexity, while human beings can still provide a more comprehensive and intuitive approach to deal with the uncertainty and ambiguity in organizational decisions.[8] Interdisciplinary collaboration is the key to AI having a real impact on the world[9]. Artificial intelligence can also be used in space[10]. And during the Covid-19 outbreak, AI could be used to develop public policy and health plans.[11] This shows that artificial intelligence has the ability of emergency management for emergencies. This is in line with China's efforts to promote emergency management education.

In the case of more progress in artificial intelligence technology, there will be more schemes and technologies involving urban development, ecological protection, economic management, financial risk and complex macro-system interaction.[12]

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