

Artificial intelligence in China

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The balance of power in technology is shifting. China, which for years watched enviously as the West invented the software and the chips powering today's digital age, has become a major player in artificial intelligence, what some think may be the most important technology of the future.

Artificial Intelligence refers to a set of computer science techniques that enable systems to perform tasks normally requiring human intelligence such as visual perception, speech recognition, decision-making and language translation. Machine learning and deep learning are branches of AI which, based on algorithms and powerful data analysis, enable computers to learn and adapt independently. For ease of reference "artificial intelligence" (AI) is used throughout this paper to refer to machine learning, deep learning and other related techniques and technologies⁽¹⁾.

China's AI market is estimated to grow from \$173m in 2015 to \$1.3bn in 2020, according to iResearch. In 2015, roughly \$203m (+76% year-over-year) capital flowed into Artificial Intelligence (AI) in China⁽²⁾.

The Chinese central government has released on July 2017 a clear plan to become the world leader in AI by 2030, aiming to surpass its rivals technologically, and build a domestic industry worth almost \$150 bn⁽³⁾. The government identifies AI as the key engine of China's progress toward a world economic leader in 2030. According to the plan, the government will provide great capital resources, market guiding and political support to AI development, and meanwhile strengthen links among private enterprises, research institutes and military bodies to promote mutual development.

Following the central government's instructions, a large number of local governments have created special plans, funds and built out research centers to focus on AI. These governments are making themselves a good example in adopting AI technologies in public services (including social welfare, education and national security).

China, the most populous country in the world, is home to 1.4bn people, 700mn of whom are on the internet communicating in the same language. As a result, China has two most important "essential production factors" in driving AI development: data and talent. China understandably generates about 13% of the global data - raw material to fuel the development of AI. It is expected to grow to 20% - 25% by 2020 and surpass that of the US⁽⁴⁾. As for talent, China, based on its large population base and strict mathematic training in national education program, is producing machine learning and deep learning researchers to fill the gap both in China and overseas: Google's Cloud Machine Learning group is co-headed by two renowned Chinese American scientists, Jia Li and Fei-Fei Li. Moreover, we noticed the wave of top talented American AI scientists and managers with Chinese background returning to China.

(1) https://www.eiuperspectives.economist.com/sites/default/files/Artificial_intelligence_in_the_real_world_1.pdf

(2) http://www.iresearchchina.com/content/details8_20728.html

(3) <https://www.nytimes.com/2017/07/20/business/china-artificial-intelligence.html>

(4) <https://www.artificialintelligence-news.com/2017/09/01/goldman-sachs-china-u-s-ai/>

AI is increasingly penetrating into most aspects of the daily life of every Chinese citizen, the ways they act and think on a daily basis. In the media space, Xiaodu, an avatar for Baidu's proprietary AI, Baidu Brain, is competing against human in facial recognition on TV. Baidu's team chose for Xiaodu to compete in areas where computers are particularly weak, face and voice recognition, against China's best minds in the popular weekly show "The Brain". The show is #1 in audience rating in its slot in China.

AI – Not just American

Chinese internet Giants catching up in the AI race

While US-based firms such as Google, Facebook and Microsoft seem still dominating the artificial intelligence space, Chinese counterparts like Baidu, Tencent, and Alibaba are quickly catching up, and in some cases, surpassing their US competitors. As the domestic Internet market has matured, the country's big players aim to become technology leaders, rather than innovative imitators.

As far back as 2013, Baidu started an internal research lab it called The Institute of Deep Learning, showing its own extreme ambitions. Now, it runs several other labs, including the 200-persons outpost in Silicon Valley. All told, the company employs more than 1,800 researchers and engineers who work on AI, including driverless cars and other robotics as well as many online services⁽⁵⁾. Deep learning technology is already driving everything from the Baidu search engine to the company's image and speech recognition services.

Tencent has established an AI lab in Seattle in May 2017, and the company is building a very serious research team back in China. Tencent already makes use of machine learning in its products (for personalized news recommendations and search, for example). Tencent's AI Lab has so far around 50 world-class AI scientists, researchers and experts, focusing on AI related research fields such as machine learning, computer vision, speech recognition, and natural language processing⁽⁶⁾. Its massive data from more than 980m users and its technical advantages constitute a great asset to the company's top AI team.

The e-commerce giant Alibaba not only applies AI-enabled chatbot, image recognition and machine learning based recommendation to its platform, the growth of its affiliate company Ant Financial is almost being shaped by the company's AI research team. Yuan (Alan) Qi, a vice president and chief data scientist at Ant, says that "AI is being used in almost every corner of Ant's business, (...), we use it to optimize the business, and to generate new products." There's no lack of examples. Most recently, Ant Financial is offering for free their AI-driven image recognition system to aid vehicle insurance claims adjusters. It enables insurers to assess automobile damage by algorithm in six seconds.

A national development plan

Beijing is encouraging its artificial intelligence push with vast sums of money. Having already spent billions on research programs, China is readying a new multibillion-dollar initiative to fund moonshot projects, start-ups and academic research, all with the aim of growing China's A.I. capabilities.

At national level, Chinese government published in 2016 a 3-year guidance in support of AI development, including capital funding and IP protection. It then approved a 15-year project (China Brain Project) the same year to research into the neural basis of cognitive function, with additional

(5) <https://www.wired.com/2017/06/ai-revolution-bigger-google-facebook-microsoft/>

(6) <https://www.artificialintelligence-news.com/2017/09/01/goldman-sachs-china-u-s-ai/>

goals of improving diagnosis and prevention of brain diseases, and driving information technology and artificial intelligence projects that are inspired by the brain. The central government then established China's AI Lab on March 2017 to boost the country's overall competence in AI: Baidu is in charge of the lab in partnership with other Chinese elite universities. The lab is responsible for researching topics in machine learning-based visual recognition, voice recognition, new types of human-machine interaction and deep learning.

Besides governmental initiatives, numerous provinces and cities are spending billions on developing robotics, and a part of that funding is likely to go to artificial intelligence research. For example, the relatively unknown city of Xiangtan, in China's Hunan province, has pledged \$2bn toward developing robots and artificial intelligence. Other places have direct incentives for the A.I. industry. In Suzhou, leading artificial intelligence companies can get about \$800,000 in subsidies for setting up shops locally, while Shenzhen, in southern China, is offering \$1m to support any A.I. project established there.

China's four competitive advantages in AI development

Data availability. As machine learning algorithms become more and more commoditized, access to huge volumes of training data is starting to become the core competitive advantage. Chinese users have different notions of and expectations for privacy and willing to provide personal information for convenience. By 2020, China's digital data universe is going to surpass US. China's share of the global digital universe will grow from 364 exabytes in 2012 to 8.6 zettabytes in 2020, whereas US from 898 exabytes to 6.6 zettabytes⁽⁷⁾.

Talent pool. Chinese researchers are already savvy in AI. In 2015, 43% of the top academic papers relating to AI were published with one or more Chinese researchers, regardless of where in the world the work had been primarily conducted⁽⁸⁾. China traditionally has strong math training which has already generated a large number of data scientists domestically. In addition, there are more and more US-trained computer science PhD returnees.

Funding. KPMG found investment by venture capital (VCs) in China reached a record high in 2016, despite a global slowdown. Egidio Zarrella, Partner, Clients and Innovation, KPMG China, said that the amount being invested in artificial intelligence in Asia is growing by the day. China is also prompting provincial governments to acquire companies and invest in start-ups: Chinese regions are armed with \$445bn for VC investments⁽⁹⁾. The other way round, China investors are investing heavily in American AI start-ups: over the past six years, they helped finance 51 American artificial intelligence companies, contributing to the \$700m raised, according to the recent Pentagon report.

Chinese pragmatism. While US companies are still responsible for a lot of the most fundamental groundbreaking research in AI fields, Chinese companies are more pragmatic about turning generic work into value-oriented applications to drive business value, especially Alibaba and Tencent. Alibaba, for example, is good at using AI to provide customized service and support based on users' purchasing behavior and interests; Tencent is researching AI under 3 main topics closely tied to their core business: content, social and game.

More often than not, Chinese AI breakthroughs are not within the radar of Western mainstream media. Their presence on western media is relatively rare and language is a serious barrier which consequently limits the understanding of Chinese technological breakthrough over the world.

(7) <https://www.emc.com/collateral/analyst-reports/emc-digital-universe-china-brief.pdf>

(8) <https://www.weforum.org/agenda/2017/01/this-is-why-china-has-the-edge-in-ai/>

(9) <https://www.deltapartnersgroup.com/sites/default/files/The%20Delta%20Perspective%20-%20State%20of%20the%20tech%20industry%20%26%20expectations.pdf>

AI is prompting the rapid development of Fintech and Insurtech in China

In Fintech area, Chinese private and public sectors are both building on rapid advances in AI and readily available consumer data to develop unique applications for consumers and businesses.

Process automation

Ant Financial launched in June 2017 an AI-driven, image-recognition system to automate the investigation of vehicle insurance claims. According to Ant Financial, exterior damage claims make up about 60% of the 45m private vehicle insurance claims filed in China every year. In a demonstration, Ant Financial's algorithm took 6 seconds to assess the damage in 12 different cases, whereas human investigators needed over 6 minutes to reach a verdict over the same claims⁽¹⁰⁾.

SenseTime, the Chinese AI start-up, as well as the world's biggest AI Unicorn, following funding round earlier this year that raised a huge \$410m, began to provide the similar offer to insurers since October 2017.

ZhongAn applies biometric recognition to automatically insure accident insurance, which is more efficient than traditional identity registration and insure/claim application. Once runners' face identified and matched with the ID photo they provided, Zhong An will activate their sport accident insurance immediately to cover them during the race, thus eliminating any procedure and avoiding other people replacing registered runners to participate in the marathon and benefit from insurance coverage. This technology has already be successfully used to identify marathon players in 4 races. It resulted an average of 40% reduction of manpower.

For customer onboarding (selfie vs administrative tasks), Ping An's agent only needs to take a selfie of the customer and him/herself, to immediately authenticate through ID photos. Then, by using natural language processing, voice recognition, the agent follows the script/steps while the customer replies. Depending on how the customer replies, the script will be different and the engine will know what kind of questions the customer should be prompted. In 5 minutes instead of 45 minutes, customers can get their policy done and sign by touching the phone screen.

Underwriting and credit scoring

ZhongAn is leveraging deep learning and machine learning to empower its big data analytics, which has significant impact on real-time insurance pricing, credit analysis and rating, credit risk pricing, user behaviour analysis, accurate marketing and customized products and services.

For example, for its Flight Delay Compensation Insurance (FDCI), ZhongAn applies its big data platform to gather various data sets - the flight dynamic state of Airline Company, the passenger identification of AIR Regulation, weather data from Meteorological Bureau to estimate the probability of flight delay. Thanks to AI, customers can purchase this insurance product even 15 minutes before departure.

Ant Financial is opening its car insurance score to the insurance industry for the first time; the score offers a car owner's user portrait and risk analysis, and quantifies it into a score between 300 and 700. It is one extension of Ant's Zhima Credit, its creditworthiness system uses advanced machine-learning algorithms and custom programmable chips to crunch huge quantities of user data in a few seconds, to determine whether to grant a customer a loan, for instance.

(10) <http://video.tudou.com/v/XMjg2MDc4MjA1Ng==.html>

Fraud claims detection

PingAn created its big data platform “PingAn Brain” in 2015. The platform applies data mining, machine learning, deep learning in analysing both structured and unstructured data (its historical customers’ data, internet data, financial transaction data and tens of million enterprises’ data) to help the company in customer profiling, risk management, fraud claims prevention and detection, claim management automation as well as health management.

In one year, its machine learning model saved PingAn \$ 302m (2bn RMB) from fraudulent claims and achieved a 78% accuracy in fraud detection, compared to 21% the previous year. Currently, “PingAn Brain” got into cities to digitalize and analyse medical records. Not only traders of PingAn will have access to these data, but also pharmas, HMOs, clinics, doctors, hospitals and patients. Ultimately, this will enable the insurer to offer health management to its customers and help them prevent critic illness by adopting a healthier lifestyle.

PICC, China’s largest property insurer, is applying Chinese start-up 4Paradigm’s own machine learning algorithm to root out fraudulent claims. Unlike other claims solutions that store and analyse unstructured claims data, 4Paradigm’s approach not only identifies suspect claims but continuously improves the accuracy of this identification by parsing petabytes of claim data in order to broaden its ability to highlight subtle fraud indicator.

There is no doubt that AI is already transforming the Chinese finance industry and has produced massive use cases in the country. Event though the gap between the research and development spending of Chinese internet companies and their global peers still exists, in terms of AI application, China may show the world how to do it.

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