

# Analysis of the Development Prospect of AI Companies in China

## Take AI Four Little Dragons for Example

Kuan Lu<sup>1,\*†</sup> and Chuhan Jin<sup>2,†</sup>

<sup>1</sup>No.3 Middle School of Tianjin

<sup>2</sup>Northwest A&F University

\*Corresponding author. Email: [guanghua.ren@gecademy.cn](mailto:guanghua.ren@gecademy.cn)

†These authors contributed equally.

### ABSTRACT

With the rise and wide application of artificial intelligence, China has also seen the emergence of the four AI Four Little Dragons -- SenseTime, Megvii, Yuncong, and Yitu. According to the development comparison of the four artificial intelligence companies, this study analyzes the business model, technology applications, and market prospects for artificial intelligence companies in China. As a result, it is concluded that innovation and technology maturity become critical, and in the capital market, these companies are under the premise of AI in future development. Moreover, combining the form of the labor market obtains the prospect of the development of the whole industry for the development of enterprises to provide a reference.

**Keywords:** Artificial intelligence, capital market, technology application market.

### 1. INTRODUCTION

Since the 18th century, human beings have experienced several epochs of technological revolution. At present, human beings are not far from the era of artificial intelligence. With the increase in the depth of public cognition of AI, more and more AI companies come onto the horizon of investors. In China, in addition to the traditional and established Internet companies such as Tencent, Baidu, and IFLYTEK, there are also four companies -- "AI Four Little Dragons" -- focusing on artificial intelligence development that has attracted much attention. In the long term, mature applications of AI technology can greatly increase productivity and help humans deal with some of the most difficult problems, such as Craniotomy and a lot of data analysis. However, there is widespread concern among many governments about the structural unemployment caused by AI's rapid replacement of human labor in the short run. Nevertheless, governments still have chosen to support the development of AI technology because it is the next era into which humanity is bound to enter. At present, AI technology has practical value in industrial fields and medical care, urban construction, business

analysis, national defense, and other fields. Thus, more and more investors are attracted to the AI industry. But not all of these investments were successful, and the dotcom bubble became the biggest barrier between reality and ideal. Furthermore, the valuation of AI companies is generally overvalued in the capital market. Therefore, while most investors are optimistic about the value of the AI industry, only a few of the winners will survive in the cutthroat business competition because of the huge cost budget. In China, benefit from government policies, investors' confidence in the market, and its advanced AI algorithms, "AI Four Little Dragons" -- SenseTime, Megvii, CloudWalk, and YITU has grown rapidly the last decade.

Yan et al. studied the revolutionary impact of AI technology on China's labor market. In this paper, by constructing a VAR panel model, they estimate the impact of AI technology on China's labor market. What is more, analyze the impact on labor employment, wages, and the labor market polarization. After that, they obtain the research findings: the first one is to continue to promote the application of AI technology in the entire industry; second, correctly face the possible side effects of AI technology on the existing labor force

in the application process; besides, make more investment in human capital, continuously improve the quality of the existing labor force, ensure that the current capability of the traditional labor force matches the requirements of AI technology, and guarantee the corresponding supporting education and scientific research investment [1]. Yang analyzed the development of AI in China's field gradually from the perspective of macro government policies to details. The determination of China government to develop AI technology and cultivate relevant talents is shown by the state-level government document. To cultivate AI talents, the Chinese government has introduced AI courses in basic education and increased cooperation and investment in AI in tertiary education. Further, the Chinese government wants to achieve a vision that provides AI education to the public. In terms of the Chinese education system, AI development brings challenges such as structural unemployment, but it also brings opportunities for individualized education. Undeniably, China is ready to embrace the intersection of AI and education [2]. Da analyzes the present situation of the development of artificial intelligence by reviewing the development history of artificial intelligence and measuring the five indicators of development of artificial: Talents, Scientific Research, Use, Data, and Hardware to measure various countries or regions in the research and development of artificial intelligence level difference. He thinks in terms of Talents, Use, and Data. China has a great advantage. He believes that technology should be used to ensure the objectivity of algorithm results, and government departments should supervise artificial intelligence methods. In addition, necessary training should be given to engineers, an accountability system should be implemented, and public awareness of transparency should be enhanced [3]. Through a comprehensive review of the domestic and international background of South Korea's AI strategy and its implementation path, Wu analyzed the development prospect of South Korea's AI strategy from four aspects of the military, economic, social, and diplomatic. He believed that South Korea needs to develop military AI technology together with its allies and friends. In addition, Wu believes that South Korea has three problems in AI: lack of AI professionals, poor investment environment, and institutional regulations. He believes South Korea should introduce and train high-end AI talents, strengthen basic AI research, and strengthen the close cooperation between government, business, and academia [4].

Cao studied the impact of artificial intelligence capital on corporate profitability. By introducing the concepts of artificial intelligence capital and corporate profitability, he focuses on analyzing the impact mechanism of artificial intelligence capital on corporate profitability via the human capital, structure capital, and physical capital of AI on the profitability of enterprises.

The paper also recommends that enterprises are supposed to coordinate the development of human, structure, and physical capital and pays attention to the enterprises' innovation and the application of supporting strategies. The paper's finding is that artificial intelligence capital has a positive impact on the profitability of enterprises. What is more, the human capital, structure capital, and physical capital of artificial intelligence capital play an important role in manufacturing companies [5]. Zhou explores the business model of the artificial intelligence industry. Based on the level of short-term profitability and commercial defensibility, he designed a 2×2 confusion matrix for AI. He divided it into four major categories: Academic spin-offs, Data-as-a-service (DaaS), Model-as-a-service (MaaS), and Robot-as-a-service (RaaS). The author interprets that this classification does not account for a certain type of company that is better, nor does it explain that a specific type of company will not be profitable or successful. In the following part, the author analyzes the uniqueness of the business model of the artificial intelligence industry. In the latter part, Zhou Jizhen believes that there are four main challenges in the artificial intelligence industry and relative strategies. Through the analysis, Zhou concludes three indispensable requirements for the construction and innovation of business models in the AI era: make the most of AI technology to bring a better experience to customers and users; solutions are supposed to derive from various algorithms, and not just ideas; the underlying structure of the business model needs to base on big data [6]. Gao and Wang conducted evaluation research on the financial competitiveness of listed companies in the artificial intelligence industry. By summarizing and reviewing the research literature and findings on the financial competitiveness of listed companies in recent years, they found out those scholars hold different standpoints for the division of financial competitiveness in different industries. So the two authors made an analysis and summary for the previous literature and selected the WIND database and the data of SSE (Shanghai Stock Exchange) and SZSE (Shenzhen Stock Exchange) annual reports of listed companies. In the paper, 36 listed companies in the SSE and SZSE A-share AI sectors were collected and counted from the database. After that, they excluded two companies with incomplete data and insufficient time limit, then collected a total of 34 companies. To analyze the financial competitiveness of selected AI companies, some indicators were set: profitability, solvency, operating capability, development capability, cash acquisition capability, and R&D innovation. After the data were preprocessed and analyzed in-depth, they obtained a lot of findings: the disparity between the listed AI companies is mainly illustrated in the five factors extracted from the data in the article; in general, those 34 companies do not gain high scores in comprehensive financial competitiveness. Also, the

scores are not much different, which shows the generally less financial competitiveness. Furthermore, among the 34 companies, the factors with greater differences are profitability, operating ability, and cash-capability, followed by R&D innovation ability and development ability, and solvency is poor compared with other factors; besides, the development of the company's internal financial capabilities is uneven [7].

Larson studied the reasons for the rapid development of AI in China through field research and interviews. He emphasizes that the achievement of China in AI has surpassed initial expectations in terms of China government. Data is driving the progress of AI in this era. The booming of the AI industry in China has to be supported by massive data that are hard to get in other countries. Despite protests about privacy, the Chinese government and researchers have no plans to slow down AI development. Larson supports that China acquires strong competitiveness in AI, which benefits from various open data and investments [8]. Dai and Yu analyze the opportunities, challenges, and prospects of artificial intelligence under the new social demand by presenting theoretical thinking on developing and applying artificial intelligence from different disciplines. In addition, he discussed the following five aspects: the social status of artificial intelligence and the relationship between the people and issues, artificial intelligence in the era of labor and employment, artificial intelligence in the era of ethical issues, artificial intelligence era education problems, and artificial intelligence technology application of enlightenment philosophy. Finally, he thinks that the future of artificial intelligence development needs on the premise of reasonable system arrangements, and we should not only consider human needs. At the same time, we should also consider the development law of artificial intelligence technology itself [9]. Taddeo and Floridi focus on how to make AI a force for good. The article offers a suggestion that establishes ethics for AI self, with the potential risks that it may bring. That is based on AI's autonomy and strong self-learning ability. As AI applications have permeated all walks of life, the public believes that AI needs to be regulated and to establish AI's ethics, which includes beneficence, non-maleficence, autonomy, and justice. On the other hand, human's right to self-determination has been eroded. That is because AI has powerful influence and transparency. In summary, the views expressed in the article support that AI should maximize its potential while respecting human dignity [10].

Chen expounds on the research content, and the basic characteristics of artificial intelligence technology show the artificial intelligence technology in the field of medical and health care, transportation, manufacturing three major areas of application. He thinks the further development of artificial intelligence technology is an inevitable trend. Artificial intelligence technology is an important driving force and has risen to national

development strategy in our country. Chen believes that the application field of artificial intelligence will be further expanded in the future, and human-computer interaction will be more convenient. He holds a positive attitude towards artificial intelligence technology [11]. Wong illustrates the potential of artificial intelligence in actual life by public health emergency, which is COVID-19. In COVID-19, the super-computing power of AI enhances data processing power and provides support for tracking data. The AI's data-processing capabilities help doctors quickly diagnose and make recommendations based on past data. On the other hand, in COVID-19, data tracking is used to effectively monitor the behavioral trajectories of infected people. Furthermore, there is also an opportunity for drones that have the potential to save lives. However, public surveillance, which is common to the Chinese, is one of the risks posed by AI. While AI has been shining in COVID-19, this is far from its full potential [12]. Zhang supports that AI and military integration brings potential and security implications in China. The sharp development of AI cannot be achieved without the support of the Chinese leadership. Meanwhile, relevant policies include, but are not limited to, carrying out national AI research and development activities, cultivating talent pool, "Going Out" strategy, and technology transfer. On the other hand, AI boosts Military revolutions. In addition to unmanned systems, which the Chinese government values most, AI has also enhanced other aspects, including training, decision-making, multi-domain offense, and defense. Furthermore, China's development of artificial intelligence and its military applications have sparked a race in the army. Although there are still some uncertainties about the military application of AI, it undeniably does reduce China's sense of insecurity about "strikes" [13].

This paper studies the business scope, operation status, and development prospects of "AI Four Little Dragons", via collecting massive data for comparative analysis. Meanwhile, this paper expounds on the reasons for the overvaluation of AI start-ups in recent years.

## **2. COMPARISON OF "AI FOUR LITTLE DRAGONS"**

In the last decade, four startups in China's AI industry have brought remarkable image, which are SenseTime, CloudWalk, YITU, and Megvii Technology. In this part, there are some compared data and information to analyze these start-ups.

### **2.1. Company vision & Products chain**

A company vision can help stakeholders quickly understand the object and ambition of the company in the long term. Official websites show some information.

In terms of the vision of Megvii Technology, Megvii Technology is working on building the AI infrastructure for LOT(The Internet of Things) systems. However, in China, the other three AI start-ups are showing even greater ambitions via their company visions that involve

more industries and sectors. Meanwhile, YITU and SenseTime mention technological innovation in their visions. Table 1 shows some related information about the vision of "AI Four Little Dragons".

**Table 1.** The vision of "AI Four Little Dragons"

Vision of "AI Four Little Dragons"	
Sense Time	Develop AI technologies that advance the world’s economies, society, and humanity for a better tomorrow.
CloudWalk	To become a global leader in the field of AI by defining intelligent living to advance human potential.
YITU	YITU is engaged in fundamental artificial intelligence research to find comprehensive solutions for machine vision, listening, and comprehension.
Megvii	Building the artificial intelligence infrastructure that connects and empowers billions of IoT devices.

When it attended ICCV-2019 which is the top computer vision conference globally, YITU showed the self-developed cloud AI chip, QuestCore, the most intelligent and cost-effective video analysis chip in the world public. Furthermore, the related technologies of YITU have been used in many fields such as smart city, smart medical treatment, and smart business. Dr. Yan Shuiheng, who is CTO of YITU, thinks that the combination of artificial intelligence and industry is the future trend. Furthermore, YITU is committed to improving the overall performance of the AI industry. Meanwhile, YITU is also participating in the national program in the AI industry in China. Thus, YITU is not only a successful start-up but also has a reputation in the academic community.

However, the development direction of CloudWalk is positioned in the human-computer collaborative operating system. At present, CloudWalk leads the banking and airport face recognition business and has also made achievements in the field of security. The strategic aim of CloudWalk is to hold a strong market share in AI niche markets such as banking, transportation, and security industries in the future. The product ecosystem of CloudWalk is related to intelligent identification, which is close to its strategic aim. Unlike YITU, which vigorously develops deep algorithms, Cloudwalk hopes to create its own product ecosystem closed-loop through the existing underlying operating system and related applications. In March 2017, ClodWalk accepted the offer of the NDRC, which means that ClodWalk joins the national team in the AI industry.

Significantly, the core products of Megvii Technology are close to its vision, which relate to ALOT. In addition, Megvii also focused on releasing the core of its robot strategy -- HETU, which is one of the most core directions of Megvii under the AIOT strategy. The ALOT of Megvii Technology layout covers three areas: consumer LOT, city LOT, and supply chain LOT (Table 2). HETU is the core product in the supply chain LOT.

**Table 2.** Megvii ALOT

Megvii ALOT (AI + LOT)		
Consumer LOT	City LOT	Supply Chain LOT
Computational Photography	Smart city management	Intelligent logistics center solution
Device Authentication	Smart public safety management	Smart warehouse solution
Face ID	Smart traffic management	
Face style	Smart building access	

Compared with other AI start-ups, SenseTime covers widespread industries (Table 3). That is because SenseTime has rapidly opened up AI applications in multiple vertical scenarios, which include the cultural tourism industry, education, smart city, smart car, and others.

**Table 3.** The products and services of SenseTime

SenseTime	
Smart City	Public safety
	Transport Hub
	Carrier
	Intelligent Device
	Remote Sensing
Smartphone	SenseMatrix (3D Face Reconstruction)
	SensePhoto (Image Processing)
	SenseMars (Multiplayer interaction)
	SenseMARS (smart Sandbox)
	others
General Cultural and Entertainment	SenseAR (Augmented Readlity Platform)
	SensePostures (Pose Estimation)
	SenseAsteria (Smart Module)
Intelligent Automobile	Intelligent Cockpit
Smart Health	SenseCare (smart health platform)
Intelligent Business	Online Application
	Offline Application
Education	Primary AI Education
	AI-Empowered Education
Advertising	SenseFocus (Advertising)

	Analytics Platform)
	SenseU (Interactive Advertising Kiosk)

At present, in China, AI start-ups have gradually shifted from market penetration to market share. Compared with the other three companies, which have developed strong scenarios in certain areas, SenseTime has various products covering a wide range because SenseTime has moved into the vertical market faster to grab market share. Objectively speaking, early product homogeneity issues also encourage each AI start-up to build its USP and aiming a different target market. At the same time, while each start-up's direction is different, "Hardware and Software integration" is a common aim for them. However, the combination of hardware and software was not initially the strategic direction for AI start-ups. Still, the market demand was

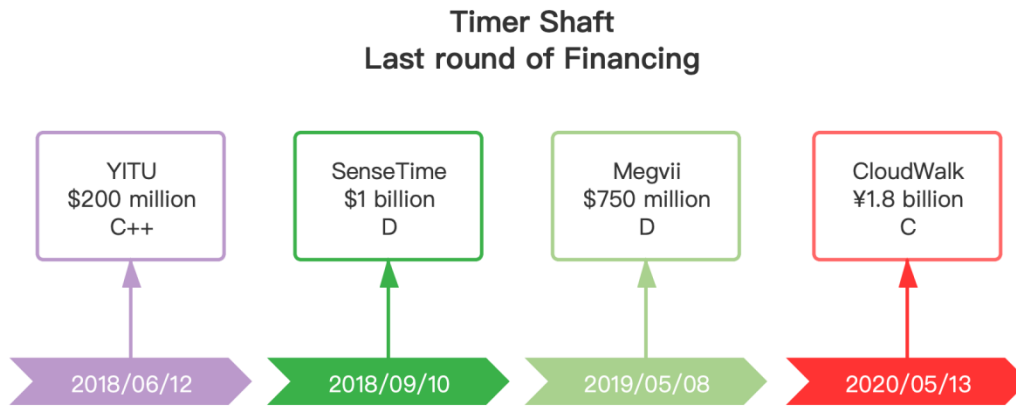
more in favor of traditional hardware because of safety and stability. Therefore, these AI startups have to choose "Hardware and Software integration" as their strategic goals.

## 2.2. Financial data

### 2.2.1. Financing

On May 13, 2020, four companies representing Chinese AI start-ups have all completed Series C financing: SenseTime, CloudWalk, YITU, and Megvii Technology (Table 4). In addition, SenseTime received \$1 billion from SoftBank Vision Fund in 2018 as its D round investment, which was widely circulated in the AI industry. That means that massive investors are attracted to excavate gold in the AI industry.

Table 4. Last round of Financing for four companies



Megvii, after SenseTime, raised \$750 million in Series D funding in 2019 May. In terms of this huge investment, Qi Yin, who is the Megvii CEO, says that this capital is not for current business, but for future business that includes two aspects which are developing and reserving some flexible funds to prepare for the future.

In 2017, CloudWalk technology invested about \$75 million in series-B after the Guangzhou municipal government injected \$300 million into CloudWalk. Earlier in the same period, its competitors, SenseTime and Megvii Technology, also got abundant investment. These investments will accelerate the development of smart cities in Asia. Unlike other AI companies, CloudWalk is just funded by industry guidance fund and state-owned and uses RMB as the currency of financing settlement (Table 5).

Table 5. CloudWalk Financing

CloudWalk			
X	Round	Capital	Investors
C		¥1.8 billion	CII-Fund; Nansha Financial Holding; Shanghai

		Guosheng Group Co, Ltd.; Industrial And Commercial Bank Of China Limited; Haier Financial Holdings; ChinaEquity Group; ICBC Asset Management (Global) Company Limited
B+	¥1 billion	Guangdong Yuke Financial Group Co. Ltd.; China Reform Holdings Corporation Ltd.; SFUND; Atlas Capital; BoHai Capital; CL-Capital; Oriza Holdings; QianHaiDeSheng Capital; QianYi Liu; YueXiu Finance; Galaxy Industrial
B	¥500 million	ShunWei Capital; Oriza Holdings; PuHua Capital; SFUND; JieAo Capital; PCITECH; XW Invest; Galaxy Innovate The World; YueXiu Financial Holdings
A	-	JieAo Capital
Angel investment	¥50 million	PCITECH

Although SenseTime and Megvii completed their Series D rounds several years ago, YITU, like Cloudwalk, raised only Series C funding but applied for IPO. On November 4, 2020, information from the Shanghai Stock Exchange showed that YITU Technology submitted its prospectus to the Science and Technology Innovation Board. Thus, YITU is expected to become the first AI company to go public among the four AI start-ups, and it will also be another AI chip start-up to go public after Cambrian.

### 2.2.2. Illusory Valuation

On the other hand, whether the valuation of AI start-ups is equal to their value has always been a controversial topic. That is because the dot-com bubble leads to unrealistic PER, which is like a phantom dreamland. Totally, in recent years, the development of AI start-ups are divided into three stages (Table 6). The red arrow represents an increase in the influence of this factor, and the green arrow represents a decrease in the influence of this factor.

**Table 6.** Factors of Valuation

Factors affecting the valuation of AI start-ups		
	Period	Factors
Stage 1	2012-2016	Algorithm, Talent
Stage 2	2016-2018	P/E ↑, Industry influence ↑, Algorithm, Talent
Stage 3	2018-At present	Commercial results ↑, Industry influence, Algorithm ↓, Talent ↓

In the first stages, between 2012-2016, AI companies' value is algorithms and talents because AI technology does not achieve commercially viable. Google's \$660m acquisition of DeepMind in January 2014, when the company had just 12 PhDs and professors, is a classic example of the value of talent. SenseTime and Megvii were also set up during that period. Remarkably, in November 2015, SenseTime was valued at \$800 million after completing A series A and A+ rounds of funding worth tens of millions of dollars.

In 2016, AI Venture entered the second stage after AlphaGa defeated Lee Sedol. The tuyen effect pushes up capital's imagination and expectation on AI, making "P/E(Price Earnings Ratio)" and "industry influence" the valuation factors. That means that only by the strength of the algorithm and highly skilled personnel of the company has been out, the trend of capital was Matthew effect. A typical example is that in 2017, the "AI Four Little Dragons" -- SensuTime, Megvii, YITU, and CloudWalk -- took more than 20 billion yuan from the total, accounting for one-fifth of the total financing of China's AI start-ups, which was 113.1 billion yuan. During this period between 2016 and 2018, SenseTime has valued at \$6 billion.

However, at present, the AI venture is in the third stage. Since 2018, as technology has become more pervasive, algorithms and talent have become less

important. On the other hand, AI as a whole develops into the technology commercialization stage. As a result, the market expects to see more commercial results and the importance of real business value increasing. In fact, in recent years, the entire AI industry is quietly carrying out a de-bubbling behavior. Thus the capital market is no longer substantially affected by PER. Meanwhile, in the current stage, which is AI Venture 3.0, the market space of the industry itself, the company's grasp of the scene "know-how," and the scene data that can be mobilized become particularly important.

### 2.2.3. Revenue & Cost

While revenue of AI start-ups is rising year after year, break-even is still a struggle. According to the prospectus published by Megvii, in 2016, 2017, 2018, and the first half of 2019, the revenue of Megvii was 67.8 million yuan, 313.2 million yuan, 1.4269 billion yuan, and 949 million yuan, respectively. The corresponding losses were 343 million yuan, 759 million yuan, 3.352 billion yuan and 5.2 billion yuan (Table 7). Based on these figures alone, Megvii's losses are significant. The company explains in its prospectus that it is because of changes in the fair value of preferred shares and continued investment in research and development.

**Table 7.** Megvii Revenue & Cost

Megvii Revenue & Cost				Unit: Million
	2016	2017	2018	The first half of 2019
Revenue	¥67.778	¥313.158	¥1,462.898	¥948.991
Cost	-	-	-	-
Profit	¥-342.825	¥-758.8	¥-3,351.694	¥-5,200.183

The "change in fair value of preferred stock" herein refers to the offshore financing of the company's pre-IPO convertible preferred stock. It can be converted into common stock at an agreed rate upon completion of the company's IPO, often at a substantial discount to the post-IPO per-share offering price.

Meanwhile, high R&D costs are a sword hanging over every AI company. A little mistake will lead to a broken chain of funds, which will lead to more serious consequences of the butterfly effect. For example, according to the prospectus, YITU lost more than \$7 billion in three and a half years but still invested almost

100% in research and development (Table 8). That shows how important research and development is for AI companies. In terms of CloudWalk, their revenue of AIOS accounted for 47% of the total amount in 2020.

CloudWalk is not a profitable company because of high R&D expenditure, which is the same as other famous AI companies such as SenseTime and YITU.

**Table 8.** YITU financial data

YITU				
	2017	2018	2019	The first half of 2020
Revenue (Million)	¥68.72	¥304.31	¥716.79	¥380.63
Profit (Million)	¥-1,303.45	¥-1,168.41	¥-3,647.13	¥-1,303.45
Total Assets (Million)	¥1,210.14	¥2,984.89	¥2,995.58	¥4,797.65
Asset-Liability ratio	189.27%	166.70%	302.52%	252.28%
(R&D Cost / Revenue) %	146.94%	95.77%	91.69%	100.10%

Most investors believe that while AI companies are highly valued at present, their real commercial value is often less than the estimated value. At the same time, as far as the AI startups, they have all received substantial funding in the past few years, but in recent years financial reports suggest that they still have not reached the break-even point. If they cannot find better profitable products to achieve a break-even point before they run out of money, they will face bankruptcy. In terms of the "AI Four Little Dragons", they do not have much time and opportunity because they've already spent a lot of money.

**3. BUSINESS MODEL-SenseTime**

SenseTime is one of the most successful AI companies in China to commercialize AI. SenseTime's success cannot be separated from its unique business model: "1 (basic research) +1 (products and solutions) +X (industry)" model. This model realizes the effective closed loop from technology, data to industry landing, realizes the sustainable profit, and successfully constructs the matrix platform-based industry enabling model.

**3.1. Route of scientific and technological research and development**

SenseTime has set its own ideas from the beginning to create an "original brain" of its own. Thus, SenseTime is the first to build an independent and controllable original technology platform. At the same time, he also focused on constructing supercomputing centers and GPU supercomputing clusters to accelerate the development of basic technology iteration and application evolution. This is an important point because SenseTime's other AI tigers are following three different paths than SenseTime. For example, according to the map of technology, chose the chip + algorithm road, in the long run after the achievements will be higher, but compared with the rapid realization of SenseTime technology, according to the map of technology, will be a more difficult and long start.

In contrast, SenseTime has gathered top AI talents in China, combined with a mature and leading original

technology platform and excellent mentor mechanism. Moreover, with a profound scientific research background, SenseTime has focused on basic research, laying a solid foundation for technological breakthrough and product innovation.

**3.2. SenseTime's products and solutions**

SenseTime has many successful cases, such as Beijing Daxing Airport, Xi ' a Metro, Zhengzhou Metro, and Shanghai Metro, using facial recognition technology to assist in security, ticket checking, and other public transportation sites. SenseTime used its advantages of many high-quality talents, rapid research and development, and high product maturity to publicize. As a result, it successfully won the trust of other enterprises. It then cooperated with many enterprises, which improved enterprises' efficiency, created a new application scenario, and promoted the intelligent upgrading of many industries.

In comparison, the application scenarios of other artificial intelligence enterprise products are relatively single. Take Megvii Technology, for example. The best application scenario of the river map system mainly developed by Megvii Technology is the logistics industry. Systems such as Vientiane can only be applied in their respective scenarios and cannot be as adaptable as SenseTime Technology. This increases the cost of research and development and limits the universality of each system, thus affecting the profitability of the enterprise.

**3.3. The combination between SenseTime and other industries**

Starting from the 4P theory, SenseTime has been the best in the industry regarding the product, price, location, and publicity.

In terms of products, SenseTime is involved in many fields, including face recognition, image recognition, text recognition, medical image recognition, video analysis, unmanned driving, and remote sensing, covering smartphones, Internet entertainment, automobiles, smart cities, as well as education, medical care, retail, advertising, finance, real estate, and other

industries. For example, Beijing Daxing International Airport, a comprehensive transportation hub globally, has a single terminal building in the world. SenseTime provides facial recognition technology for the Smart Passenger Security System, which will be deployed at 58 security checkpoints on the four floors above the terminal.

In comparison, the other three companies do not have such a wide coverage of SenseTime. Take Yuncong as an example. At present, the main business scope of Yuncong is in the service industry, such as precision marketing for shopping malls, customer flow analysis, member management, unmanned smart stores, intelligent operation management, and other services in the background.

Compared with the wide coverage of SenseTime, the cloud from the whole to the fine line, more emphasis on the ultimate in an industry. However, this also leads to the lack of staying power. The subsequent development will lag behind SenseTime, such a multi-line development of enterprises, profitability will be lower than SenseTime.

## **4. DEVELOPMENTAL POTENTIAL**

### ***4.1. Application***

SenseTime has independently developed and established a deep learning platform and supercomputing center. At the same time, the company rolled out a range of artificial intelligence technologies, including face recognition, image recognition, text recognition, medical image recognition, video analysis, unmanned driving, and remote sensing. In addition, its businesses cover a lot of industries, such as smartphones, Internet entertainment, cars, smart cities, and education, healthcare, retail, advertising, finance, real estate.

Megvii, a company with deep learning as its core competitiveness, integrates algorithms, computing power, and data to create a “trinity-integrated” new generation AI productivity platform, Megvii Brain++, and open source its core, deep learning framework “Tian Yuan”.

The business of CloudWalk covers lots of fields, such as smart finance, smart governance, smart travel, smart business. At the same time, CloudWalk also provides customers with personalized, scenario-oriented, and professional, intelligent services.

YITU Technology transforms advanced artificial intelligence technology into industry-leading AI infrastructure and industrial solutions to enable intelligent urban upgrading. In addition, YITU healthcare, with the world's leading artificial intelligence technology and the deep accumulation of the health care industry, provides medical intelligent full

stack type product solutions. It is committed to embedding medical AI products in rapid clinical workflow, boosting China's medical service level promotion, and diagnosis and treatment are preferred; besides, it improves medical productivity with artificial intelligence technology, expanding the new frontiers of medicine. At the same time, YITU combines world-leading artificial intelligence technology with business application scenarios, providing AI infrastructure and industry solutions. All in all, YITU Technology has three core businesses: smart cities, smart healthcare, and smart business.

Different kinds of artificial intelligence have different applications, and as such, they have different opportunities and challenges. Let's continue with the examples of four companies

### ***4.2. Opportunity***

SenseTime has several advantages over other companies. First, SenseTime has established deep cooperative relations with dozens of first-rate universities and research institutes at home and abroad. As a result, it has profound academic accumulation in artificial intelligence and a sound talent training mechanism, which means that SenseTime has an adequate talent pool for its future development. Second, SenseTime's AI technology has made great achievements in education. At present, SenseTime has built a complete set of AI education ecology from basic AI textbooks to SenseStudy teaching experimental platform, which is not available to other AI players in China.

Compared with the other three companies, the biggest advantage of Megvii is that it has more applications in the field of public travel represented by Didi, E-Dai-drive, Yidao Yongche, and Shenzhou Rental-Car. It provides these customers with technical services, including face recognition and driver identity verification, which means Megvii has the right of speech in public transportation software that the other three companies do not. Megvii is also the only AI company in the mobile space that can compete directly with SenseTime. Similarly, Megvii also serves mobile phone brands including Oppo, Vivo, Xiaomi, Nokia, Honor, Smartisan, etc.

CloudWalk is the only one of the four companies whose founding team is in the university. Therefore, CloudWalk Technology has its key layout in the banking and security fields. In addition, CloudWalk has also participated in national and industry standards-setting AI leaders. At the same time, CloudWalk is also the backbone of the country's new infrastructure development. All in all, CloudWalk will have more advantages in nation-building.



YITU is unique among the four AI companies because its early focuses on applying artificial intelligence technology to medical imaging are deeply rooted in the medical field. Later also slowly to finance, security and other expansion. While it may not have obvious advantages in finance or security, it has much strength in medicine. According to the figure in the medical field has a lot of ground application cases, YITU has deployed its product in dozens of third-tier hospitals, such as Zhejiang Shen People's Hospital, Fudan University Cancer Hospital, Zhejiang Provincial Children's Hospital. According to the figure, these products are going into the actual workflow of doctors, which brings more to the progress of China's medical possibilities.

While there are opportunities for artificial intelligence, there are also many challenges.

### **4.3. Challenge**

Generally, at the beginning of an enterprise's development, there will be the main business. For example, Facebook's main business is social networking, Google's main business is Internet search, and Amazon's main business sells books online. The biggest challenge for SenseTime, however, is that it has no main business. Although SenseTime has chosen to develop in areas such as driverless cars, image recognition, and facial recognition, companies in each of these areas do better than SenseTime. By the way, in fact, no one company can solve all of the technical problems with driverless cars and image recognition, which means even SenseTime doesn't have a solution for these technical problems.

Megvii has two big challenges. Firstly, in October 2019, the U.S. Department of Commerce placed Megvii on its "Entity List". It means that U.S. exporters cannot assist them in obtaining any item covered by this regulation; in other words, Megvii is effectively being deprived of trade opportunities in the United States. Secondly, the huge loss of operating performance is the more serious problem of the company, and the high investment in research and development is a major factor in the company's continued loss. Megvii's current business model is not a simple technology authorization but a security business under the cloak of AI. In the past two years, urban Internet of Things business accounts for about 65% of the revenue, which is the main source of revenue for the company. The main income of urban Internet of Things business comes from the security field, and the TOB and TOG business need a large number of sales personnel to follow up, which leads to the high sales cost of the company.

## **5. CONCLUSION**

Artificial intelligence has a great application prospect in the future, and it can provide convenience for human beings in many fields. However, in the process of AI research and development, legal restrictions in overseas countries and expensive funds will limit the progress of AI research. Therefore, if researchers want to develop artificial intelligence more smoothly, these companies should strengthen communication and cooperation and make more reasonable use of funds. AI companies often develop blueprints to help stakeholders quickly understand the company's long-term goals and aspirations. However, while revenues for AI start-ups are rising year on year, breaking even is still a struggle. These companies typically face three uncertain risks: talent shortages, government policy, and economic problems. To solve this problem, AI companies generally face the challenge of hiring large numbers of AI talent. In addition, the government will also make policies to help the development of artificial intelligence. To make profits through AI, operators should ensure an effective closed loop from technology, data to industry landing and achieve sustainable profits, and build an industry enabling model of matrix platform.

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