

At the Invitation of AETDEW Fellow Professor Ewe Hong Tat AAET President and Dato Lee Yee Cheong, AETDEW President, AETDEW Fellow Professor Han Liqun gave the Keynote Address at the Kuala Lumpur Engineering Science Fair KLESF on 8 November 2024. Professor Han is the foremost authority on AI Education in Schools in China.



KLESF

Kuala Lumpur Engineering Science Fair

**The evolutionary path
of human tools**
- from saving physical energy
to saving mental energy
人类工具的进化之路—从省力到省脑



Speaker: Professor Han Liqun
(AETDEW Fellow)

Affiliation: former Dean of School of Information Engineering, Beijing Technology and Business University, and Vice Chairman of the 5th/6th Council of China Association for Artificial Intelligence.



Venue: Main Stage, MIECC
Date: 8/11/2024
Time: 10.30am

For Further Information, Please Contact:
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Kuala Lumpur Engineering Science Fair



Friday – Sunday
8-10
November 2024
9.00am – 6.00pm
<Malaysia Time (GMT +8)>

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MINES International Exhibition
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Jalan Dulang, MINES Wellness City,
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KLEF THE FAIR 2024

18th MALAYSIA FESTIVAL OF MIND

10 November 2024

INES International Exhibition Centre

- Group of approximately 20 people posing for a group photo on a red carpet.
- Men are wearing suits or collared shirts.
- Women are wearing professional attire, including hijabs and dresses.

Dato Lee Yee Cheong organised a Roundtable at KLESF for Malaysian AI Education Stakeholders to have an in-depth dialogue with Professor Han Liqun. Important participants included AETDEW Incoming President Ts Choo Kok Beng, Chairman of UNESCO International Science Technology Innovation for South South Cooperation (ISTIC) Professor Basyaruddin and AI Experts from the Ministry of Education Malaysia Curriculum Division, Educational Policy and Research Division and Educational Technology and Resources Division. Also Present were AI Education Experts from the Private Sector.



Key Malaysian AI Stakeholders at the Roundtable



Dato Lee Yee Cheong's Takeaway from Roundtable Discussion with Professor Han Liqun

(1) Government must have standards on text books on AI Education in Schools: Example given in her : “Teaching Guide for AI Education in Primary and Secondary Schools”

(2) AI is not in the core curriculum for schools in China; In secondary schools, it becomes part of the core curriculum “ICT”. In primary schools, it is part of the core curriculum “Science”

(3) It is very difficult for teachers in China to understand the contents of AI text books as the technology is new and advanced

(4) AI text books in any country must reflect the culture and custom of that country. Malaysia must not copy the text books from China or any other country.

(5) For her text book “AI for Secondary Schools”, she has to supplement every topic in the text book with teaching kits for the teachers. She has just completed the 36 teaching kits for her text book.

(6) In AI teaching, the teacher must learn from the students as the students are more adept in computer and digital technologies than the teacher. They also have first hand experience in most AI applications in their daily lives.

(7) Chinese Government has reduced the burden of schooling for children by reducing the school hours. But working parents do not want to look after the children more hours a day at home. As a compromise, students spend two hours rather than the whole afternoon in school. Part of it is used for AI education

(8) In primary schools in China, teachers are equipped with short videos of 5 minute duration or so that the teachers can show to the students with their invention.

(9) In China like everywhere else, teachers fear AI robots will replace them. Teachers' concern must be allayed to convincing them that AI robot is but another tool that as their teaching assistants will make teaching more comprehensive.

(10) In China, AI training for teachers is the most urgent task that increasingly requires the active participation of the private sector, namely industry and the community.

AETDEW Hosted Lunch for Professor Han Liqun on 9 November 2024 at the Malaysian Petroleum Club 42nd Floor Petronas Twin Tower No.2.





Follow Up Activities in 2025

- 1. Professor Han Liqun will help organise a China-Malaysia AI Teacher Training Workshop in Kuala Lumpur together with ISTIC and MOE assisted by AETDEW during first half of 2025.**
- 2. ISTIC will have a AI Teacher Training Workshop during the ISTIC Biennial Women in Science Technology Innovation and Economy Conference in Beijing May 2025. The Conference is hosted by UNESCO International Centre for Engineering Education ICEE at Tsinghua University. Professor Han Liqun will assist in organising the Workshop.**

Follow Up Activities in 2025

3. AETDEW Fellow Goh Peng Ooi will be organising a High Level High Profile ASEAN AI Conference in Kuala Lumpur in the Autumn of 2025 in celebration of Malaysia being the ASEAN Chairman in 2025. He will include a session on training needs for AI teachers in schools. Professor Han Liqun will help to organise input from China.

4. Professor Han Liqun has completed a set of 36 AI Teacher Training Aid in collaboration with AI Education Agencies and Institutes in Zhongguancun, Beijing. Dato Lee Yee Cheong has requested Professor Han Liqun to seek the agreement of her partners to allow the electronic version of the AI Teachers Training Aid for use in AI Teacher Training in Malaysia and ASEAN

ANNEX

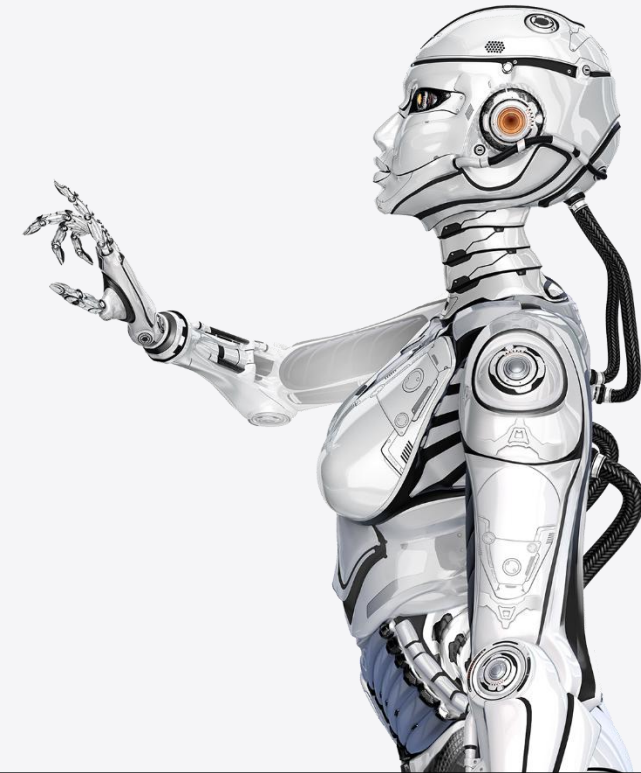
Professor Han Liqun Lecture in KLESF November 2024



China AI Education Development and The Evolutionary Journey of Human Tools —— From Labor-saving to Brain-saving

工具的进化之旅——从省力到省脑

Professor Han Liqun, AETDEW Fellow



Development Plan for the New Generation of Artificial Intelligence(2017-2030)

Strategic goals for the development of artificial intelligence in China

Step 1: By 2020, the overall technology and application of artificial intelligence will be integrated with the world advanced level synchronization.

Step 2: By 2025, significant breakthroughs will be made in the basic theory of artificial intelligence, some technologies and applications have reached the world's leading level.

Step 3: By 2030, the overall theory, technology, and application of artificial intelligence reaching the world's leading level and becoming the world's main artificial intelligence Innovation Center.

The strategic layout of AI talent cultivation in China

Forming a highland of artificial intelligence talents in China

Building the discipline of artificial intelligence and cultivating versatile talents

Setting up courses related to artificial intelligence in primary and secondary schools

Gradually carry out national intelligent education projects

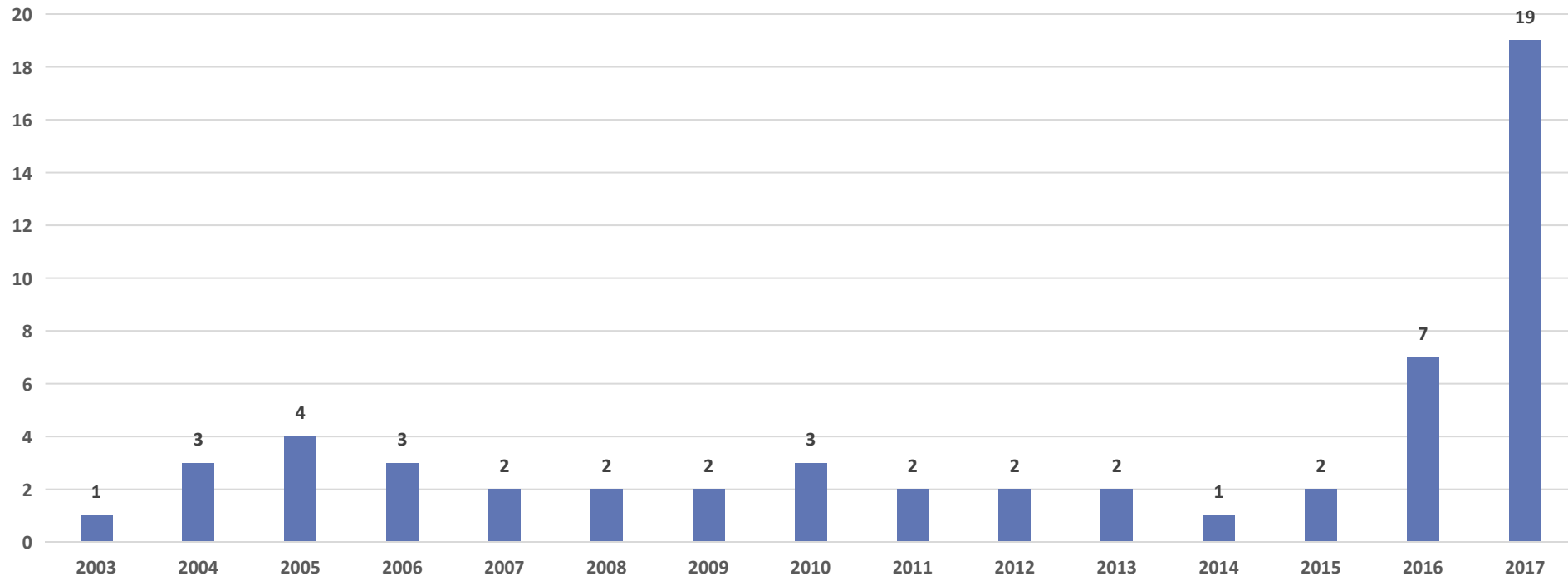
Talent Education for the Age of Artificial Intelligence



The scale of AI professional talent cultivation in China

Undergraduate Education

Number of Universities Offering AI Majors in China (2003-2017)



The scale of AI professional talent cultivation in China

Undergraduate Education

From 2018 to the end of 2023

- More than 525 universities have offered undergraduate programs in artificial intelligence,
- 208 universities have offered majors in intelligent science and technology.



The rapid development of artificial intelligence and related disciplines has provided solid talent support for the leapfrog development of artificial intelligence in China at present.

The scale of AI professional talent cultivation in China

Vocational Education

- ◆ 2020-2023: A total of 1531 vocational colleges have established the Artificial Intelligence Technology Application (Service) major
- ◆ Currently, a large number of vocational colleges have adopted the "AI+X" composite talent training model.

These AI related majors have been established in vocational education institutions, providing an urgently needed reserve of applied, skilled, and practical talents for the artificial intelligence industry.

Our Work on AI Courses in Primary and Secondary Schools

AI curriculum system and teaching objectives for primary and secondary schools

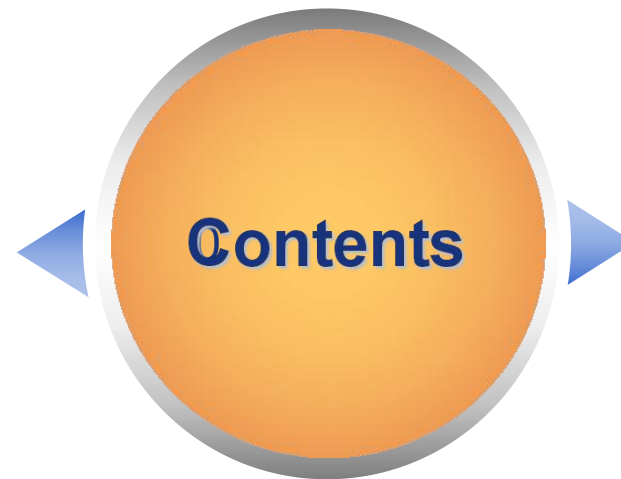


Learning Stage Design

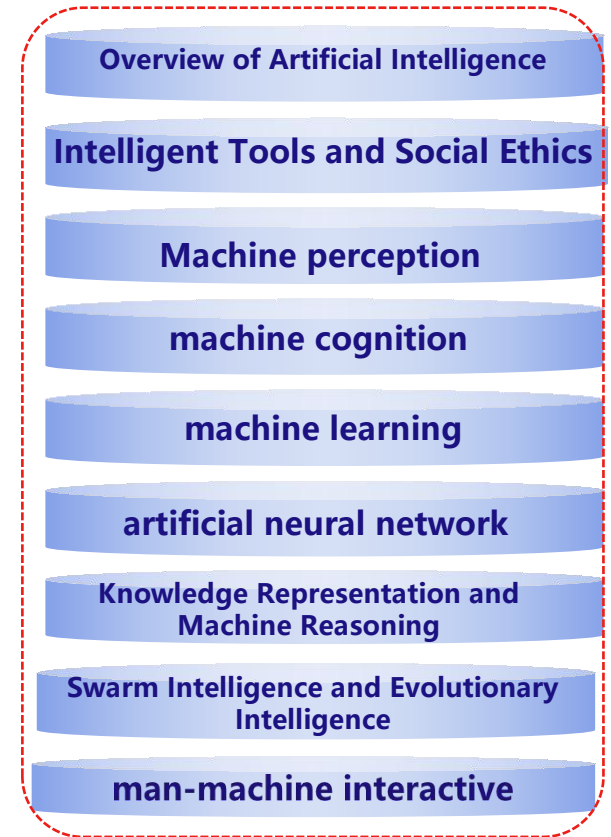
target design

Content Design

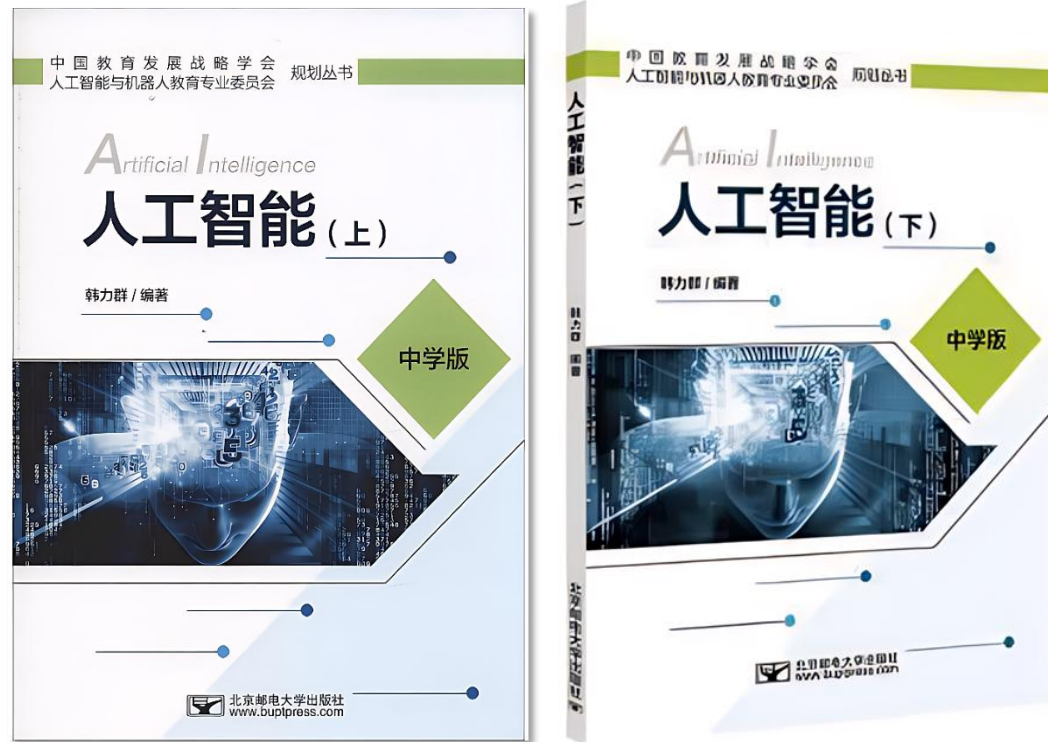
Implementation



Standardization
normalization



Our Work on AI Courses in Secondary Schools



Artificial Intelligence Volume 1 and Volume 2

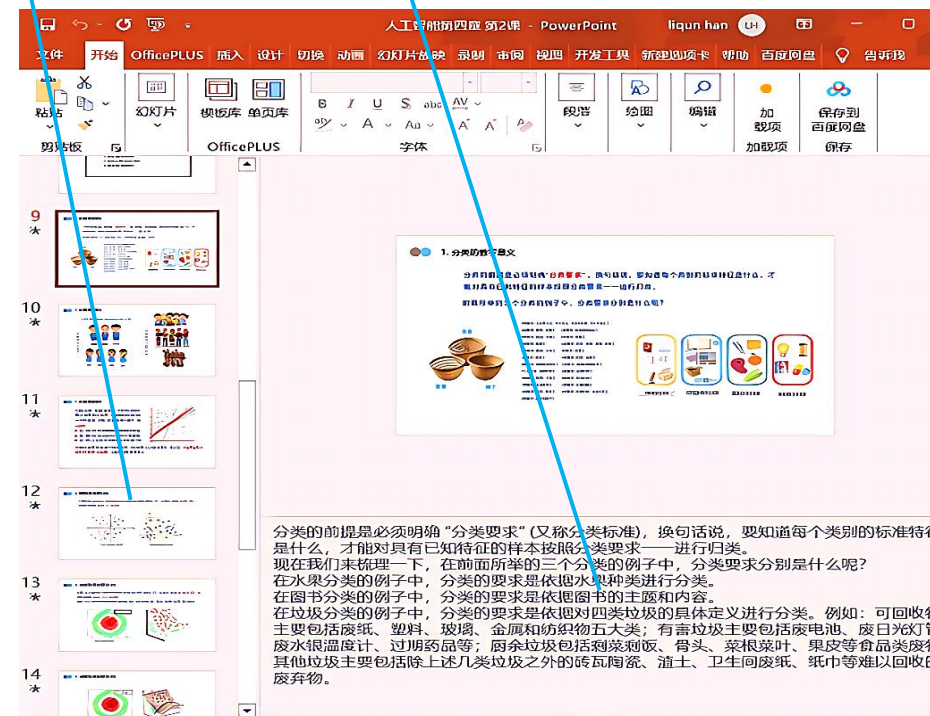


Artificial Intelligence and Smart Society

Our Work on AI Courses in Secondary Schools

To address the severe shortage of AI teachers in primary and secondary schools, as well as the widespread fear of AI courses among teachers, we have developed detailed teacher training materials for each lesson, including detailed lesson plans, courseware, and scripts for each lesson.

主题一：工具的进化 《人工智能(中学版)》第二章1-2节样课 教学方案		
教学环节	教学内容	参考时长
教学目标	1. 理解科技的发展推动着工具与时俱进 2. 能识别各类工具的能力层次 3. 了解AI工具的特点及人-机关系	
教学内容	第一节 与时俱进的工具 1. 农耕时代的工具：通过常见的农业生产工具、手工工具和纺织工具了解古代工具的主要特点； 2. 工业时代的工具：通过机械化、电气化、自动化、信息化四个发展阶段典型工具的特点，体会科技的进步和生产力的发展如何推动着工具不断进化。理解为什么信息化的发展方向必然是智能化，人类创造的工具必然会向智能工具进化。 第二节 工具的能力层次 1. 能源驱动的动力工具 2. 听命于程序的自动工具 3. 耳聪目明的信息工具 4. 聪明能干的智能工具 第三节 人工智能时代的AI工具	30
课堂讨论	从农业社会发展到信息社会，人类创造的工具拓展了人的体力，延伸了人的感官，提升了人的信息获取能力，还有必要向智能化方向发展吗？ 如果人的体力劳动和脑力劳动都被聪明能干的工具取代了，人还需要学习和工作吗？	8
课堂练习	教师提问：如果将工具分为四类：动力工具、自动工具、信息工具、智能工具。PPT中给出的工具分别属于哪一类？ 教师提问：请举例说明四类工具的主要特点。	7



Our Work on AI Courses in Primary Schools

first grade



Human intelligence and machine intelligence

second grade



Human perception and machine perception

third grade



machine learning

fourth grade



AIGC

fifth grade



multi-sensor fusion

sixth grade



Optimization and Swarm Intelligence

First semester

second semester



Intelligent tools



Human cognition and machine cognition



man-machine interactive



pattern recognition



artificial neuron net



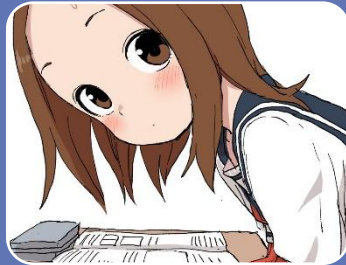
knowledge reasoning

Official requirements for AI abilities of primary and secondary school students



Primary school stage

- Emphasis is placed on enlightening students' artificial intelligence thinking, enabling them to initially possess artificial intelligence literacy and social responsibility.



Junior school stage

- Being able to use artificial intelligence to empower one's own learning and life to better adapt to the new opportunities and challenges of a smart society.

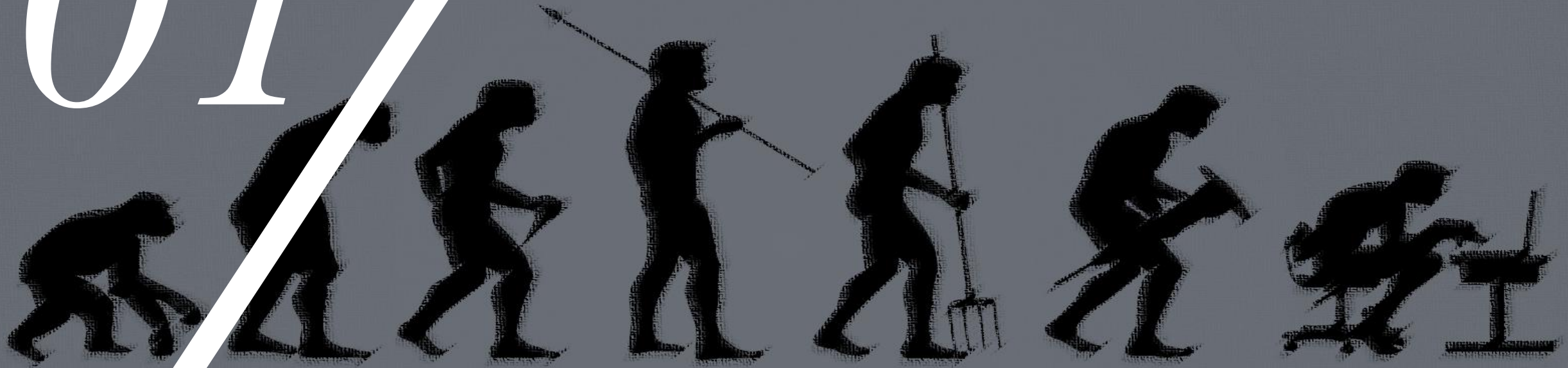


High school stage

- **Further strengthen**

the basic capabilities

01



Tools That Keep Pace with the Times

What is a tool?

The term "tool" here refers broadly to all man-made products used in human life and work, including various types of implements, machines, software (APPs), and so on.





1. Tools of the agricultural era

Tools of production

From the Stone Age to the Agricultural Age, the labor tools created by humans have been evolving towards being more labor-saving, durable, and efficient.



plows, hoes, and sickles greatly increased the efficiency and productivity of farming, allowing more land to be cultivated and more food to be harvested.



1. Tools of the agricultural era

Hand tools



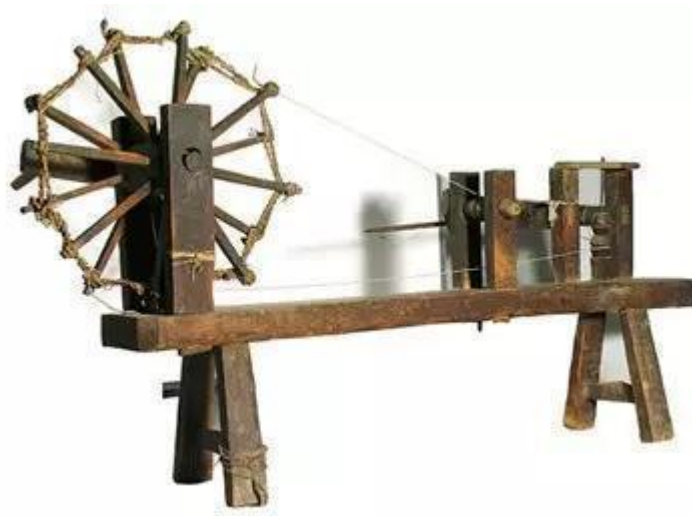
saws, hammers, chisels, and pliers are common hand tools invented in ancient times. The exquisite craftsmanship and ingenious use of these tools demonstrate the superb skills and wisdom of ancient craftsmen.



1. Tools of the agricultural era

Textile tools

Textile production was one of the important handicraft industries in ancient times. Spinning wheels and looms are common textile tools. The emergence of these tools allowed people to produce a greater variety and more exquisite textiles.



Spinning wheel



loom



1. Tools of the agricultural era

To further improve production efficiency, humans also created tools that use animals instead of human labor, greatly expanding human physical strength.



donkeys to pull millstones



oxen for plowing

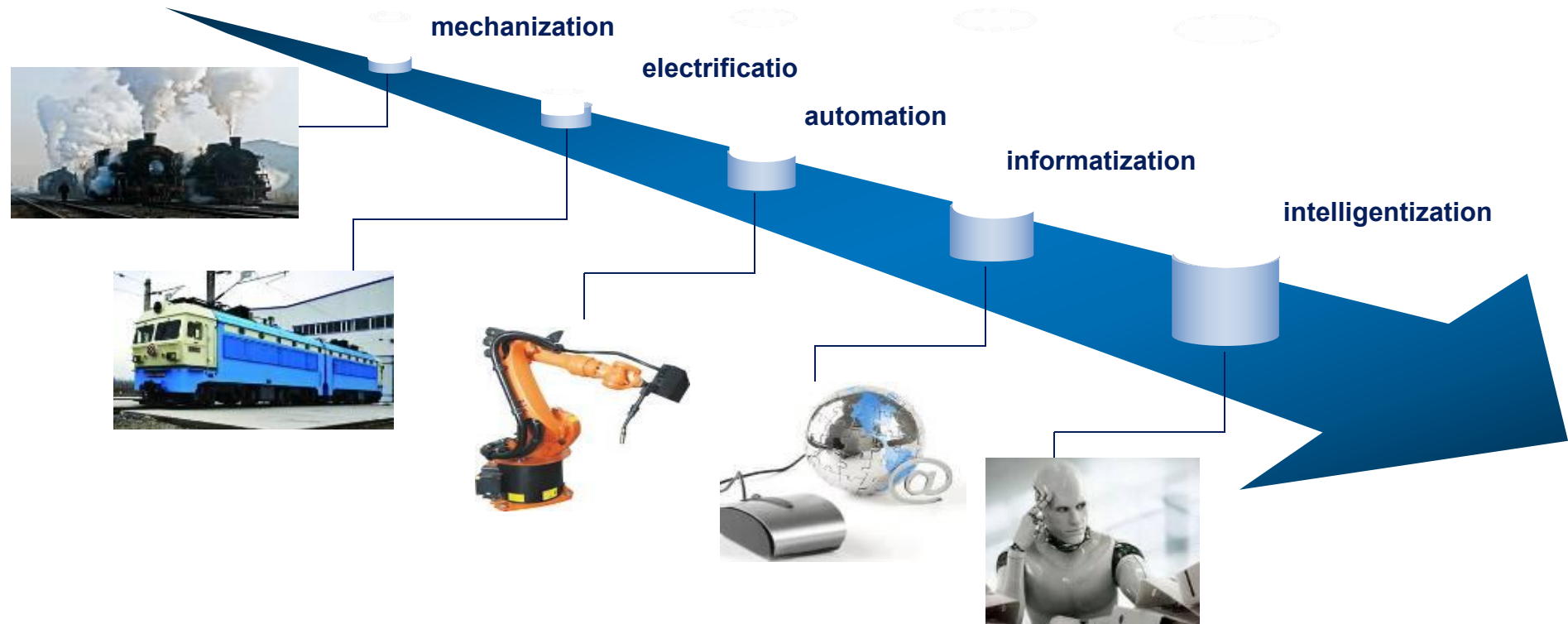


horses for carriages



2. Tools of the Industrial Age

Since entering the industrial society, the development of technology and productivity has gone through four stages: mechanization → electrification → automation → informatization, and is currently accelerating into the process of intelligentization.



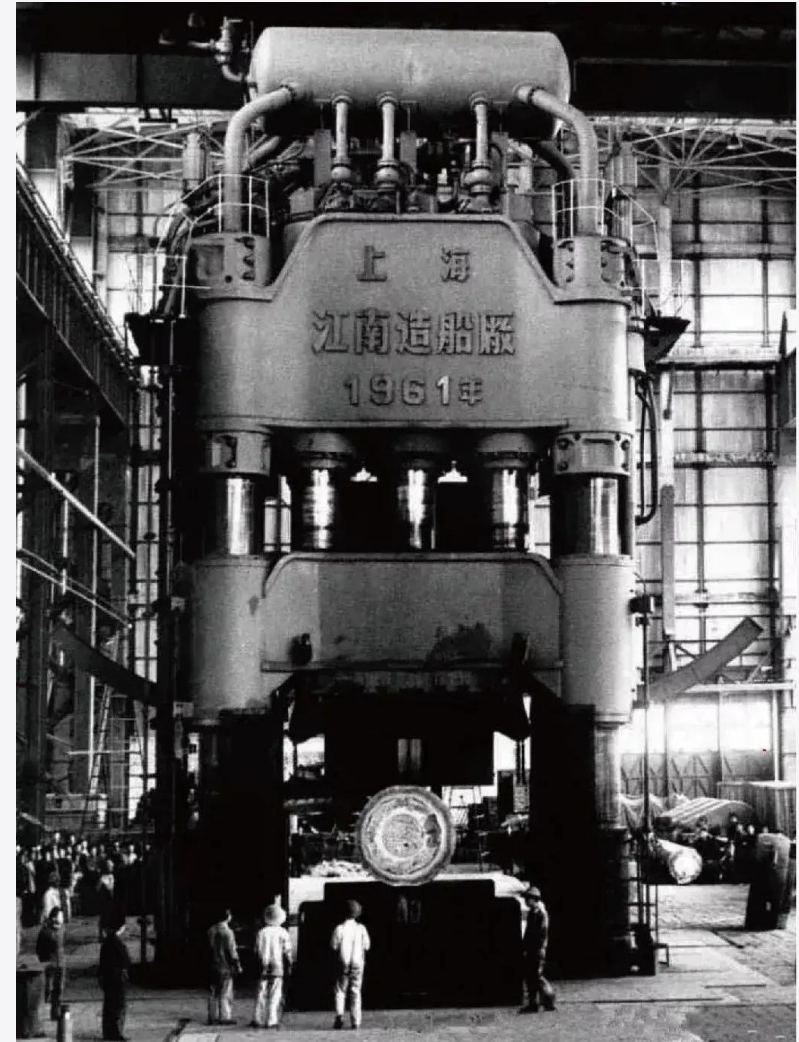


2. Tools of the Industrial Age

In the era of mechanization, steam engines, hydraulic presses, and other power-driven machinery replaced human physical labor.



Steam locomotive



In June 1962, a 12000 ton free forging hydraulic press was successfully developed in Shanghai.



2. Tools of the Industrial Age

In the era of electrification, people used electrical equipment powered by electric motors to replace human physical labor.



Electric Locomotive



2. Tools of the Industrial Age

In the early stages of industrialization, the mechanization and electrification phases, humans created "incredibly strong, tireless" power tools. These tools greatly expanded human physical strength, reduced human physical labor, and significantly increased production efficiency.



2. Tools of the Industrial Age

In the era of automation, people used sensors, detection technology, and automatic control technology to create automatic machines that obey programs. Typical scenarios include the emergence of many fully automated production lines and industrial robots in the manufacturing industry.





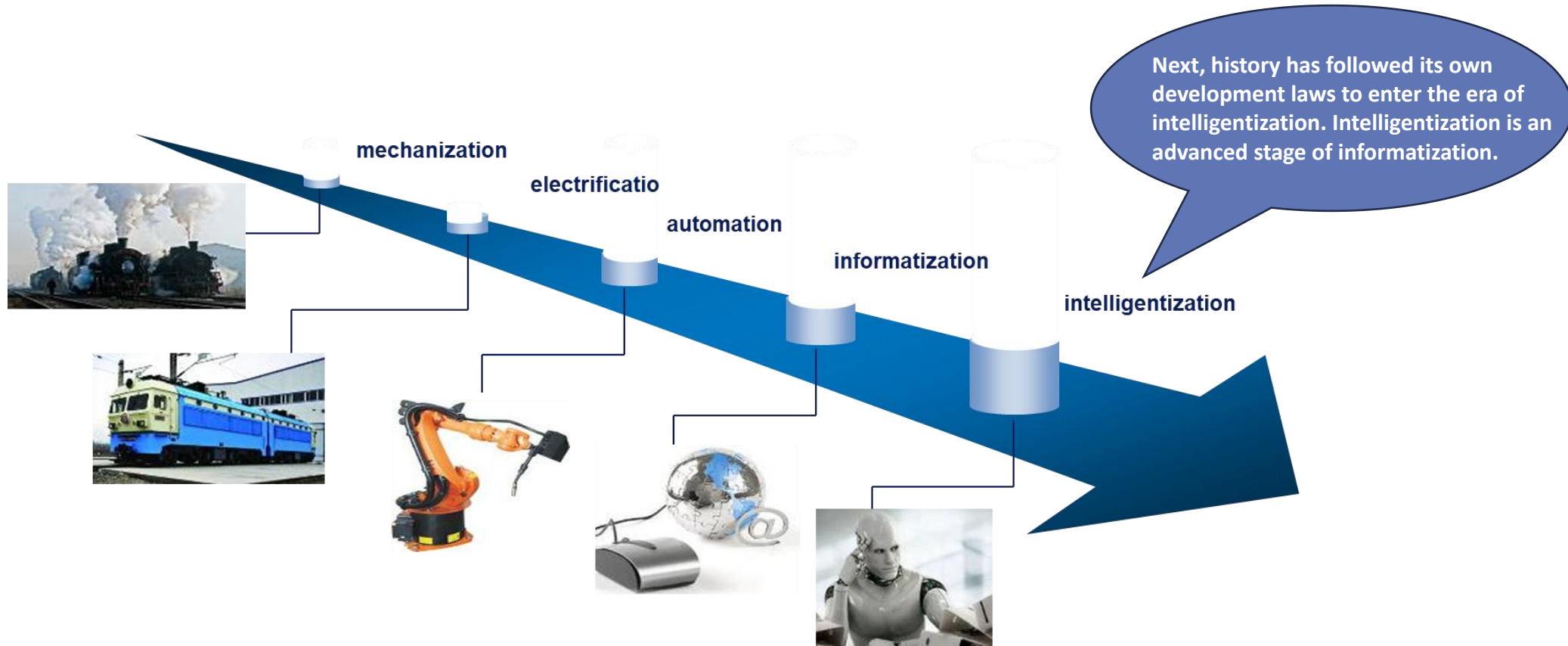
2. Tools of the Industrial Age

In the era of informatization, people have created "omniscient and omnipresent" information tools for humans using computer and communication technology, and internet technology. In the information age, people have utilized computer and communication technologies, as well as internet technologies, to create information tools for humanity that can "see in all directions and hear from all sides."





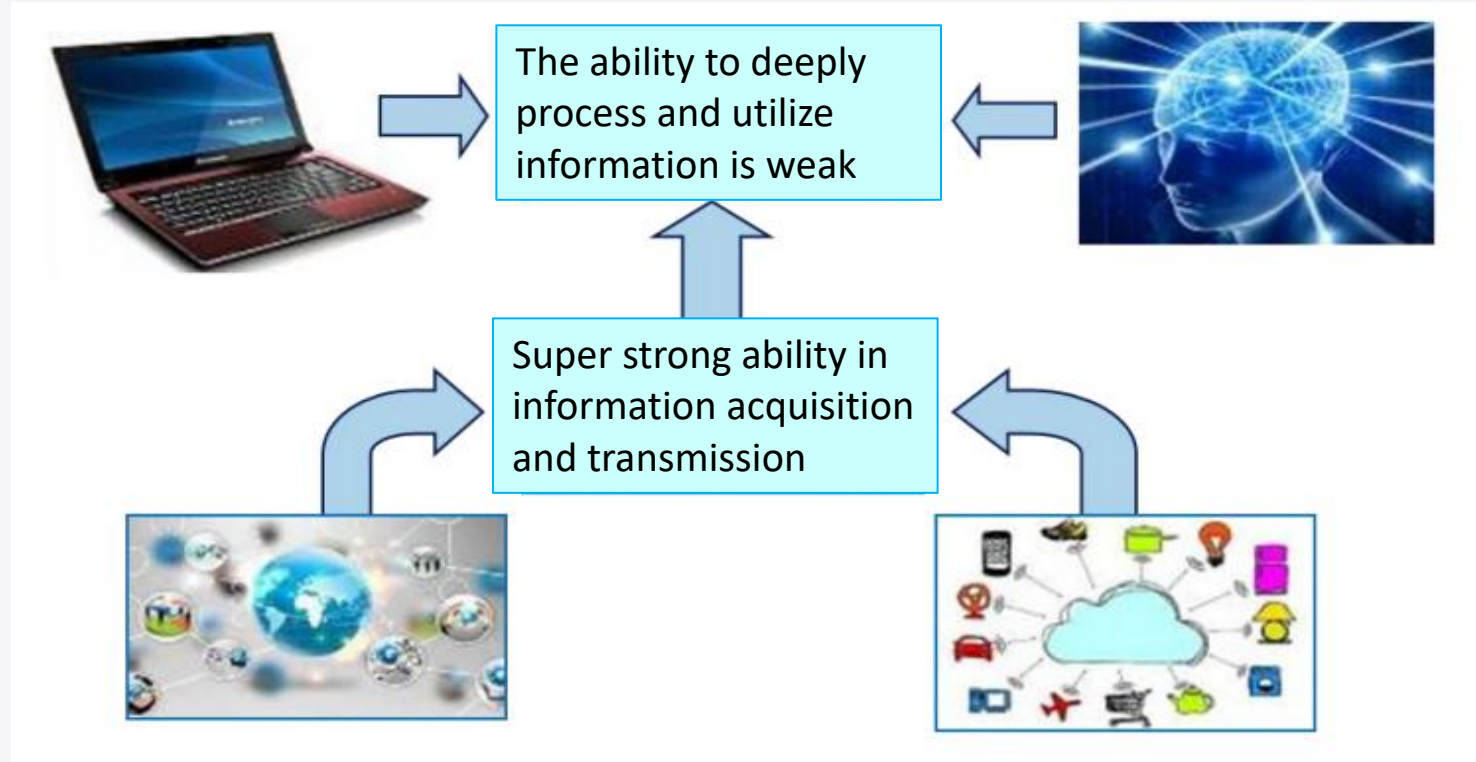
2. Tools of the Industrial Age





3. Why is the intelligentization era an advanced stage of informatization?

- ◆ The rapid development of modern information technology has greatly expanded human information transmission and reception capabilities.
- ◆ In terms of information processing and utilization, modern information technology still falls far short of human capabilities.



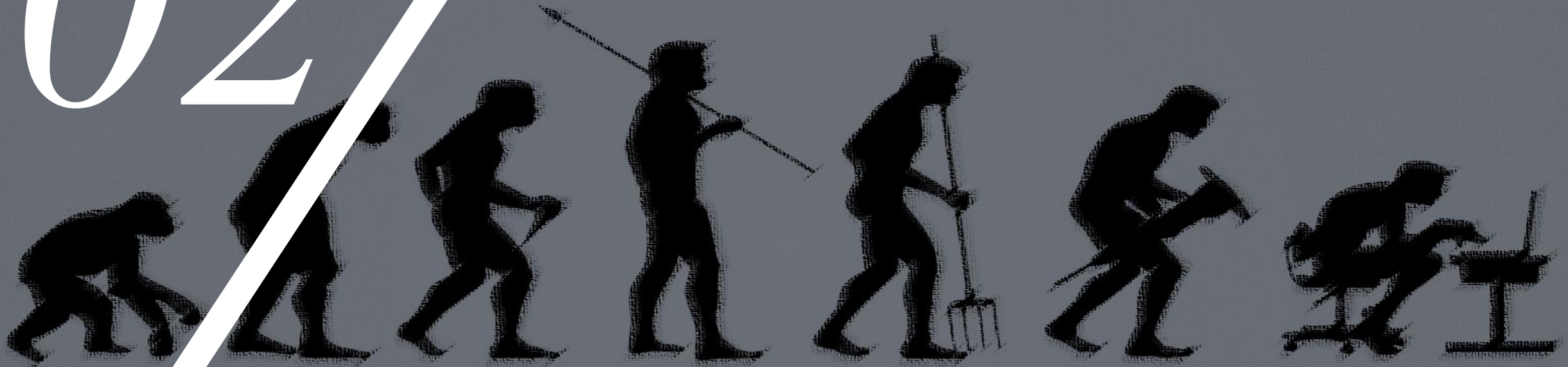


3. Why is the intelligentization era an advanced stage of informatization?

In the era of explosive information growth, what we need more is intelligent tools that can process information like the human brain. An information society will inevitably develop towards the direction of intelligentization.



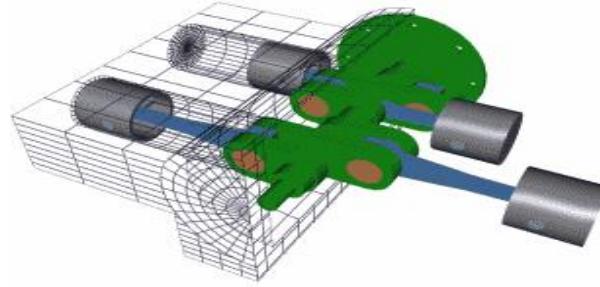
02



The Capability Levels of Tools



1. Incredibly strong power tools



The machines that can only simulate human movements and expand human physical fitness are mainly energy driven power tools, such as electric motors, drills, tractors, cranes, etc. The characteristic of these tools is that they are "infinitely powerful and tireless" due to energy drive, and the sense of gain they bring us is "labor saving" or "effort-saving".



2. Automatic tools that obey programs

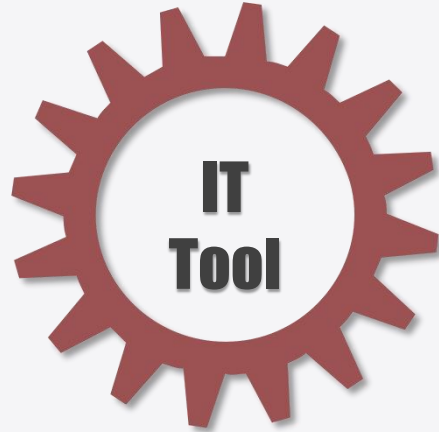


If a machine can automatically execute a pre-designed program based on the collected information, such a machine belongs to automatic tools, such as fully automatic washing machines, air conditioners, rice cookers, and so on. The greatest sense of gain that these tools bring us is; It can save both labor and worry.





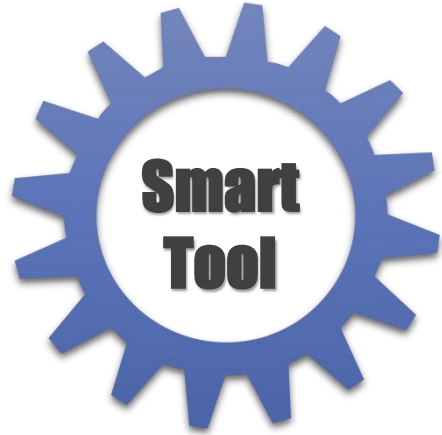
3. Information tool with "sharp ears and clear eyes"



The application of information technology, such as computers, communication equipment and the Internet, has provided us with a large number of information tools, such as telephones, mobile phones, WeChat and e-mail, which are all information tools. Their biggest feature is that they have expanded our ability to send and receive remote information. Such tools have brought us a sense of gain; Make everyone feel like they have a "thousand mile eye" and a "windward ear" in terms of information dissemination.



4. Smart and capable intelligent tools



Machines that can make decisions autonomously according to given knowledge and rules and automatically execute decisions are intelligent tools. Intelligent tools are not only "strong and tireless" due to energy drive, and "acute in hearing and vision" due to information, but more importantly, they can think and process information like humans, make autonomous and correct decisions. Therefore, for humans, the sense of gain from intelligent tools is "labor-saving, worry-saving, and brain-saving."



4. Smart and capable intelligent tools

The Evolution of Washing Tools



Manual laundry



Semi automatic washing machine



4. Smart and capable intelligent tools

The Evolution of Washing Tools



Manual laundry



Semi automatic
washing machine



Fully automatic
washing machine



Haier
海尔

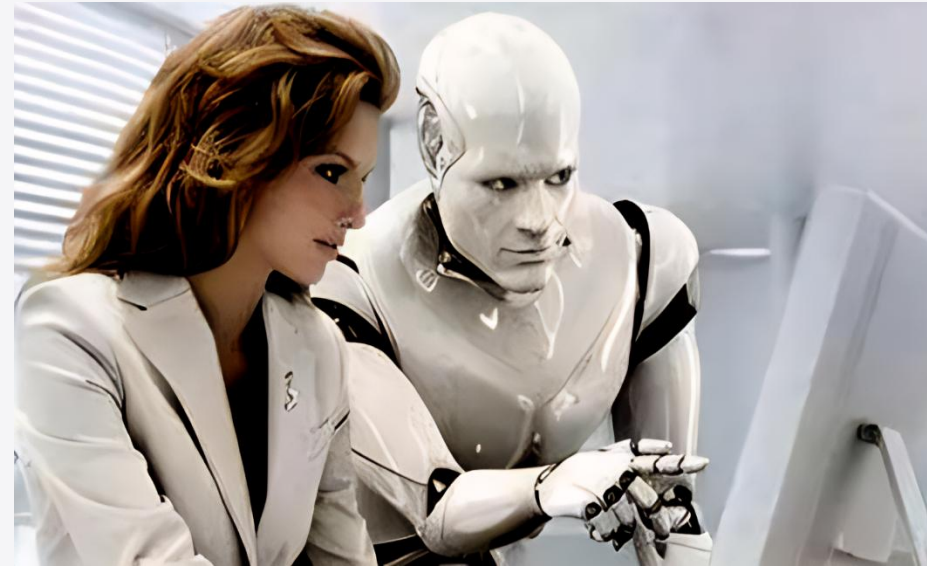


Intelligent
washing machine

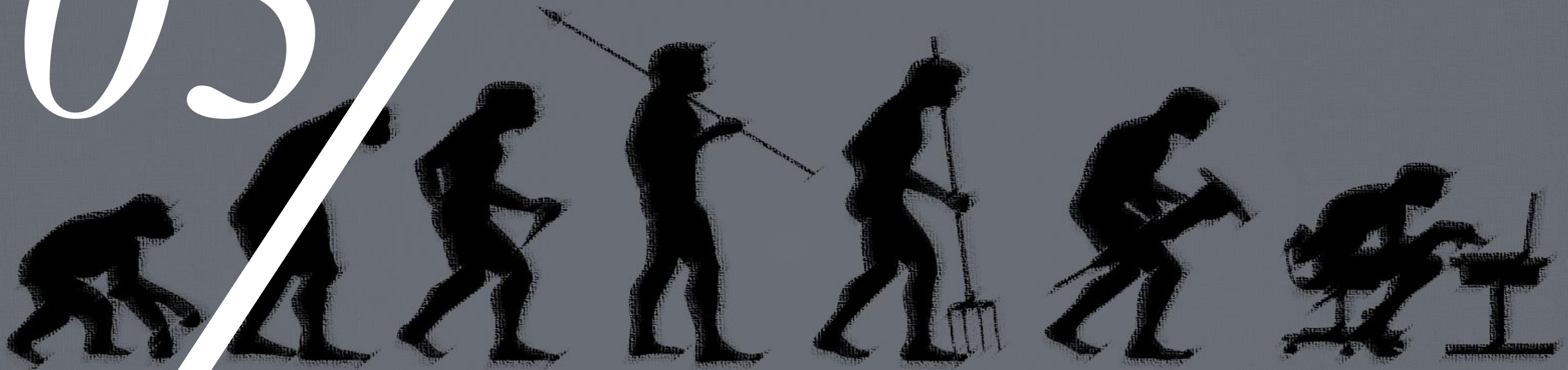


4. Smart and capable intelligent tools

Researching and developing intelligent machines with human intelligence characteristics, enabling them to process information, extract patterns, and utilize knowledge like humans, is an inevitable trend in an information society. The further development of informatization will inevitably be intelligentization, and this trend has become increasingly clear.



03

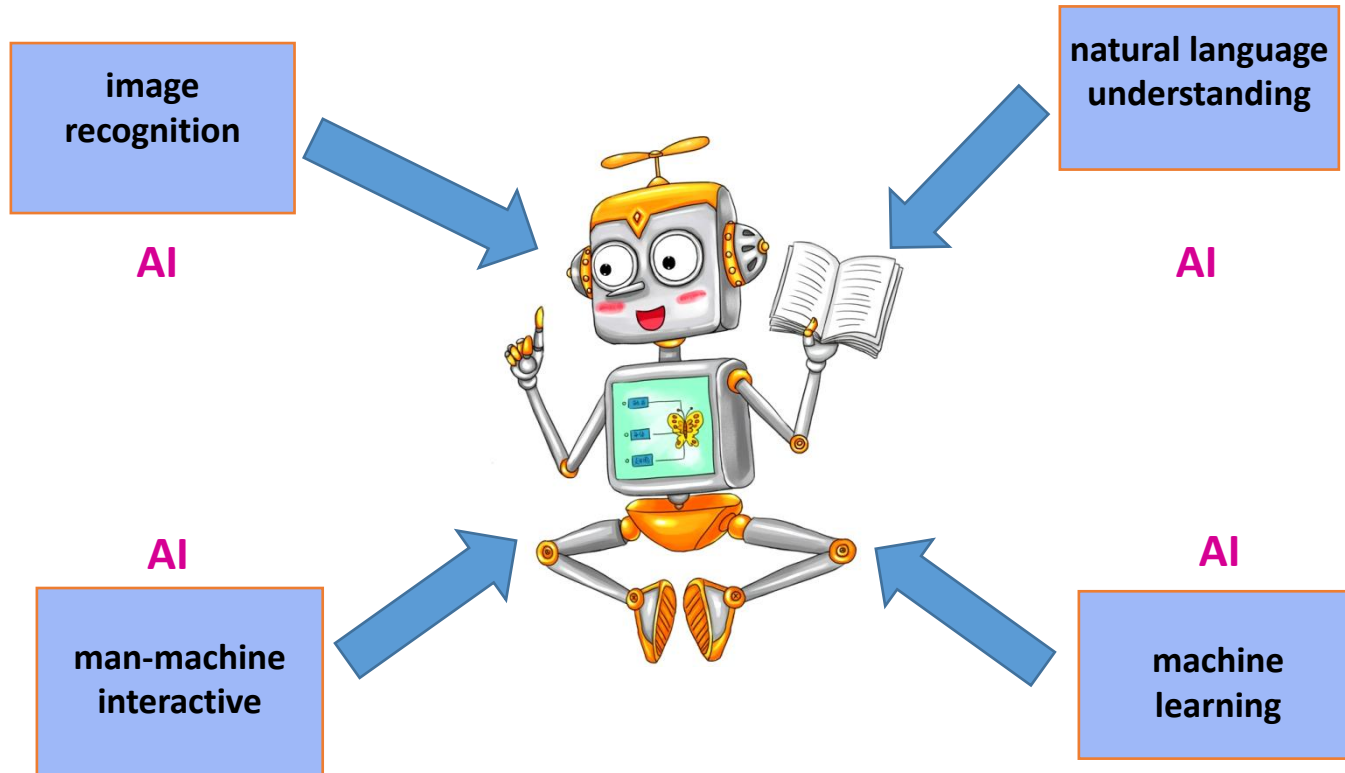


*Typical Representatives of
Intelligent Tools - Intelligent Robots*



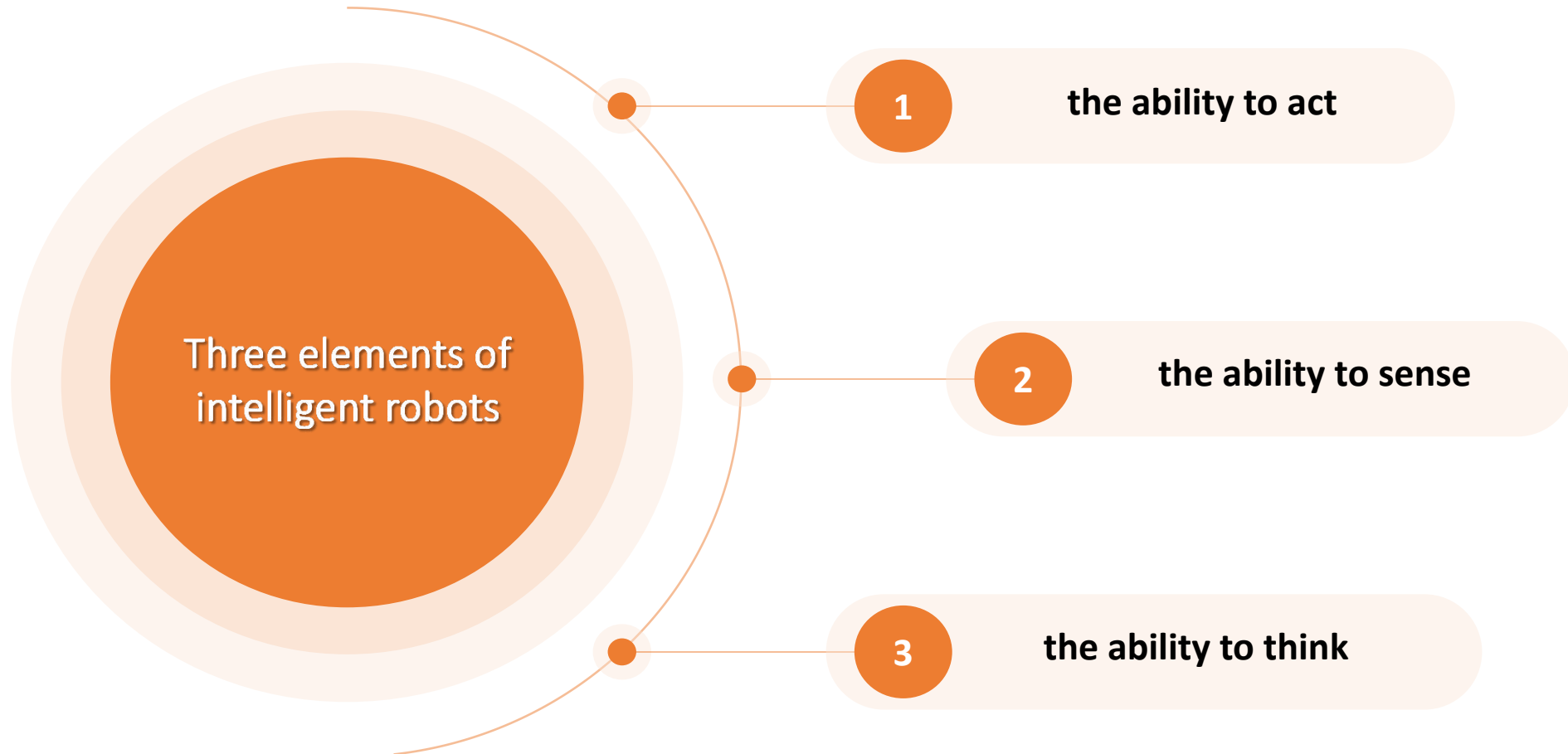
1. Basic knowledge of intelligent robots

Intelligent robots are the best place for AI technology to exert its powerful strength and are a typical representative of intelligent machines.





1. Basic knowledge of intelligent robots

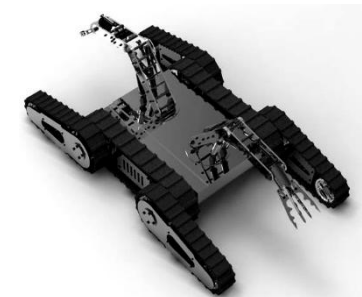
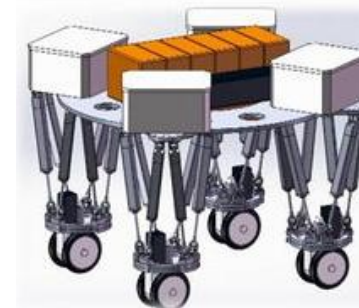
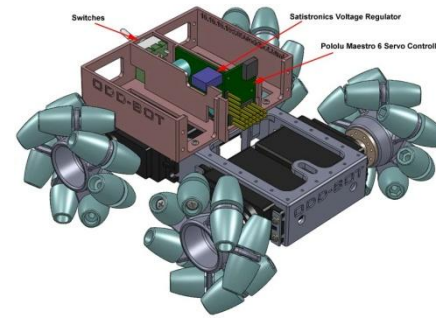




2. The Evolution and Generation of Robots

The first generation of robots is an automatic machine that can only work according to pre-programmed procedures. Its characteristic is that it has "hands" or "feet" to act: hands are mechanical arms that perform tasks, and feet are wheels that enable movement.

First Generation Robot





2. The Evolution and Generation of Robots

The second generation of machines can perceive; Sensors are equivalent to human sensory organs, enabling robots to recognize the external environment and perceive their own state.

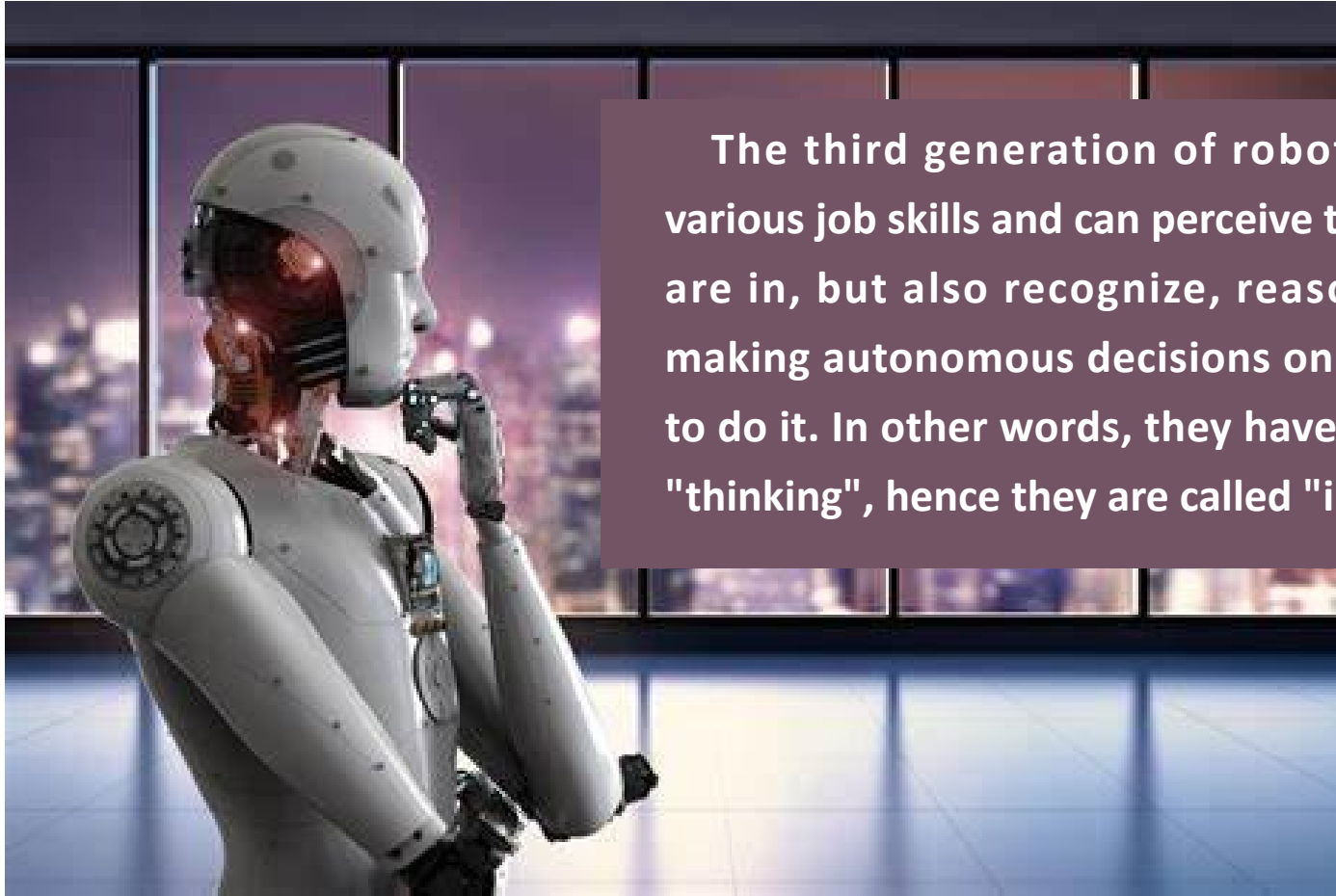
Second Generation Robots





2. The Evolution and Generation of Robots

Third Generation Robots



The third generation of robots not only possess various job skills and can perceive the environment they are in, but also recognize, reason, plan, and learn, making autonomous decisions on what to do and how to do it. In other words, they have the third element of "thinking", hence they are called "intelligent" robots.



2. The Evolution and Generation of Robots

Third Generation Robots

**The basic elements
of intelligent robots:**

the ability to act ←

the ability to sense ←

the ability to think ←

Key technologies of artificial intelligence	
Big Data/Cloud Computing	Knowledge engineering
Machine learning	knowledge graph
Inductive reasoning model	Large Language Model (LLM)
computer vision	Swarm intelligence
natural language processing	Evolutionary Intelligence
Knowledge engineering	AIGC



3. Various types of intelligent robots

Intelligent Service Robot



Kitchen robots have entered reality



3. Various types of intelligent robots

Intelligent public service robot

Delivery robot



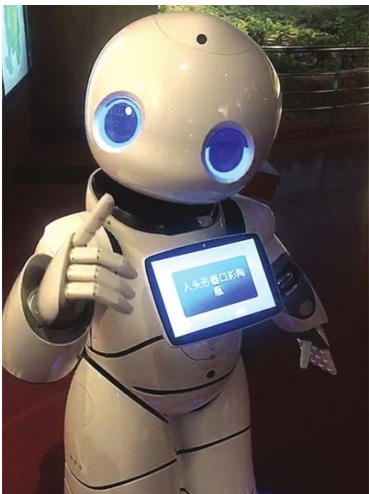
Welcome robot



Room service robot



Explain robots



Consulting Robot



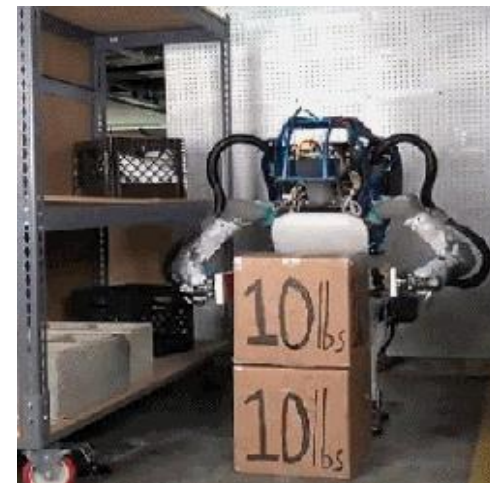
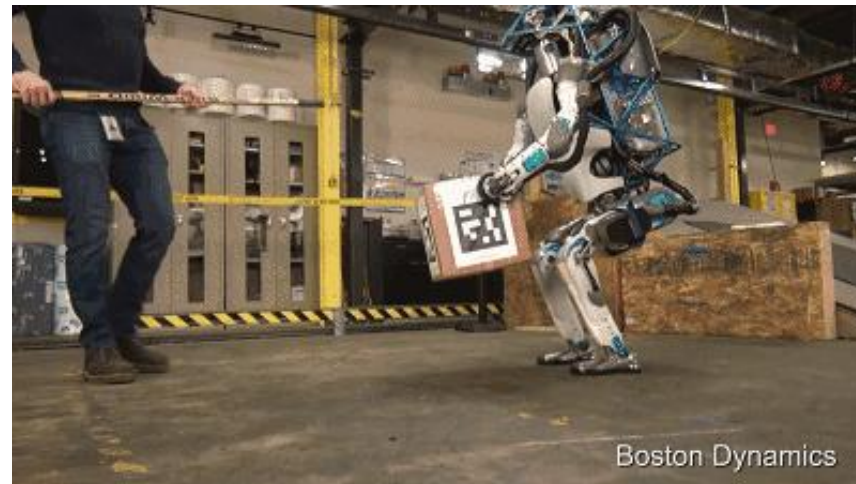
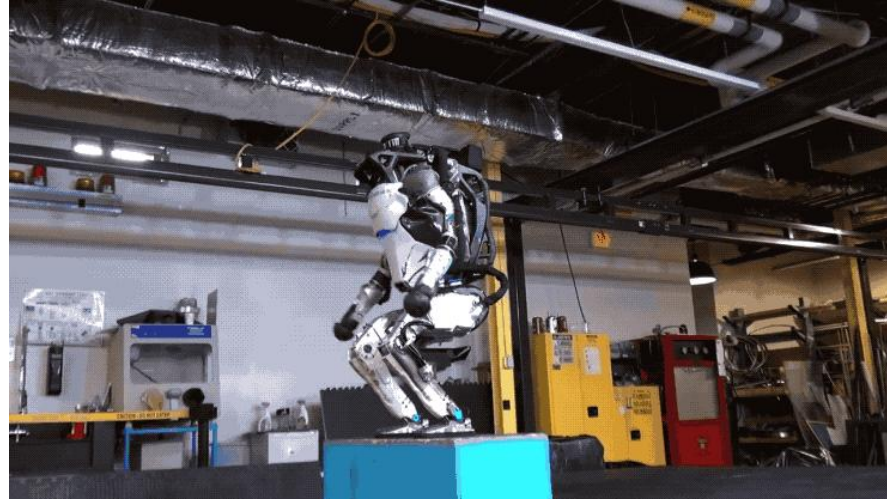
Entertainment Robot





3. Various types of intelligent robots

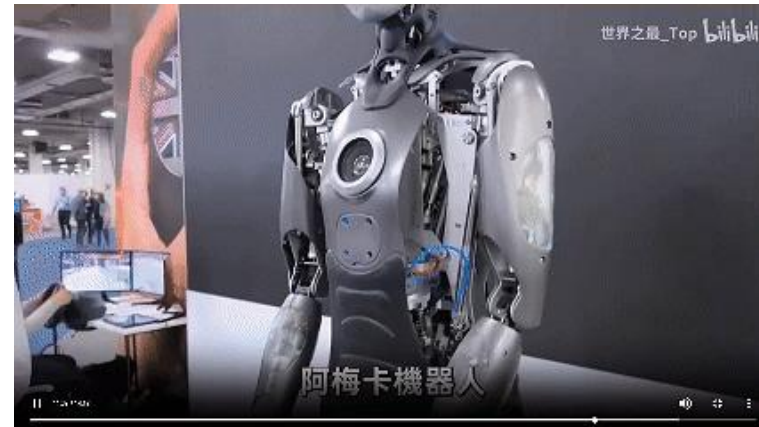
Humanoid service robots





3. Various types of intelligent robots

Humanoid service robots





3. Various types of intelligent robots

Special robots



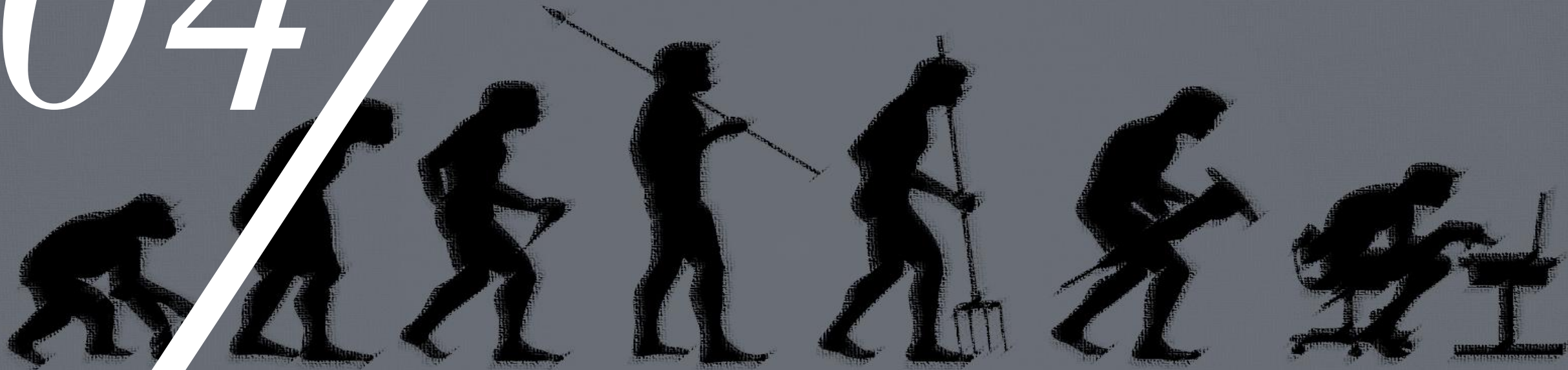


4. The development trend of intelligent robots



It can be foreseen that the comprehensive application of various AI technologies will enhance the "sensory" ability of robots to "**perception**" ability, the "automatic execution" ability of robots to "**autonomous decision-making**" ability, and the "scheduling knowledge" ability of robots to "**acquire knowledge**" through learning. Robots are no longer cold machines, they will have human-like thinking, psychology, and emotions; They will be understanding, with rich expressions and increasingly human-like behavior.

04



The most popular smart tool currently available: AIGC

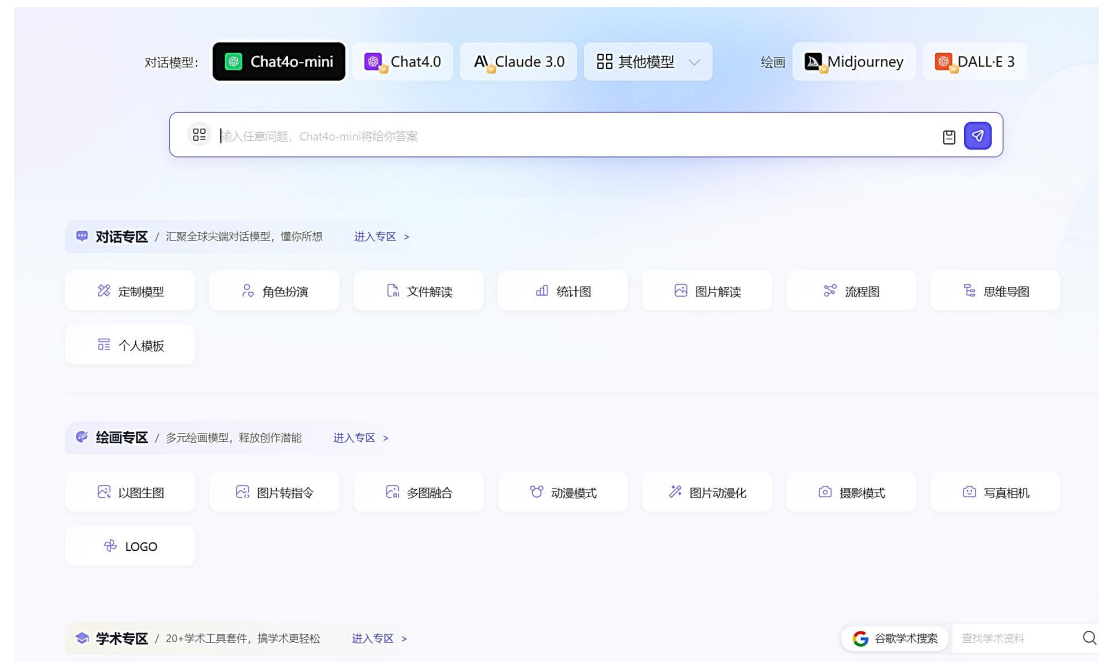


6. Content generation tool

AIGC (AI generated content)

Multimodal Large Model

- 【text generate text】
- 【text generate image】
- 【text generate music】
- 【text generate video】
- 【text generate code】





6. Content generation tool

learning ability

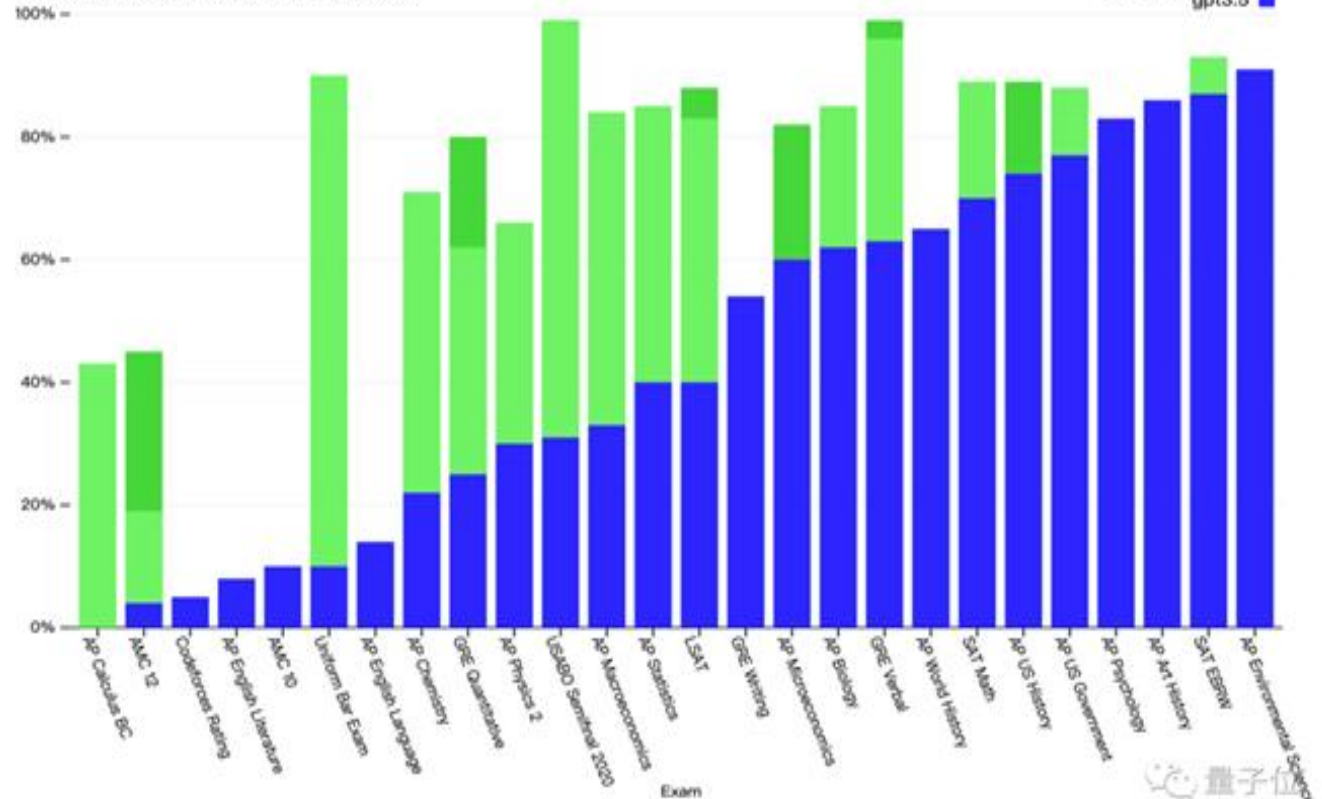
AIGC has strong learning ability and can improve its generation quality and efficiency through continuous training. Having AIGC take the exam is a good way to test learning effectiveness.

Learning effectiveness test

The blue bar in this picture represents the score of Chat GPT3.5 on the American College Entrance Examination SAT test, while the green bar represents the score of GPT-4, which scored 710 in reading and writing and 700 in mathematics (out of 800).

Exam results (ordered by GPT-3.5 performance)

Estimated percentile lower bound (among test takers)

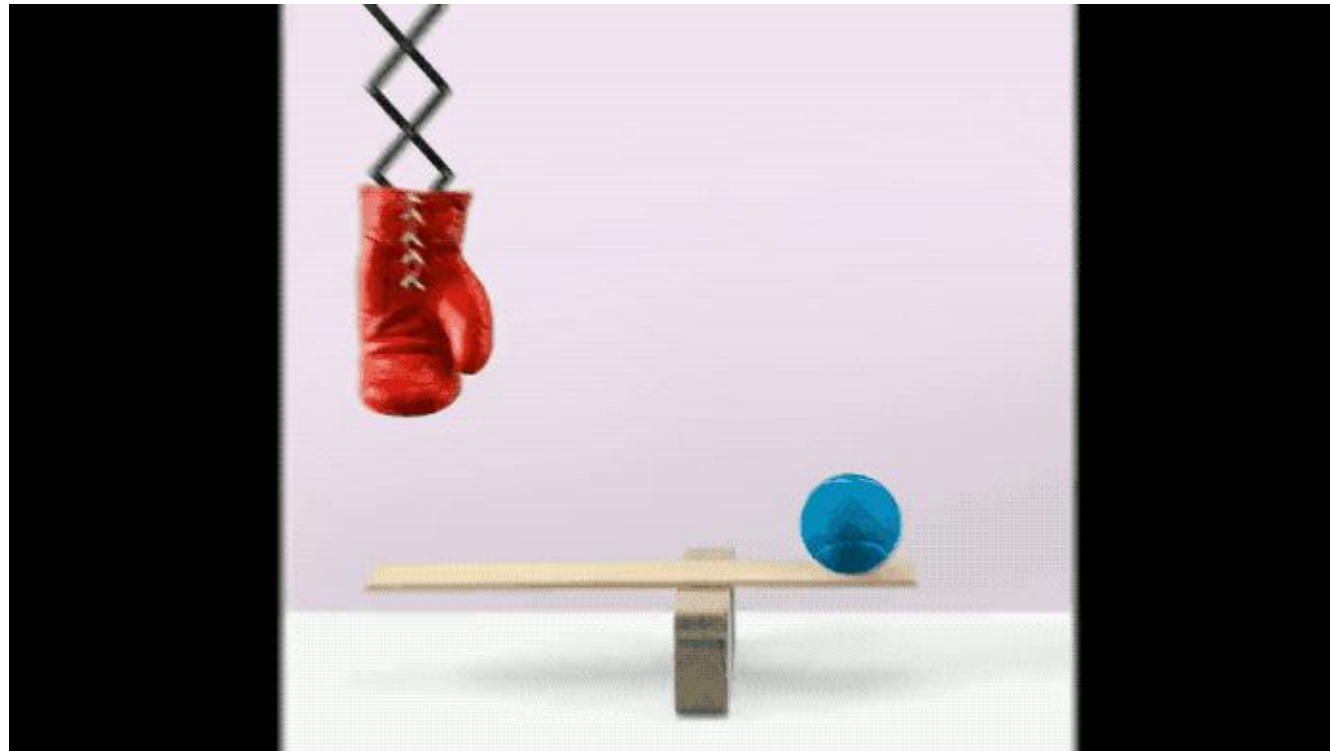




6. Content generation tool

Understand ability

AIGC uses deep learning techniques to understand the meaning of human natural language and generate content.

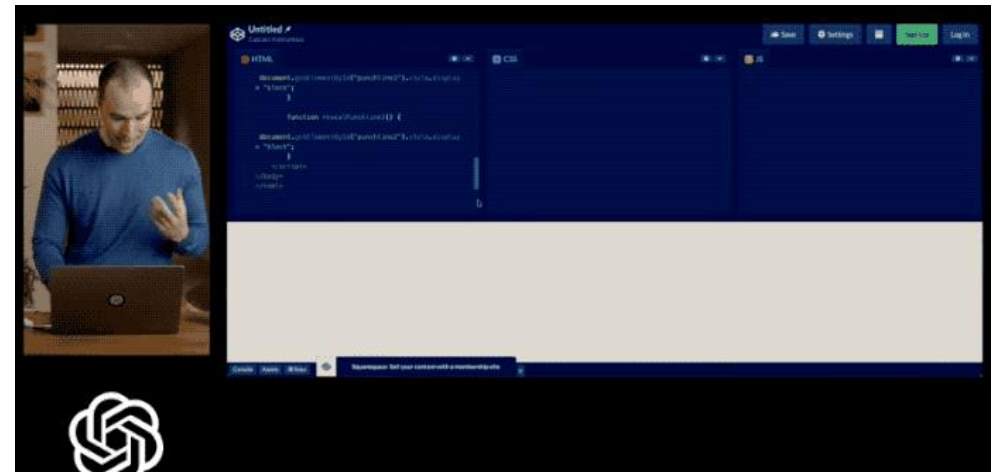




6. Content generation tool

With the continuous development of technology, AIGC has acquired a certain degree of innovation ability and can create based on understanding.

Simply draw a draft of a website on paper, take a photo and upload it to GPT-4, and it can immediately generate the website's HTML code!



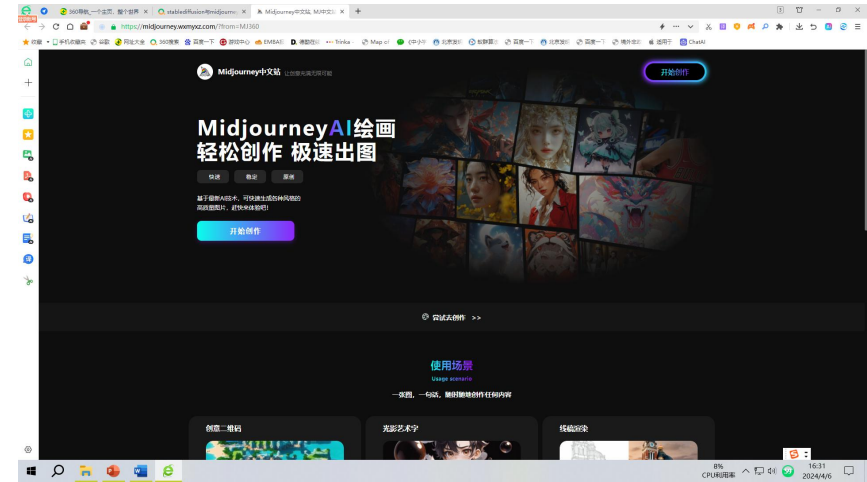


6. Content generation tool

AI painting



DALL-E 3



Midjourney

Stable Diffusion Public Release

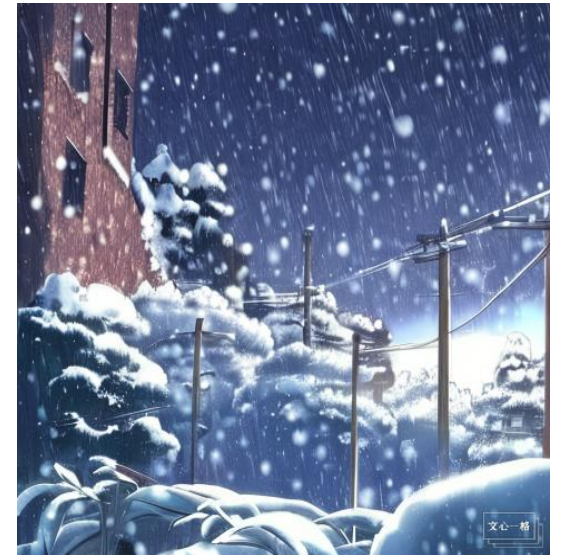




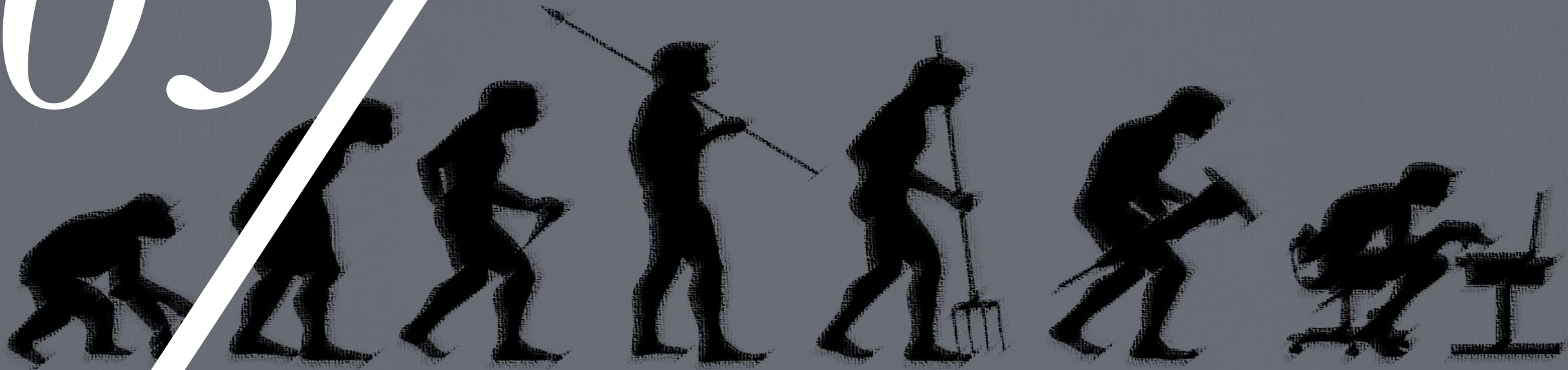
6. Content generation tool

AI Painting: Four Seasons Scenes of Spring, Summer, Autumn, and Winter

AI painting



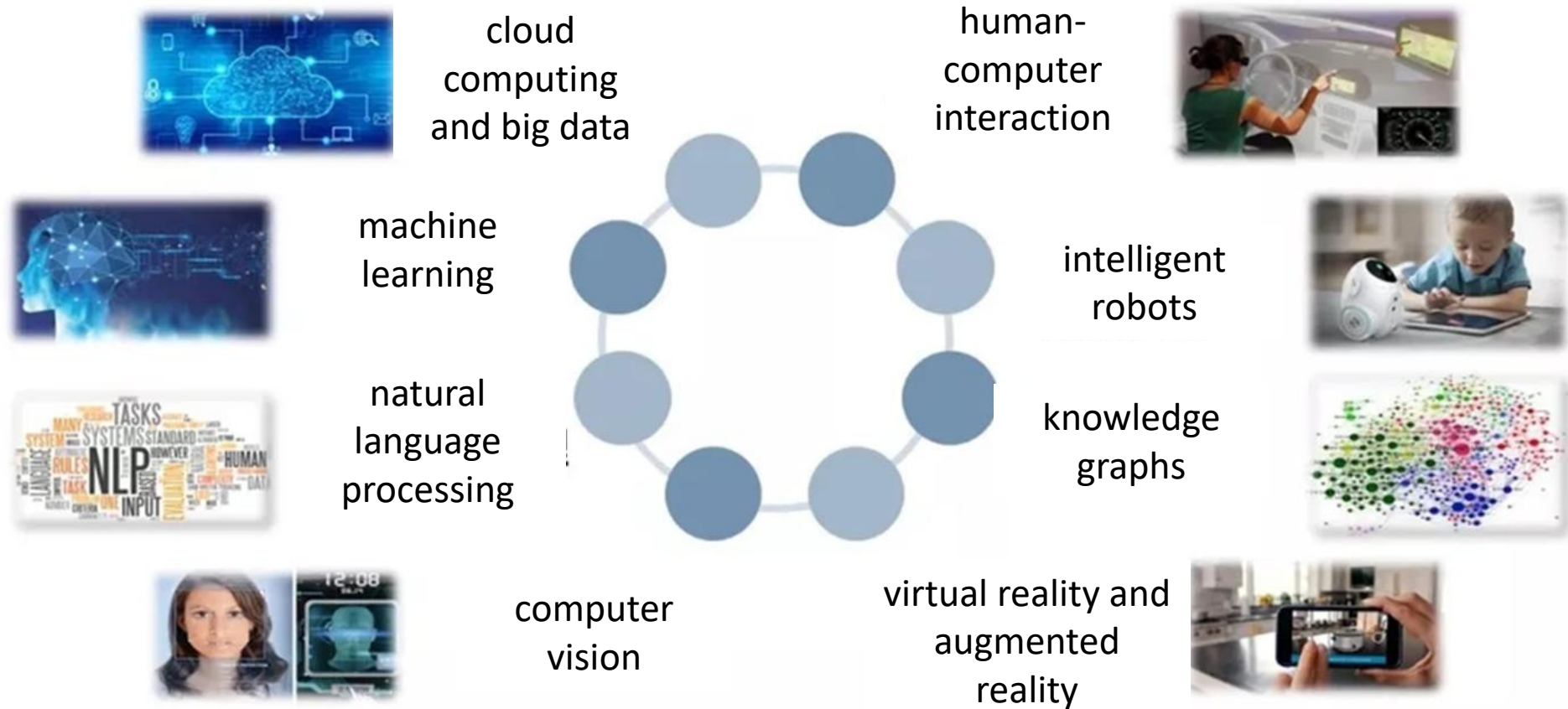
05



The impact of AI Tools on education

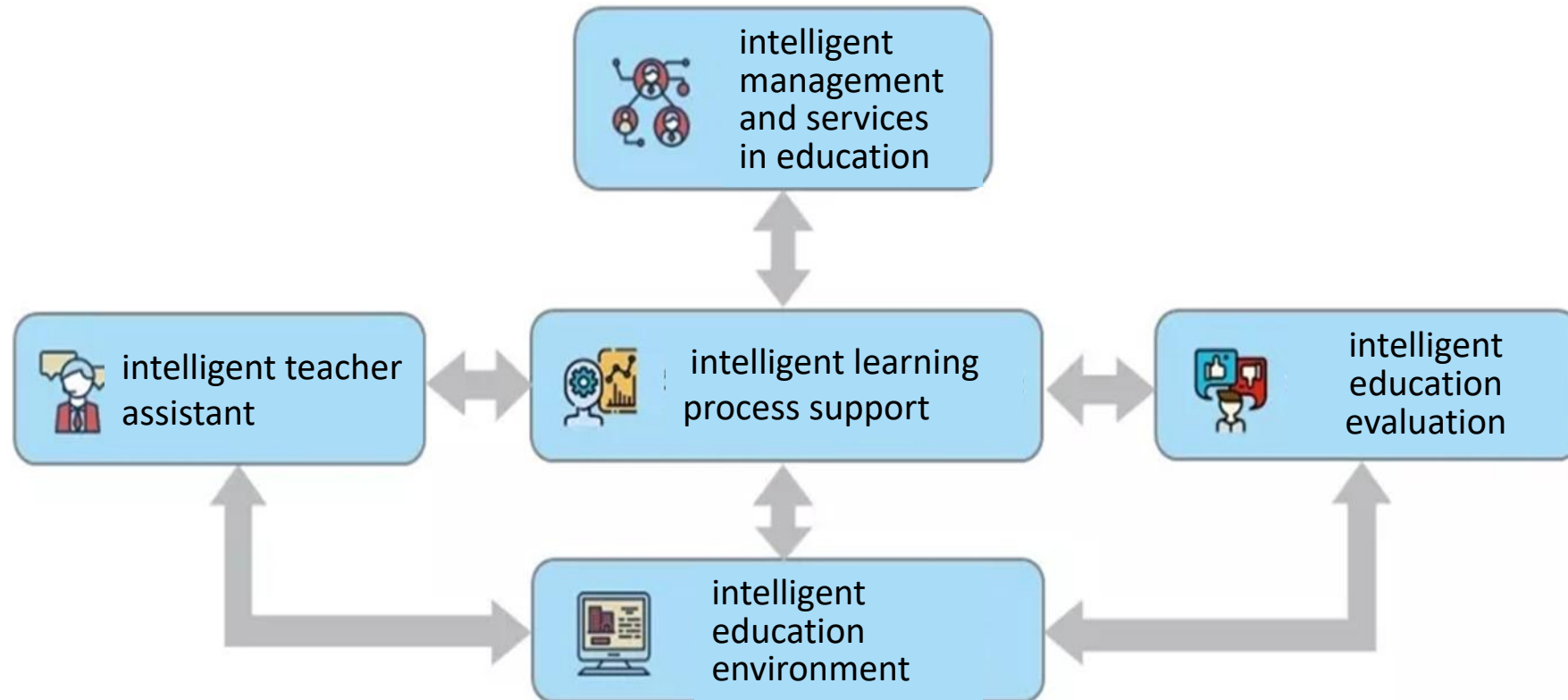


How AI tools empower education





How AI tools empower education

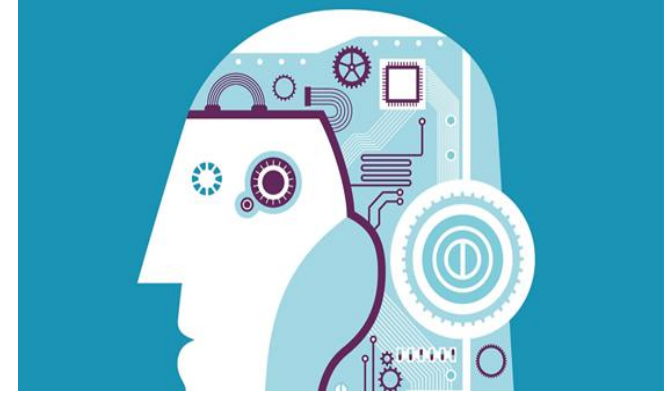
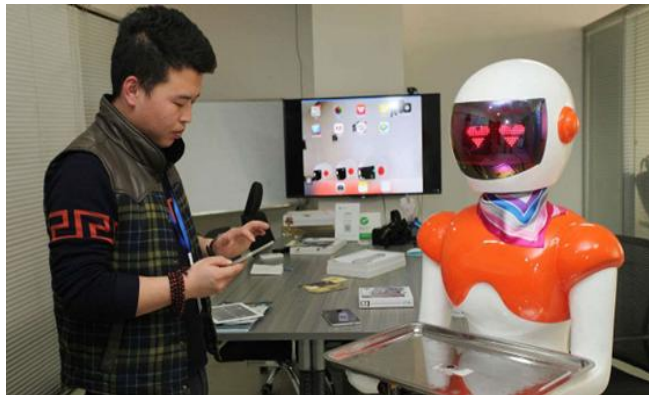




How AI tools empower education

One of the changes triggered by AI technology: **precision teaching**

The existing artificial intelligence technology has achieved fine segmentation of knowledge points: For example, through artificial intelligence algorithms, a quadratic equation can be broken down into 107 knowledge points; The knowledge points of junior high school English listening can be divided into more than 8000. The knowledge graph drawn from this can accurately see through every knowledge loophole based on the clues left by students during their learning process.

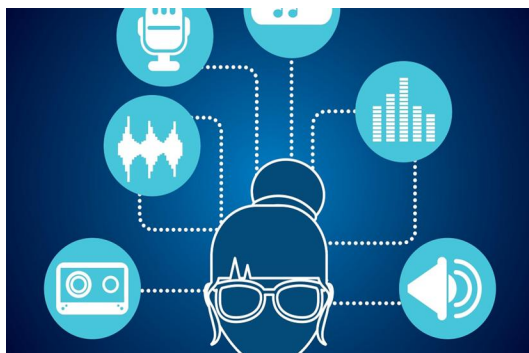




How AI tools empower education

The second change triggered by AI technology : **personalized teaching and scaling**

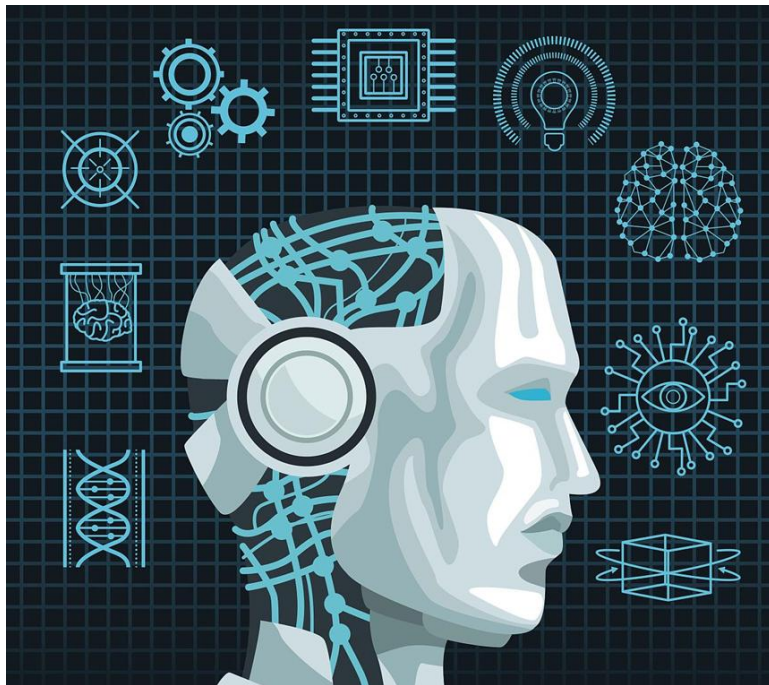
AI technology is deeply integrated with other related disciplines, which can analyze the learning abilities, characteristics, and knowledge blind spots of different learners, thus accurately depicting a portrait of learners with thousands of faces. In a typical educational scenario in the future, it is likely that the teacher and dozens of AI assistants will work together to teach, with each AI assistant responsible for a child, assisting the teacher in tracking the learning process of each student, and then diagnosing different students' thinking patterns, learning abilities, and learning methods, achieving true "no discrimination in education".





How AI tools empower education

The third change triggered by AI technology: **the popularization of high-quality teachers**



The artificial intelligence system combines the historical experience of high-quality teachers teaching millions of students across the country. Using artificial intelligence systems to simulate high-quality teachers can tailor educational plans for each student, implement the education process one-on-one, and enable every student to enjoy the best education, achieving educational equity.



How AI tools empower education

The fourth change triggered by AI technology: **reshaping the relationship between teaching and learning**

The traditional teaching model has always been unable to break away from the teacher centered approach. In fact, more knowledge in life comes from experiences and practices outside the classroom, which is where artificial intelligence comes in handy. The AI based adaptive learning system enables students to become the true protagonists in learning.





Future Classroom





Conclusion

Let's fully enjoy the convenience brought by intelligent tools and make them indispensable intelligent helpers in our work and life.



谢谢
Thanks