1. Visão Geral da Inteligência Artificial

1.1 - AI Overview

Marciel Barros

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Universidade Federal do Ceará

HUAWEI

Objectives

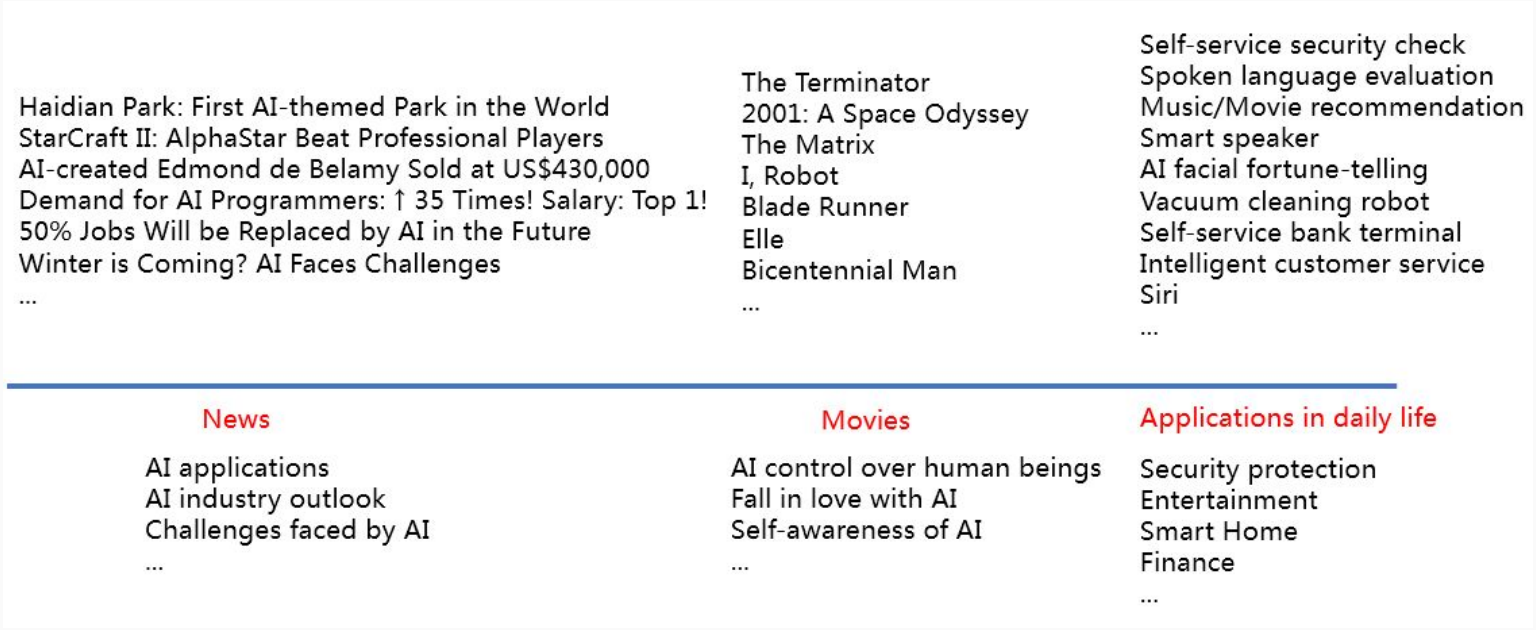
- Upon completion of this course, you will be able to:
  - Understand basic concepts of artificial intelligence (AI).
  - Understand AI technologies and their development history.
  - Understand the application technologies and application fields of AI.
  - Know Huawei's AI development strategy.
  - Know the development trends of AI.

Table of Contents

1. **AI Overview**
2. Technical Fields and Application Fields of AI
3. Huawei's AI Development Strategy
4. AI Disputes
5. Future Prospects of AI

AI in the Eyes of the Society

- People get to know AI through news, movies, and actual applications in daily life. What is AI in the eyes of the public?



AI in the Eyes of Researchers

"I propose to consider the question, 'Can machines think?'"

— Alan Turing 1950

The branch of computer science concerned with making computers behave like humans.

— John McCarthy 1956

The science of making machines do things that would require intelligence if done by men.

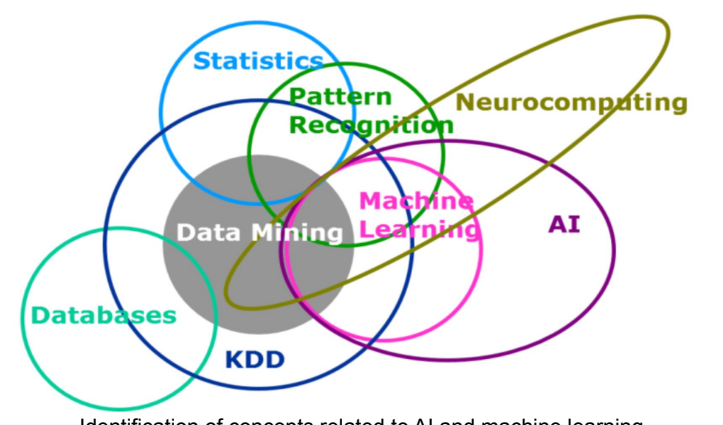
— Marvin Minsky

What Are Intelligences?

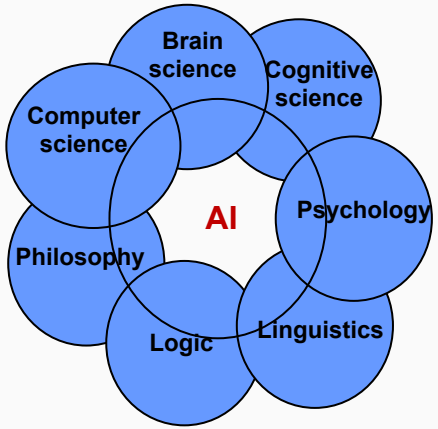
- Howard Gardner's Multiple Intelligences
- Human intelligences can be divided into seven categories:
  - Verbal/Linguistic
  - Logical/Mathematical
  - Visual/Spatial
  - Bodily/Kinesthetic
  - Musical/Rhythmic
  - Inter-personal/Social
  - Intra-personal/Introspective

What Is AI?

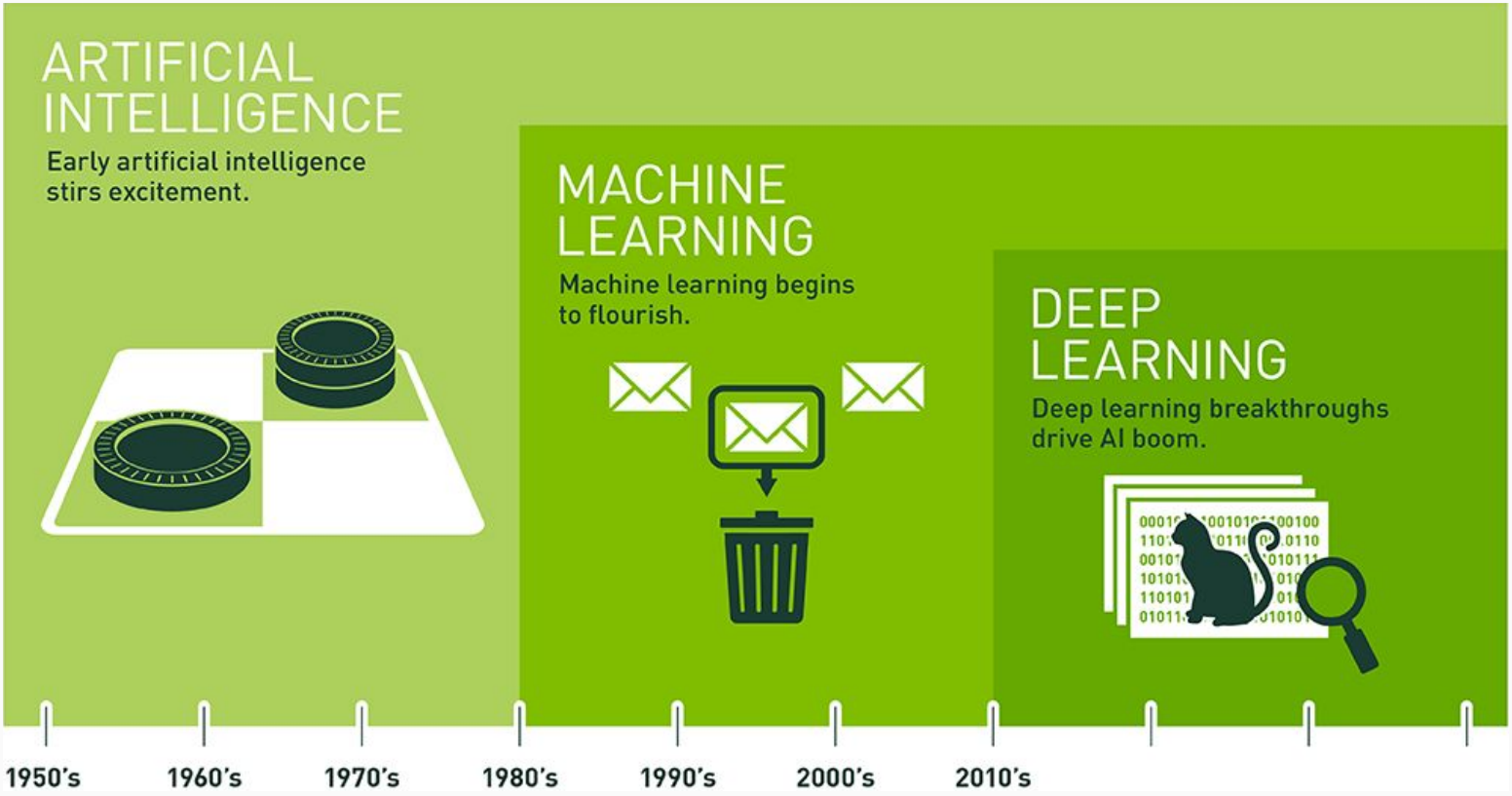
- Artificial Intelligence (AI) is a new technical science that studies and develops theories, methods, techniques, and application systems for simulating and extending human intelligence. In 1956, the concept of AI was first proposed by John McCarthy, who defined the subject as "science and engineering of making intelligent machines, especially intelligent computer program". AI is concerned with making machines work in an intelligent way, similar to the way that the human mind works. At present, AI has become an interdisciplinary course that involves various fields.



Identification of concepts related to AI and machine learning
AI Development Report 2020



Relationship of AI, Machine Learning, and Deep Learning



Relationship of AI, Machine Learning, and Deep Learning

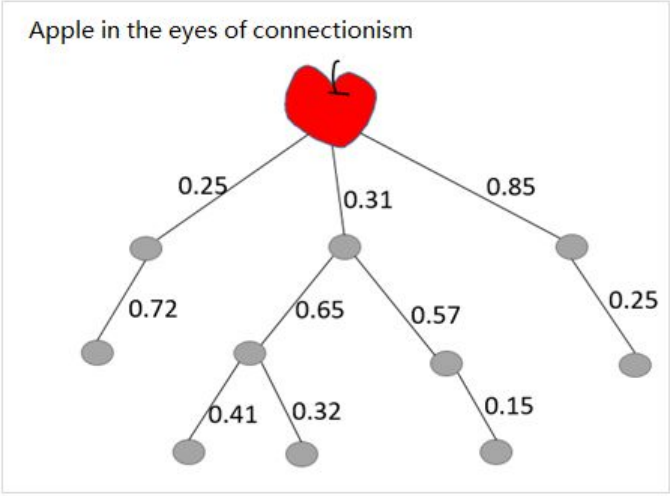
- **AI:** A new technical science that focuses on the research and development of theories, methods, techniques, and application systems for **simulating and extending human intelligence**.
- **Machine learning:** *A core research field of AI.* It focuses on the study of how computers can **obtain new knowledge or skills by simulating or performing learning behavior of human beings**, and reorganize existing knowledge architecture to improve its performance.
- **Deep learning:** *A new field of machine learning*. The concept of deep learning originates from the research on artificial neural networks. The multi-layer perceptron (MLP) is a type a deep learning architecture. **Deep learning aims to simulate the human brain to interpret data such as images, sounds, and texts**.

Three Major Schools of Thought: Symbolism

- Basic thoughts
  - The cognitive process of human beings is the **process of inference and operation of various symbols**.
  - A human being is a physical symbol system, and so is a computer. Computers, therefore, can be used to simulate intelligent behavior of human beings.
  - The core of AI lies in knowledge representation, knowledge inference, and knowledge application. Knowledge and concepts can be represented with symbols. Cognition is the process of symbol processing while inference refers to the process of solving problems by using heuristic knowledge and search.
- **Representative of symbolism: inference, including symbolic inference and machine inference**

Three Major Schools of Thought: Connectionism

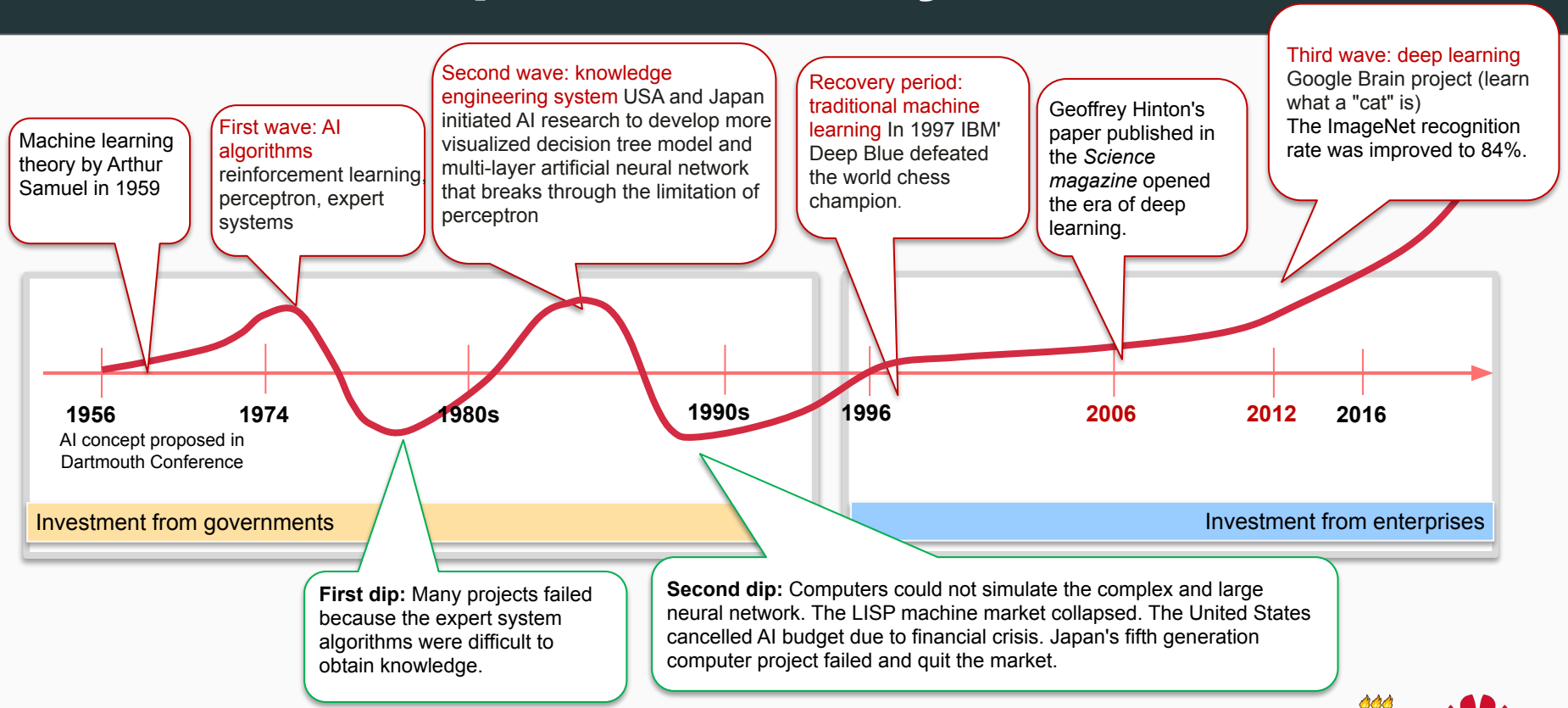
- Basic thoughts
  - The basis of thinking is neurons rather than the process of symbol processing.
  - Human brains vary from computers. A computer working mode based on connectionism is proposed to replace the computer working mode based on symbolic operation.
- **Representative of connectionism: neural networks and deep learning**



Three Major Schools of Thought: Behaviorism

- Basic thoughts:
  - Intelligence depends on **perception and action**. The perception-action mode of intelligent behavior is proposed.
  - Intelligence requires no **knowledge, representation, or inference**. AI can evolve like human intelligence. Intelligent behavior can only be demonstrated in the real world through the constant interaction with the surrounding environment.
- **Representative of behaviorism: behavior control, adaptation, and evolutionary computing**

Brief Development History of AI



Types of AI

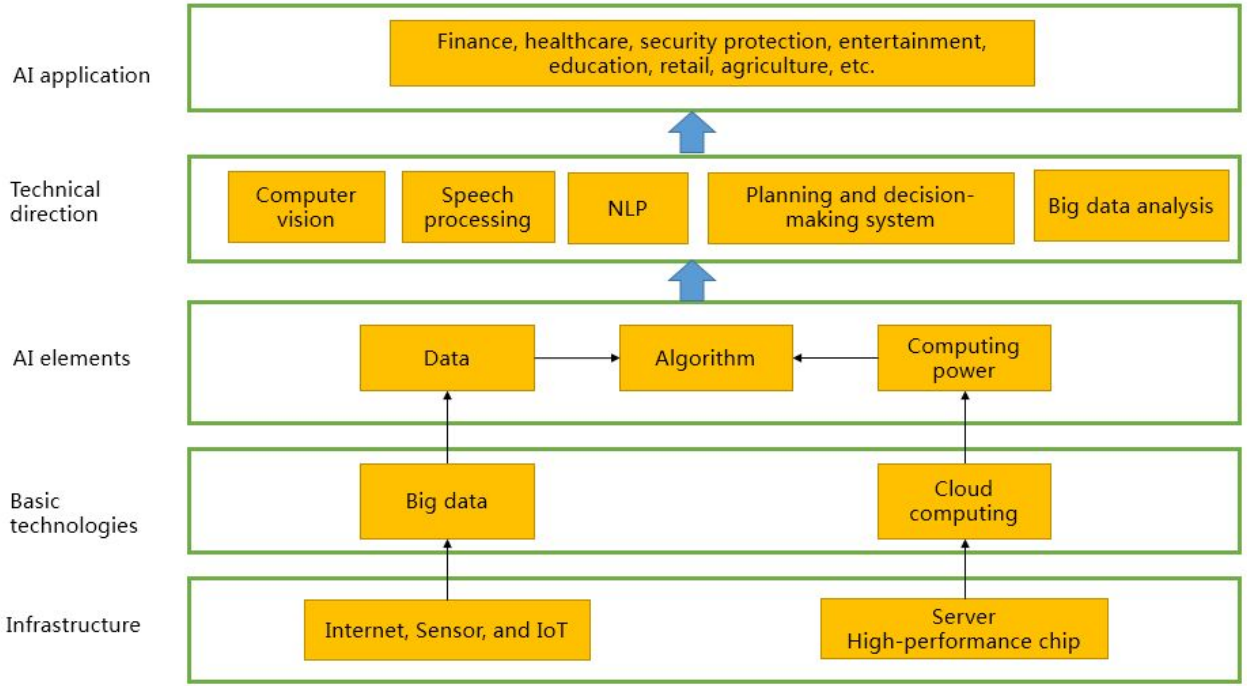
- **Strong AI**
  - The strong AI view holds that it is possible to create **intelligent machines** that can really r**eason and solve problems**. Such machines are considered to be **conscious** and **self-aware**, can independently think about problems and work out optimal solutions to problems, have their own system of values and world views, and have all the same instincts as living things, such as survival and security needs. It can be regarded as a new civilization in a certain sense.
- **Weak AI**
  - The weak AI view holds that intelligent machines **cannot really reason and solve problems**. These machines only look intelligent, but **do not have real intelligence** or **self-awareness**.

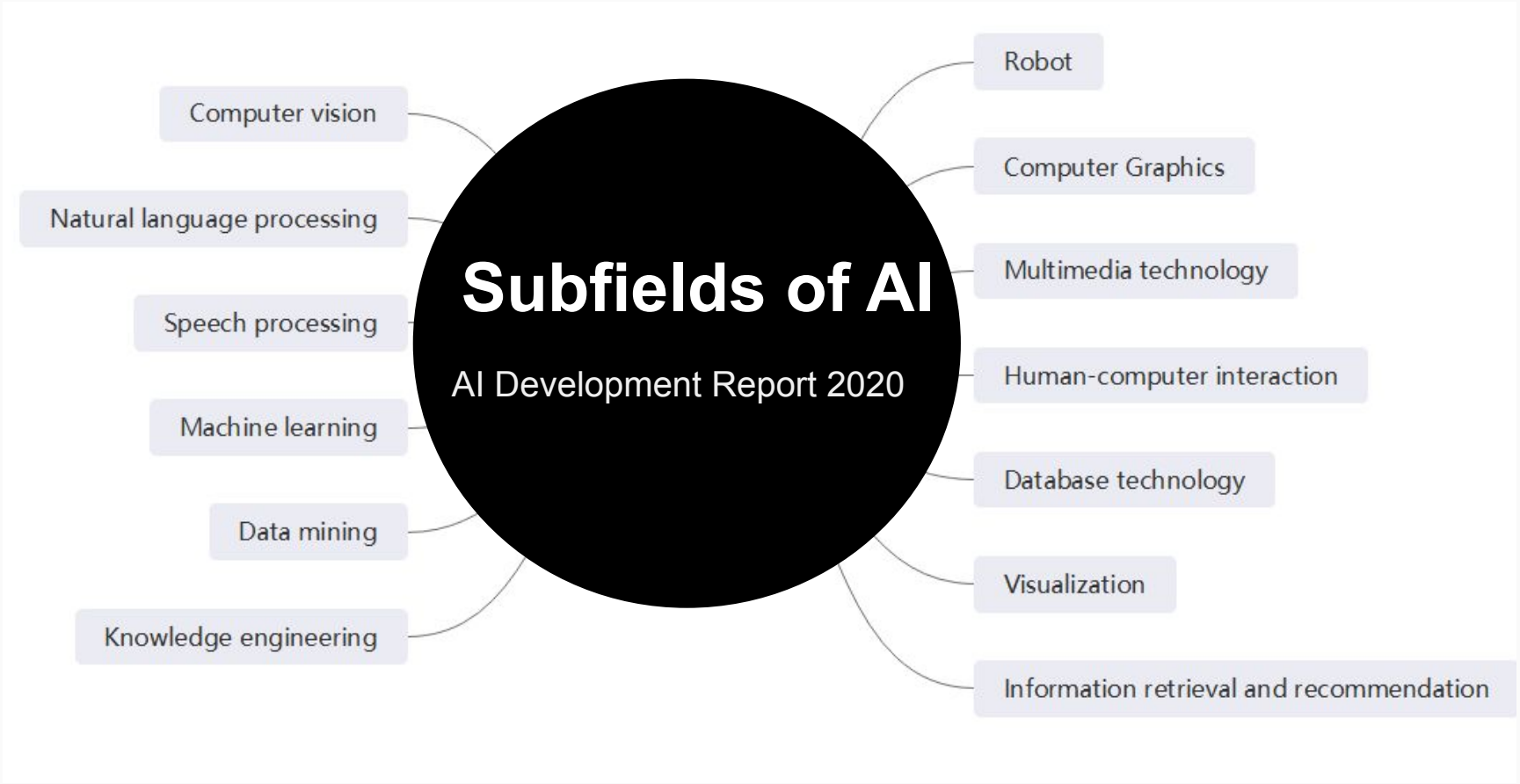
Classification of Intelligent Robots

- Currently, there is no unified definition of AI research. Intelligent robots are generally classified into the following four types:
  - "*Thinking like human beings*": **weak AI**, such as Watson and AlphaGo
  - "*Acting like human beings*": **weak AI,** such as humanoid robot, iRobot, and Atlas of Boston Dynamics
  - "*Thinking rationally*": **strong AI** (Currently, no intelligent robots of this type have been created due to the bottleneck in brain science.)
  - "*Acting rationally*": **strong AI**

AI Industry Ecosystem

The four elements of AI are **data**, **algorithm**, **computing power**, and **scenario**. To meet requirements of these four elements, we need to combine AI with cloud computing, big data, and IoT to build an intelligent society.




Subfields of AI
AI Development Report 2020
Computer vision
Natural language processing
Speech processing
Machine learning
Data mining
Knowledge engineering
Robot
Computer Graphics
Multimedia technology
Human-computer interaction
Database technology
Visualization
Information retrieval and recommendation

Thank You!

Next: 1.2 - Technical Fields and Application Fields of AI