



Artificial Intelligence Reinforcement Learning

Zhi Wang
Nanjing University



Artificial Intelligence



The simulation of human intelligence processes by machines, especially **computer systems**

The ability to **learn**, **understand**, and **think** about things in a **logical** way

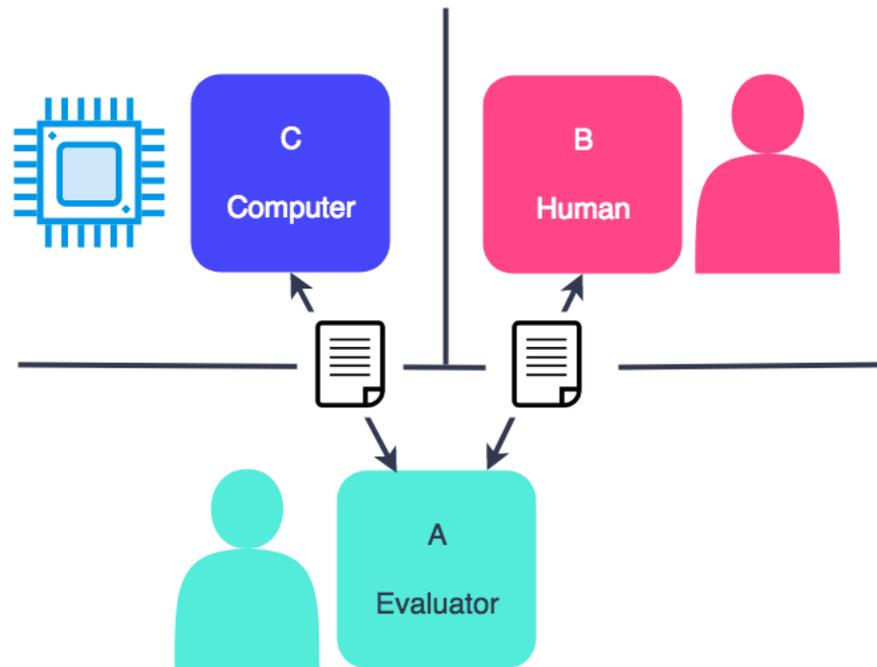
Artificial intelligence is a type of technology that mimics the human thought, empowering machines to act on their own and to perform functions similar to human intelligence, such as the ability to **perceive**, **learn**, **reason**, and **act**



Birth of AI



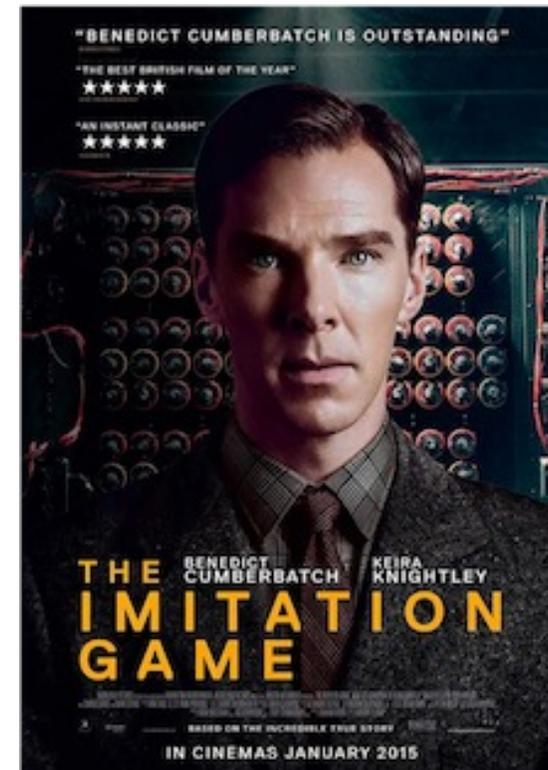
Turing test (图灵测试)



Beyond Turing: AI may **exceed human intelligence**



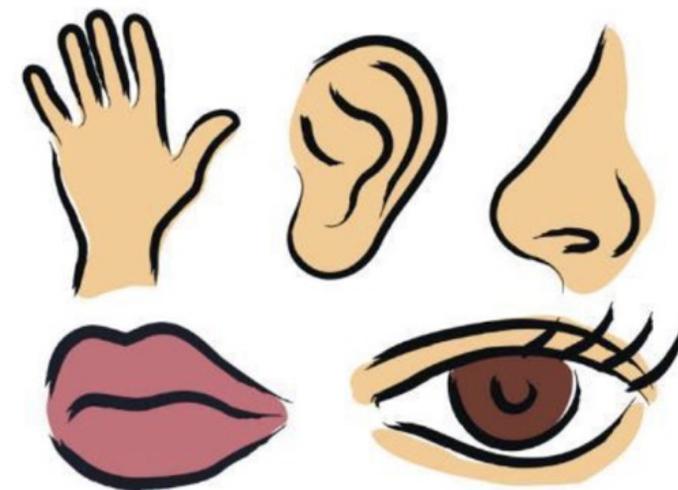
**Alan Turing
(1912~1954)**



Perception (感知)



- 人类：视觉（主要），听觉/触觉/嗅觉/味觉（直觉？）
- 动物：可能比人类的传感器更加灵敏
- 机器：摄像头（主要），语音，激光，雷达



Computer Vision



The Age of Recognition

ImageNet

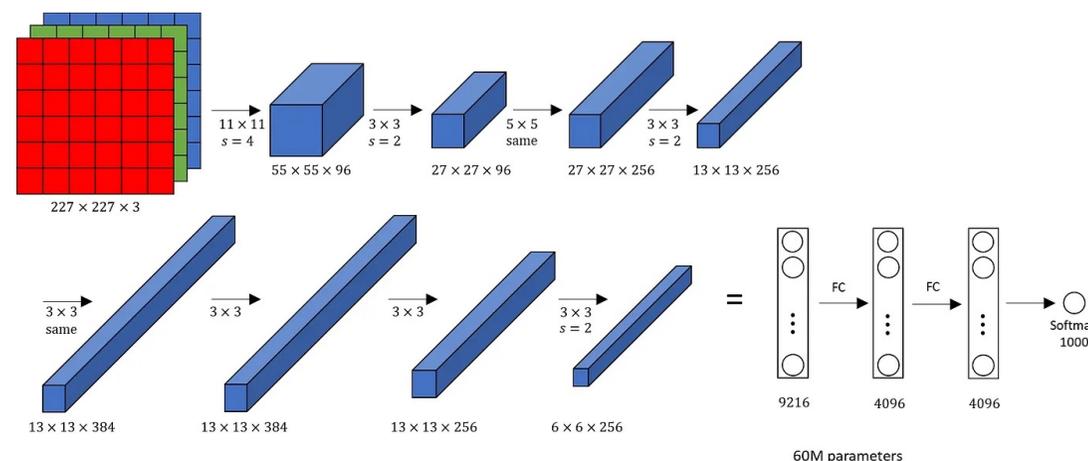
- First version of the dataset was released in 2009
- The annual ImageNet Large Scale Visual Recognition Challenge (ILSVRC) began in 2010

AlexNet, a groundbreaking CNN, 2012

- A milestone of deep learning

Faster R-CNN, object detection, 2015

Deep Residual Network, 2015

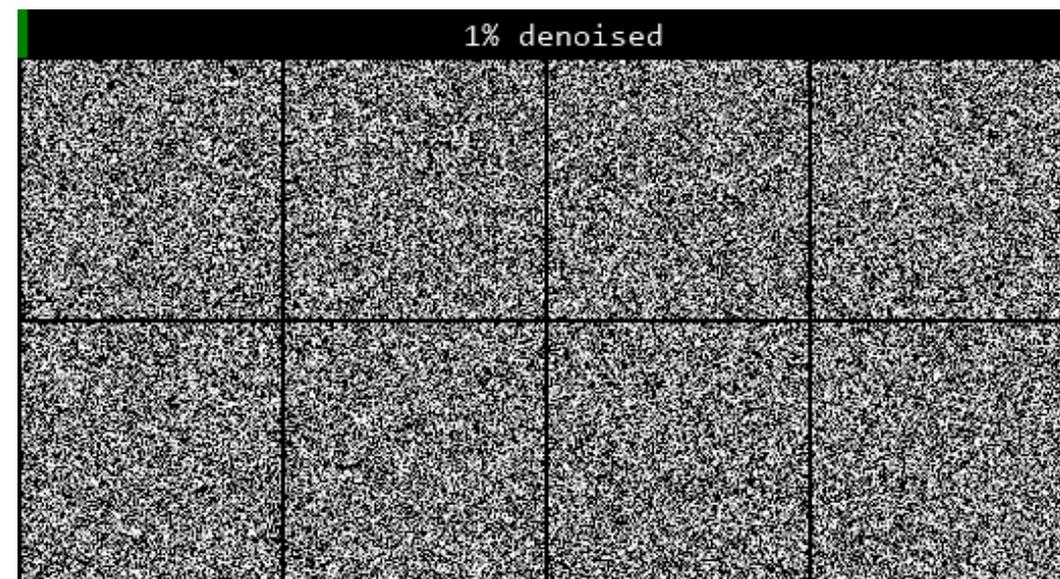
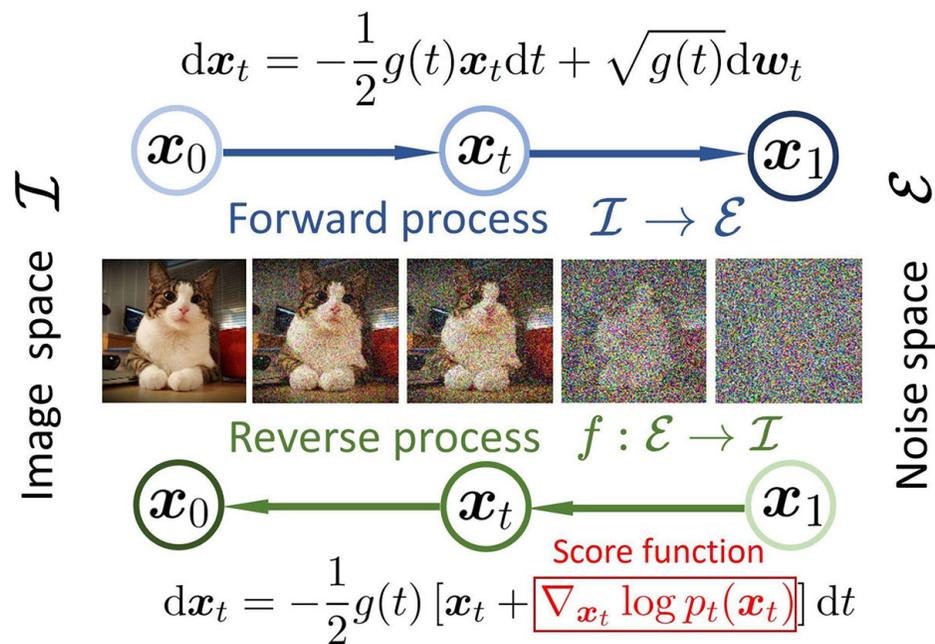


Computer Vision



- VAE, GAN
- Diffusion Models, Flow Models

The Age of Generation



Computer Vision



Diffusion Models, Flow Models

The Age of Generation

Example 4

Stable Diffusion XL 0.9 Demo

Stable Diffusion XL 0.9 is the latest text-to-image model from StabilityAI. [Access Stable Diffusion 2.1 Space here](#) [Access Stable Diffusion 1 Space here](#)
For faster generation and API access you can try [DreamStudio Beta](#).

an insect robot preparing a delicious meal

low quality, illustration

Generate image



Share to community

Advanced settings

Stable Diffusion 2.1 Demo

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Example 2

Stable Diffusion XL 0.9 Demo

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A pikachu fine dining with a view to the Eiffel Tower

low quality

Generate image



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The Age of Generation



ChatGPT (Generative Pre-Training)

Next-token prediction

**Transformer
(Scaling Law)**

Enter text:

The dog eats the apples.

Self-supervised learning



464 3290 25365 262 22514 13

Understanding (理解)



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MORESON

貓 v.s 狗 誰的智商更高

貓大腦 v.s 狗大腦

貓咪的皮質神經元數量
約有2億5000萬

狗狗的皮質神經元數量
約有5億3000萬

大腦

勝

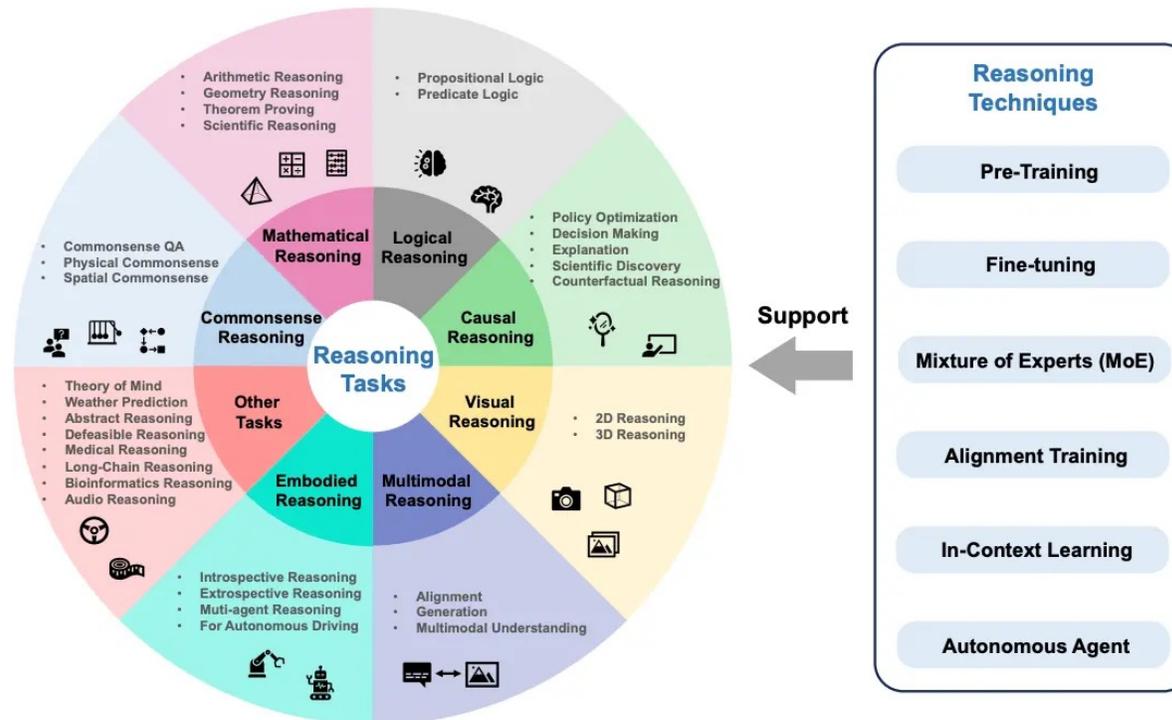
#狗狗在處理複雜任務和學習能力上可能較佔優勢

毛孩學堂

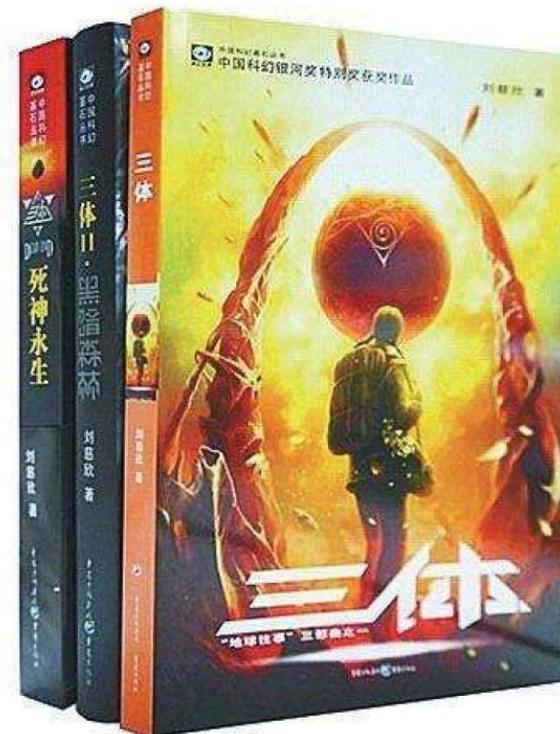
Understanding (理解)



- Large Language Models (LLMs), Vision-Language Models (VLMs)



- 现在智能的最前沿为什么是大语言模型发展驱动的？
- 语言是高度结构化的一种表达方式
 - 人类是大模型的传感器
 - 人类感知，理解，压缩了世界知识，并用文本和语言记录下来
 - 大模型吸取，学习这些内容并建模为一个强大而丰富的空间
- 语言是智能的一种载体/表现形式，非唯一
 - 只用RGB去观测宇宙一样
 - 总会有紫外，红外这些看不到看不清的东西



Decision-Making (决策)



Execution (执行)

