ARTIFICIAL INTELLIGENCE

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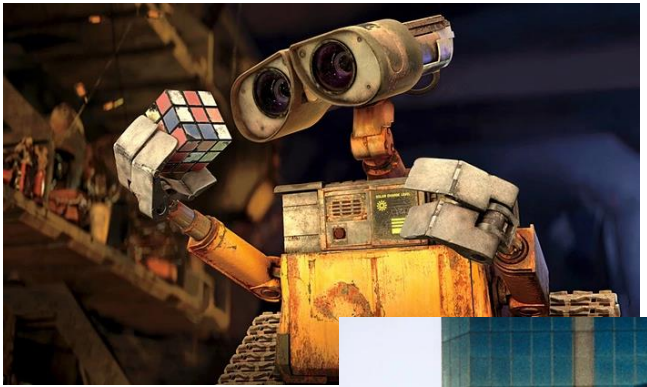
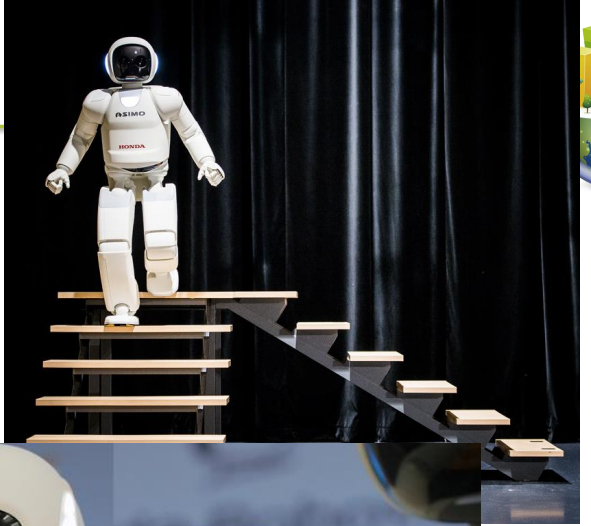
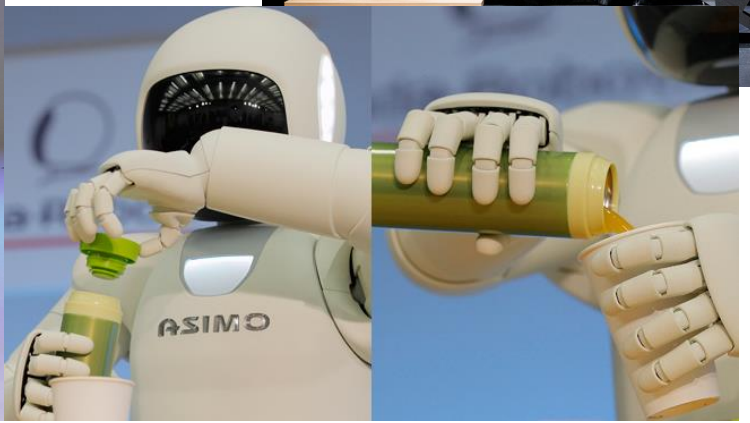
AI in Fiction



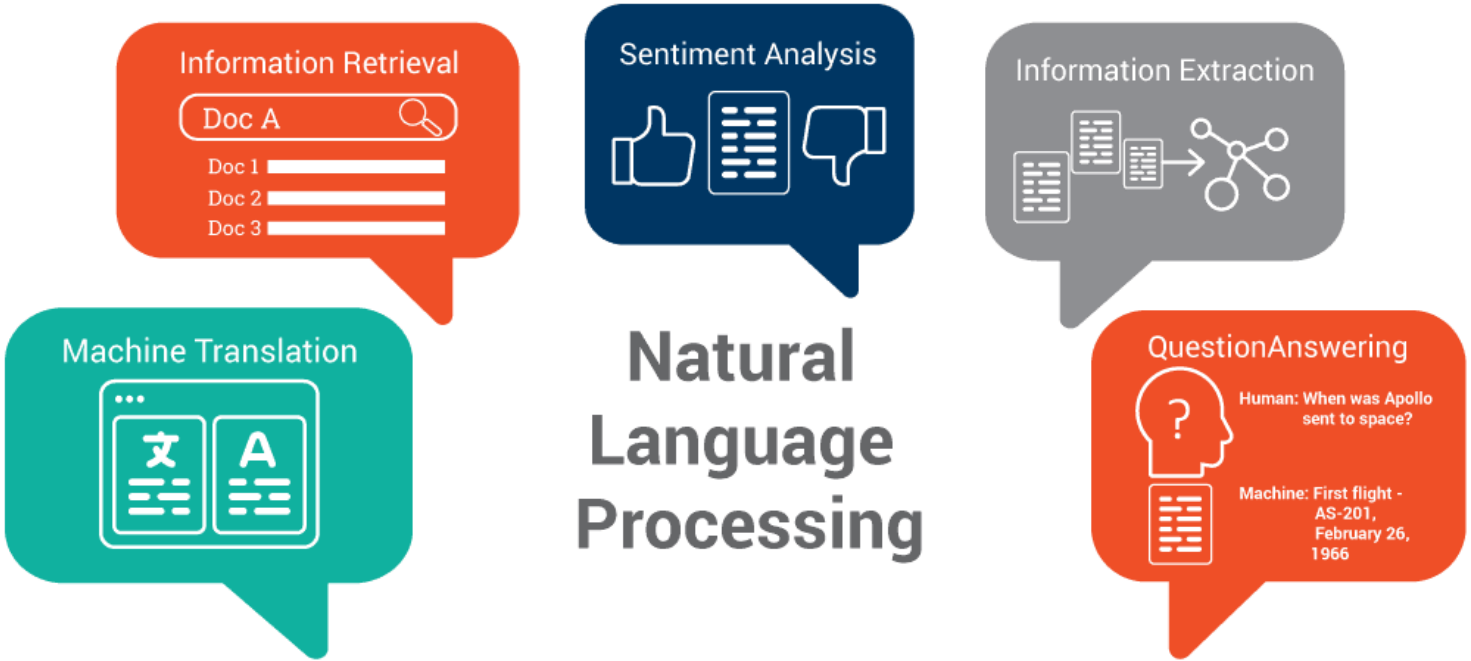
AI in Reality



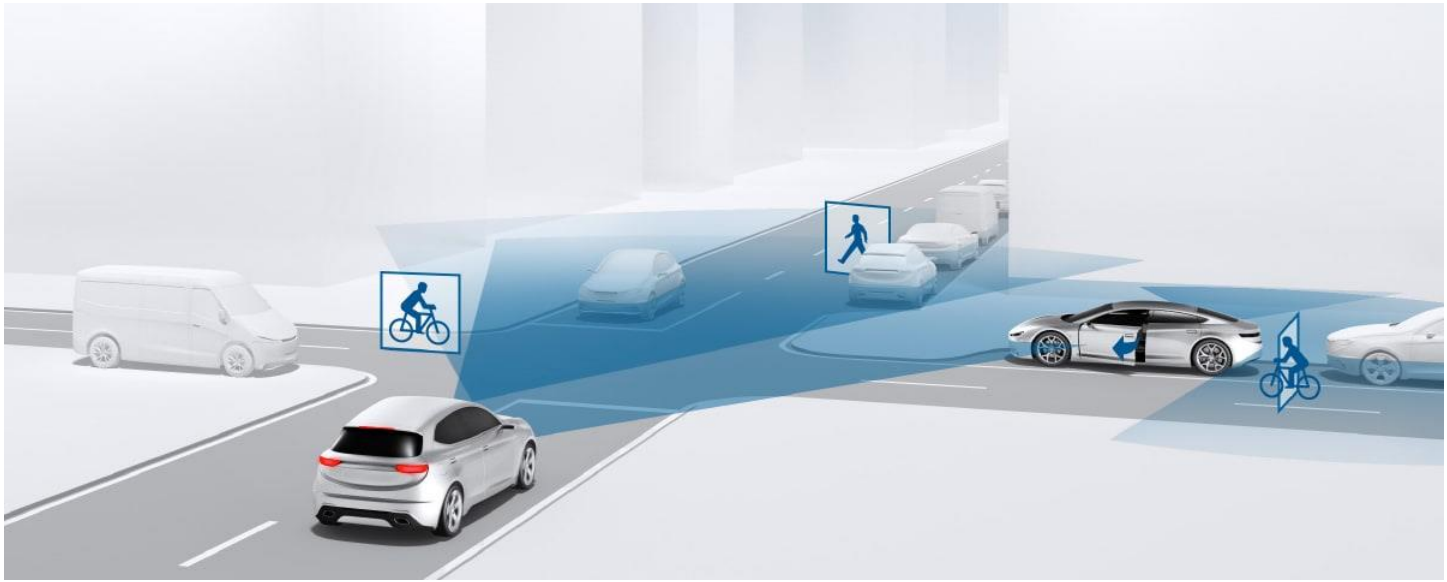



DRC
HUBO


POLARIS


Information Retrieval
Doc A
Doc 1
Doc 2
Doc 3
Sentiment Analysis
Information Extraction
Machine Translation
Natural Language Processing
QuestionAnswering
Human: When was Apollo sent to space?
Machine: First flight - AS-201, February 26, 1966

ADAS (Advanced Driver Assistance Systems)



Autonomous vehicles

What is biological intelligence?

- Sensory processing (xử lý giác quan)
  - Visual cortex (vỏ thị giác)
  - Auditory cortex (vỏ thính giác)
  - Somatosensory cortex (vỏ xúc giác)
- Motor cortex (vỏ vận động)
- Cognitive functions (chức năng nhận thức)
  - Memory (ghi nhớ)
  - Reasoning (suy luận)
  - Executive control (kiểm soát điều hành)
  - Learning (học)
  - Language (ngôn ngữ)

What is biological intelligence?

- A mix of general-purpose and special-purpose algorithms
- General-purpose
  - Memory formation, updating, retrieval
  - Learning new tasks
- Special-purpose
  - Recognizing visual patterns
  - Recognizing sounds
  - Learning language
- All are integrated seamlessly

What is AI?

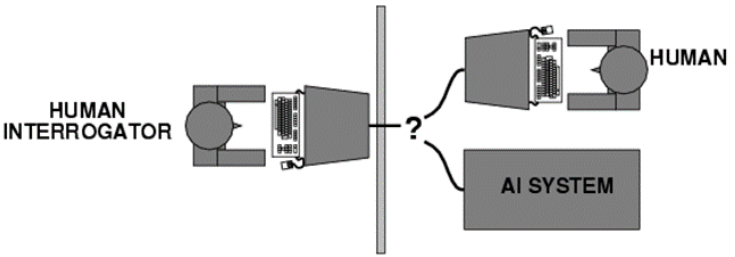
- "The exciting new effort to make computers think … ***machines with minds***." (Haugeland, 1985)
- "The automation of activities that we ***associate with human thinking***, activities such as decision-making, problem solving, learning …" (Bellman, 1979)
- "The art of creating machines that perform functions that ***require intelligence*** when perform by people." (Kurzwell, 1990)
- "The study of ***mental faculties*** through the use of ***computational models***." (Charniak and McDermott, 1985)
- "The study of the computations that make it possible to ***perceive, reason, and act***." (Winston, 1992)
- "Computational Intelligence is the study of the design of ***intelligence agents***." (Poole *et al.*, 1998)

What is AI?

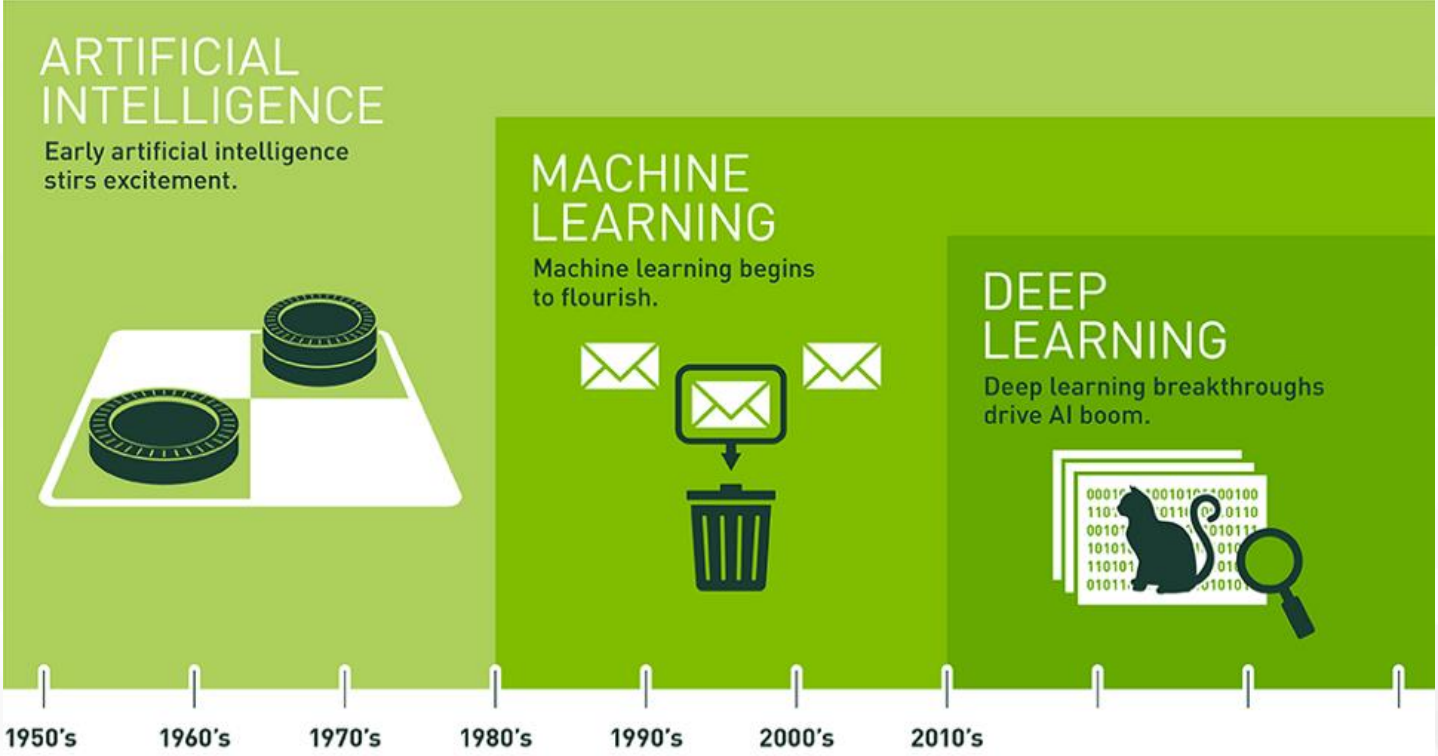
Thinking Humanly (Suy nghĩ như con người)	Thinking Rationally (Suy nghĩ hợp lý)
Acting Humanly (Hành động như con người)	Acting Rationally (Hành động hợp lý)

Acting humanly: Turing test

- AI is all about duplicating what the human brain does
- Can a machine think? → If it could, how would we tell? (Alan Turing)
- Turing test

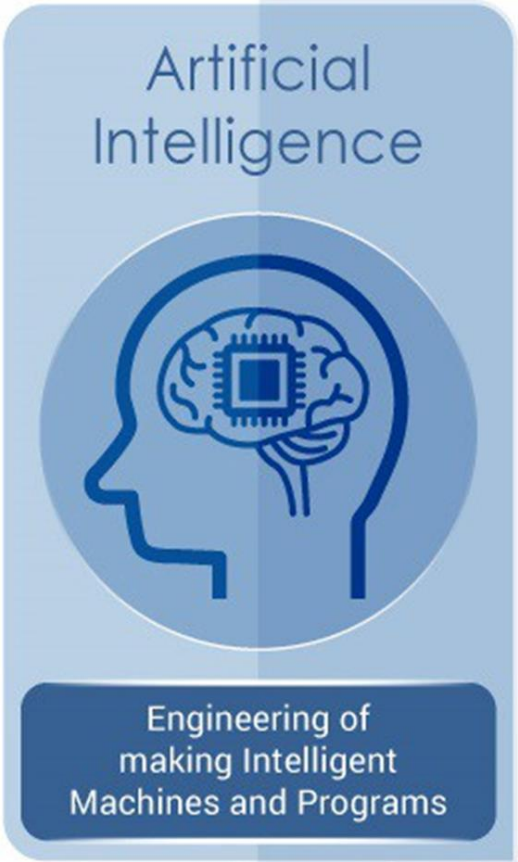


- Loebner contest



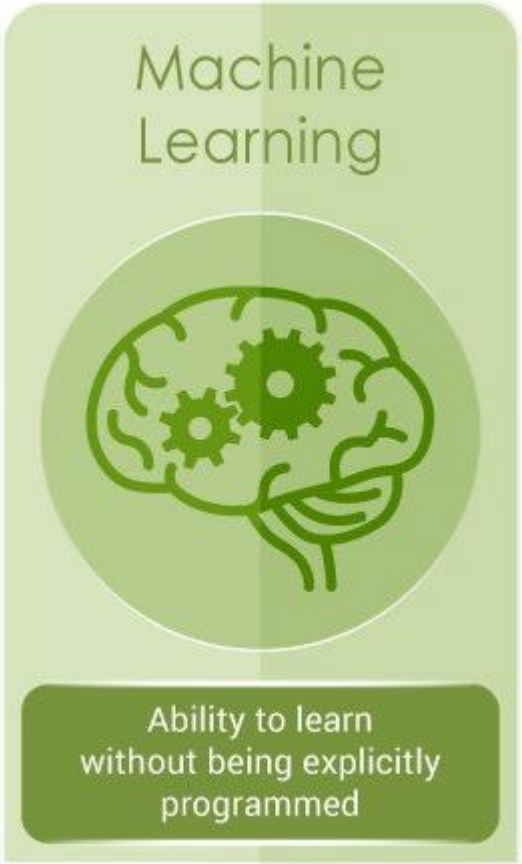
Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.

Source: NVIDIA



- John McCarthy coined the term Artificial Intelligence in 1956. Demonstration of the first running AI program at Carnegie Mellon University.
- AI sub-areas:

Human Intelligence:		**Artificial Intelligence:**
Visual cortex	→	Computer vision
Auditory cortex	→	Signal/speech processing
Somatosensory cortex	→	Haptics
Motor cortex	→	Robotics
Memory	→	Knowledge representation
Reasoning	→	Search, inference
Executive control	→	Planning, decision-making
Learning	→	Model learning
Language	→	Language understanding



- **Machine Learning - An Approach to Achieve Artificial Intelligence.**
- **Definition:** Machine learning is the study of algorithms that improve their performance P at some task T with experience E.
- **Types of Learning:**
  - Supervised learning
  - Unsupervised learning
  - Semi-supervised learning
  - Reinforcement learning

- Deep Learning - A Technique for implementing Machine Learning.
- Deep Learning = Deep Artificial Neural Networks