# GIỚI THIỆU VỀ AI

# Which of these exhibits intelligence?

- You beat somebody at chess.
- You prove a mathematical theorem using a set of known axioms.
- You need to buy some supplies, meet three different colleagues, return books to the library, and exercise. You plan your day in such a way that everything is achieved in an efficient manner.
- You are a lawyer who is asked to defend someone. You recall three similar cases in which the defendant was guilty, and you turn down the potential client.
- A stranger passing you on the street notices your watch and asks, “Can you tell me the time?” You say, “It is 3:00.”
- You are told to find a large Phillips screwdriver in a cluttered workroom. You enter the room (you have never been there before), search without falling over objects, and eventually find the screwdriver.

# Which of these exhibits intelligence?

- You are a six-month-old infant. You can produce sounds with your vocal organs, and you can hear speech sounds around you, but you do not know how to make the sounds you are hearing. In the next year, you figure out what the sounds of your parents' language are and how to make them.
- You are a one-year-old child learning Arabic. You hear strings of sounds and figure out that they are associated with particular meanings in the world. Within two years, you learn how to segment the strings into meaningful parts and produce your own words and sentences.
- Someone taps a rhythm, and you are able to beat along with it and to continue it even after it stops.
- You are some sort of primitive invertebrate. You know nothing about how to move about in your world, only that you need to find food and keep from bumping into walls. After lots of reinforcement and punishment, you get around just fine.

# What is intelligence?

| | |
|---|---|
| Perceptions | Capacity for analysis, abstraction / generalization |
| Execution capacity | Adaptability |
| Learning | Communications |
| Knowledge | Intelligence quotient vs. Emotional Quotient |
| Reasoning | ...? |

# What is the definition of Artificial Intelligence (AI)?

What do you think?

# What is the definition of AI?

| | |
|---|---|
| Systems that think like humans | Systems that think rationally |
| Systems that act like humans | Systems that act rationally |

**Bellman, 1978**

"[The automation of] activities that we associate with human thinking, activities such as decision making, problem solving, learning"

# What is the definition of AI?

| | |
|---|---|
| Systems that think like humans | Systems that think rationally |
| Systems that act like humans | Systems that act rationally |

**Charniak & McDermott, 1985**

"The study of mental faculties through the use of computational models"

https://eecs.wsu.edu/~holder/courses/AI/

# What is the definition of AI?

| | |
|---|---|
| Systems that think like humans | Systems that think rationally |
| Systems that act like humans | Systems that act rationally |

**Haugeland, 1985**

"The exciting new effort to make computers think *machines with minds*, in the full and literal sense"

# What is the definition of AI?

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**Kurzweil, 1990**

“The art of creating machines that perform functions that require intelligence when performed by people”

# What is the definition of AI?

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**Luger & Stubblefield, 1993**

"The branch of computer science that is concerned with the automation of intelligent behavior"

# What is the definition of AI?

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**Schalkoff, 1990**

"A field of study that seeks to explain and emulate intelligent behavior in terms of computational processes"

# What is the definition of AI?

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| Systems that think like humans | Systems that think rationally |
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**Rich & Knight, 1991**

"The study of how to make computers do things at which, at the moment, people are better"

# What is the definition of AI?

| | |
|---|---|
| Systems that think like humans | Systems that think rationally |
| Systems that act like humans | Systems that act rationally |

**Winston, 1992**

"The study of the computations that make it possible to perceive, reason, and act"

# What is the definition of AI?

| | |
|---|---|
| Systems that think like humans | Systems that think rationally |
| Systems that act like humans | Systems that act rationally |

**Dean et al., 1995**

"The design and study of computer programs that behave intelligently. These programs are constructed to perform as would a human or an animal whose behavior we consider intelligent"

# What is the definition of AI?

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| Systems that think like humans | Systems that think rationally |
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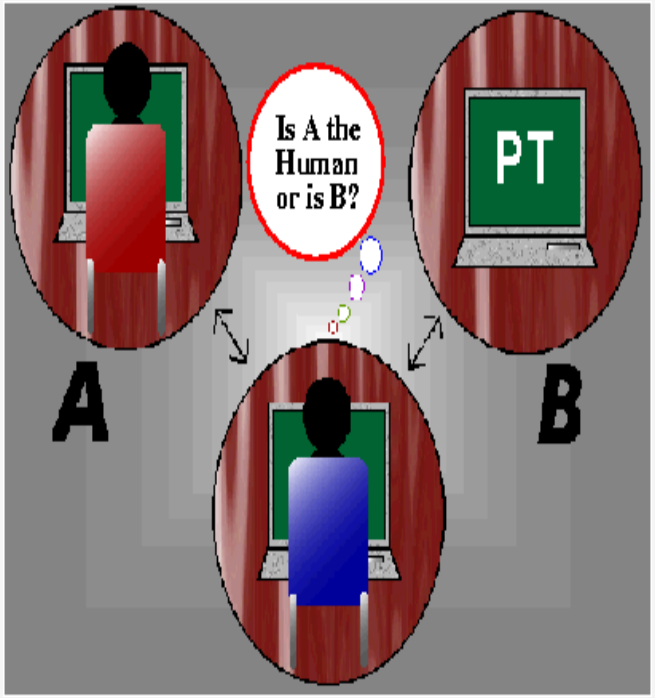
**Nilsson, 1998**

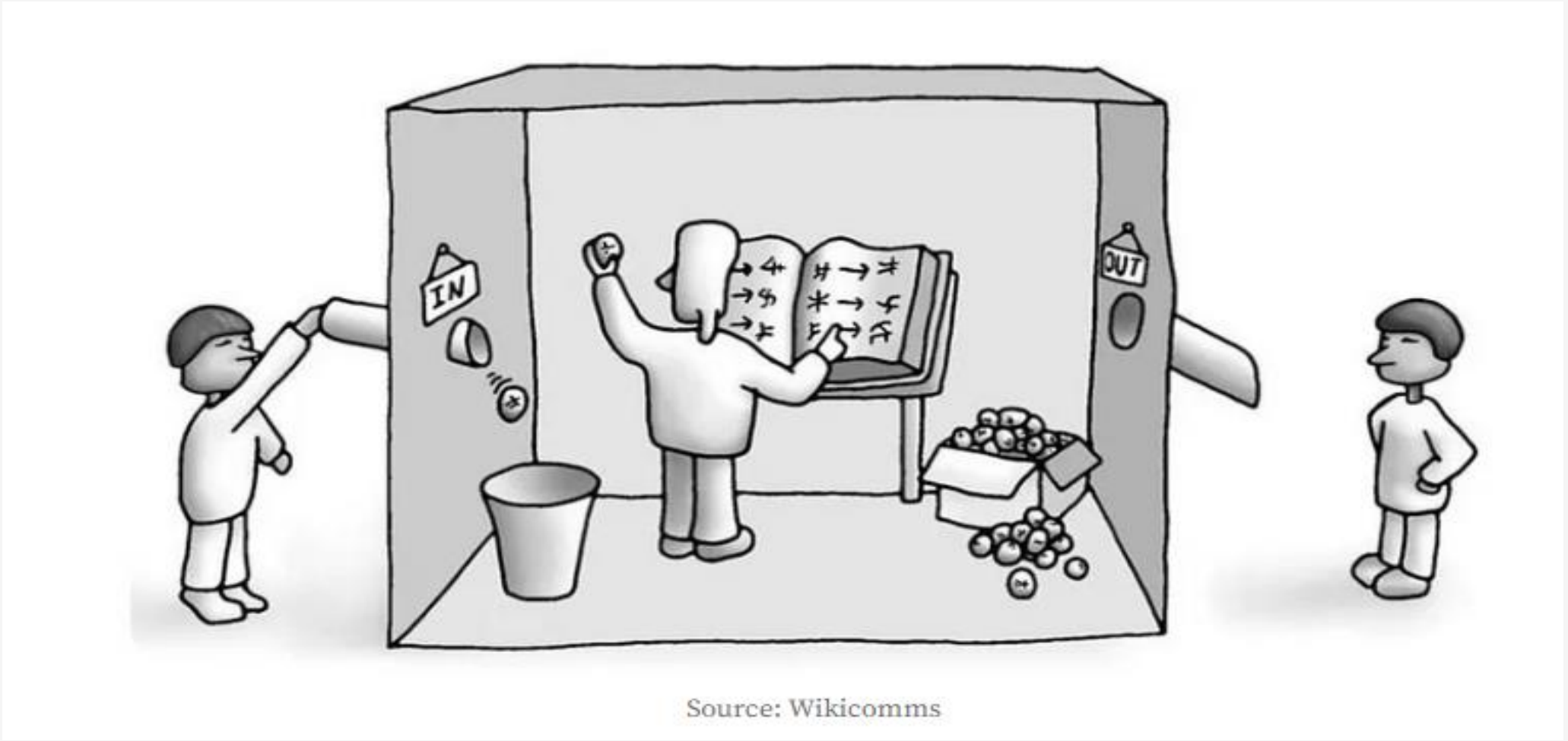
"Many human mental activities such as writing computer programs, doing mathematics, engaging in common sense reasoning, understanding language, and even driving an automobile, are said to demand intelligence. We might say that [these systems] exhibit artificial intelligence"

# Approach 1: Acting Humanly

- Turing test: Produce responses like humans
  - Turing (1950) “Computing machinery and intelligence”
  - "Can the machine think" → "Can the machine behave intelligently?" (Like a human)
  - Operational test for intelligent behavior: the imitation game
    - Question by the interrogator
    - Response by human or AI system
    - Can the interrogator distinguish between the human and the system?



# Chinese Room Argument



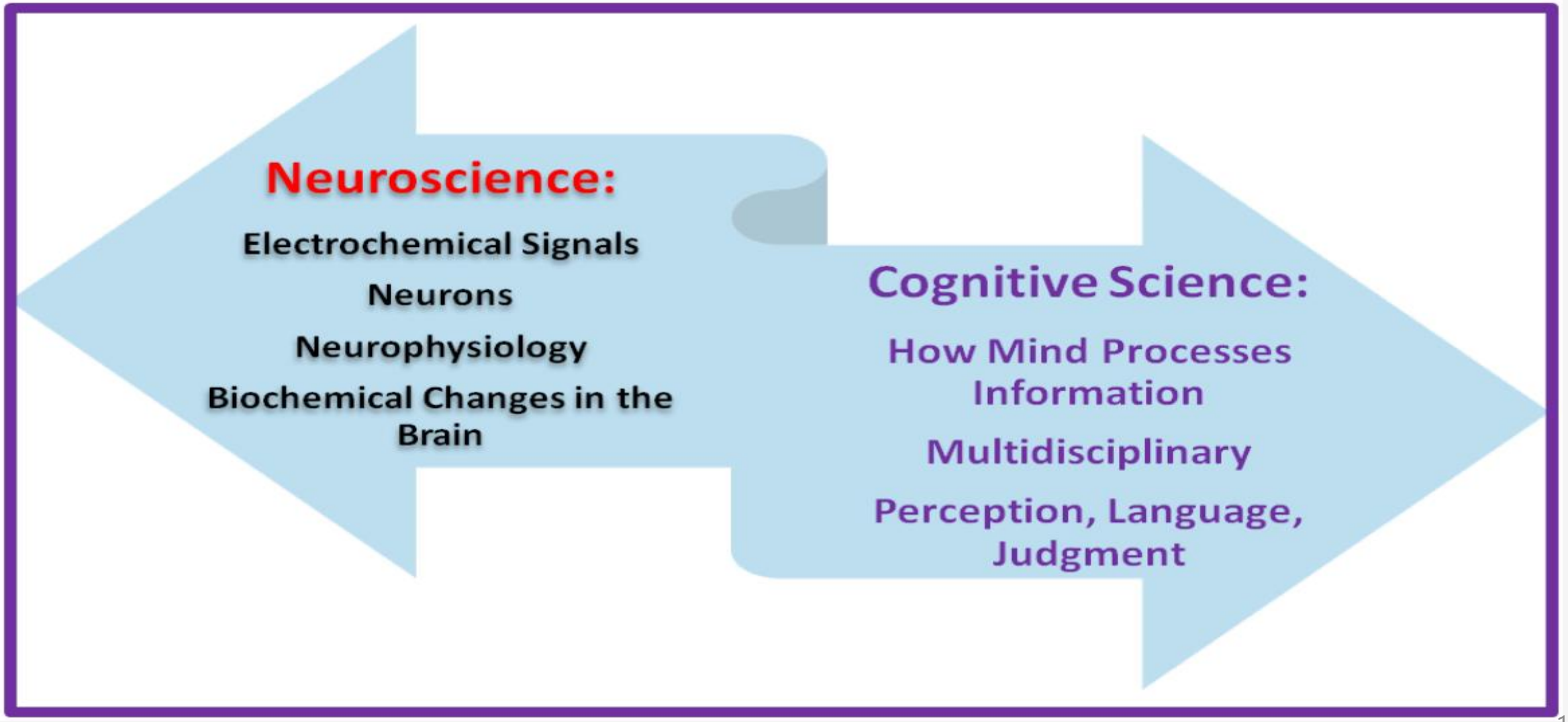

Source: Wikicomms

# Approach 2: Thinking Humanly

Cognitive modeling

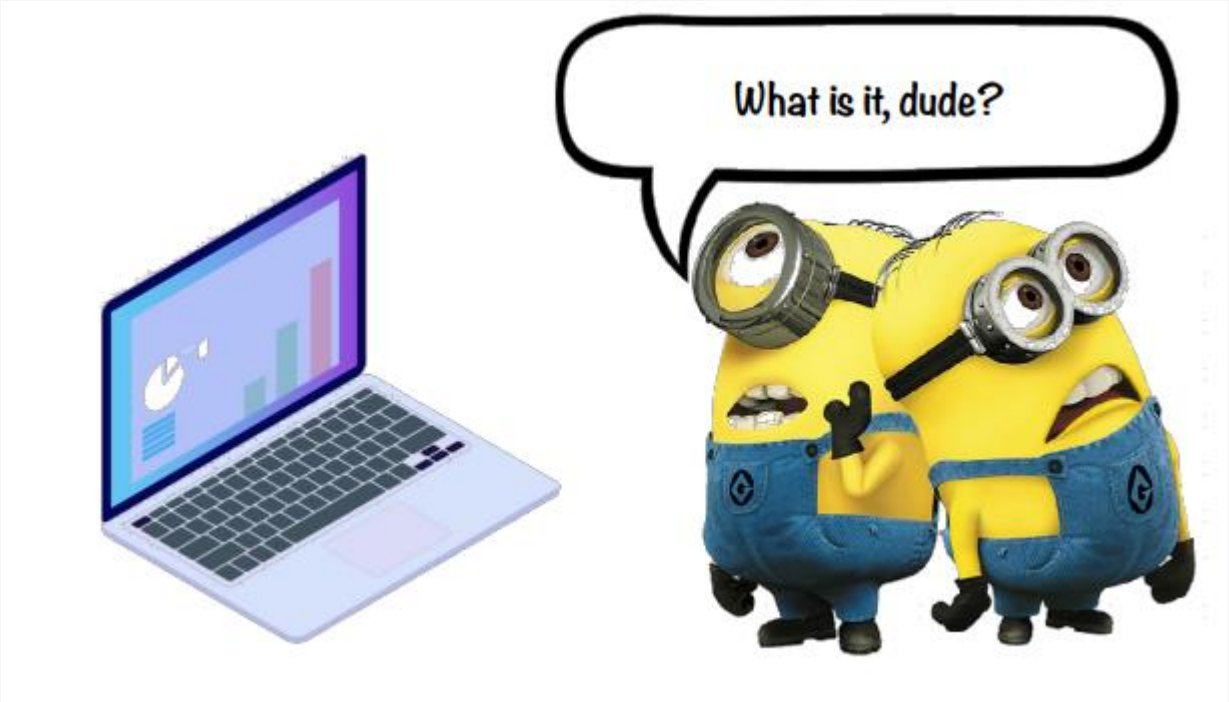
- Systems should solve problems the same way humans do.
- Requires knowledge of brain function
- Need scientific theories for internal brain activities.
- Two approaches:
  - predict and test the behaviors of human subjects (top-down)
  - or direct identification of neurological data (bottom-up)
- These 2 approaches (roughly speaking, cognitive science and neuroscience) are now distinct fields of AI

# Cognitive Science v.s. Neuroscience




https://www-labs.iro.umontreal.ca/~liubang/ift3335-h22/Lecture%201%20-%20AI%20intro.pdf

# Example: how computer works?

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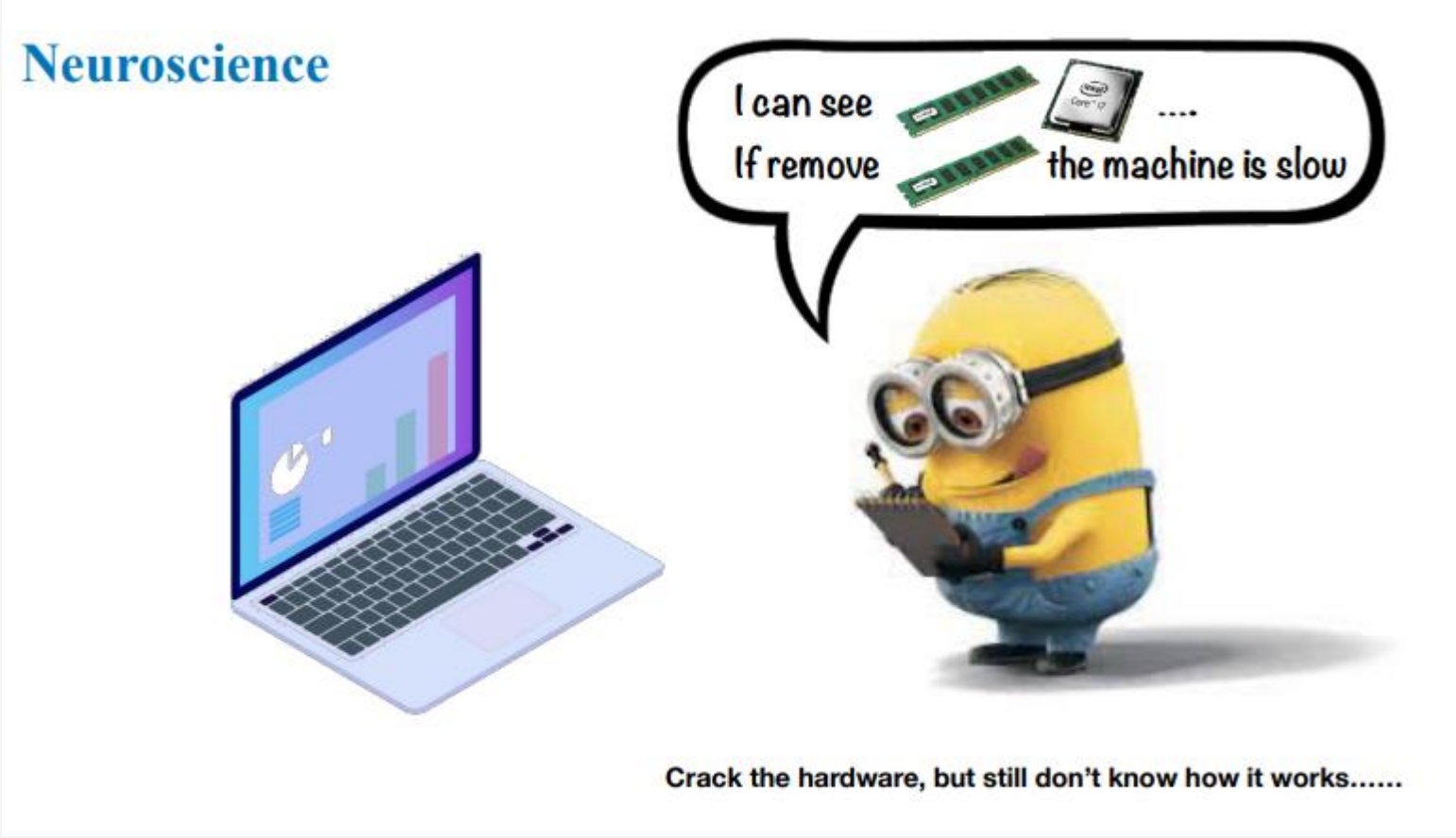
# Neuroscience

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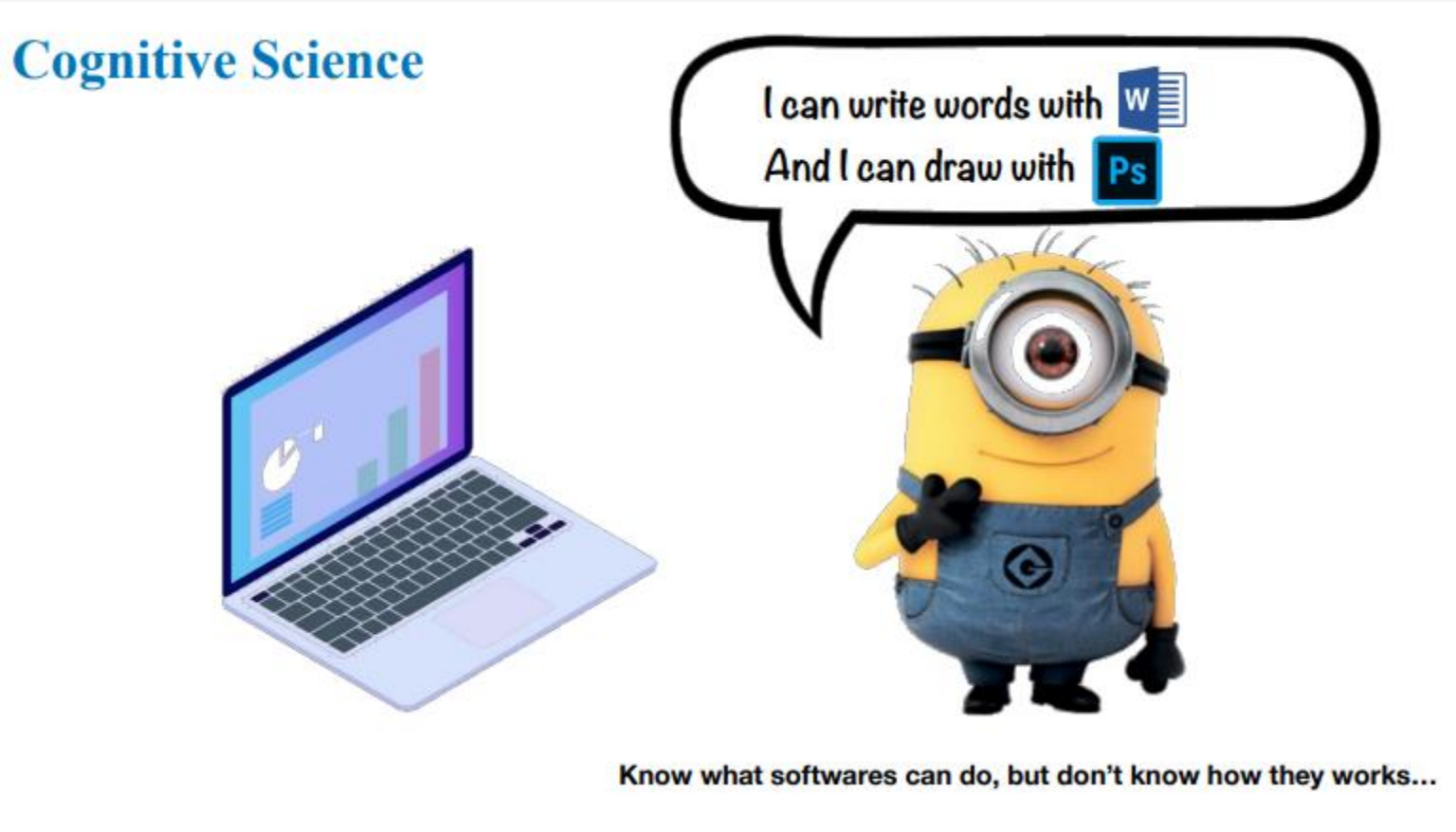
# Cognitive Science




https://www-labs.iro.umontreal.ca/~liubang/ift3335-h22/Lecture%201%20-%20AI%20intro.pdf

# Cognitive Science v.s. Neuroscience

Neuroscience is the scientific study of the nervous system, aims to to understand the fundamental and emergent properties of neurons, glia and neural circuits

The goal of cognitive science is to understand the principles of intelligence with the hope that this will lead to a better comprehension of the mind and of learning and to develop intelligent devices.

https://www-labs.iro.umontreal.ca/~liubang/ift3335-h22/Lecture%201%20-%20AI%20intro.pdf

# Approach 3: Thinking Rationally: "laws of thought"

- Aristotle: What are the correct argument / thought processes?
- Laws of thought, the three fundamental laws of logic that are ascribed to Aristotle:
  - 1. The law of contradiction: for all propositions p, it is impossible for both p and not p to be true
  - 2. The law of excluded middle: either p or ~p must be true, there being no third or middle true proposition between them
  - 3. The principle of identity: if a propositional function F is true of an individual variable x, then F is true of x, or: F(x) ⊃ F(x), in which ⊃ means "formally implies." Another formulation of the principle of identity asserts that a thing is identical with itself, or (∀x) (x = x), in which ∀ means "for every"; or simply that x is x.

# Approach 3: Thinking Rationally: "laws of thought"

- Some Greek schools have developed different forms of logic: notation and derivation rules for thoughts; may or may not precede the idea of mechanization.
- Direct line from mathematics and philosophy to modern AI
- Problems:
  - Not all intelligent behavior is the result of logical deliberation.
  - What is the process of thinking? What thoughts should I be having?

# Approach 4: Acting Rationally

- Rational behavior: Doing Right Things
  - Right things: those that are supposed to maximize the achievement of objectives, given the information available.
- Rationality only concerns what decisions are made (not the thought process behind them)
- Goals are expressed in terms of the utility of outcomes
- Being rational means maximizing your expected utility

# Weak AI vs. Strong AI

| Weak AI | Strong AI |
| --- | --- |
| Weak AI refers to AI systems that are designed and trained for a specific task or a narrow set of tasks. | Strong AI, or Artificial General Intelligence (AGI), refers to AI systems with human-level intelligence and understanding. |
| These AI systems are not generally intelligent; they excel in performing a predefined task but lack true understanding or consciousness. | These AI systems have the ability to perform any intellectual task that a human being can do, adapt to different domains, and possess a form of consciousness or self-awareness. |
| Examples of weak AI include virtual assistants like Siri or Alexa, recommendation algorithms used by streaming services, and chatbots that are designed for specific customer service tasks. | Achieving Strong AI is a long-term goal of AI research and would require the development of AI systems that can reason, learn, understand, and adapt across a wide range of tasks and contexts. |
| Weak AI is highly specialized and does not possess human-like cognitive abilities or general problem-solving capabilities beyond its narrow domain. | Strong AI is currently a theoretical concept, and no AI system has reached this level of general intelligence |



https://github.com/microsoft/AI-For-Beginners/blob/main/lessons/1-Intro/README.md

# Foundations of AI

- Philosophy
  - 450 BC, Socrates asked for algorithm to distinguish pious from non-pious individuals
  - Aristotle developed laws for reasoning
- Logic/Mathematics
  - 1847, Boole introduced formal language for making logical inference
- Computation
  - 1776, Smith views economies as consisting of agents maximizing their own well being (payoff)
- Biology/Neuroscience
  - 1861, Study how brains process information
- Psychology/Cognitive Science
  - 1879, Cognitive psychology initiated
- Evolution
  - 1957, Skinner studied behaviorist approach to language learning

# AI and related fields

Logical AI

Search

Pattern Recognition

Representation

Inference

Common sense knowledge and reasoning

Learning from experience

Planning

Epistemology

Ontology

Heuristics

Genetic Programming

# Branches of AI

1.Game Playing

You can buy machines that can play master level chess for a few hundred dollars. There is some AI in them, but they play well against people mainly through brute force computation--looking at hundreds of thousands of positions. To beat a world champion by brute force and known reliable heuristics requires being able to look at 200 million positions per second.

2. Speech Recognition

In the 1990s, computer speech recognition reached a practical level for limited purposes. Thus United Airlines has replaced its keyboard tree for flight information by a system using speech recognition of flight numbers and city names. It is quite convenient. On the other hand, while it is possible to instruct some computers using speech, most users have gone back to the keyboard and the mouse as still more convenient.

# Branches of AI

3.Understanding Natural Language

Just getting a sequence of words into a computer is not enough. Parsing sentences is not enough either. The computer has to be provided with an understanding of the domain the text is about, and this is presently possible only for very limited domains.

4. Computer Vision

The world is composed of three-dimensional objects, but the inputs to the human eye and computers' TV cameras are two dimensional. Some useful programs can work solely in two dimensions, but full computer vision requires partial three-dimensional information that is not just a set of two-dimensional views. At present there are only limited ways of representing three-dimensional information directly, and they are not as good as what humans evidently use.

# Branches of AI

5. Expert Systems

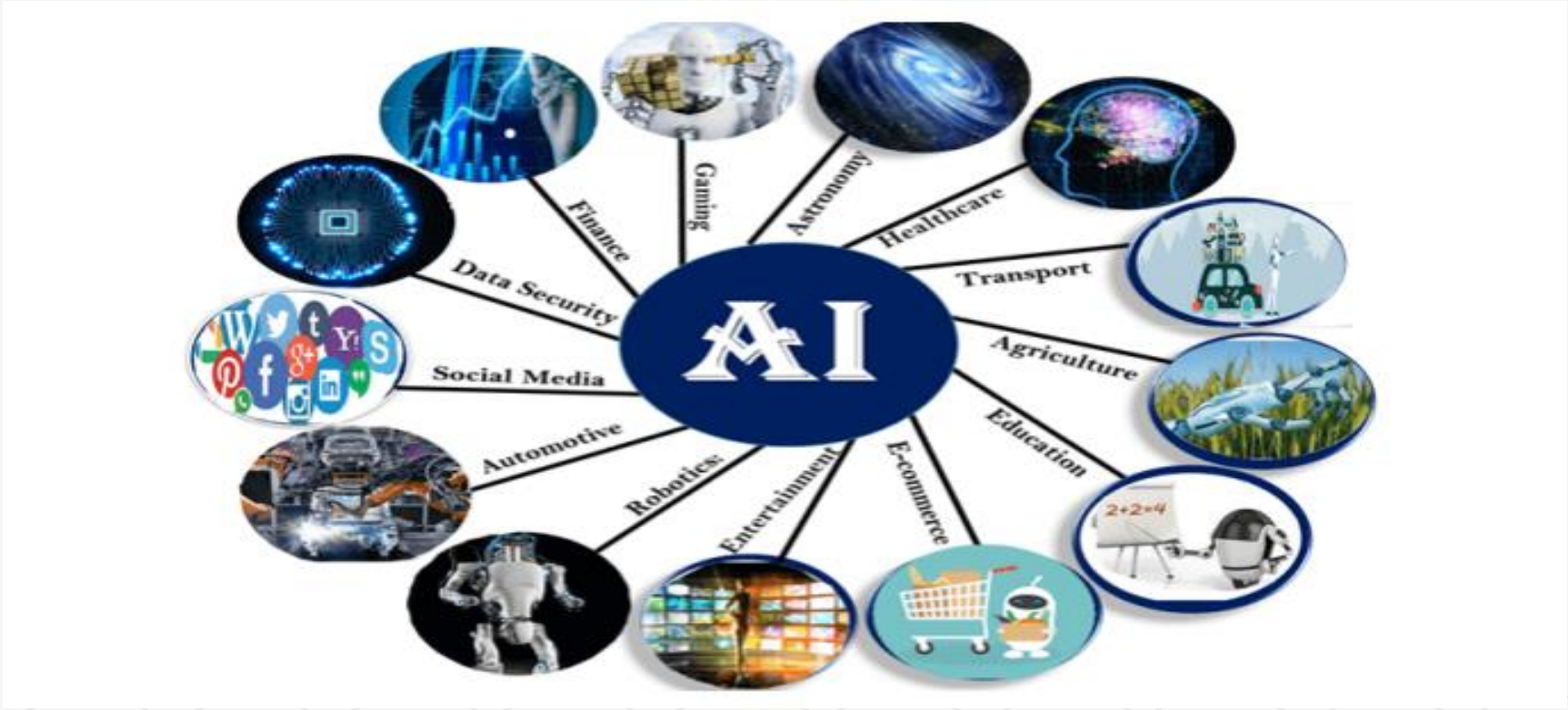
A ``knowledge engineer'' interviews experts in a certain domain and tries to embody their knowledge in a computer program for carrying out some task. How well this works depends on whether the intellectual mechanisms required for the task are within the present state of AI. When this turned out not to be so, there were many disappointing results.

6.Heuristic Classification

One of the most feasible kinds of expert system given the present knowledge of AI is to put some information in one of a fixed set of categories using several sources of information.

# Applications

Following are some sectors which have the application of Artificial Intelligence:



# Applications

1. AI in Astronomy

 Artificial Intelligence can be very useful to solve complex universe problems. AI technology can be helpful for understanding the universe such as how it works, origin, etc.

2. AI in Healthcare

 In the last, five to ten years, AI becoming more advantageous for the healthcare industry and going to have a significant impact on this industry.

 Healthcare Industries are applying AI to make a better and faster diagnosis than humans. AI can help doctors with diagnoses and can inform when patients are worsening so that medical help can reach to the patient before hospitalization.

3. AI in Gaming

 AI can be used for gaming purpose. The AI machines can play strategic games like chess, where the machine needs to think of a large number of possible places.

# Applications

4. AI in Finance

 AI and finance industries are the best matches for each other. The finance industry is implementing automation, chatbot, adaptive intelligence, algorithm trading, and machine learning into financial processes.

5. AI in Data Security

 The security of data is crucial for every company and cyber-attacks are growing very rapidly in the digital world. AI can be used to make your data more safe and secure. Some examples such as AEG bot, AI2 Platform, are used to determine software bug and cyber-attacks in a better way.

6. AI in Social Media

 Social Media sites such as Facebook, Twitter, and Snapchat contain billions of user profiles, which need to be stored and managed in a very efficient way. AI can organize and manage massive amounts of data. AI can analyze lots of data to identify the latest trends, hashtag, and requirement of different users.

# Applications

7. AI in Travel & Transport

 AI is becoming highly demanding for travel industries. AI is capable of doing various travel related works such as from making travel arrangement to suggesting the hotels, flights, and best routes to the customers. Travel industries are using AI powered chatbots which can make human-like interaction with customers for better and fast response.

8. AI in Automotive Industry

 Some Automotive industries are using AI to provide virtual assistant to their user for better performance. Such as Tesla has introduced TeslaBot, an intelligent virtual assistant.

 Various Industries are currently working for developing self-driven cars which can make your journey more safe and secure.

# Applications

9. AI in Robotics:

 Artificial Intelligence has a remarkable role in Robotics. Usually, general robots are programmed such that they can perform some repetitive task, but with the help of AI, we can create intelligent robots which can perform tasks with their own experiences without pre-programmed.

 Humanoid Robots are best examples for AI in robotics, recently the intelligent Humanoid robot named as Erica and Sophia has been developed which can talk and behave like humans.

10. AI in Entertainment

 We are currently using some AI based applications in our daily life with some entertainment services such as Netflix or Amazon. With the help of ML/AI algorithms, these services show the recommendations for programs or shows.

# Applications

11. AI in Agriculture

 Agriculture is an area which requires various resources, labor, money, and time for best result. Now a day's agriculture is becoming digital, and AI is emerging in this field. Agriculture is applying AI as agriculture robotics, solid and crop monitoring, predictive analysis. AI in agriculture can be very helpful for farmers.

12. AI in E-commerce

 AI is providing a competitive edge to the e-commerce industry, and it is becoming more demanding in the e-commerce business. AI is helping shoppers to discover associated products with recommended size, color, or even brand.

13. AI in education:

 AI can automate grading so that the tutor can have more time to teach. AI chatbot can communicate with students as a teaching assistant.

 AI in the future can be work as a personal virtual tutor for students, which will be accessible easily at any time and any place.

# How AI is different?

| Artificial Intelligence | Natural Intelligence |
| --- | --- |
| Non Creative | Creative |
| Precise | May Contain Error |
| Consistency | Non Consistent |
| Multitasking | Can't Handle |

# Advantages of AI

Trí tuệ nhân tạo sẽ không cần ngủ cũng như các vấn đề khác ảnh hưởng đến tâm trí sinh học như đi vệ sinh và ăn uống.

Xem xét vấn đề một cách vô cảm. Khi mọi người đưa ra quyết định, đôi khi những quyết định đó dựa trên cảm xúc hơn là logic. Đây không phải lúc nào cũng là cách tốt nhất để đưa ra quyết định.

Sao chép dễ dàng hơn. Khi trí tuệ nhân tạo được đào tạo trong một nhiệm vụ, tâm trí đó có thể được sao chép rất dễ dàng, so với việc đào tạo nhiều người cho cùng một nhiệm vụ.

# Disadvantages of AI

Tự sửa đổi, khi kết hợp với tự sao chép, có thể dẫn đến những kết quả nguy hiểm, không mong muốn, chẳng hạn như một loại virus máy tính mới và thường xuyên biến đổi.

Không có khả năng chữa lành. Hệ thống sinh học có thể chữa lành theo thời gian và điều trị. Mặt khác, hầu hết các hệ thống máy tính thường cần phải tắt để bảo trì.

Robot quân sự có thể khiến một quốc gia có thể sử dụng bừa bãi tấn công các nước kém phát triển hơn với ít thương vong về người, nếu có.

Những tiến bộ nhanh chóng của AI có thể đồng nghĩa với tình trạng thất nghiệp cơ cấu lớn

# Future of AI

Tương lai gần

- Hiện tại, Ai đang ở vị trí tương tự như ngành công nghiệp máy tính cá nhân năm 1978.

- Ngay cả bây giờ chúng ta cũng có robot đảm nhận công việc.

- Hiện Nhật Bản sử dụng khoảng 320 robot các loại trên 10.000 nhân viên, trong khi Đức sử dụng 148 robot công nghiệp trên 10.000 nhân viên, Ý 116, Thụy Điển 99 và từ 50 đến từ 50 đến 80 mỗi nước ở Mỹ.

# Future of AI

Tương lai xa

- Ai và robot còn thua xa máy tính nhưng sẽ chỉ là vấn đề thời gian trước khi chúng trở nên phổ biến như điện thoại di động trong cuộc sống hàng ngày của chúng ta.

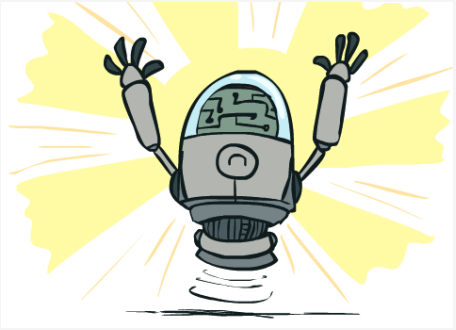
- Ray Kurzweil đã sử dụng định luật Moore (mô tả sự cải tiến không ngừng theo cấp số nhân trong công nghệ kỹ thuật số với độ chính xác kỳ lạ) để tính toán rằng máy tính để bàn sẽ có sức mạnh xử lý tương tự như bộ não con người vào năm 2029 và đến năm 2045 trí tuệ nhân tạo sẽ đạt đến điểm mà nó có thể tự cải thiện với tốc độ vượt xa mọi thứ có thể tưởng tượng được trong quá khứ.

- Một số nhà tương lai học và nhà văn khoa học viễn tưởng đã dự đoán rằng con người và máy móc trong tương lai sẽ hợp nhất thành Cyborg có khả năng và sức mạnh hơn cả hai. Ý tưởng này được gọi là chủ nghĩa xuyên nhân văn.

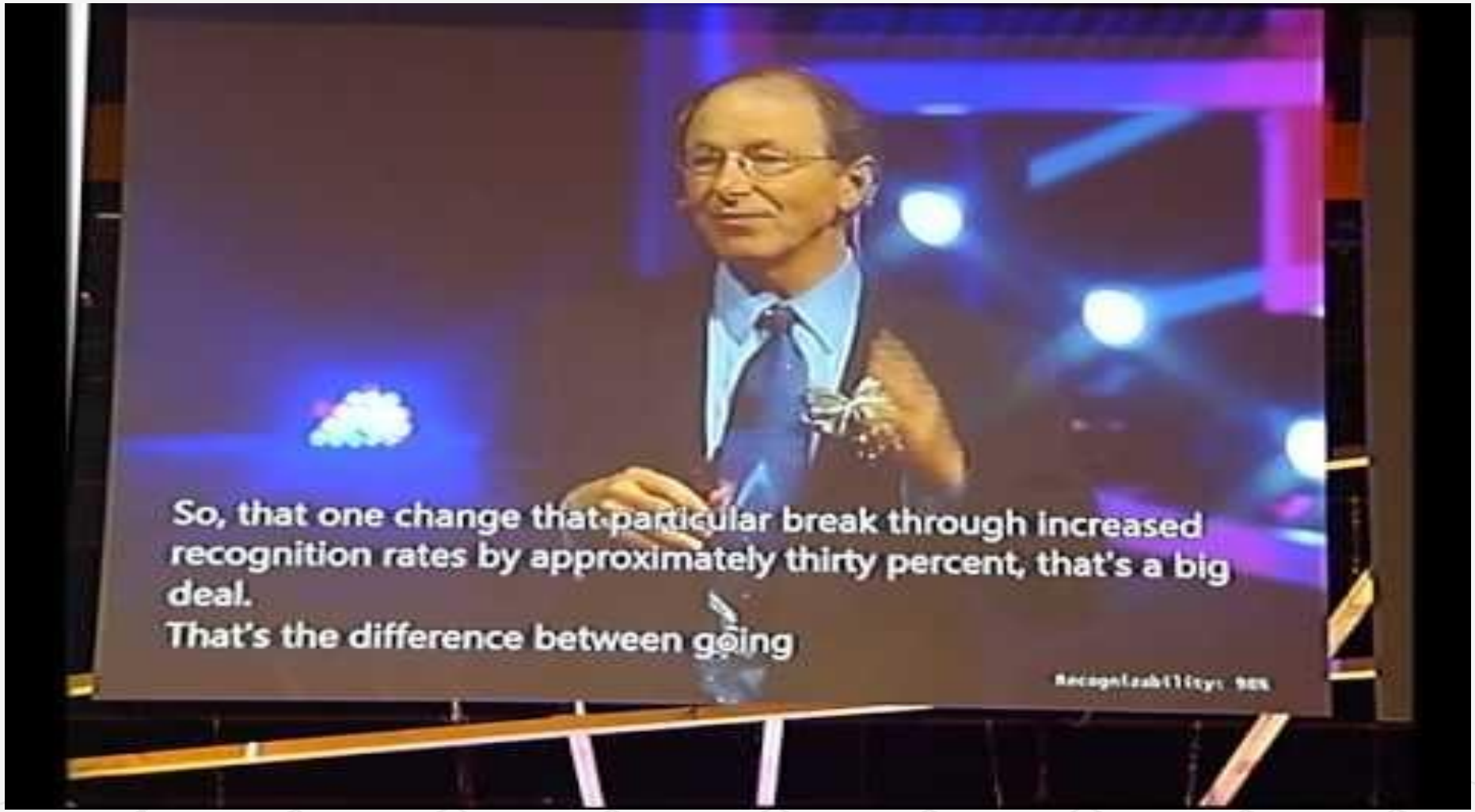
# What Can AI Do?

Quiz: Which of the following can be done at present?

- ✓ Play a decent game of Jeopardy?
- ✓ Win against any human at chess?
- ✓ Win against the best humans at Go?
- ✓ Play a decent game of tennis?
- ✓ Grab a particular cup and put it on a shelf?
- ✗ Unload any dishwasher in any home?
- ✓ Drive safely along the highway?
- ✗ Drive safely along Telegraph Avenue?
- ✓ Buy a week's worth of groceries on the web?
- ✗ Buy a week's worth of groceries at Berkeley Bowl?
- ? Discover and prove a new mathematical theorem?
- ? Perform a surgical operation?
- ✓ Translate spoken Chinese into spoken English in real time?
- ✗ Write an intentionally funny story?



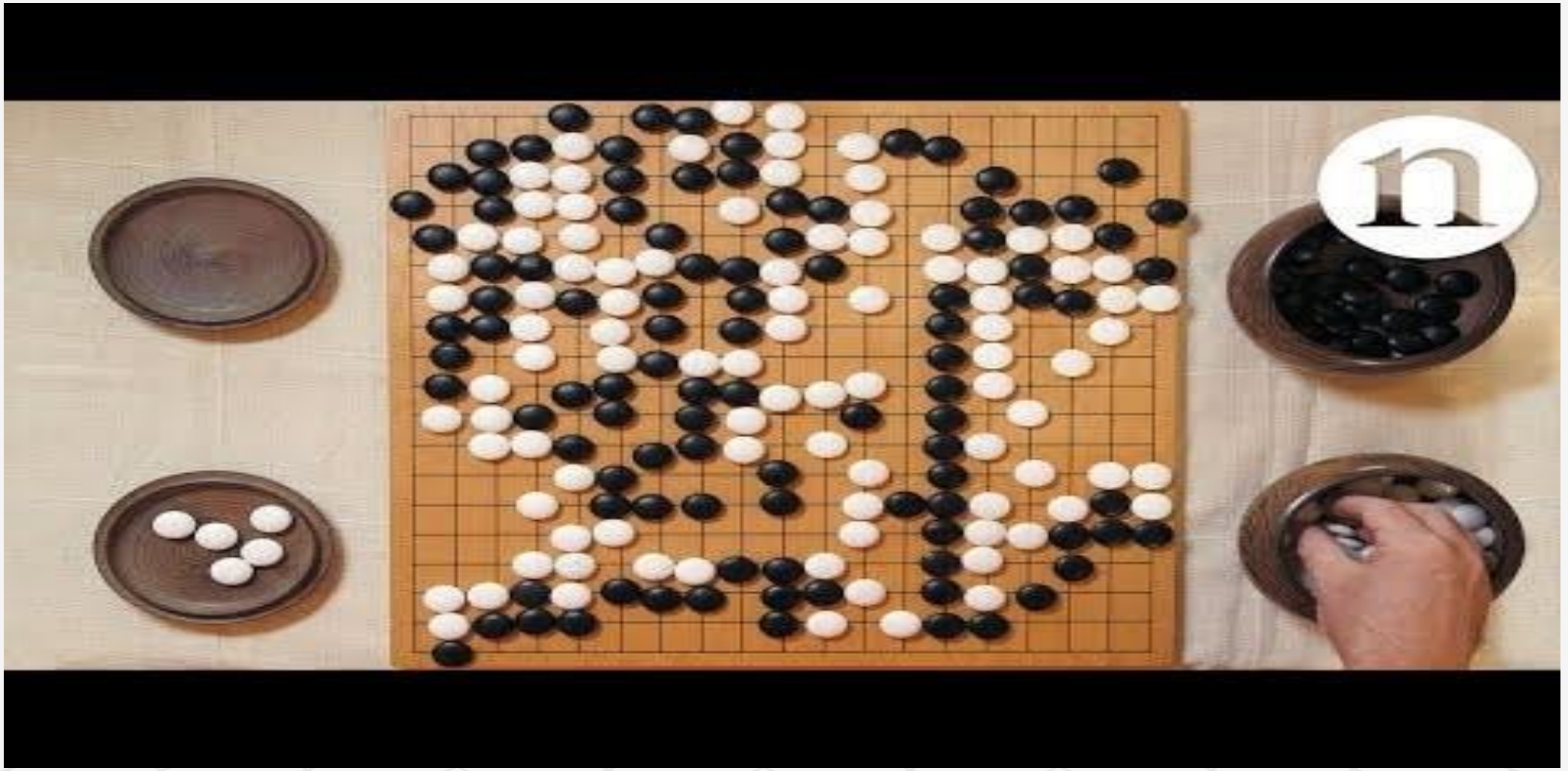
# What Can AI Do? Speech translation and synthesis (2012)



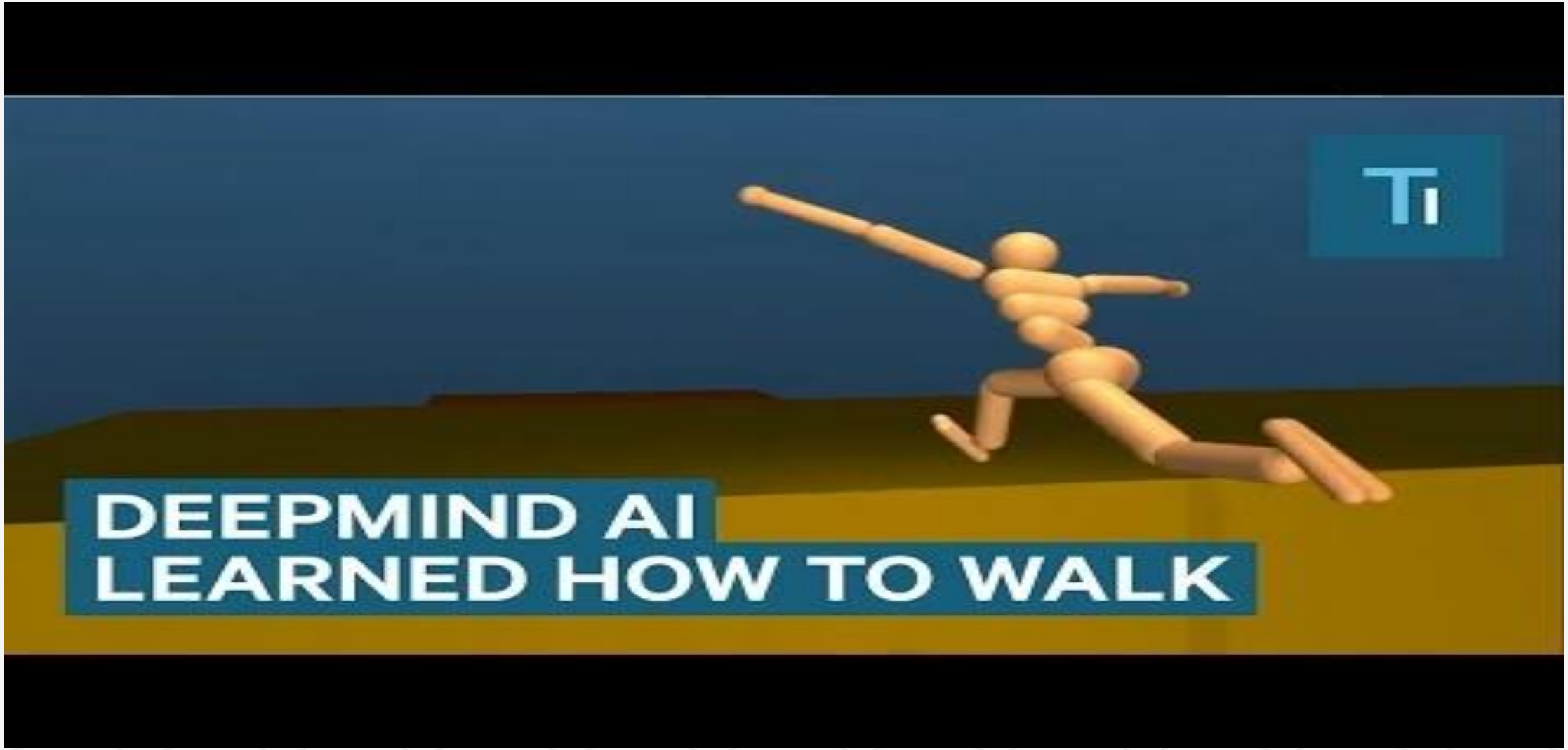
# What Can AI Do? Speech synthesis and question answering (Google, 2018)

# What Can AI Do? Playing Atari games (2013)

# What Can AI Do? Beat the best human Go players (2016)



# What Can AI Do? Learning to walk (2017)

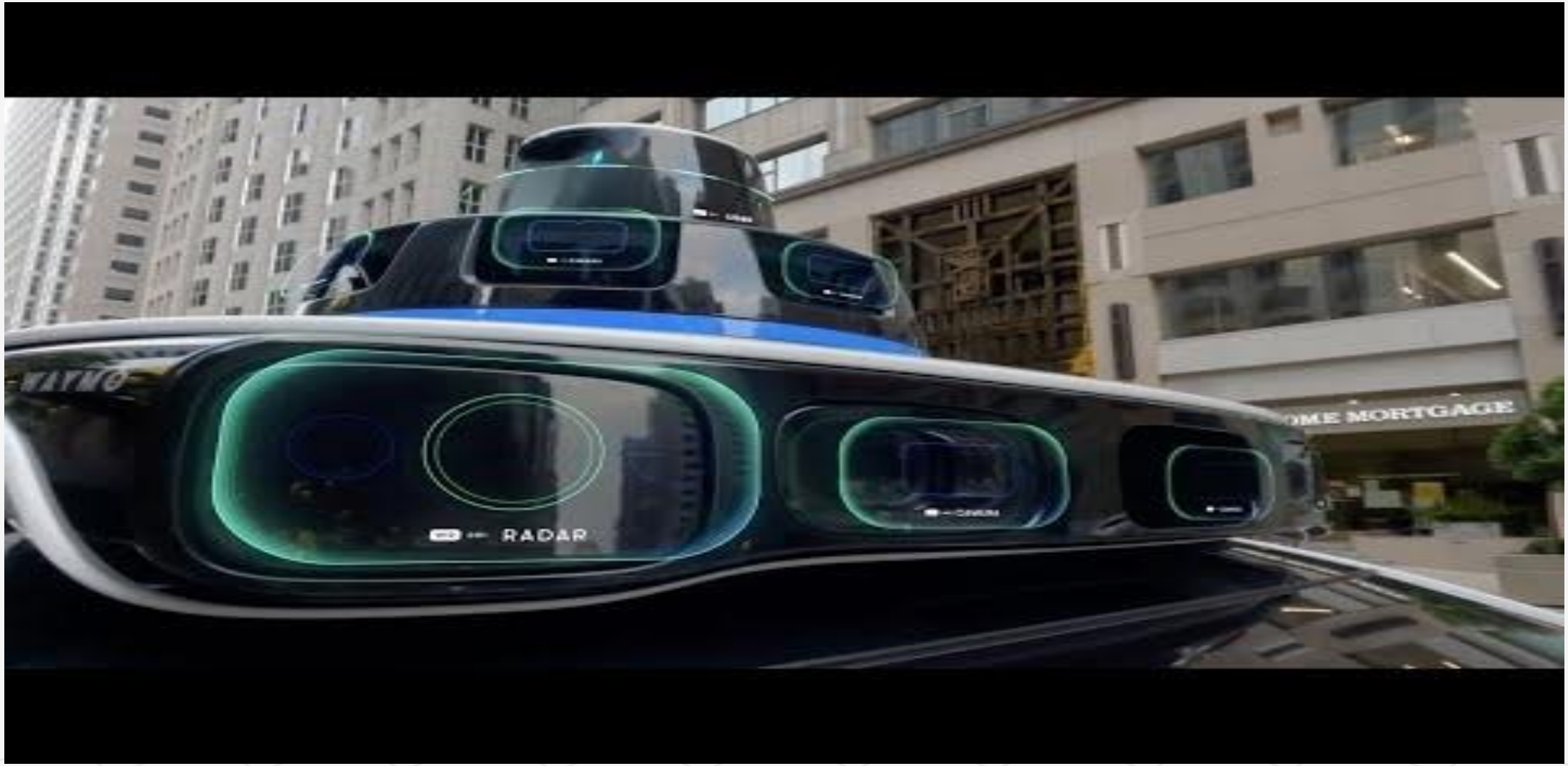


# What Can AI Do? Playing soccer (2018)

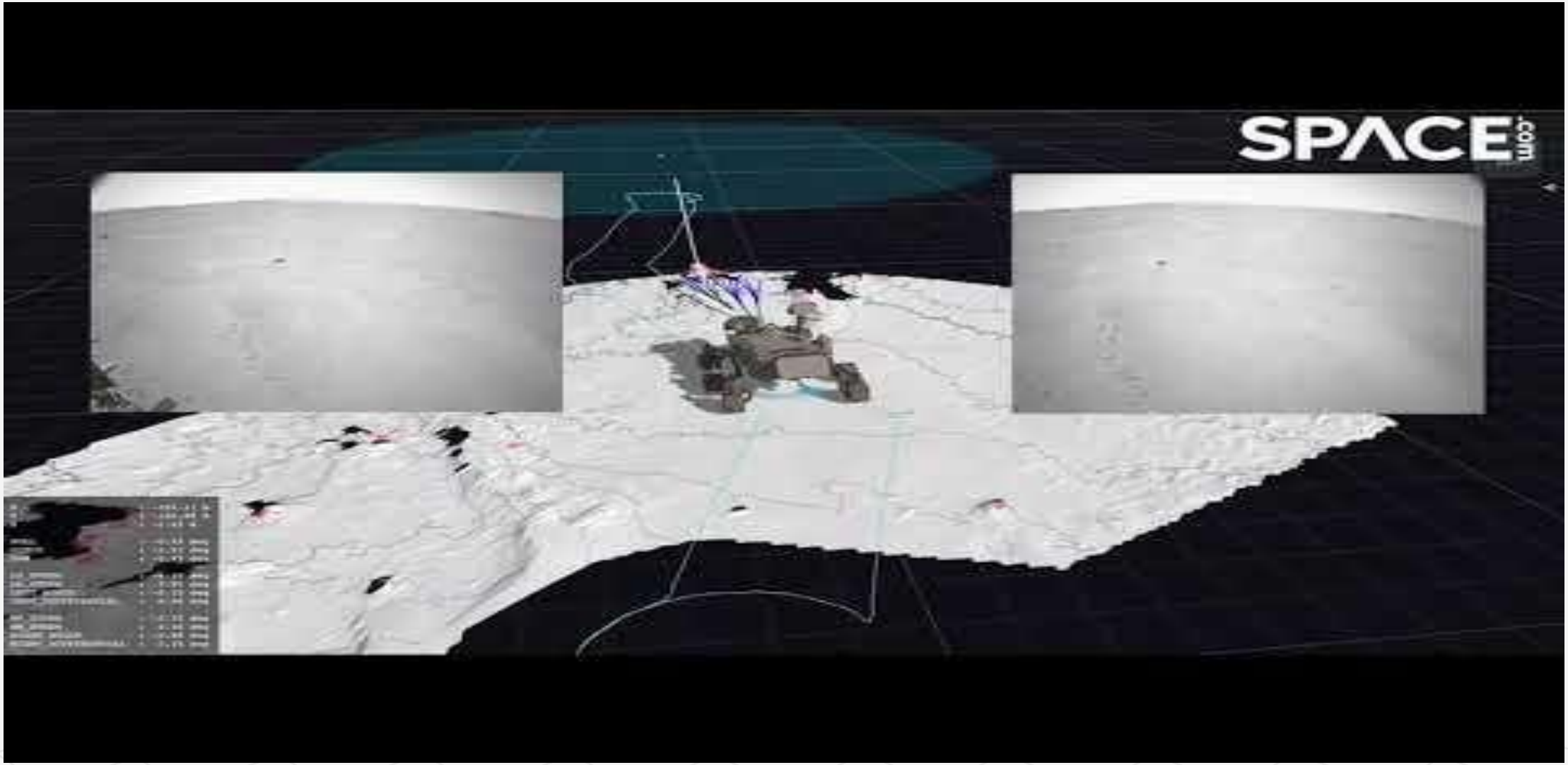
# What Can AI Do? … although some robots might now do better (2021).

# What Can AI Do? Driving a car (NVIDIA, 2016)

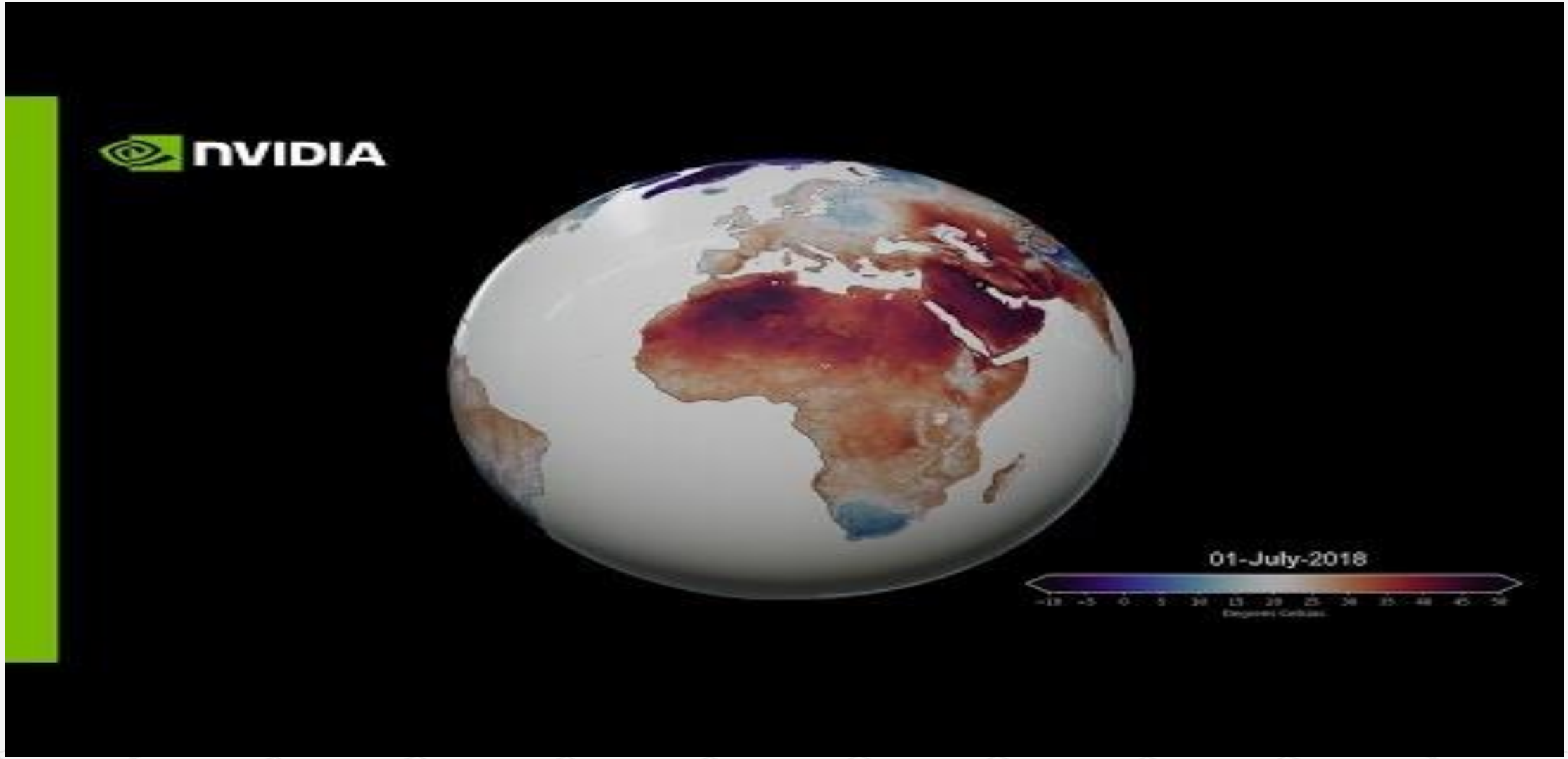
# What Can AI Do? Autonomous cars (Waymo, 2022)



# What Can AI Do? Driving on Mars (NASA/JPL, 2021)



# What Can AI Do? Predicting extreme weather events (NVIDIA, 2023)

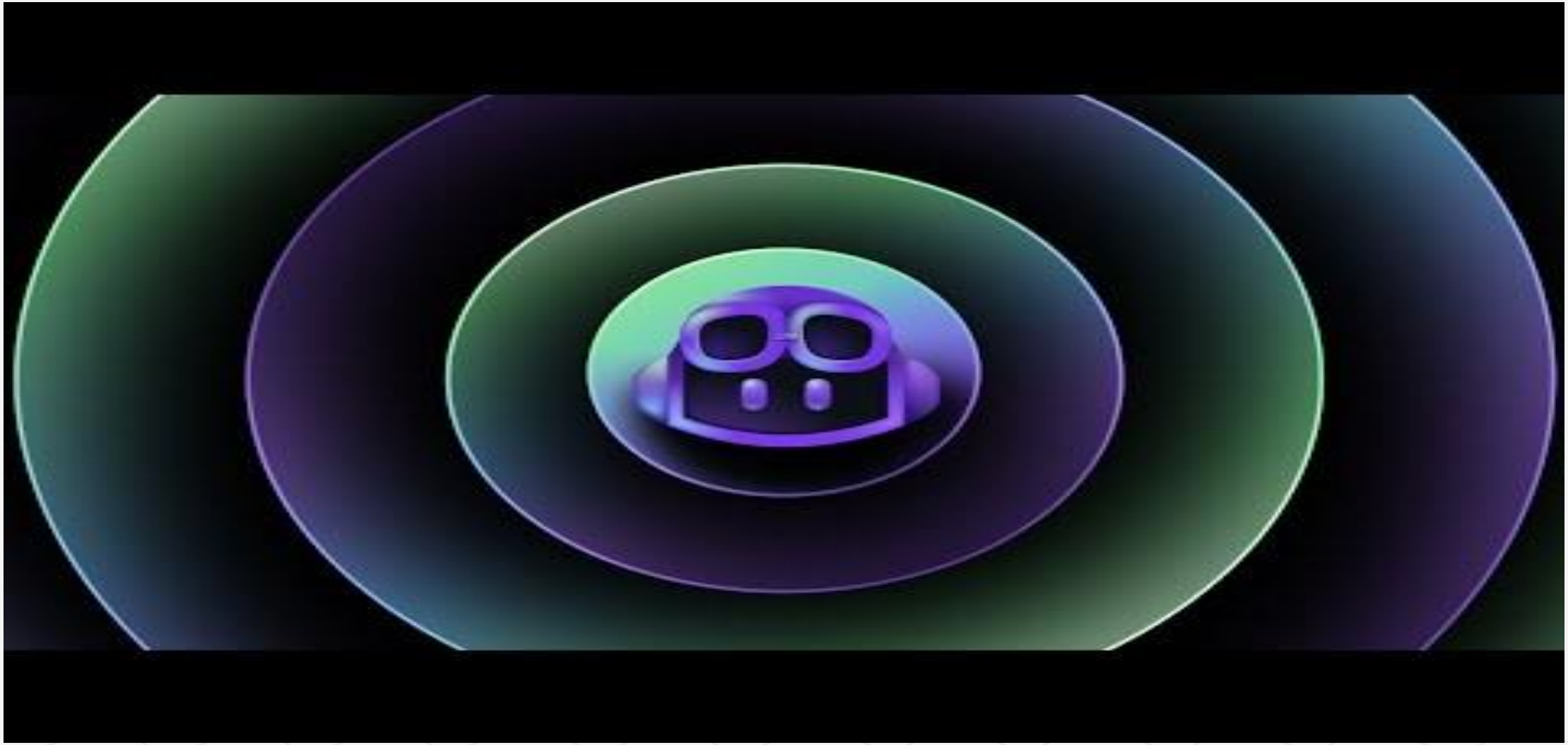


# What Can AI Do? Improving Tuberculosis Monitoring with Deep Learning (NVIDIA, 2020)

# What Can AI Do? Solving protein folding (Deepmind, AlphaFold, 2020)

# What Can AI Do? Powering the future of clean energy (NVIDIA, 2023)

# What Can AI Do? Write computer code (Github Copilot X, 2023)



# What Can AI Do? Learning to sort waste (ULiège, 2021)

# Why Study AI?

- AI makes computers more useful
- Intelligent computer would have huge impact on civilization
- AI cited as “field I would most like to be in” by scientists in all fields
- Computer is a good metaphor for talking and thinking about intelligence

# WHY SHOULD  LEARN AI?

Among 15 **most in-demand tech skills**:

- ML and AI
- Quality Assurance for ML Algorithms
- Real-World ML Experience

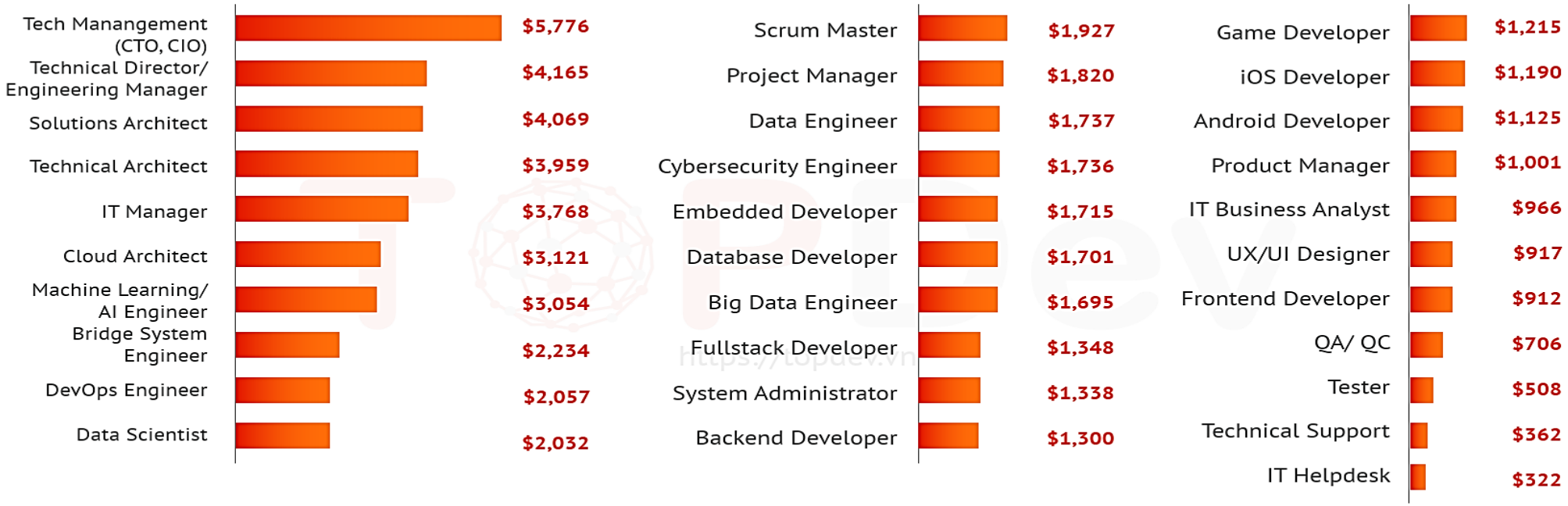
*– Forbes Technology Council, 2020*

# WHY SHOULD LEARN AI?

## DEVELOPER SALARY @POSITION

2021 VIETNAM IT MARKET REPORT
Developers Recruitment State

### DEVELOPER SALARY BY POSITIONS




As predicted by the previous reports, highest-paying positions require special skills like Data Analyst, DevOps, Machine Learning or AI. Due to Covid-19 impact which leads to urge for business digital transformation, the importance of Cloud Service & DevOps has played a critical role in maintaining & developing the business. Therefore, there has experienced dramatical growth in demand for Cloud/ DevOps engineers which follow with those positions increasingly salary base.

CTO, CIO or Tech Management positions which are still considered the highest career goals with more responsibilities & adaptability to "new normal" era, which now is not limited anymore, ranging from people & performance management, planning & strategies, risk managements, cybersecurity & scalability along with stability. To reach this, managers have to master strong basic skills, handle management tasks, optimize companies' technology/ technology-based products & on-time adjustment.

Source: topdev.vn, 2021

TOPDev
Find Top IT Jobs </> Hire Top Developers

# WHY SHOULD  LEARN AI?

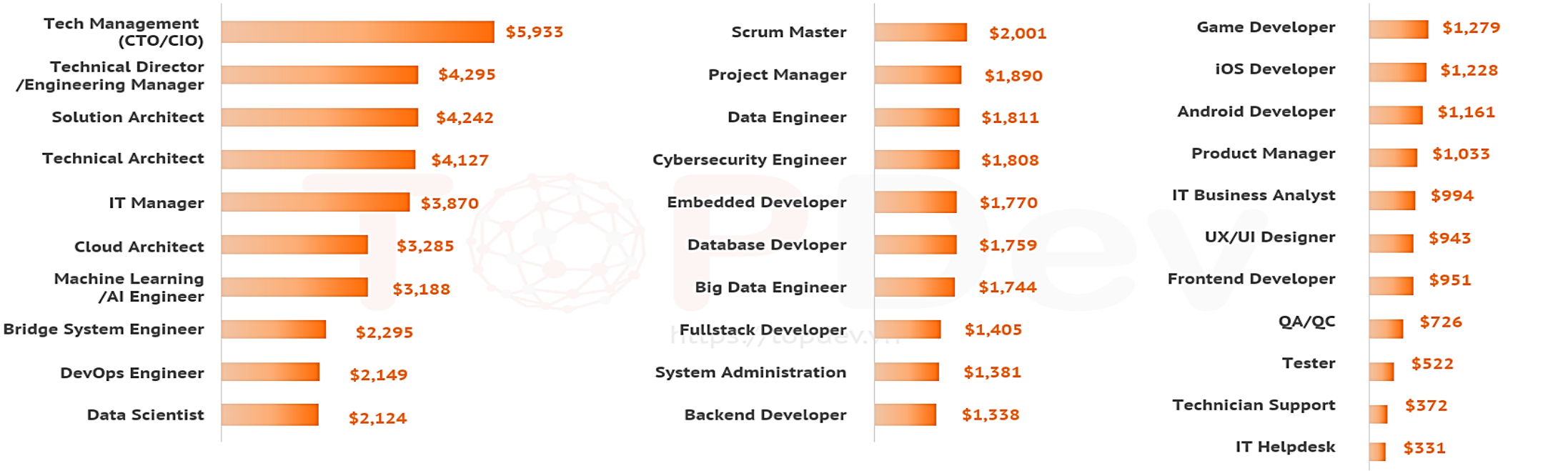
## DEVELOPER SALARY @POSITION

VIETNAM IT MARKET REPORT
TECH HIRING 2022

### DEVELOPER SALARY BY POSITIONS IN IT INDUSTRY

**(relatively up to 3 years of experience working in specific technology)**

[Unit: USD]
Note: All salary data stated in this page refers to monthly gross salary before tax and excludes other benefits like overtime, bonus, etc.

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Source: topdev.vn, 2022

# WHY SHOULD LEARN AI?

## TOP FASTEST GROWING IT JOBS IN 2022 – 2023

VIETNAM IT MARKET REPORT
TECH HIRING 2022

### DATA SCIENTIST

Data scientists use technical and analytical skills to identify patterns, handle data, and draw valuable conclusions. They recognise the right solutions by combining theoretical and industry knowledge, contextual insights, and scepticism of established assumptions.
Some Data Scientist skills include: Machine Learning algorithms, creating data models, programming languages, such as Python and R, identify business issues to provide appropriate solutions.

| Level 1 | Level 2 | Level 3 |
|---|---|---|
| Fluently use basic features | Proficiently use | Master, self-build/ optimize |
| $ 1,593 | $ 2,124 | $ 2,443 |

### DEVOPS ENGINEER

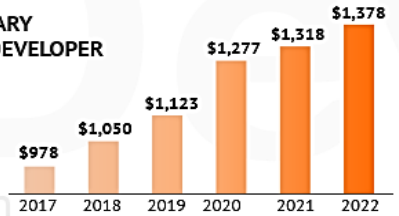
DevOps engineer has been named one of the most-hired roles in recent years. DevOps engineer oversees the coding, scripting and development processes. They are also in charge of the software development team involved in the deployment and network operations.
Some DevOps engineer skills include: programming languages, such as Python and R, coding and scripting, Good grasp of tools, such as Git and Jenkins, Mastery in Linux or UNIX system administration, Strong communication and interpersonal skills, Deep understanding of DevOps best practices.

| Level 1 | Level 2 | Level 3 |
|---|---|---|
| Fluently use basic features | Proficiently use | Master, self-build/ optimize |
| $ 1,612 | $ 2,149 | $ 2,471 |

### FULL-STACK DEVELOPER

A full-stack developer is in charge of developing and building APIs using various combos of stack technologies and is proficient in both front-end and back-end programming.
Some of the full-stack developer skills include: Good understanding of programming languages (MongoDB, Express.js, AngularJS, and Node.js...), Knowledge of how to design and develop an API, Understanding of web development fundamentals, Good command over database technologies.

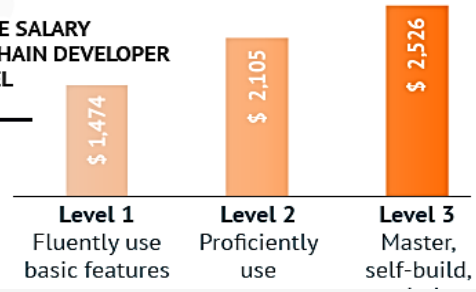
AVERAGE SALARY
FULL-STACK DEVELOPER
2017 - 2022
[unit: USD]




### BLOCKCHAIN DEVELOPER

A blockchain developer develops and implements blockchain-based architecture and solutions.
A blockchain developer should have strong programming abilities and a complete understanding of the technologies, such as cloud computing, security protocol stacks, crypto libraries, functions, and consensus processes. Some of blockchain developer skills include: programming languages like C++, Java, Python, JavaScript, and C#, working with codebases, Good knowledge of algorithms and data structures.

AVERAGE SALARY
BLOCKCHAIN DEVELOPER
BY LEVEL
[unit: USD]






Source: topdev.vn, 2022

# Course Description

**Course Objectives:**

Môn học này giới thiệu tới người học các vấn đề, ý tưởng và giải thuật nền tảng trong lĩnh vực trí tuệ nhân tạo (artificial intelligence), bao gồm các giải thuật giải quyết vấn đề bằng tìm kiếm (solving problems by searching), và học củng cố (reinforcement learning). Việc nắm bắt được các ý tưởng và giải thuật này không chỉ giúp người học có khả năng giải quyết các vấn đề bằng AI, mà còn giúp người học có thể tiếp thu những thành tựu tiên tiến trong lĩnh vực dễ dàng hơn.

**Programming languages:**

Python

# Course Outline

Giới thiệu về AI

Lập trình Python cho data science

Đạo đức và luật cho AI. Các khái niệm cơ bản của hệ thống thông minh

Các khái niệm cơ bản của hệ thống thông minh

Uninformed search algorithms

Informed search algorithms

Local search

Searching in complex environments

Constraint satisfaction problems

Introduction to reinforcement learning

# Text Book and References


1. Russell, S. J., & Norvig, P. (2016), *Artificial Intelligence: A Modern Approach* (3rd ed.). Pearson.
2. Lapan, M. (2020). *Deep Reinforcement Learning Hands-On*. Packt Publishing Ltd.
3. Géron, A. (2017). *Hands-On Machine Learning with Scikit-Learn and Tensorflow: Concepts, Tools, and Techniques to Build Intelligent Systems*. O'Reilly Media.
4. Murphy, K. P. (2012). *Machine Learning: A Probabilistic Perspective*. MIT Press.

# Activities and grading

| | |
|---|---|
| Exercises (midterm): | 50% |
| Project and presentation (final): | 50% |

➔ NO PLAGIARISM!
VIOLATION WILL RESULT IN FAILING THE COURSE.

Online activities:
https://fhqx.hcmute.edu.vn
https://utexlms.hcmute.edu.vn

# Hoạt động nhóm

Các Bạn hãy tìm hiểu và trình bày về thành tựu AI mà bạn thích; triển vọng nghề nghiệp của ngành AI.

# Q&A