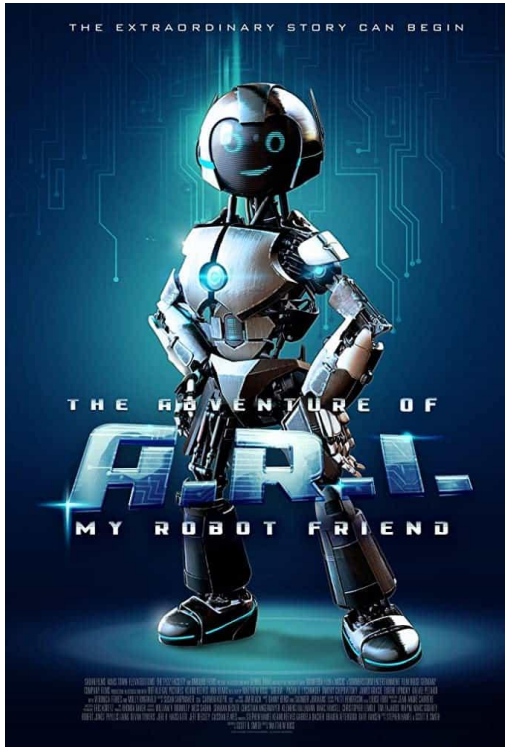
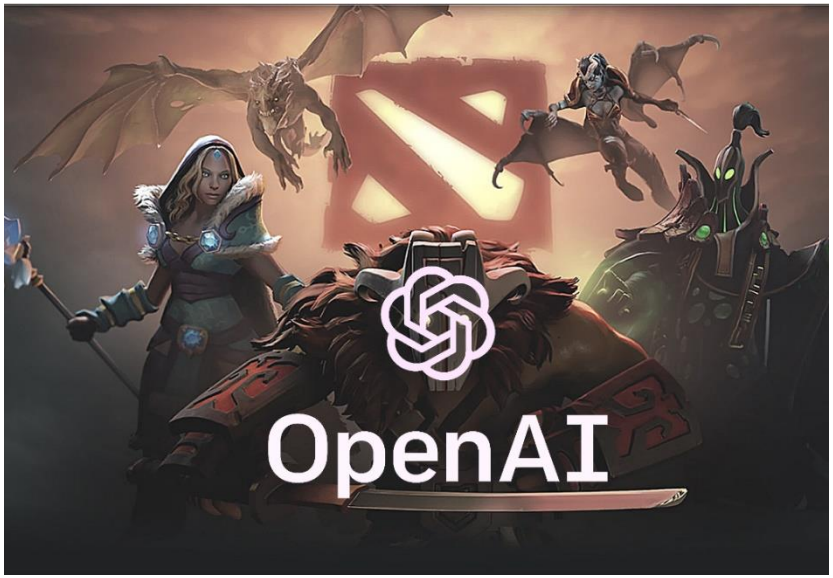
Introduction to AI
(AI - Artificial Intelligence)

Content

- What is AI?
- Example of AI

AI: A dream for everyone





Quiz 1

In which of the following ways can Artificial Intelligence (AI) be defined?

A. AI is the application of computing to help machines solve problems in intelligent ways without humans having to hard code the desired outcomes manually

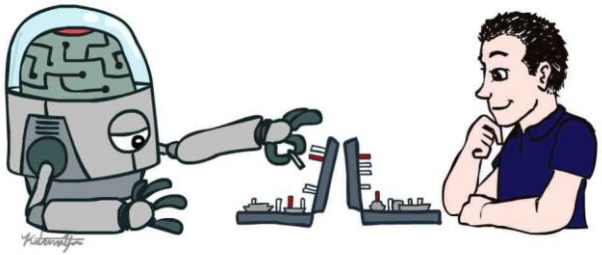
B. AI is about giving machines the intelligence and capabilities to think like humans so they can do every job that a human can

C. AI is an augmented intelligence, whihc helps human experts make evidence-based informed decisions while the machines do the time-consuming work

What is AI?

The science that studies the construction of intelligent agents that can **simulate human capabilities** in many different aspects:

- **Perception**: hearing, seeing, …
- **Thinking**: reasoning, learning, ...
- **Response**: speak, perform actions, …



Nguồn ảnh: UC Berkely. CS188 Intro to AI

How do we define intelligence?

- Human beings have innate intelligence, defined as the intelligence that governs every activity in our body.
- This intelligence is what causes an oak tree to grow out of a little seed, and an elephant to form from a single-celled organism

How does AI learn

Machines
are provided with ability to examine and create machine learning models

- Supervised Learning
- Unsupervised Learning
- Reinforcement Learning

Type of AI

- Based on strength, breadth, and application, AI can be described in different ways

1. **Weak AI** or Narrow AI
2. **Strong AI** or Generalized AI
3. **Super AI** or Conscious AI

Weak or Narrow AI

- Weak or Narrow AI is AI that is applied to a **specific domain**.
- For example: language translators, virtual assistants, self-driving cars, AI-powered web searches, recommendation engines, and intelligent spam filters.
- Applied AI can perform specific tasks, but not learn new ones, making decisions based on programmed algorithms, and training data

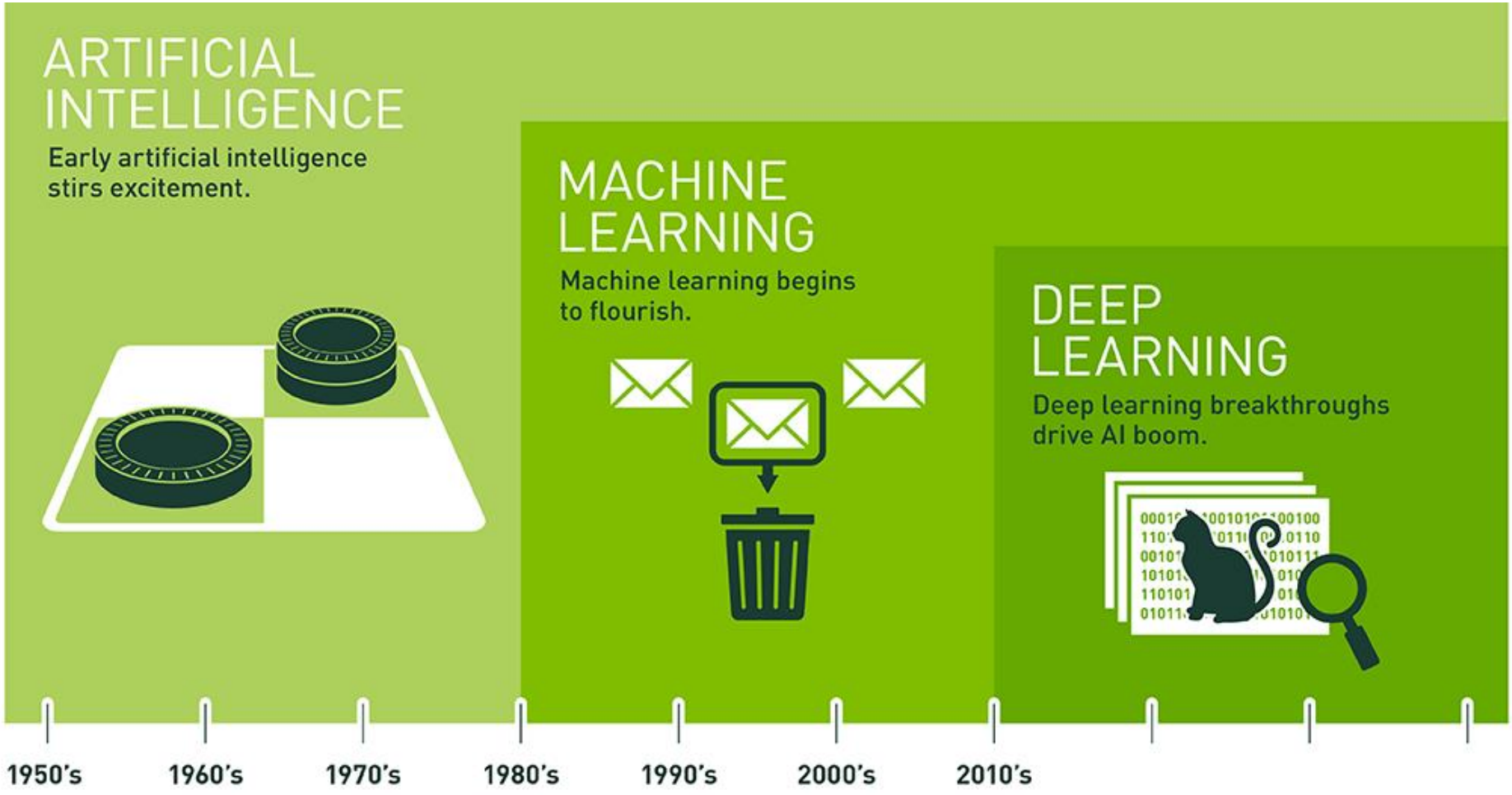
Strong AI or Generalized AI

- **Strong AI** or Generalized AI is AI that can interact and operate a wide variety of independent and unrelated tasks.
- It can **learn new tasks** to solve new problems, and it does this by teaching itself new strategies.
- Generalized Intelligence is the combination of many AI strategies that learn from experience and can perform at a human level of intelligence

Super AI or Conscious AI

- **Super AI or Conscious AI** is AI with human-level consciousness, which would require it to be self-aware.
- Because we are not yet able to adequately define what consciousness is, it is unlikely that we will be able to create a conscious AI in the near future

AI and related concepts



Source: https://blogs.nvidia.com/blog/2016/07/29/whats-difference-artificial-intelligence-machine-learning-deep-learning-ai/

Quiz 2

- Which one of these ways is NOT how AI learns?

  A. Proactive Learning

  B. Reinforcement Learning

  C. Unsupervised Learning

  D. Supervised Learning

Quiz 3

- Which of the following are attributes of Weak or Narrow AI?

  A. Make decisions based on programmed algorithms and training data in a specific domain

  B. Perform specific tasks

  C. Teach itself new strategies in a variety of domains

  D. Learn new tasks to solve new problems

Quiz 4

- What is the role that philosophy plays in AI?

  A. Provide guidance on ethical considerations

  B. Determine the application in software and hardware

  C. Determine viable learning models and measure performance

APPLICATION OF AI

2030

addition to GDP on the basis of AI

study by PWC

AI means different things to different people

Video Game Designer

AI means writing the code that affects how bots play or how the environment reacts to the player

Screenwriter

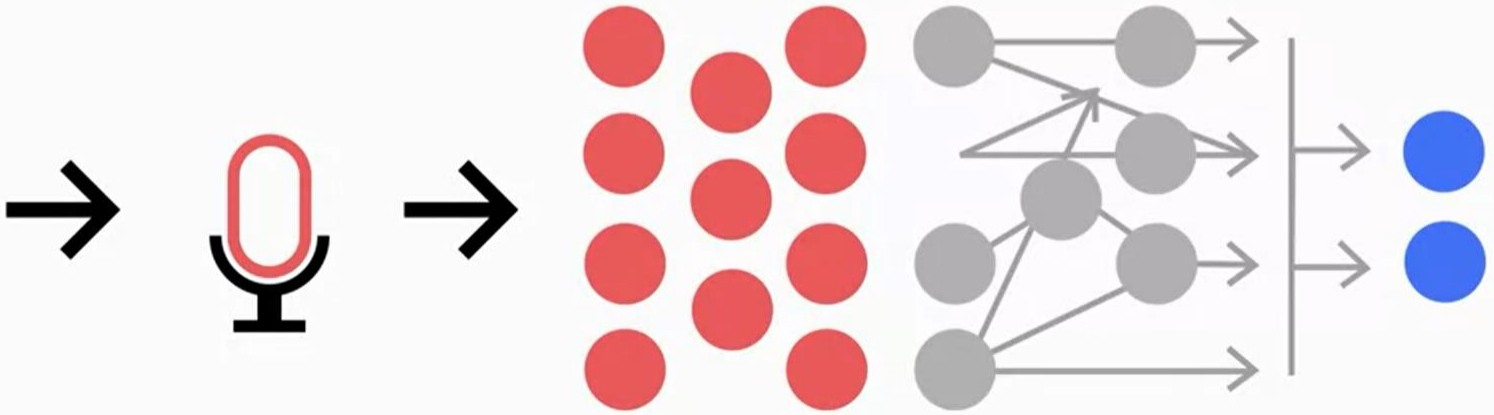
AI means a character that acts like a human with some trope computer features mixed in

Data Scientist

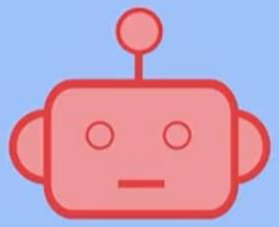
AI is a way of exploring and classifying data to meet specific goals

AI algorithms

that learn by example are the reason we can talk to Watson, Alexa, Siri, Cortana, and Google Assistant, and they can talk back to us

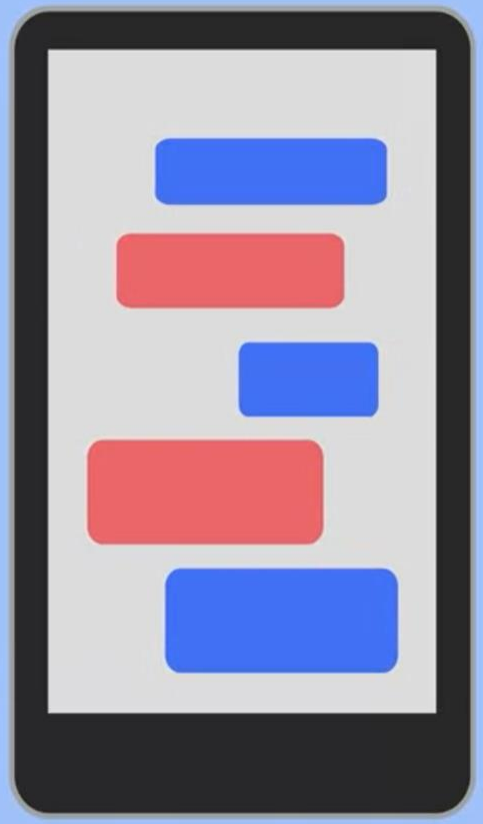


Chatbots

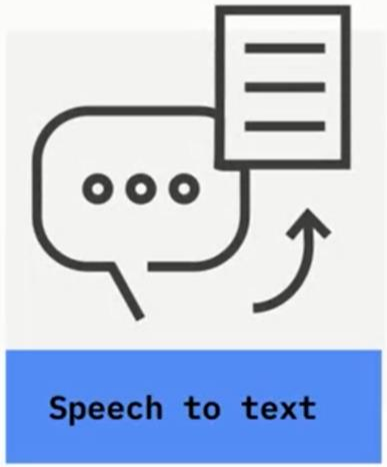


Providing students with easy to learn conversational interfaces

On demand online tutors

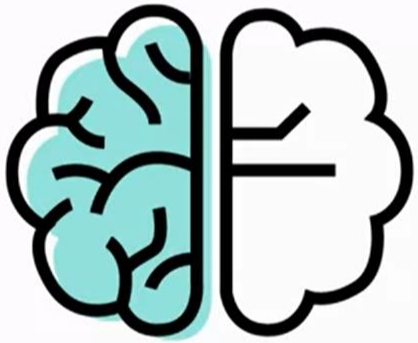


AI speech-to-text technology



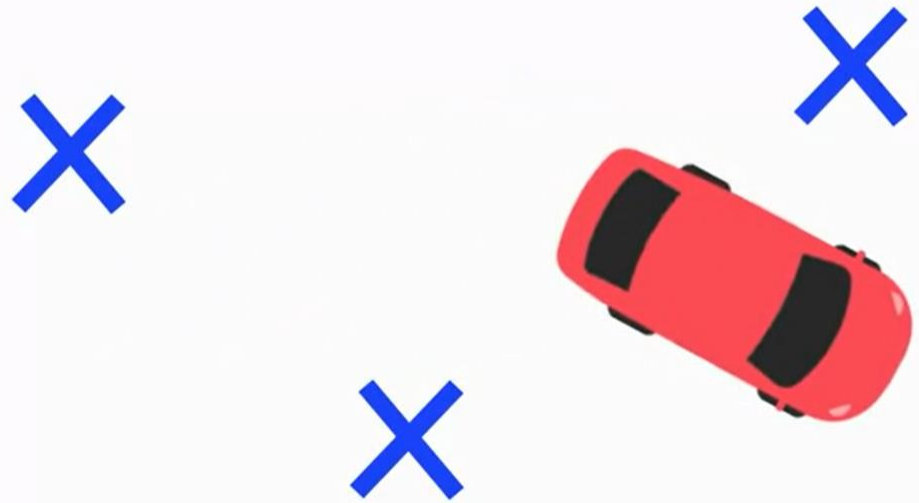
Advances in speech synthesis

Computer Vision

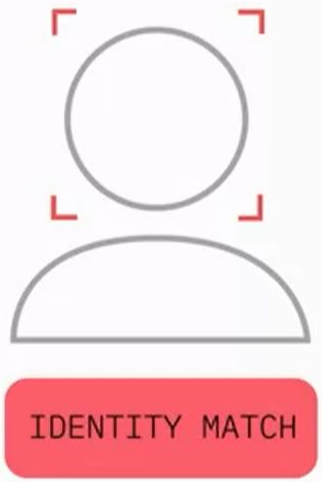


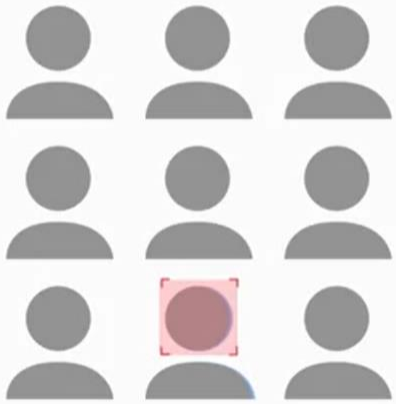
Advances in AI

Computer Vision



Computer Vision

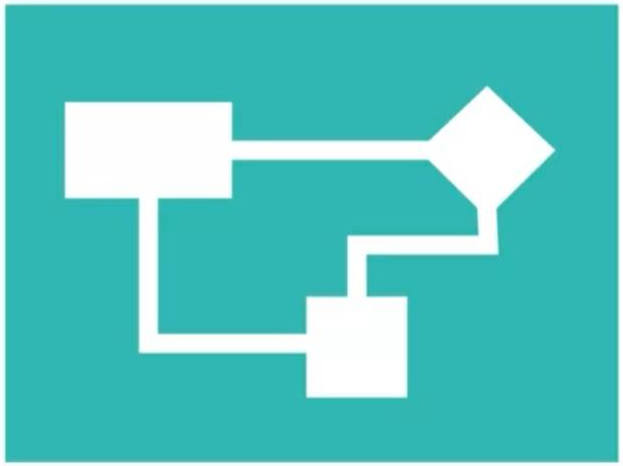




Computer Vision

facial recognition, social media apps to detect and tag users, and law enforcement agencies to identify criminals in video feeds

Computer Vision



Helps automate tasks such as:

Detecting cancerous moles in skin images

Finding symptoms in X-ray and MRI scans

AI is impacting the quality of our lives on a daily basis

AI is impacting the quality of our lives on a daily basis

Detecting fradulent transactions

Identifying credit card fraud

Preventing financial crimes

AI is impacting the quality of our lives on a daily basis

Helping doctors arrive at more accurate preliminary diagnoses

Reading medical imaging

Finding appropriate clinical trials for patients

Making operational processes less expensive

AI is impacting the quality of our lives on a daily basis

AI has the potential to:

Access enormous amounts of information

Imitate humans

Make recommendations

Correlate data

Much more

Quiz 5

- Which of the following are applications of Computer Vision?

  A. Detecting fraudulent transactions

  B. On-demand online tutors

  C. Self-driving cars

  D. Finding symptoms in X-Ray and MRI scans

Quiz 6

- Advances in speech-to-text technology are the reason speech-impaired patients are able to speak in their own voice.

  A. TRUE

  B. FALSE

AI Innovations: Personal robots

Source: https://www.youtube.com/watch?v=QdQL11uWWcI

AI Innovations: Humanoid robots

Source: https://www.youtube.com/watch?v=9DaTZQxg21U

AI Innovations: Deep Blue – AlphaGo

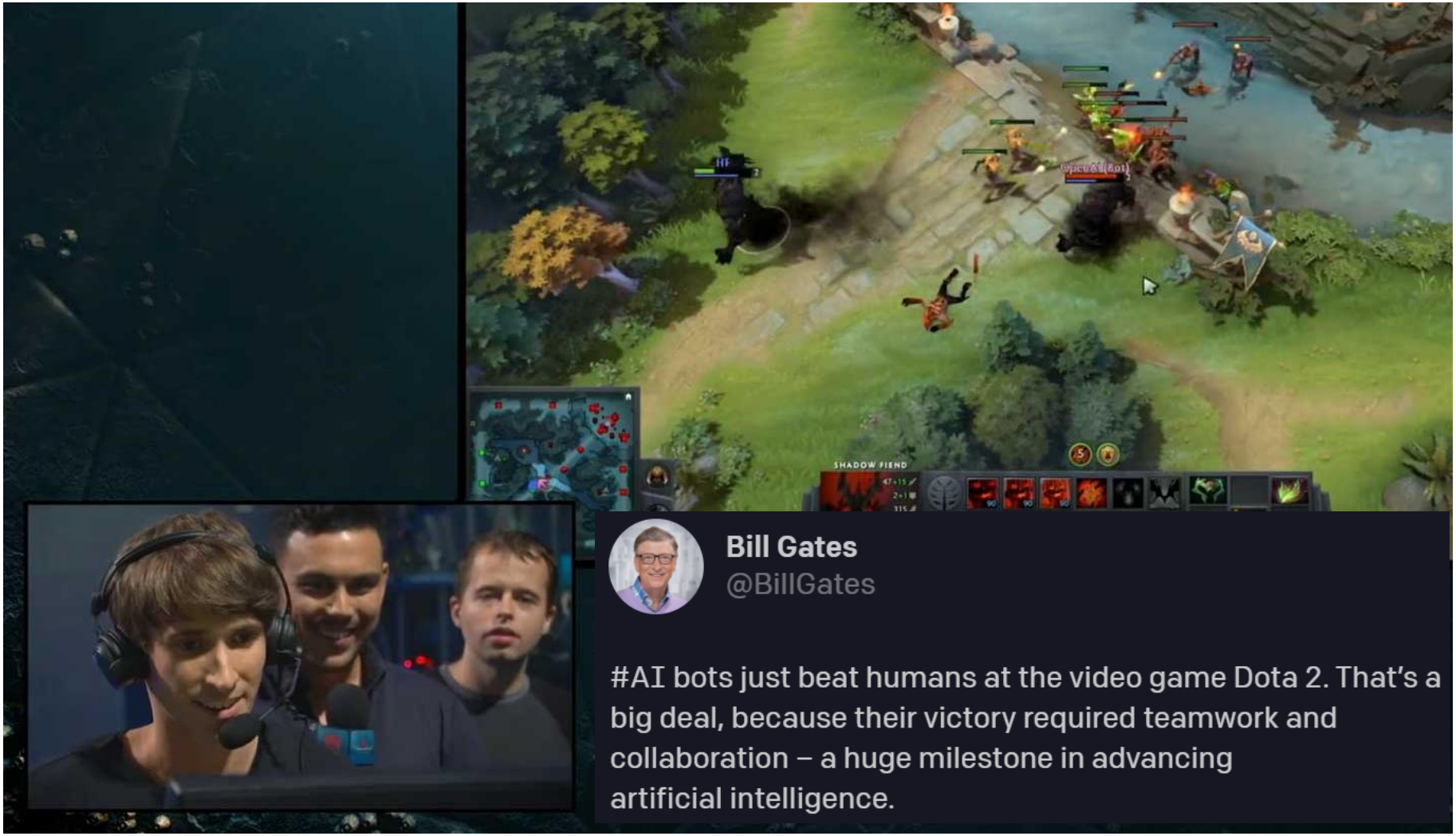
Deep Blue vs. Kasparov
(02/1996 and 05/1997)

AlphaGo vs. Lee Sedol
(03/2016)

The complexity of Chess and GO

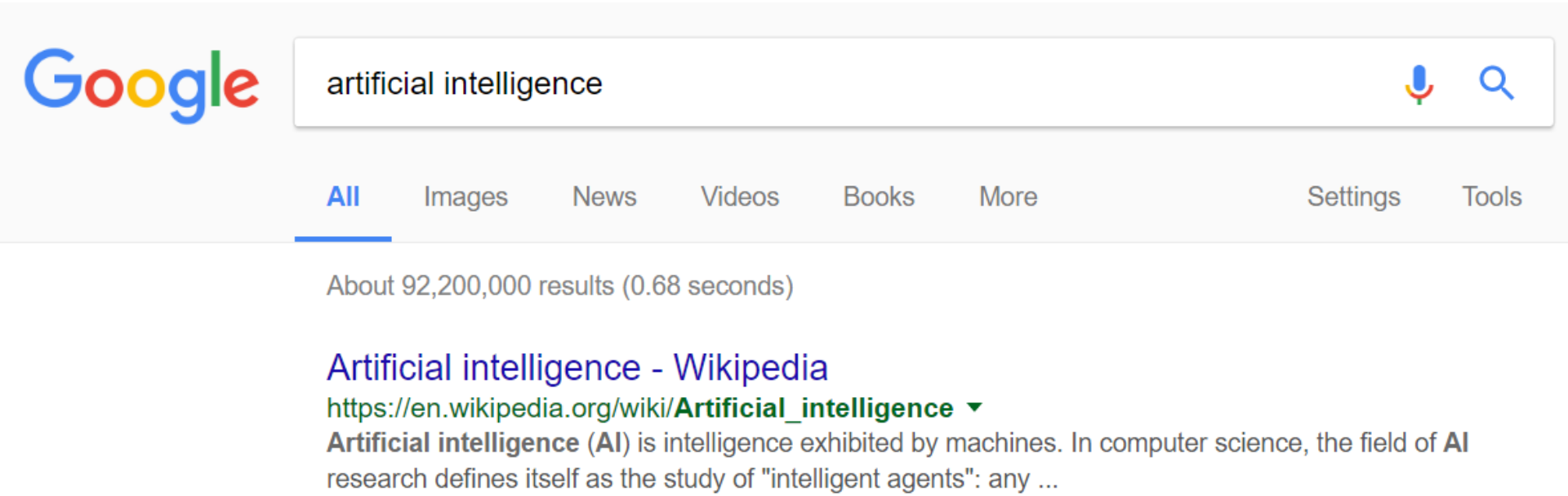
Source: https://www.youtube.com/watch?v=SUbqykXVx0A

AI Innovations: OpenAI Five



Source: https://openai.com/projects/five/

Ví dụ về ứng dụng của AI: tìm kiếm

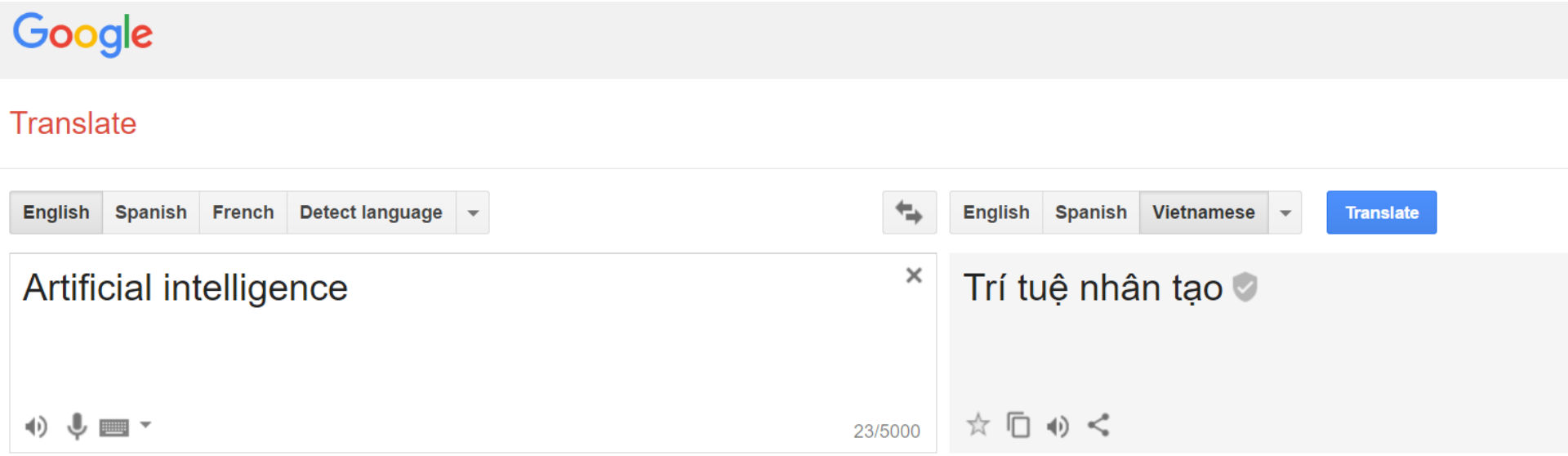


Ví dụ về ứng dụng của AI: lọc spam email

Ví dụ về ứng dụng của AI: hiểu tiếng nói

Nguồn: http://www.scmp.com/magazines/post-magazine/article/1925784/why-baidus-breakthrough-speech-recognition-may-be-game

Ví dụ về ứng dụng của AI: dịch máy



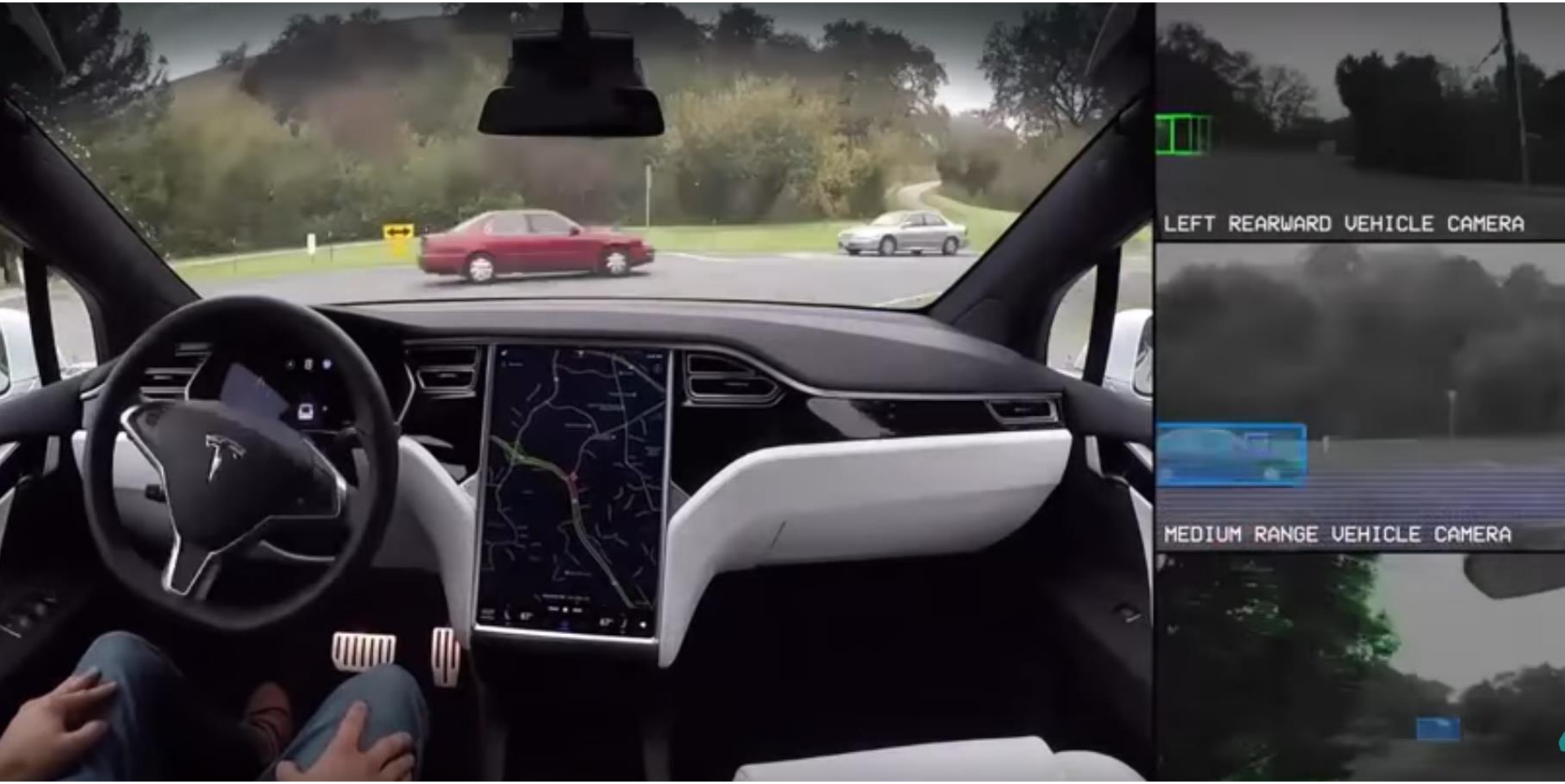
Real time translation

Ví dụ về ứng dụng của AI: hiểu hình ảnh

Nguồn: https://www.youtube.com/watch?v=Xe5RcJ1JY3c

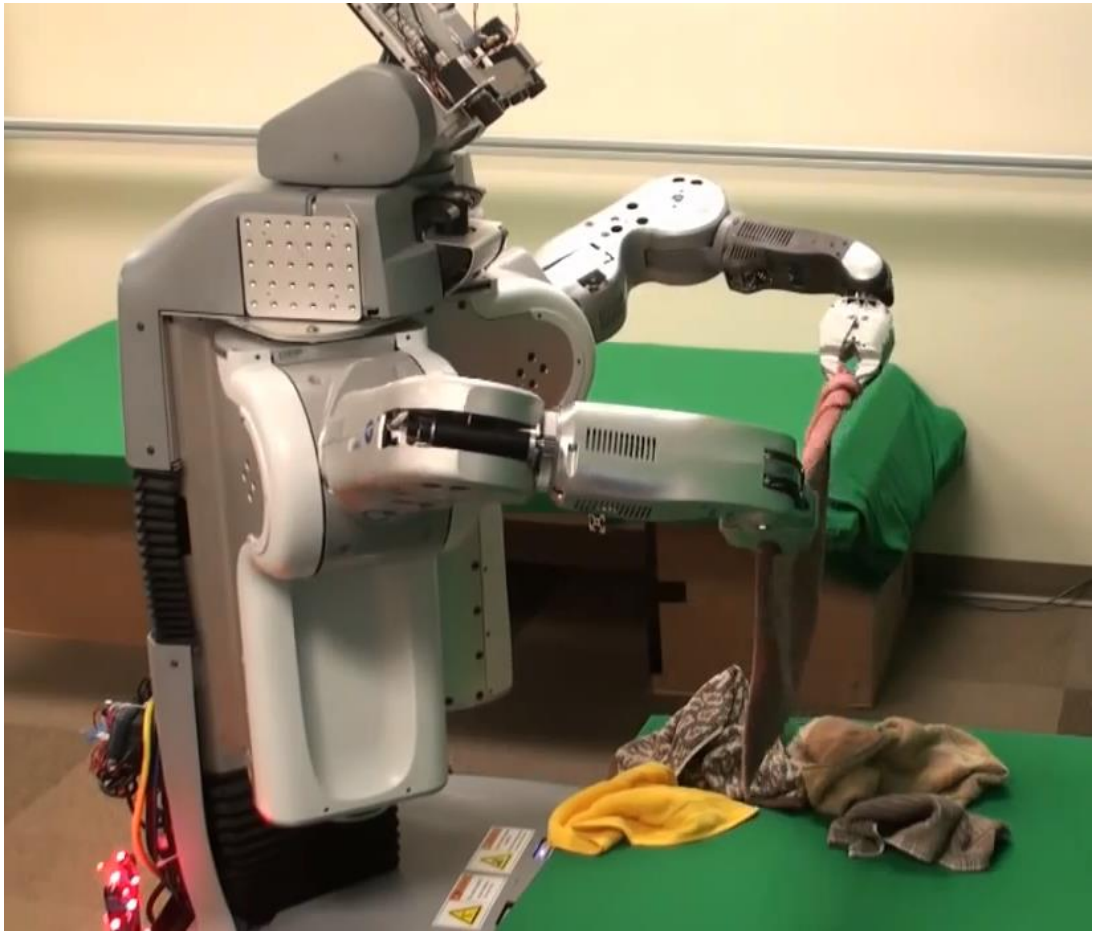
Hiểu Video

Ví dụ về ứng dụng của AI: xe tự lái



Nguồn: https://www.youtube.com/watch?v=KGctOXn-qlw

Ví dụ về ứng dụng của AI: làm việc nhà



Nguồn: https://www.youtube.com/watch?v=gy5g33S0Gzo

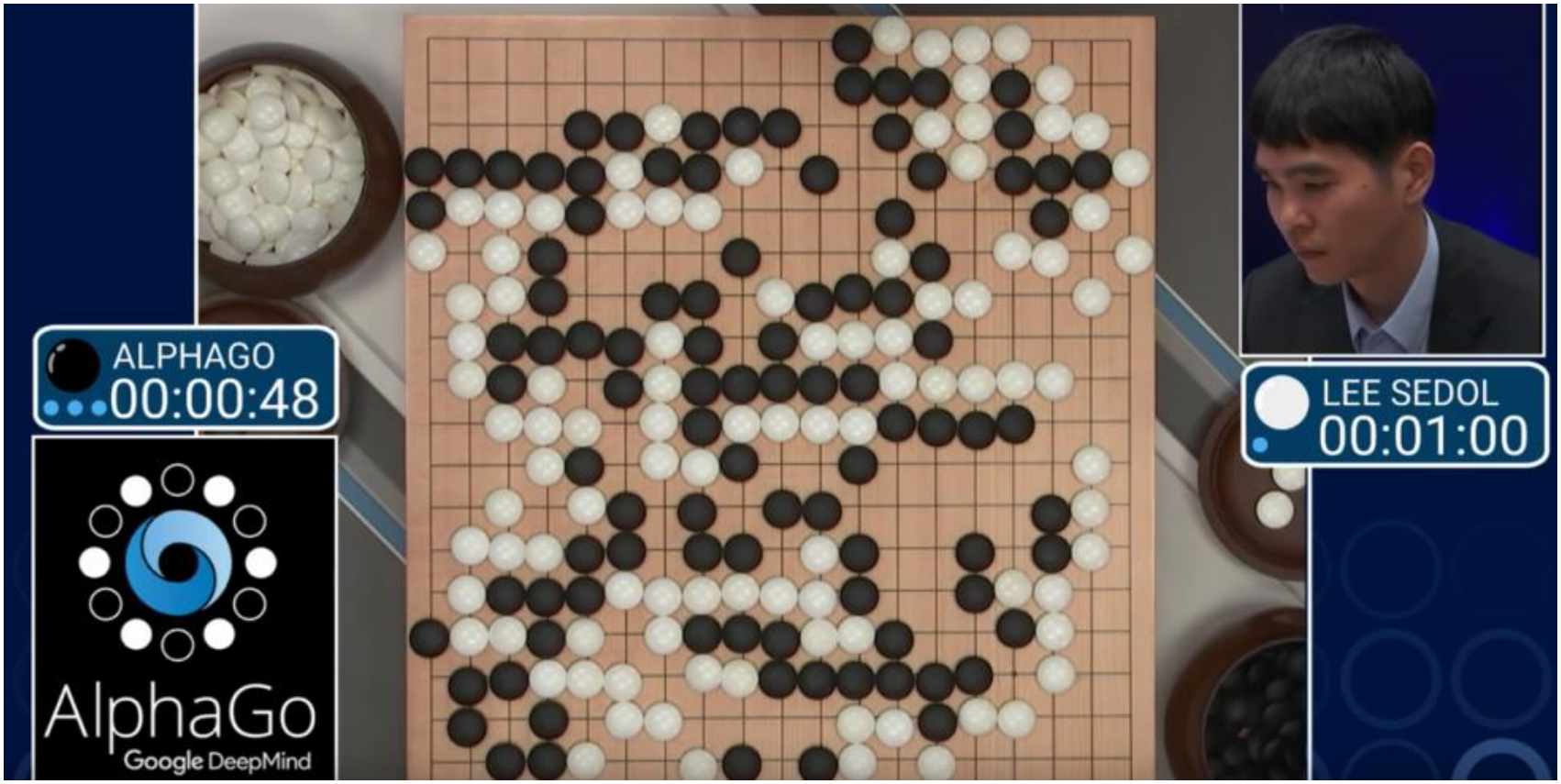

Cloth Grasp Point Detection
based on Multiple-View Geometric Cues
with Application to Robotic Towel Folding
Jeremy Maitin-Shepard
Marco Cusumano-Towner
Jinna Lei
Pieter Abbeel
Department of Electrical Engineering and Computer Science
University of California, Berkeley
International Conference on Robotics and Automation, 2010

Ví dụ về ứng dụng của AI: tự động chơi game

1996: Kasparov thắng Deep Blue
Kasparov: “I could feel --- I could smell --- a new kind of intelligence across the table.”

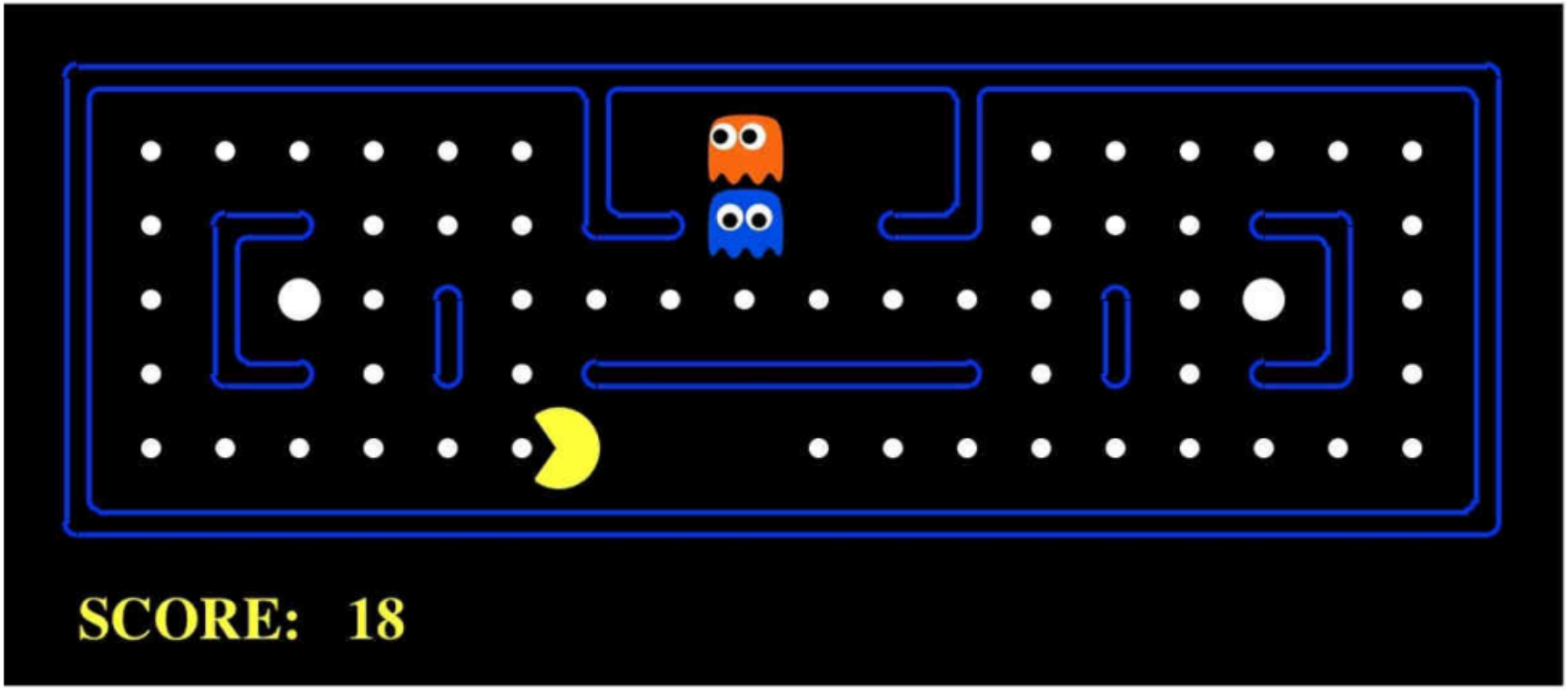
1997: Deep Blue thắng Kasparov
Kasparov: “Deep Blue hasn't proven anything.”

Ví dụ về ứng dụng của AI: tự động chơi game



2016: AlphaGo thắng Lee Sedol với tỉ số 3-1

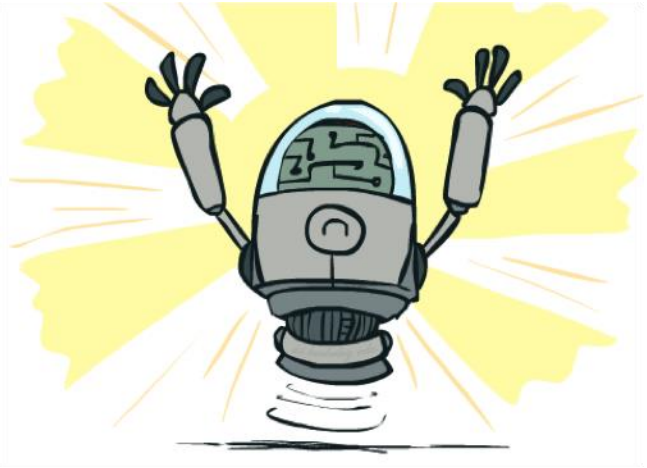
Ví dụ về ứng dụng của AI: chơi game Pacman



Nguồn ảnh: UC Berkely. CS188 Intro to AI

AI Có thể làm gì?

Câu hỏi: Hiện tại AI có thể làm được các tác vụ sau hay không?



- Chơi bóng bàn?
- Lái xe dọc theo một con đường núi?
- Lái xe trên đường ở TPHCM?
- Mua hàng theo yêu cầu trên web?
- Mua hàng theo yêu cầu tại siêu thị?
- Khám phá và chứng minh một định lý toán học mới?
- Trò truyện với một người trong 1 giờ?
- Thực hiện phẫu thuật?
- Cất chén dĩa và gấp quần áo?
- Phiên dịch đoạn đối thoại từ tiếng Trung sang tiếng Anh trong thời gian thực?
- Viết một câu truyện cười?

AI Có thể làm gì?

Câu hỏi: Hiện tại AI có thể làm được các tác vụ sau hay không?

- ✓ Chơi bóng bàn?
- ✓ Lái xe dọc theo một con đường núi?
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- ✓ Phiên dịch đoạn đối thoại từ tiếng Trung sang tiếng Anh trong thời gian thực?
- ✗ Viết một câu truyện cười?

Quiz – What is AI?

1. Spreadsheet that calculates sums and other pre-defined functions on given data
2. Predicting the stock market by fitting a curve to past data about stock prices
3. A GPS navigation system for finding the fastest route
4. A music recommendation system such as Spotify that suggests music based on the users' listening behavior
5. Big data storage solutions that can store huge amounts of data (such as images or video) and stream them to many users at the same time
6. Photo editing features such as brightness and contrast in applications such as Photoshop
7. Style transfer filters in applications such as Prisma that take a photo and transform it into different art styles (impressionist, cubist, ...)

Quiz – What is AI?

1. Spreadsheet that calculates sums and other pre-defined functions on given data **NO**
2. Predicting the stock market by fitting a curve to past data about stock prices **YES**
3. A GPS navigation system for finding the fastest route **YES**
4. A music recommendation system such as Spotify that suggests music based on the users' listening behavior **YES**
5. Big data storage solutions that can store huge amounts of data (such as images or video) and stream them to many users at the same time **NO**
6. Photo editing features such as brightness and contrast in applications such as Photoshop **NO**
7. Style transfer filters in applications such as Prisma that take a photo and transform it into different art styles (impressionist, cubist, ...) **YES**

Quiz – What is AI?

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Lập trình hệ thống vs AI

Lập trình hệ thống	***Lập trình A.I***
• Dữ liệu + Thuật toán = Chương trình. • Xử lý dữ liệu. • Dữ liệu trong bộ nhớ được đánh địa chỉ số • Xử lý theo các thuật toán. • Định hướng xử lý các đại lượng định lượng số. • Xử lý tuần tự theo mẻ. • Không giải thích trong quá trình thực hiện. • Kết quả chính xác, không được mắc lỗi.	• Tri thức + Điều khiển =Chương trình. • Xử lý dữ liệu định tính(các ký hiệu tượng trưng). • Xử lý dựa trên tri thức cho phép dùng các thuật giải heuristic, các cơ chế suy diễn. • Tri thức được cấu trúc hoá, để trong bộ nhớ làm việc theo ký hiệu. • Định hướng xử lý các đại lượng định tính (logic), các ký hiệu tượng trưng và danh sách. • Xử lý theo chế độ tương tác (hội thoại ngôn ngữ tự nhiên). • Có giải thích hành vi của hệ thống trong quá trình thực hiện. • Kết quả tốt, cho phép mắc lỗi.