

PAT 498/598 (Winter 2025)

Music & AI

Lecture 2: What is AI?

Instructor: Hao-Wen Dong



SCHOOL OF MUSIC, THEATRE & DANCE
PERFORMING ARTS TECHNOLOGY
UNIVERSITY OF MICHIGAN

Communications

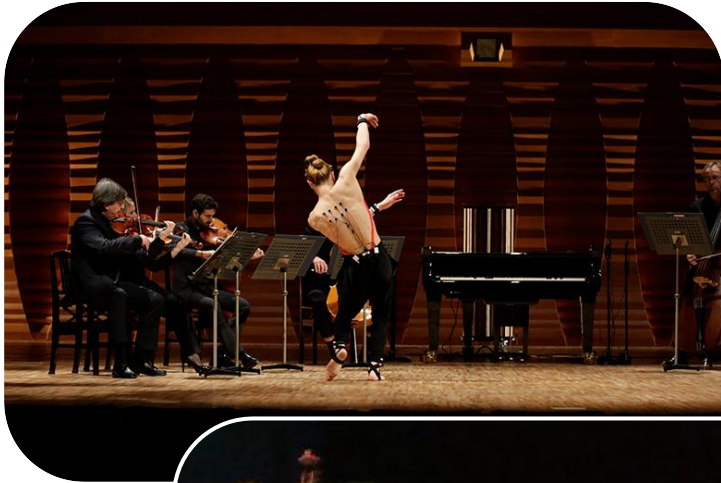
- **Course website:** Syllabus, schedule, readings, recordings, etc.
- **Email:** Announcements
- **Google Chat:** Q&A



[hermandong.com/teaching/
pat498_598_winter2025](https://hermandong.com/teaching/pat498_598_winter2025)

(Recap) Music & AI

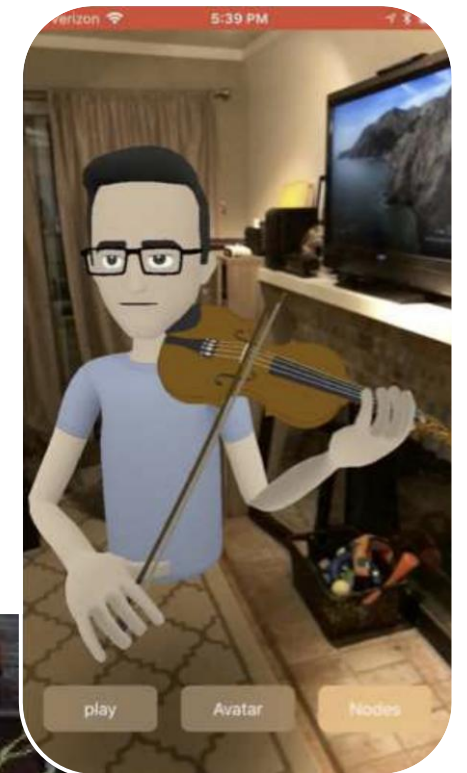
(Source: Yamaha)



(Source: Sankei Shimbun)



(Shlizerman et al., 2019)



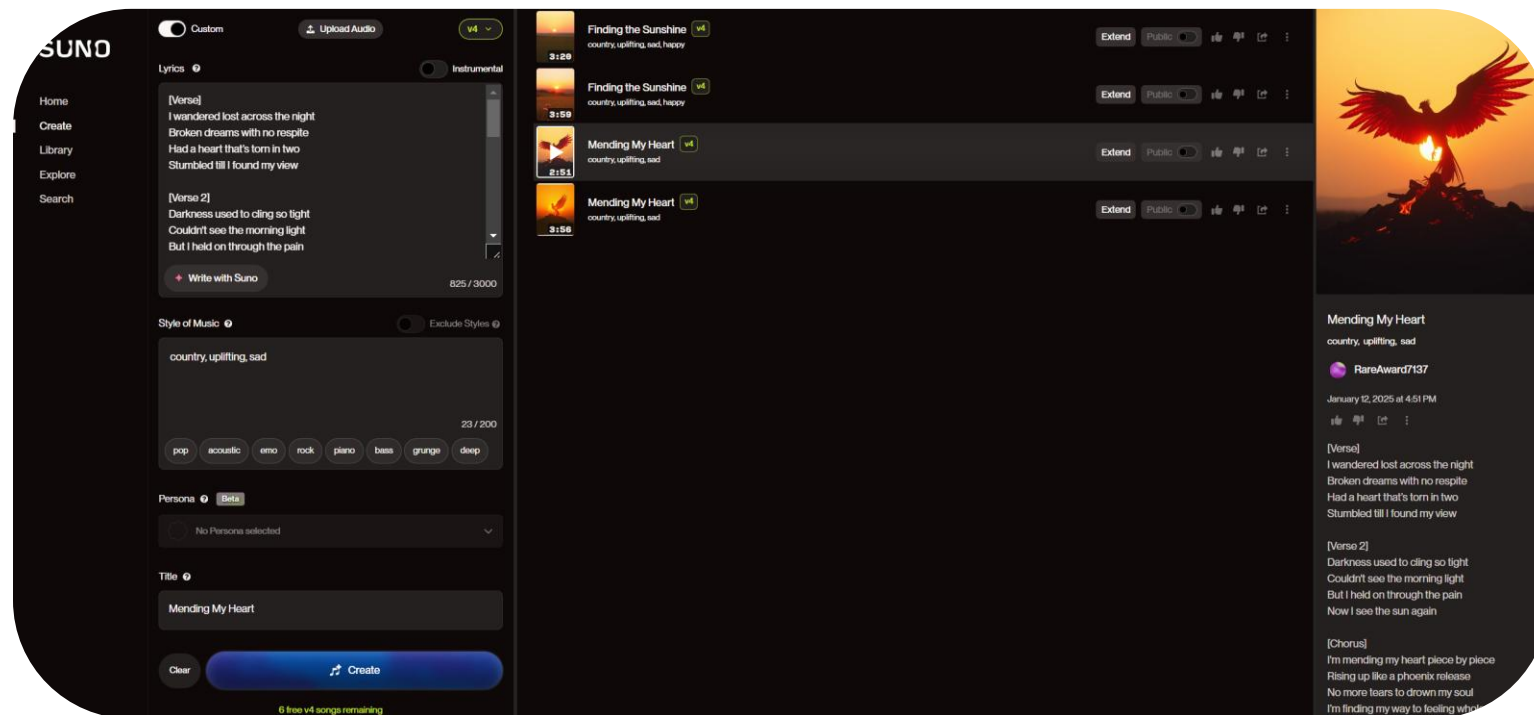
(Source: Robot Gizmos)



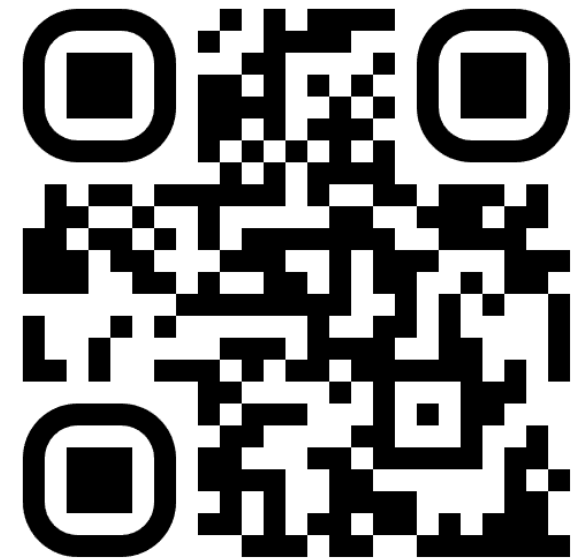
(Source: NBC DFW)

Shlizerman et al., "Audio to Body Dynamics," *Proc. CVPR*, 2018.
yamaha.com/en/news_release/2018/18013101/
sankei.com/article/20240113-CQCOSQHJWFIYPJJKZDCITRTRVI/
roboticgizmos.com/shimon-musical-robot-deep-learning/
nbcdfw.com/entertainment/the-scene/how-verdigris-ensemble-is-using-ai-to-create-a-new-concert-experience/3366031/

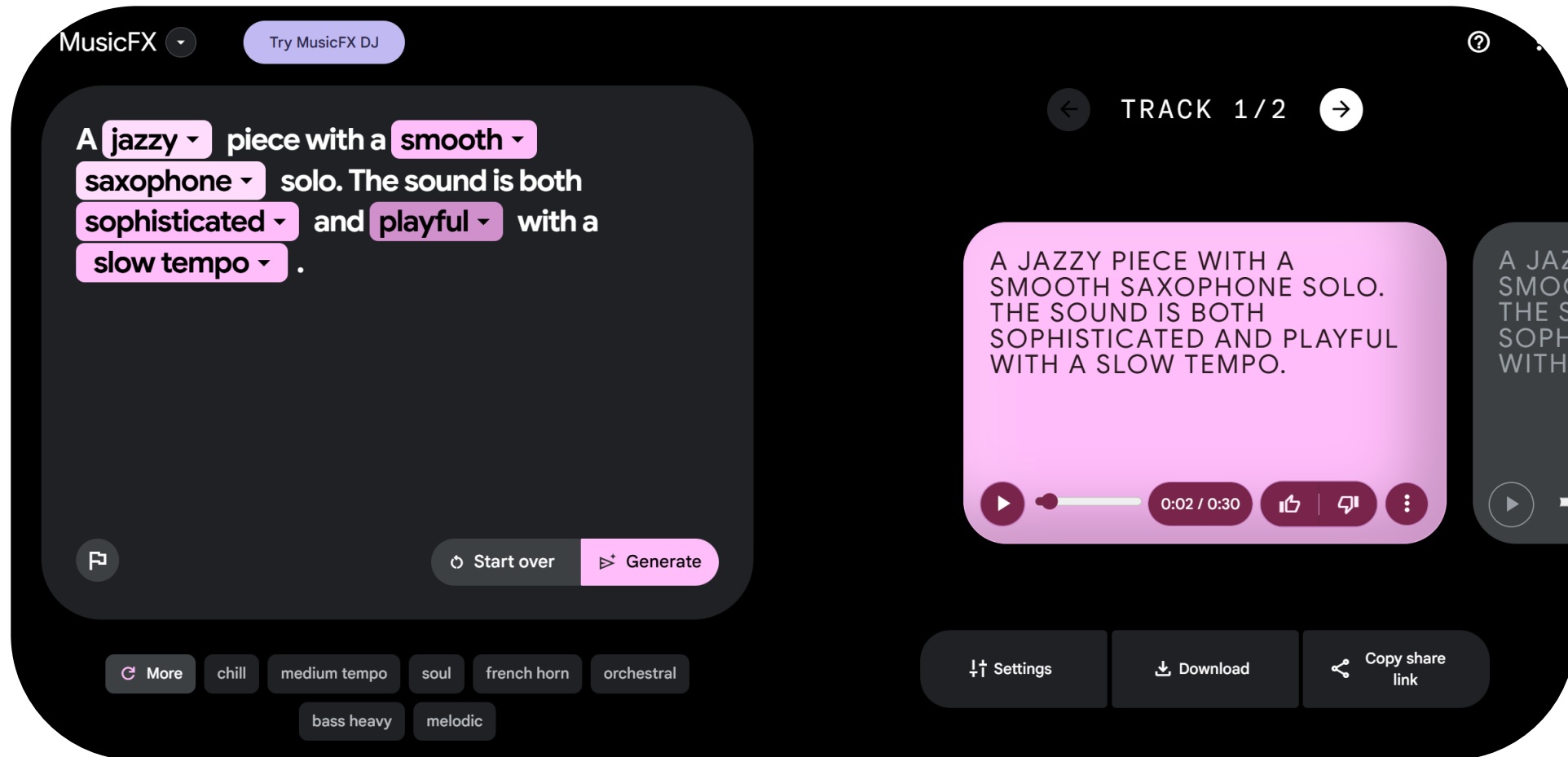
(Recap) Suno AI v4 (2024)



suno.com

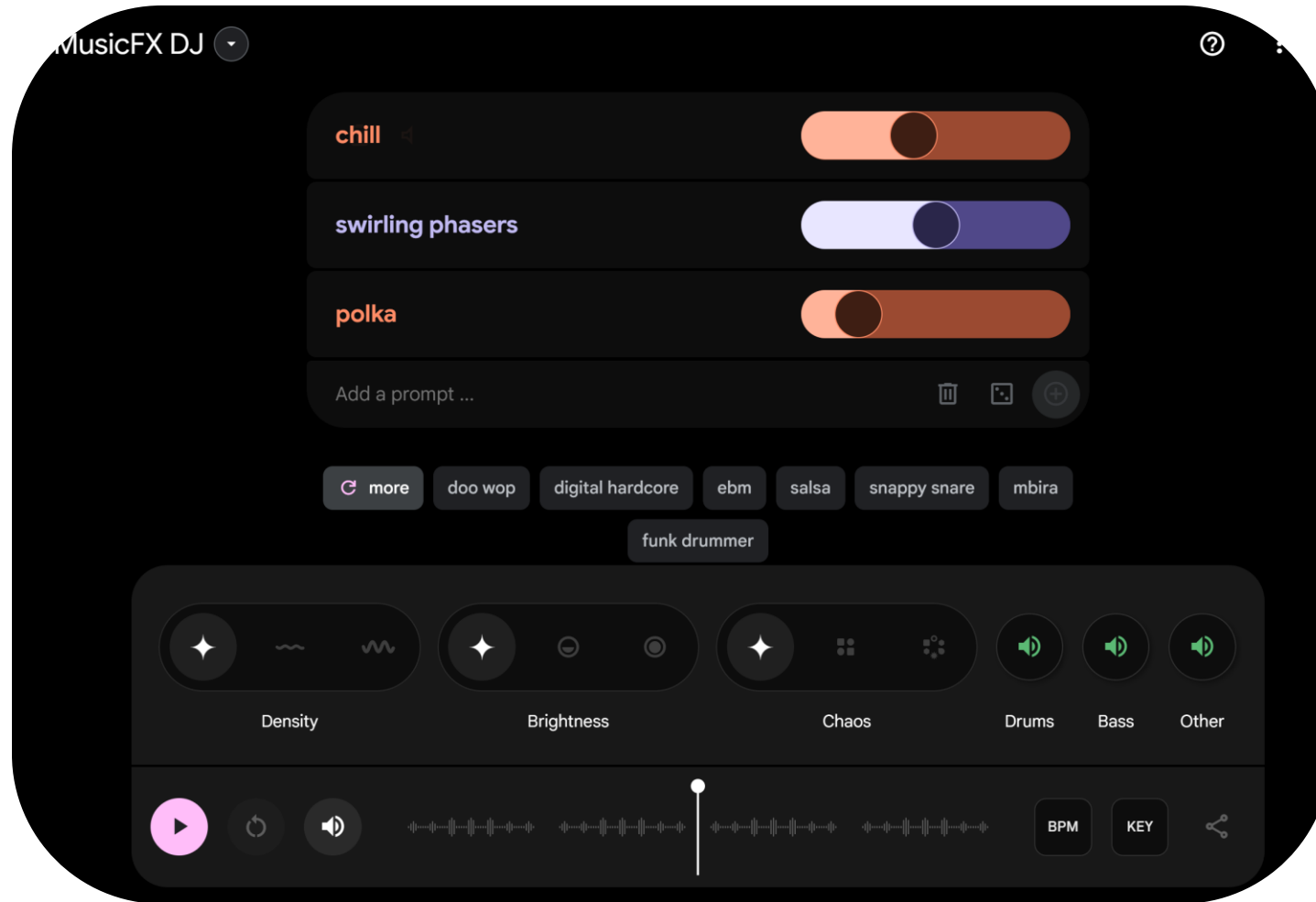


(Recap) Music FX (2024)



aitestkitchen.withgoogle.com/tools/music-fx

(Recap) Music FX DJ (2024)



aitestkitchen.withgoogle.com/tools/music-fx-dj

(Recap) Music FX DJ (2024)



youtube.com/live/IUQW5LgBZvQ

(Recap) MovieGen (2024)

Meta Movie Gen

Learn about the research for the most advanced media foundation AI models and see how Meta is partnering with creators and directors to enable immersive storytelling.



[ai.meta.com/research/
movie-gen/](https://ai.meta.com/research/movie-gen/)



What is Artificial Intelligence?

Can you? (I, Robot, 2004)



youtu.be/siHfHUm3HGE

What is Artificial Intelligence?

The exciting new effort to **make computers think ... *machines with minds***, in the full and literal sense (Haugeland, 1985)

The **automation of activities that we associate with human thinking**, activities such as decision-making, problem solving, learning ... (Bellman, 1978)

Systems that think like humans

The study of **mental faculties through the use of computational models** (Charniak & McDermott, 1985)

The study of the computations that **make it possible to perceive, reason, and act** (Winston, 1992)

Systems that think rationally

Systems that act like humans

The art of creating machines that **perform functions that require intelligence when performed by people** (Kurzweil, 1990)

The study of how to make computers **do things at which, at the moment, people are better** (Rich & Knight, 1991)

Systems that act rationally

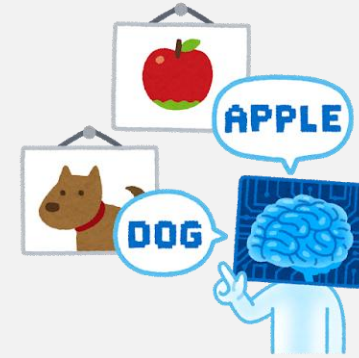
A field of study that seeks to **explain and emulate intelligent behavior in terms of computational processes** (Schalkoff, 1990)

The branch of computer science that is concerned with the **automation of intelligent behavior** (Luger & Stubblefield, 1993)

What is Artificial Intelligence?



Systems that **think like humans**

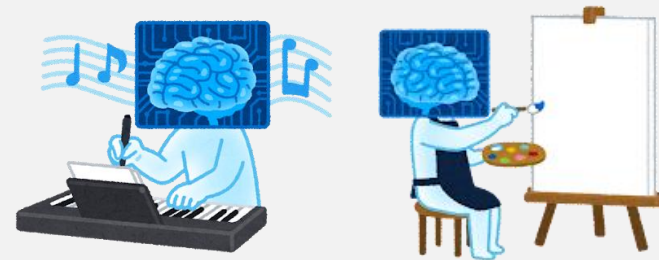


Systems that **think rationally**

Systems that **act like humans**

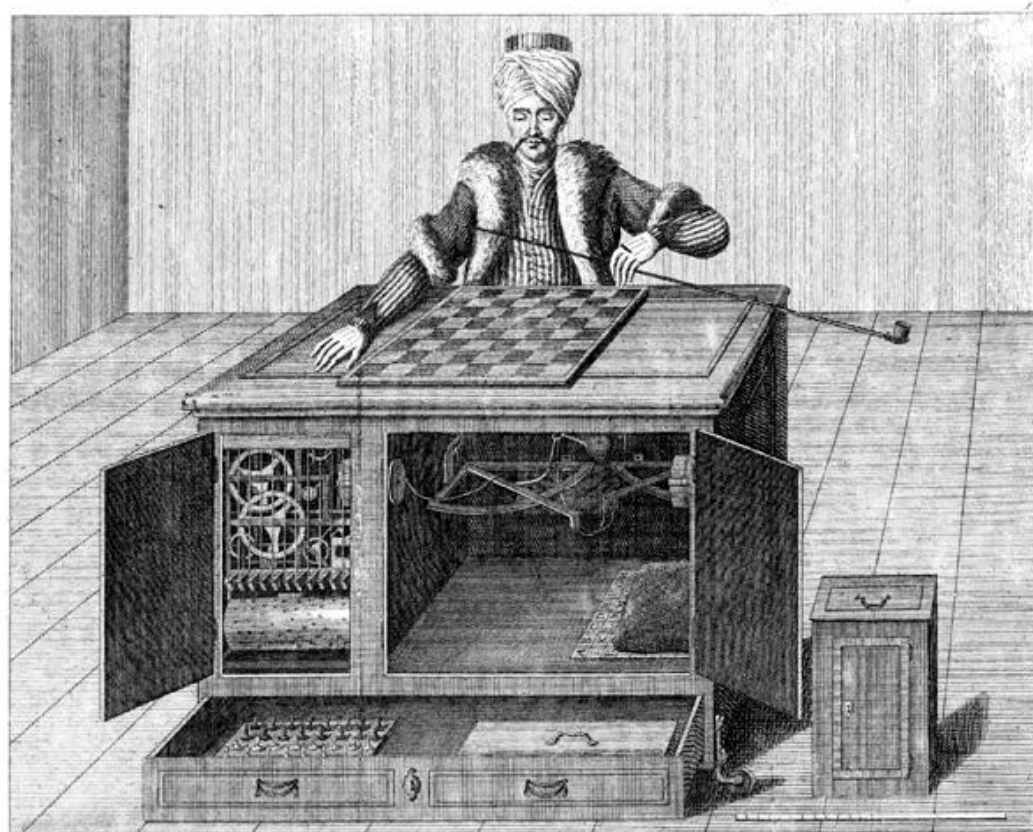


Systems that **act rationally**



Thinking vs Acting

Thinking vs Acting: **The Turk** (1770)



W. de Kempelen del. Ch. a Mehel, excud. Basilea. P. G. Pintz, fecit.
Der Schachspieler, wie er vor dem Spiel gezeiget wird, vor dem Le. Souver. d. Checs, tel qu'on le montre avant le jeu, par devant.

(Source: Wikimedia)



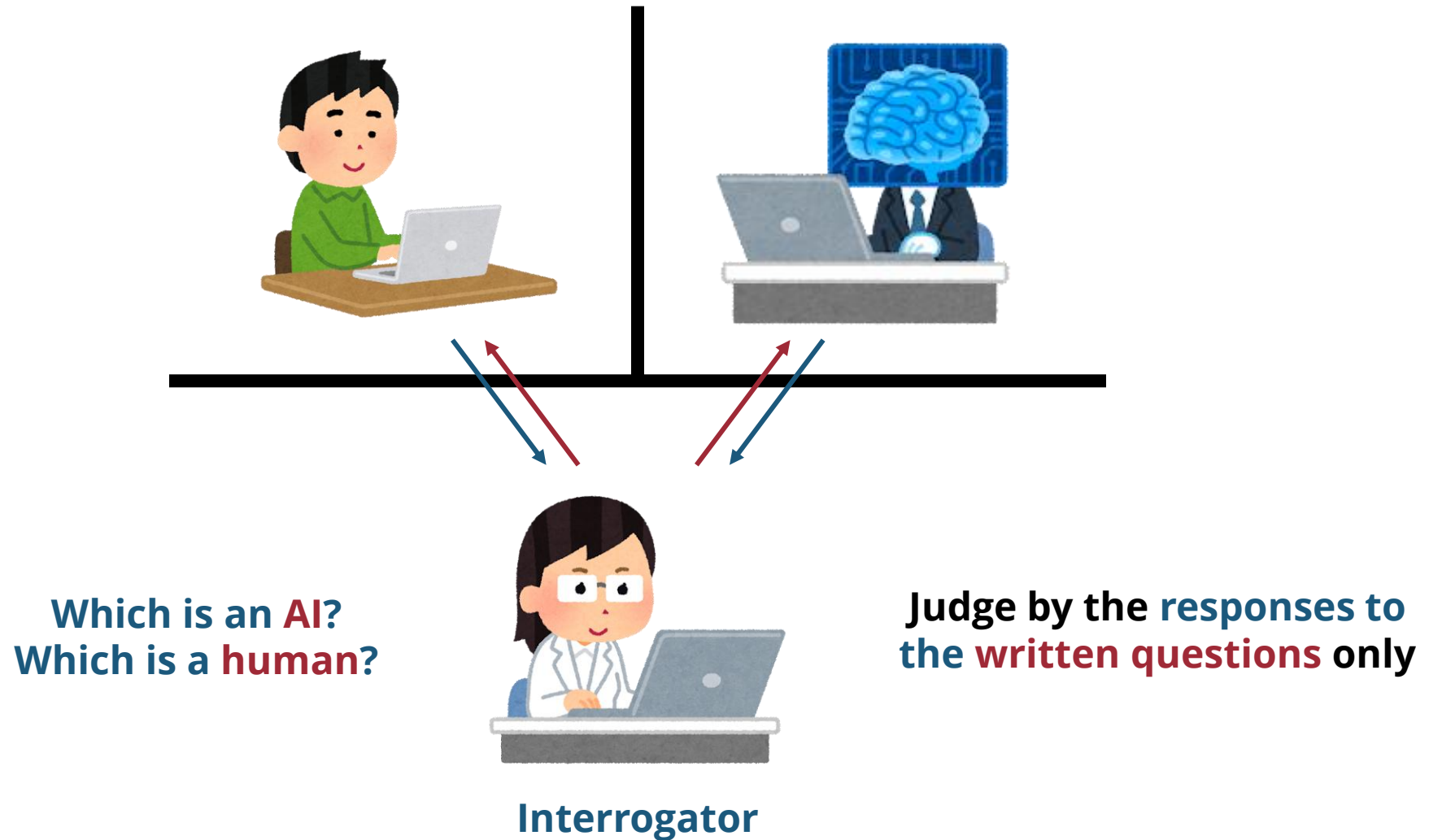
youtu.be/7W_kQsO6MPc

Thinking vs Acting: **The Turk** (1770)



youtu.be/Xosn4ManeD4

Thinking vs Acting: Turing Test (1950)



Thinking vs Acting: The Chinese Room (1980)

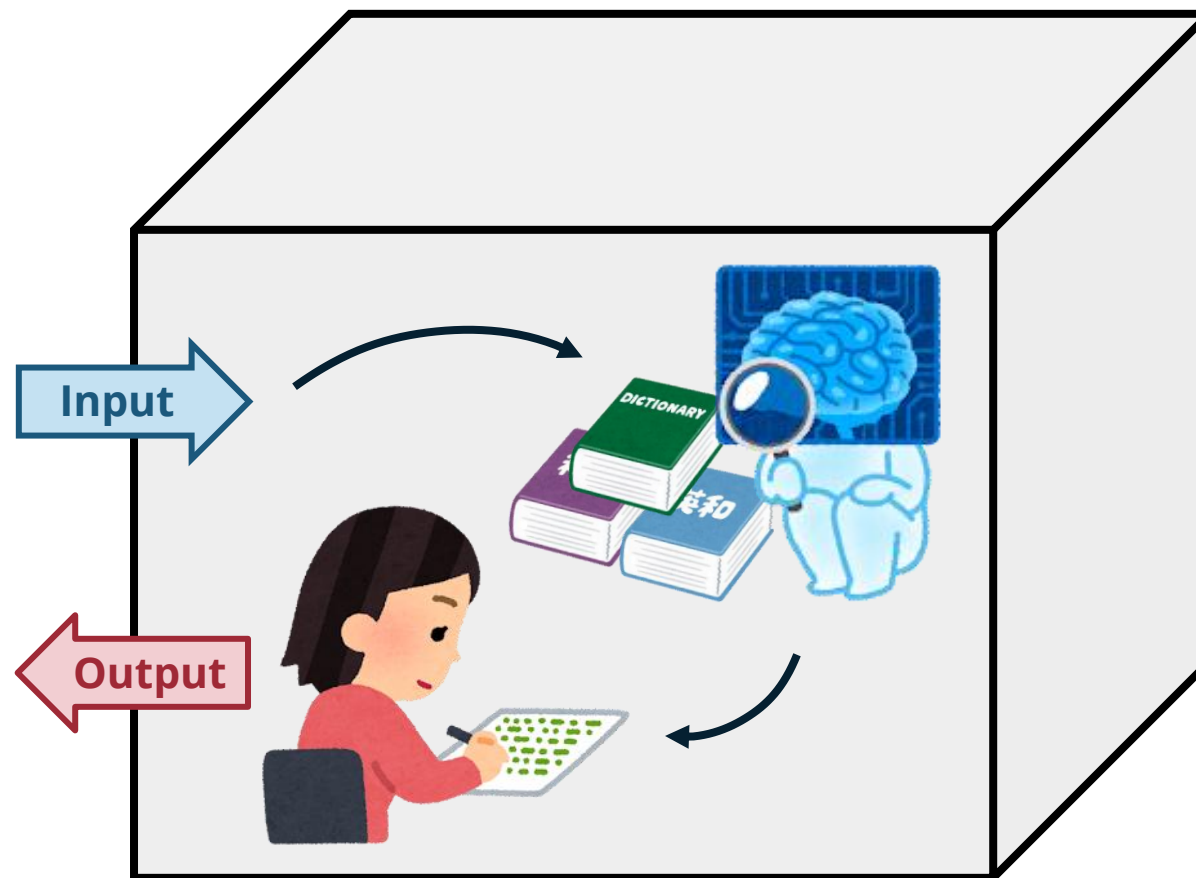
你會說中文嗎？
(Do you speak Chinese?)

會哦，我中文很流利！
(Yep, I speak fluent Chinese!)

你知道人工智慧是什麼嗎？
(Do you know what AI is?)

不知道耶，人工智慧是什麼？
(I don't know. What is AI?)

⋮



Is this considered intelligence?

Thinking vs Acting: The Chinese Room (1980)

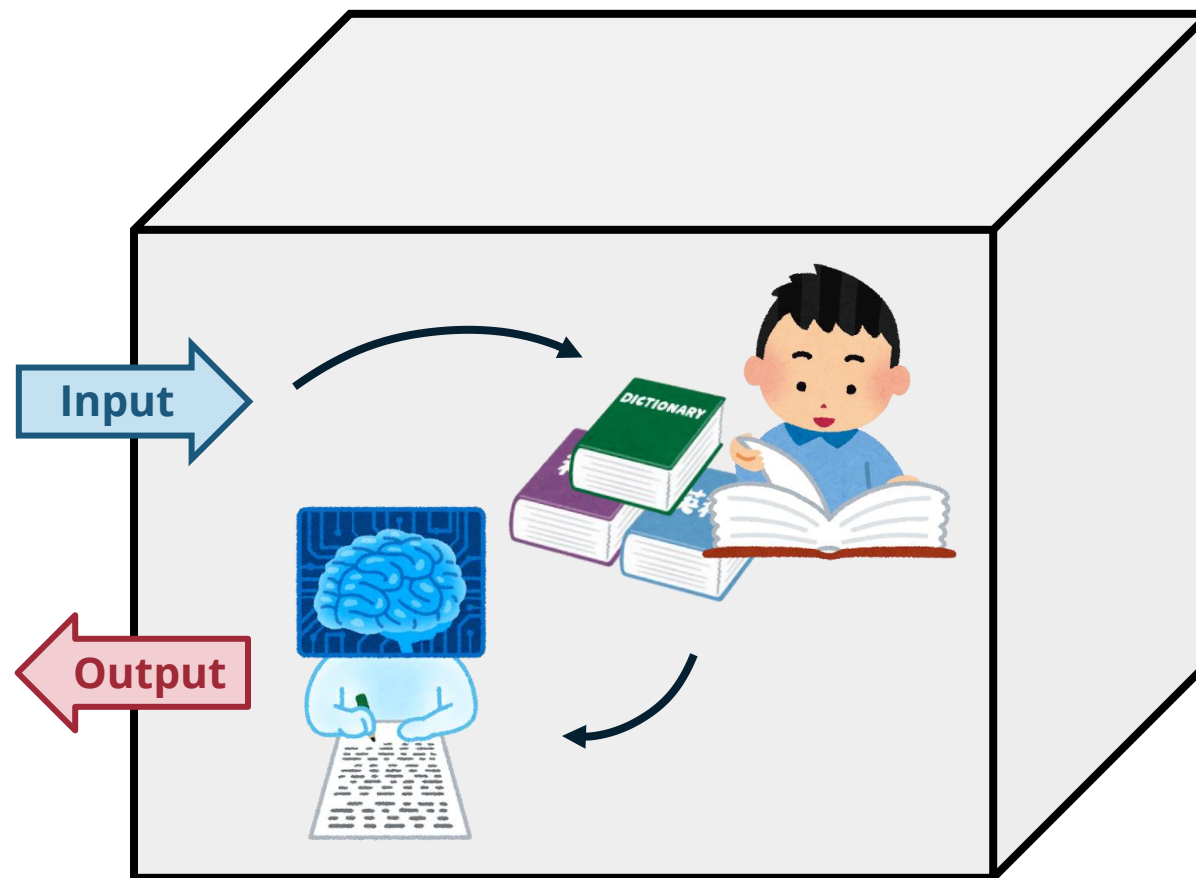
你會說中文嗎？
(Do you speak Chinese?)

會哦，我中文很流利！
(Yep, I speak fluent Chinese!)

你知道人工智慧是什麼嗎？
(Do you know what AI is?)

不知道耶，人工智慧是什麼？
(I don't know. What is AI?)


⋮




Isn't this like the **Turk**?

Human vs AI

Can you? (I, Robot, 2004)



Can a robot write a Symphony?



Can a robot take a blank canvas
and turn it into a masterpiece?

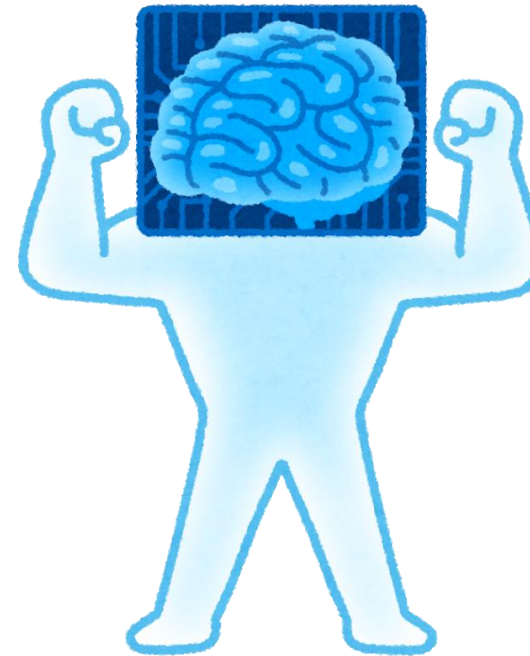


Can you?

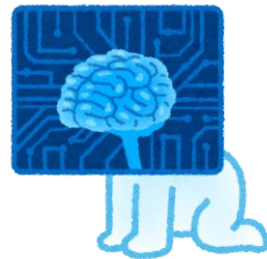
Human vs AI: Weak AI vs Strong AI

Artificial General Intelligence (AGI)

Reaches human-level intelligence
Have a self-aware consciousness
Solve multiple tasks
Can learn and plan



Performs a single task
Cannot learn from experience
Cannot reason



Human vs AI: The Many AGI Tests

- **The Coffee Test** (Steve Wozniak, 2010)
 - Can the AI **make a cup of coffee** after entering an average home: find the coffee machine and coffee, add water, find a mug, and brew the coffee by pushing the proper buttons?
- **The Robot College Student Test** (Ben Goertzel, 2012)
 - Can the AI enroll in a university, **take classes like humans**, and **earn its degree**?
- **The IKEA Test** (Gary Marcus, 2015)
 - Can the AI control a robot to **assemble an IKEA furniture** correctly by reading the instructions?
- **The Modern Turing Test** (Mustafa Suleyman, 2023)
 - Can the AI **make \$1M** on a retail web platform in a few months with a **\$100K investment**?

Victoria Turk, "The Plan to Replace the Turing Test with a 'Turing Olympics'," *VICE*, January 28, 2015.

Ben Goertzel, "What counts as a conscious thinking machine?," *New Scientist*, September 5, 2012

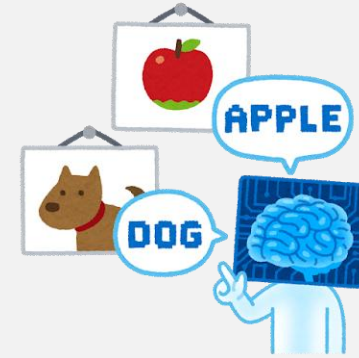
Michael Shick, "Wozniak: Could a Computer Make a Cup of Coffee?," *Fast Company*, March 3, 2010.

Mustafa Suleyman, "Mustafa Suleyman: My new Turing test would see if AI can make \$1 million," *MIT Technology Review*, July 14, 2023.

What is Artificial Intelligence?



Systems that **think like humans**

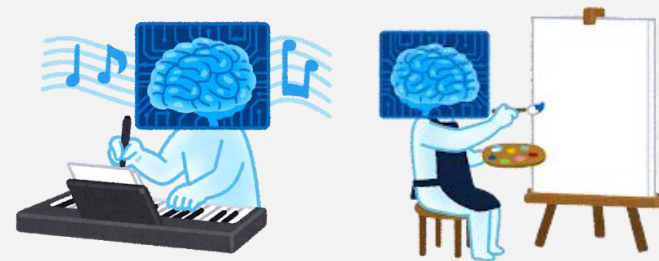


Systems that **think rationally**

Systems that **act like humans**



Systems that **act rationally**



Discussion: What is your expectation of a **Real AI**?

- **Thinking vs Acting**

- An AI **needs to know how to think (Votes: 10)**
- An AI **doesn't need to know how to think (Votes: 3)**

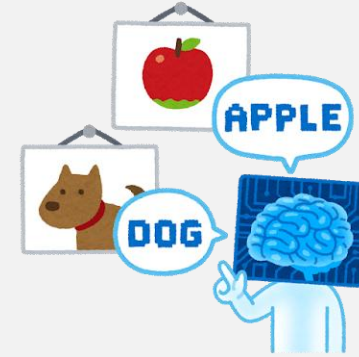
- **Human vs AI**

- An AI **needs to behave like a human (Votes: 0)**
- An AI **doesn't need to behave like a human (Votes: 13)**

What is Artificial Intelligence?



Systems that **think like humans**

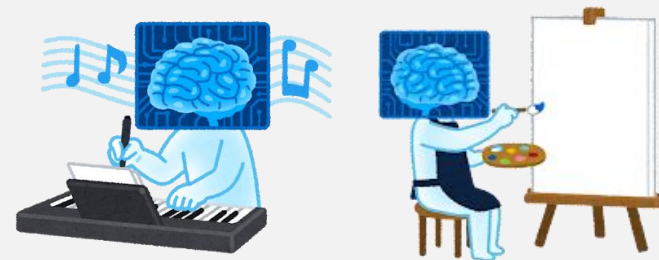


Systems that **think rationally**

Systems that **act like humans**



Systems that **act rationally**



What is Artificial Intelligence?

What is Artificial Intelligence?

AI is the study of how to make computers **do things at which, at the moment, people are better.**

– Elaine Rich and Kevin Knight, 1991

1997



(Source: Britannica)

2016



(Source: The Guardian)

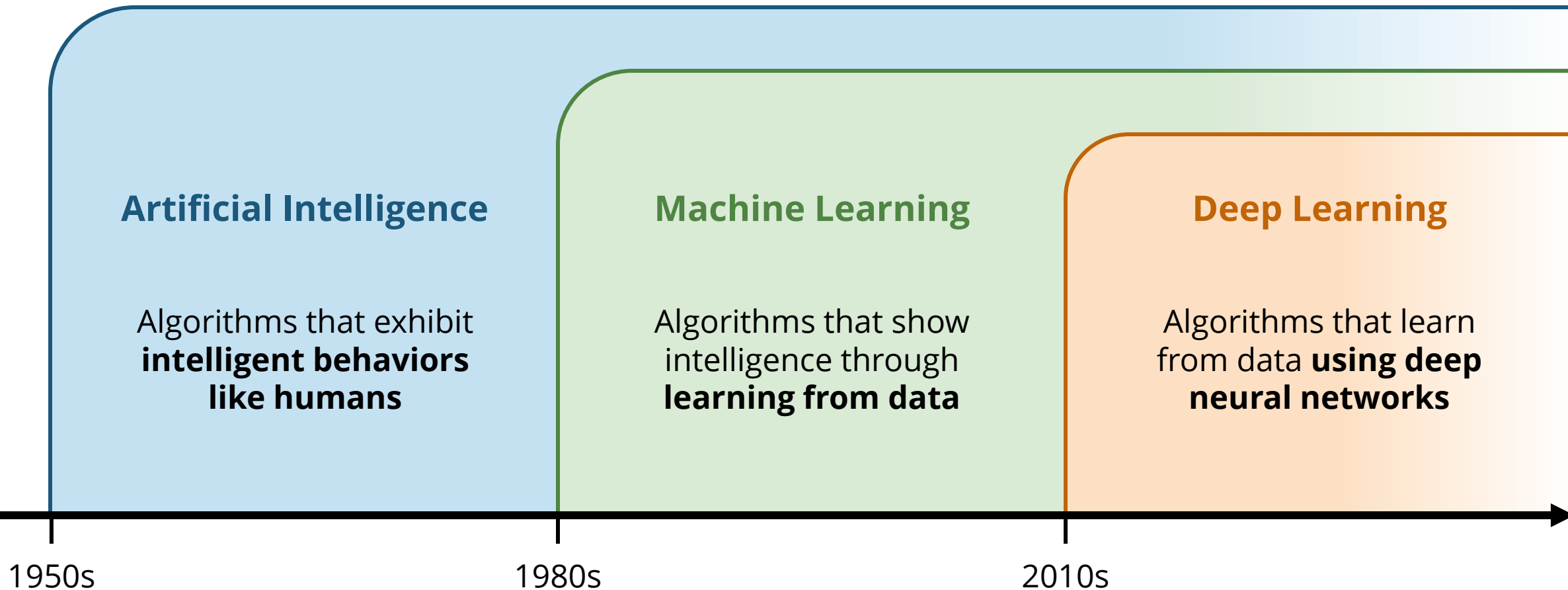
20??



(Source: SC2HL)

Elaine Rich and Kevin Knight, *Artificial Intelligence*. United Kingdom: McGraw-Hill, 1991.
britannica.com/topic/Deep-Blue
theguardian.com/technology/2016/mar/15/alphago-what-does-google-advanced-software-go-next
youtube.com/watch?v=PFMRDm_H9Sg

AI vs ML vs DL

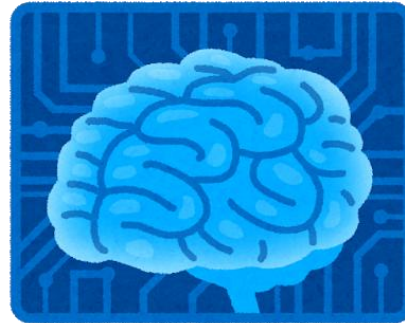


Building Blocks of Modern AI Systems



Data

×



Model

×



Use Case

Key difference from
traditional AI

Analytic AI vs Generative AI

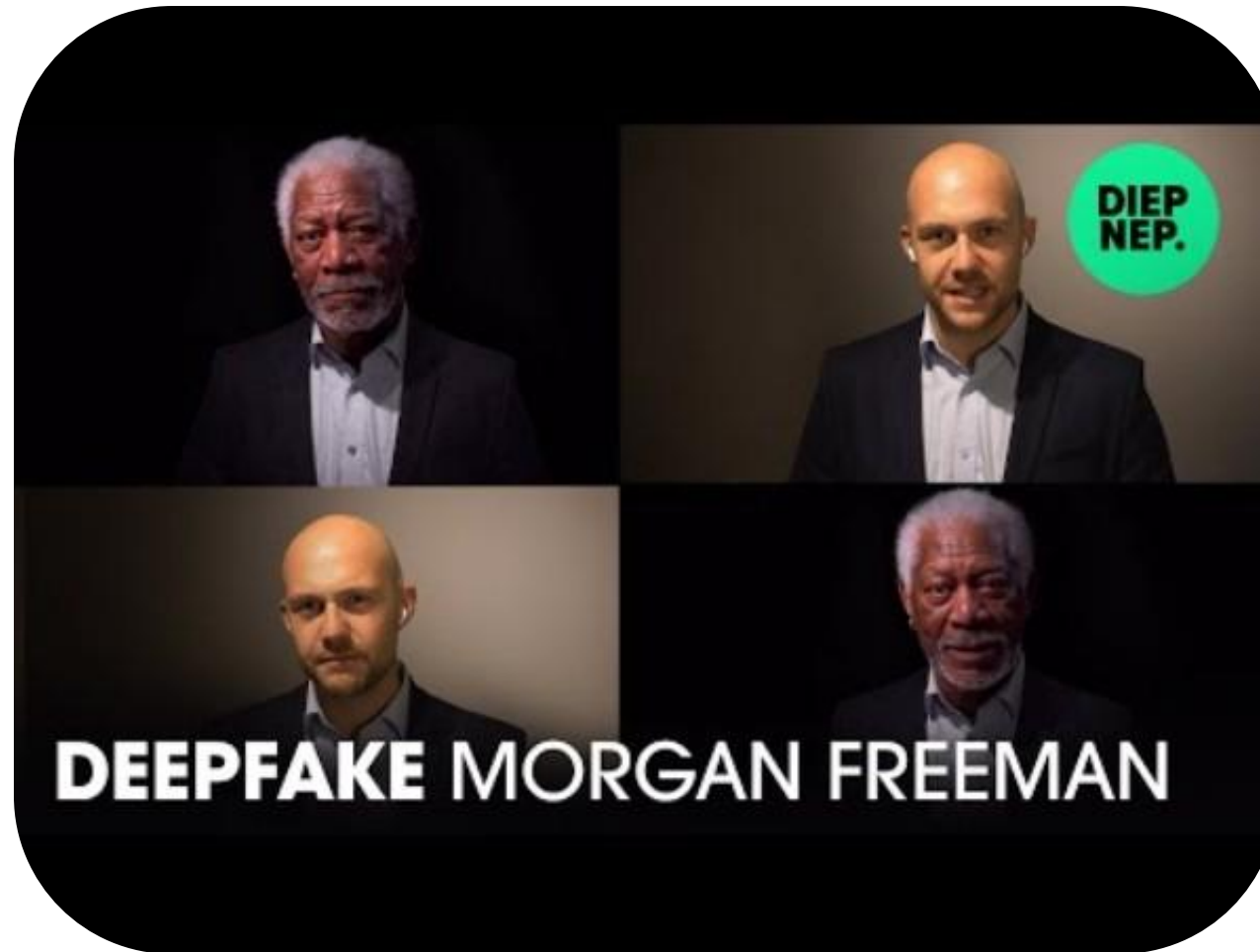


This is **NOT** Morgan Freeman (2021)



youtu.be/oxXpB9pSETo

This is **NOT** Morgan Freeman (2021)



youtu.be/F4G6GNFz0O8

Generative AI for Visual Arts



(Source: Cosmopolitan)

First Prize in Digital arts
at Colorado State Fair
Fine Arts Competition

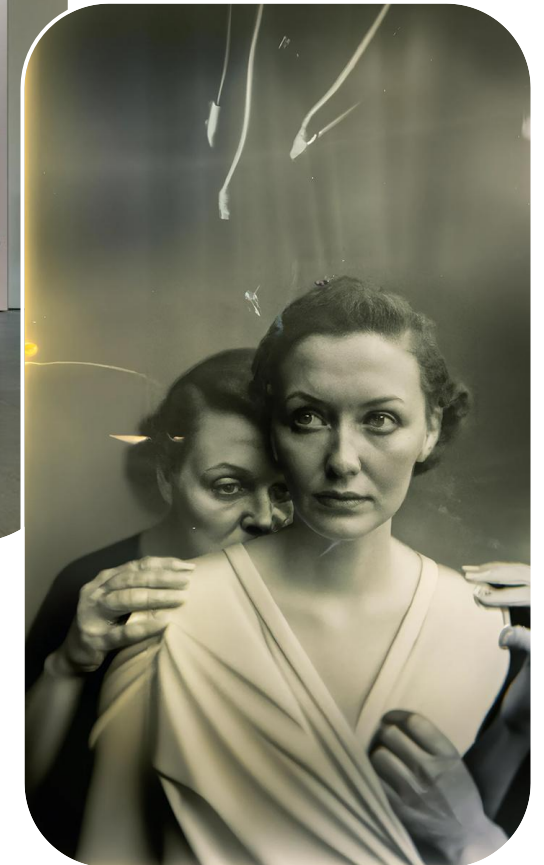


(Source: CNN Business)

(Source: MoMA Magazine)



Sony World
Photography Award in
Creative Open Category



(Source: CNN)

Gloria Liu, "[The World's Smartest Artificial Intelligence Just Made Its First Magazine Cover](#)," *Cosmopolitan*, June 21, 2022.
Rachel Metz, "[AI won an art contest, and artists are furious](#)," *CNN Business*, September 3, 2022.
Refik Anadol, "[Refik Anadol on AI, Algorithms, and the Machine as Witness](#)," *MoMA Magazine*, December 20, 2022.
Lianne Kolirin, "[Artist rejects photo prize after AI-generated image wins award](#)," *CNN*, April 18, 2023.

Generative AI for Video Generation



Homework 1: Real of Fake!?



Homework 1: Real of Fake!?

- **Don't worry! You'll be graded by completion (instead of correctness)!**
- Instructions will be sent by **emails** and released on the **course website**
- Please submit your work to **Gradescope**
- Due at **11:59pm ET** on **January 22**
- Late submissions: **1 point deducted per day**