Machine Learning

Salymbekov University
Miss Aliia Beishenalieva
aliya.beiwenalieva@gmail.com

Lecturer

Aliia Beishenalieva

❑ Education:

- From 2023.03: **Ph.D.** in Electrical and Computer Engineering (INHA University, South Korea)
- 2023.02: **M.S.** in Electrical and Computer Engineering (INHA University, South Korea)
- 2020.07: **B.S.** in Telematics (KGTU, Kyrgyzstan)

❑ Experience:

- From 2024.09: **Lecturer** (Salymbekov University)
- 2021.03-2024.08: **Senior Researcher** (Multimedia Networks LAB, Incheon), **Teaching assistant**
- 2020.09-2021.03: **IT Specialist** (startup company, Bishkek)
- 2020.03-2020.06: **Internship in Data Engineering** (Beeline, Bishkek)
- 2019.06: **Summer school** (Koln Technical University, Germany)

❑ Publications:

Course objectives

- This course is for you if:
  - If you're wondering what the AI is;
  - If you want to be familiar with trends of AI;
  - If you wonder how do neural networks work;

➢*(Machine Learning)* Machine Learning Magic: Your First Steps

Course info

- Course type: Offline, Online (zoom)
- Duration: : 2 times a week 80 mins each
- Period: from 01.09. 24 to 31.12.24

Course info

Schedule:

Week1	introduction, History of AI
Week2	Overview of ML, Types of learning: supervised, unsupervised, RL
Week3	ML libraries, Linear regression
Week4	Decision tree , K-Means
Week5	Neural Networks
Week6	Back propagation
Week7	ANN, CNN, RNN
Week8	Code analysis, Students project (MNIST), midterm
Week9	Deep learning, gradient decent
Week10	Computer vision
Week11	Computer vision, final project topics
Week12	Object detection, Practical session
Week13	Face recognition, Data engineering, Practical session
Week14	(Project implementation)
Week15	Project presentations
Week16	Project presentations

Grading Policy

- ❑ Attendance: 10%
- ❑ Midterm: 20%
- ❑ Students project: 40%
- ❑ Assignments: 20%
- ❑ Extra points: 10%

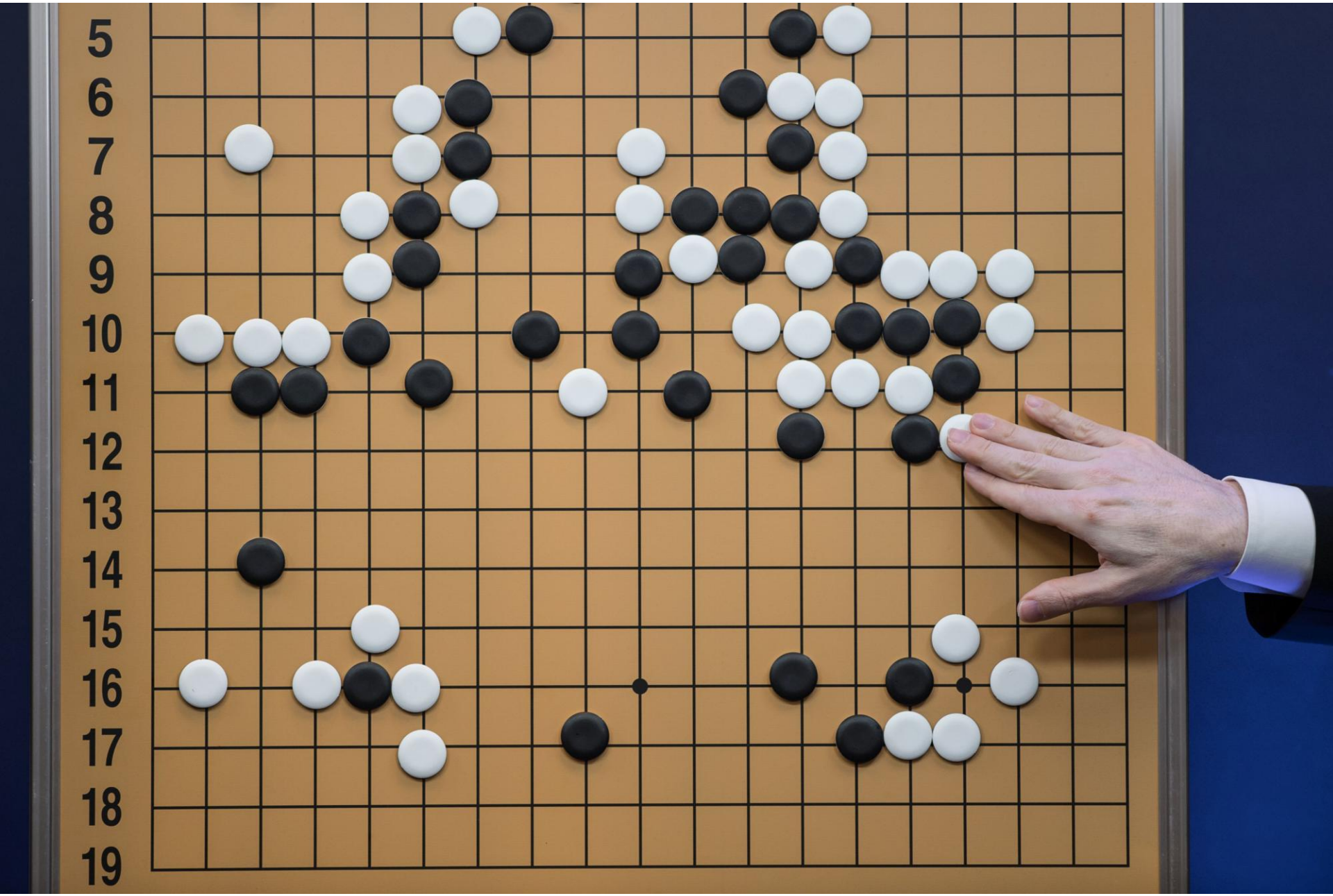
What is an AI?

Artificial Intelligence

Artificial Intelligence

Artificial Intelligence

examples


5
6
7
8
9
10
11
12
13
14
15
16
17
18
19

AlphaGO 2016

Lee (Professional GO player) – AI (AlphaGo)
1-4

AlphaGo - The Movie | Full award-winning documentary

https://www.youtube.com/watch?v=WXuK6gekU1Y&t=1s

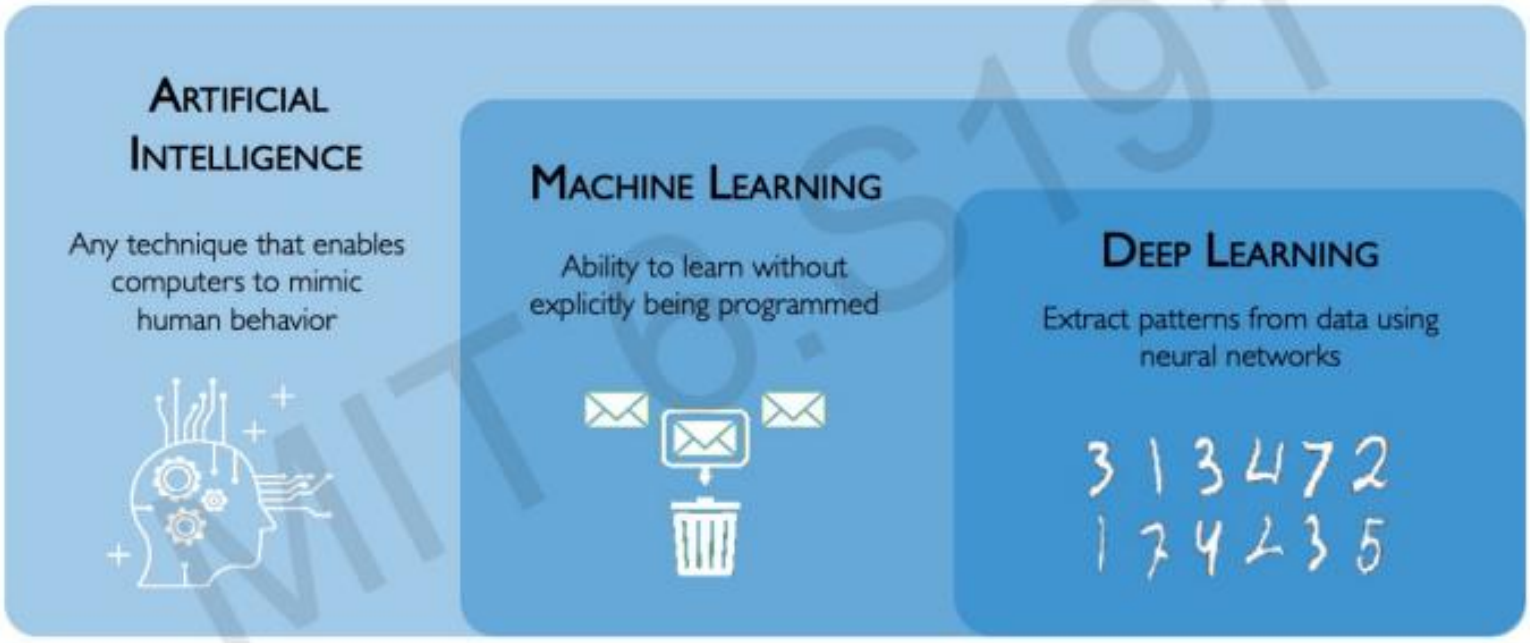
Artificial Intelligence

- Games
- Chatbots
- Recommendation systems (music, Netflix)
- Language translation
- Face recognition
- Siri, Alisa
- etc.

Artificial Intelligence

- AI is when machines show intelligence, similar to how humans think and make decisions.
- In computer science, a smart machine can understand its surroundings and make choices to help it achieve a goal.
- AI research focuses on areas like reasoning, learning, understanding language, planning, recognizing surroundings, and moving or controlling objects.

Artificial Intelligence



MIT 6.S191

Recap

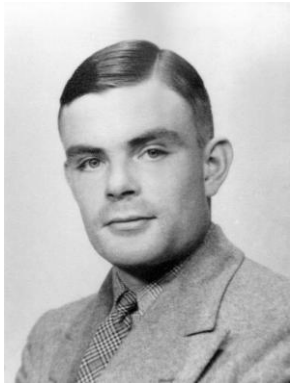
- **What do you remember from yesterday?**

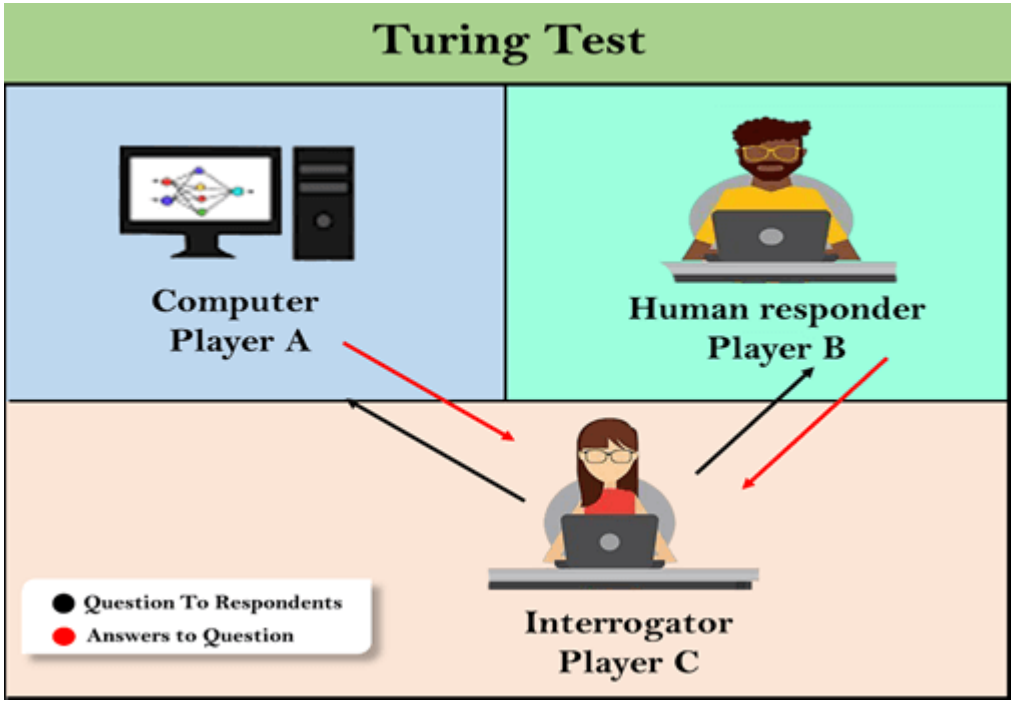
- **GitHub account???**
- **New repository???**

- **You need to upload notes, info, data, files starting from today's class**

The history of AI

Alan Turing (1936): One of the first people to shape the idea of machines performing complex tasks was Alan Turing. In 1936, Turing proposed a theoretical device called the 'Turing Machine,' which could simulate the logic of any computer algorithm. He later developed the 'Turing Test' in 1950, to determine whether a machine could exhibit human-like intelligence.





The history of AI

The Dartmouth Conference (1956): This is often referred to as the birth of AI as a field. John McCarthy and his colleagues organized the Dartmouth Conference, where they proposed that 'every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it.' The optimism here set the tone for the next few decades of AI research.

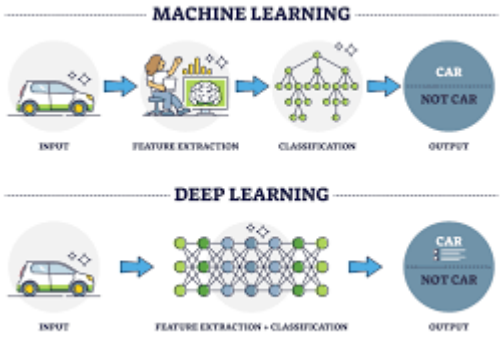
The Logic Theorist: In 1956, Newell and Simon developed 'The Logic Theorist,' considered one of the first AI programs. It proved mathematical theorems and showed that computers could simulate human problem-solving.

- Axiom 1: All humans are mortal.
- Axiom 2: Simon is a human.
- Theorem: Simon is mortal.

The history of AI

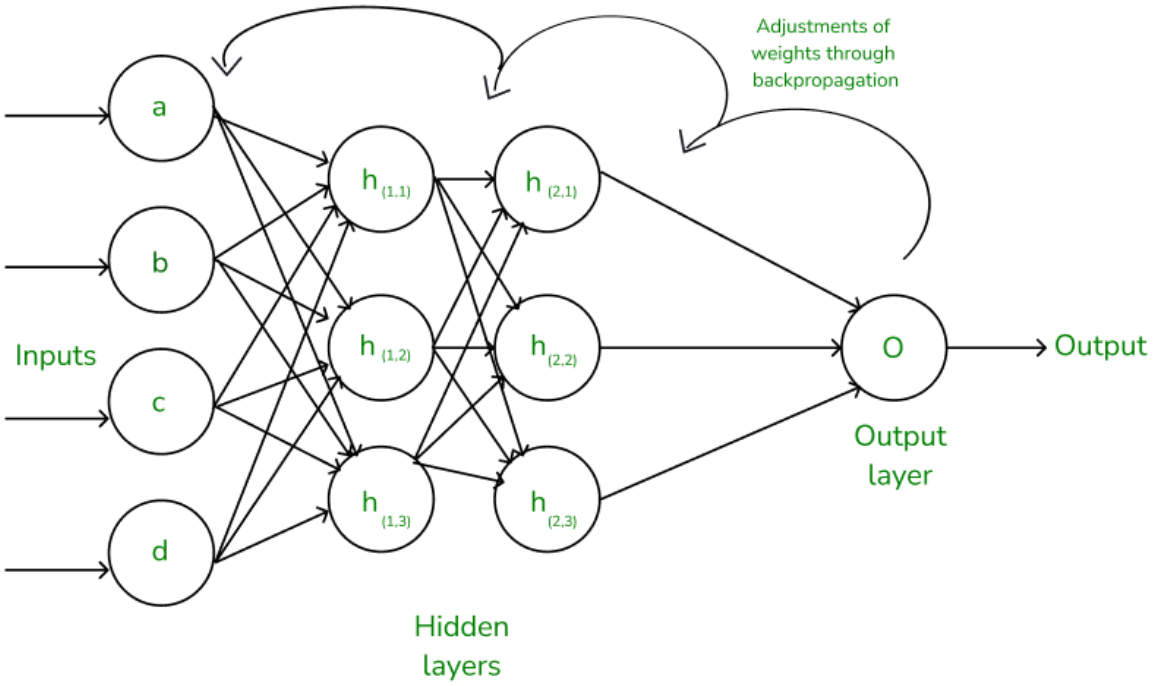
1980s-Neural networks and backpropagation. These models were inspired by the human brain and were more capable of learning from data. A key breakthrough was the 'backpropagation algorithm,' which allowed neural networks to 'learn' from their mistakes by adjusting weights across multiple layers.
Machine learning—machines could now improve their performance over time without being explicitly programmed for every task.

From 2000s-Deep learning, Big Data, GPTs.



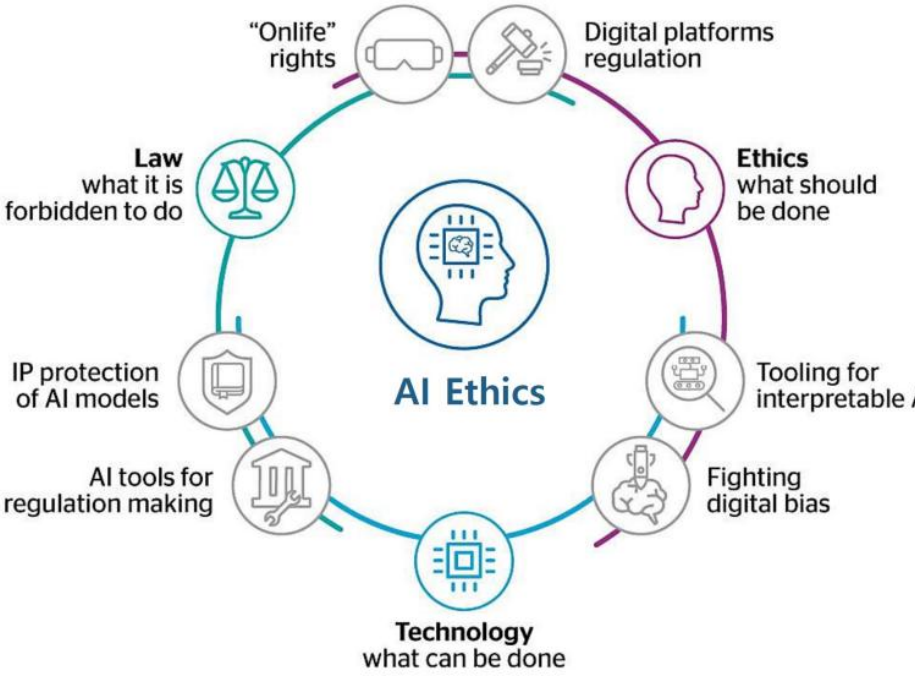
The history of AI

Backpropagation

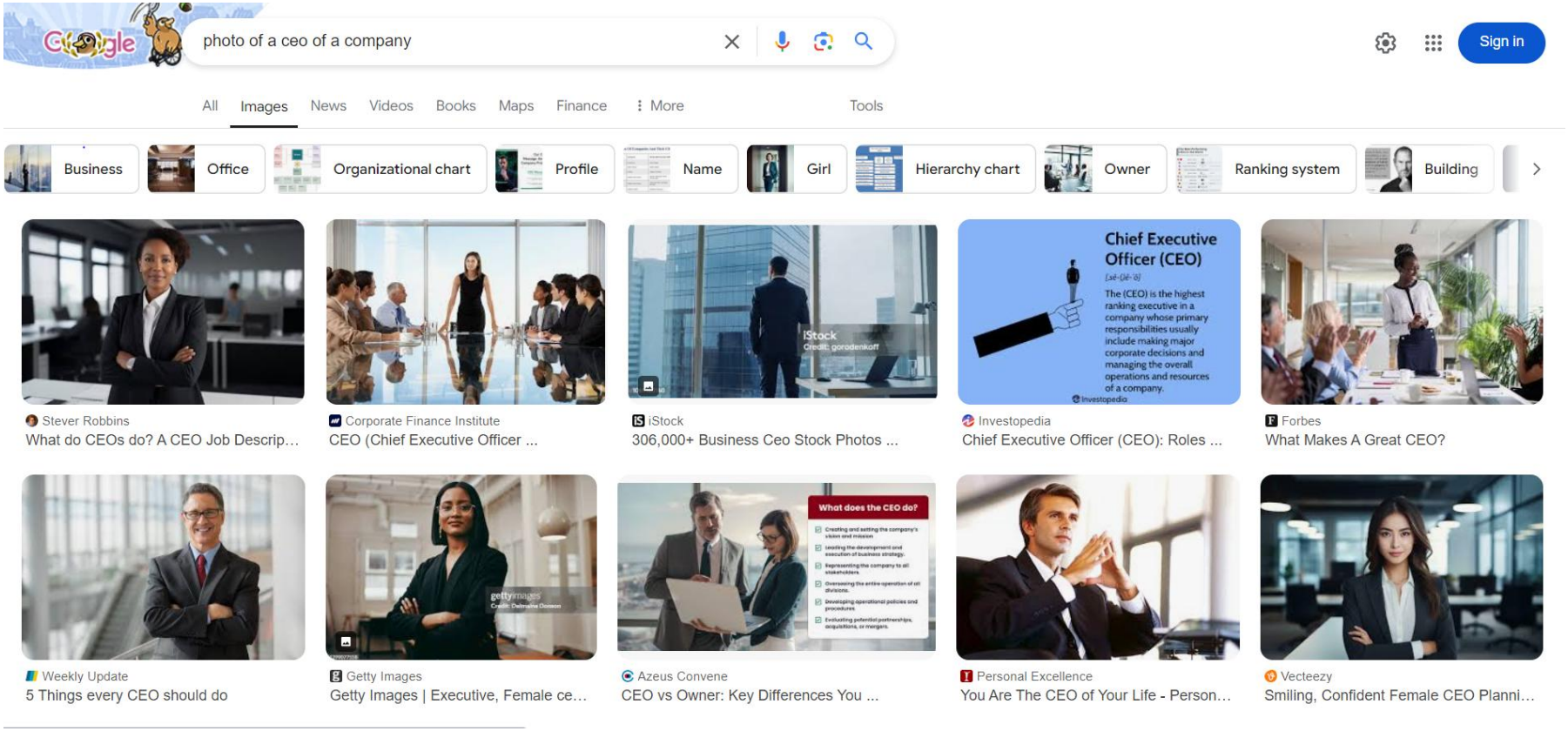


The history of AI

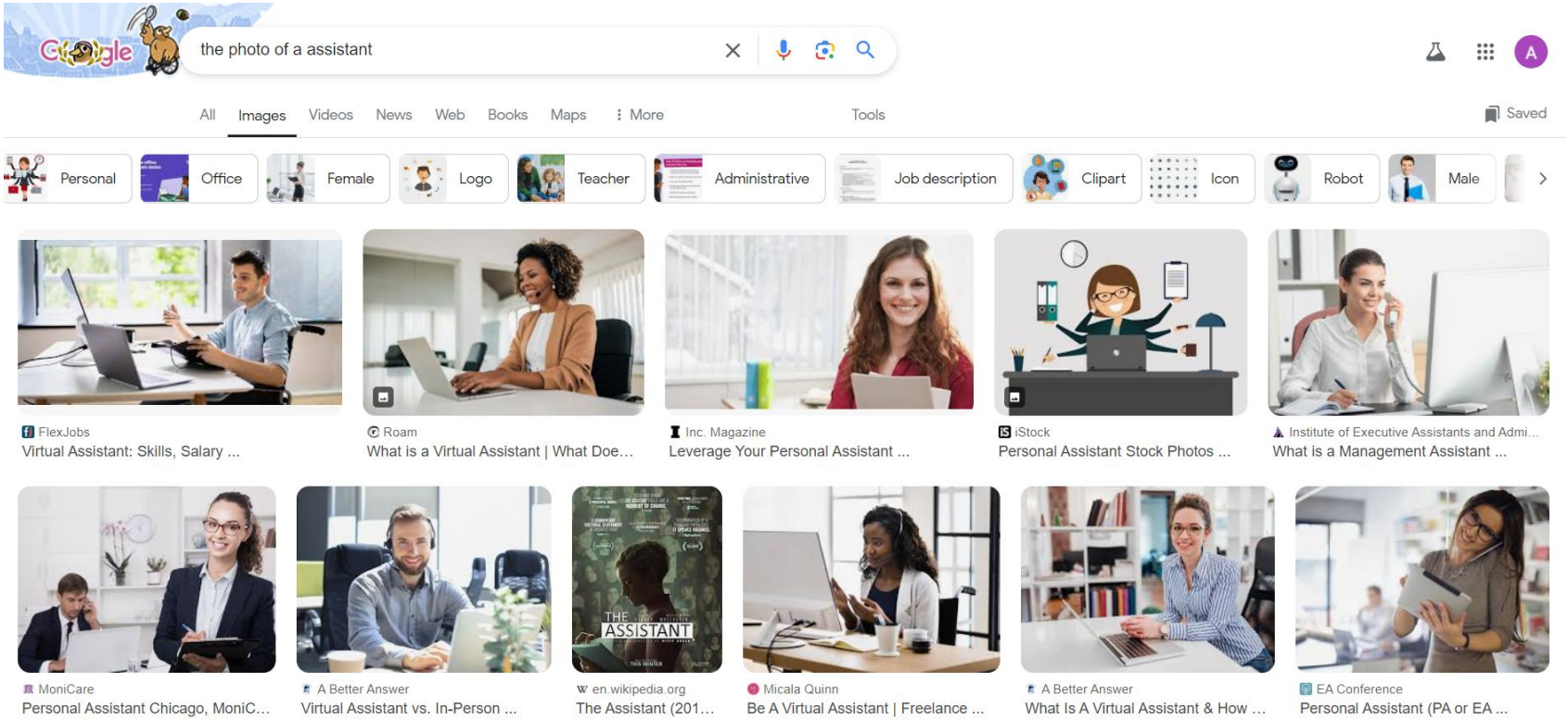
Ethical Challenges:
Bias in AI models, privacy concerns, and even issues surrounding AI safety.



The history of AI



The history of AI



The history of AI

Future of AI:
Researchers are now focusing on areas like explainable AI—making AI systems more transparent and understandable—and general AI, which would have the ability to perform any intellectual task that a human can.

Assignment

- Right now -> Choose 5 AI applications individually (write it down) /10 mins
- In the next class you will present about that AI application within 10-15 mins / ppt file should be uploaded into your GitHub account before the next class
- Give me a list that consists of your full name and GitHub username