

Machine Learning



Salymbekov University

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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

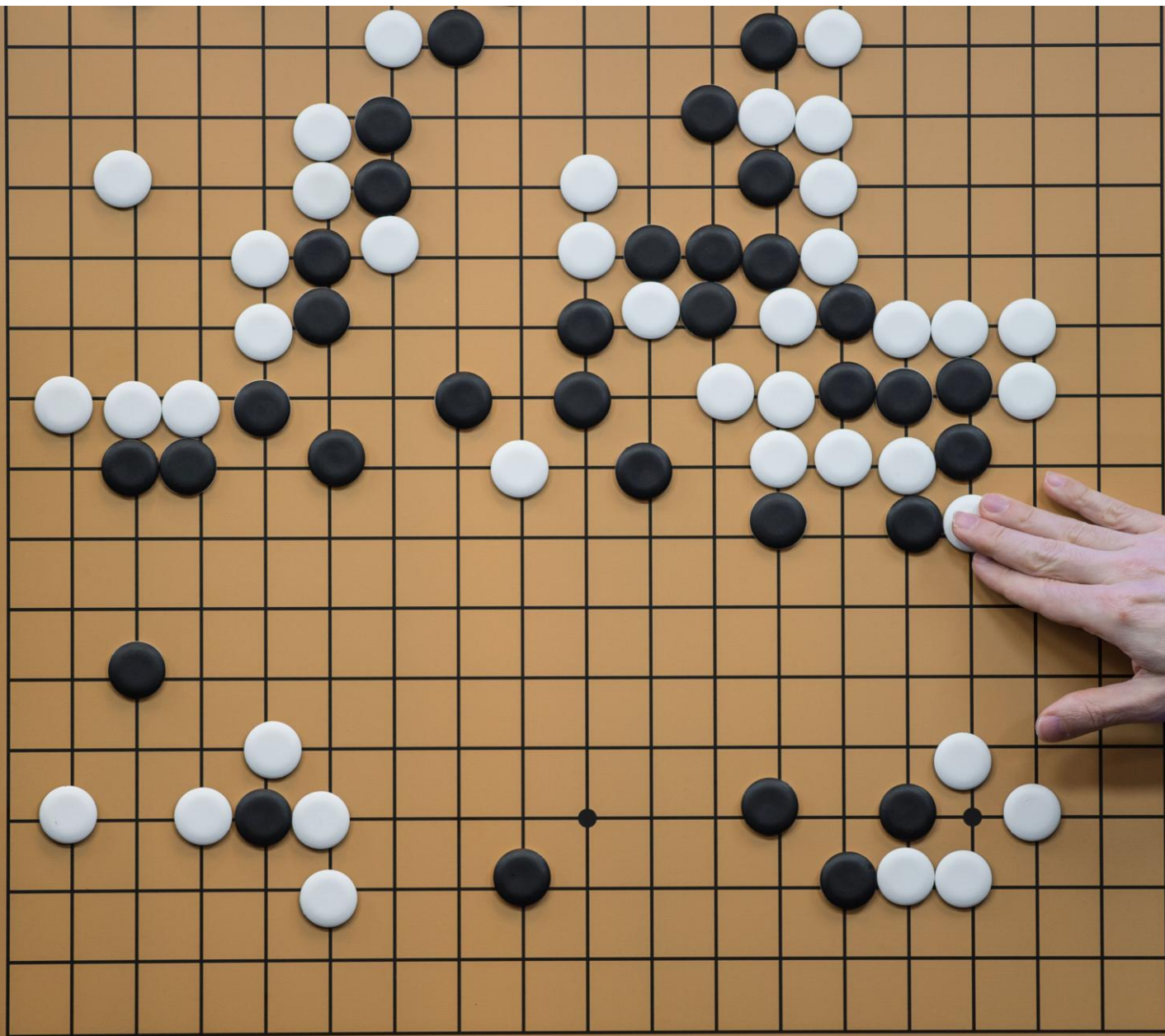


Artificial Intelligence



examples

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18
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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

ARTIFICIAL INTELLIGENCE

Any technique that enables computers to mimic human behavior



MACHINE LEARNING

Ability to learn without explicitly being programmed



DEEP LEARNING

Extract patterns from data using neural networks

3 1 3 4 7 2
1 7 4 2 3 5

Recap

☐ What do you remember from yesterday?

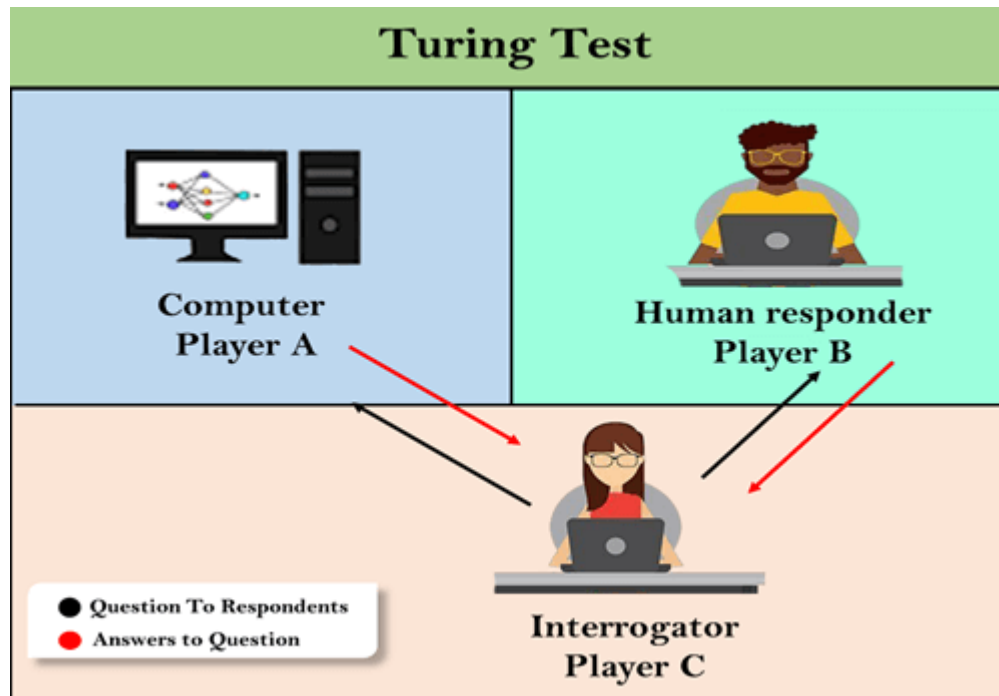
☐ GitHub account???

☐ 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.



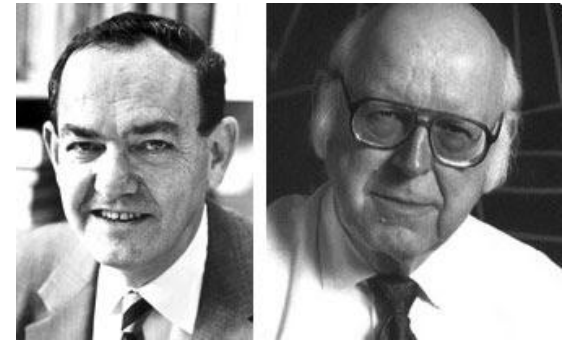
The history of AI



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.

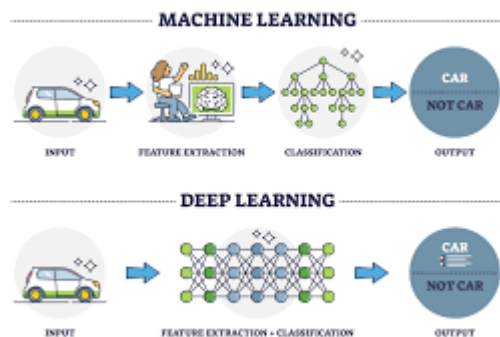


The history of AI

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.

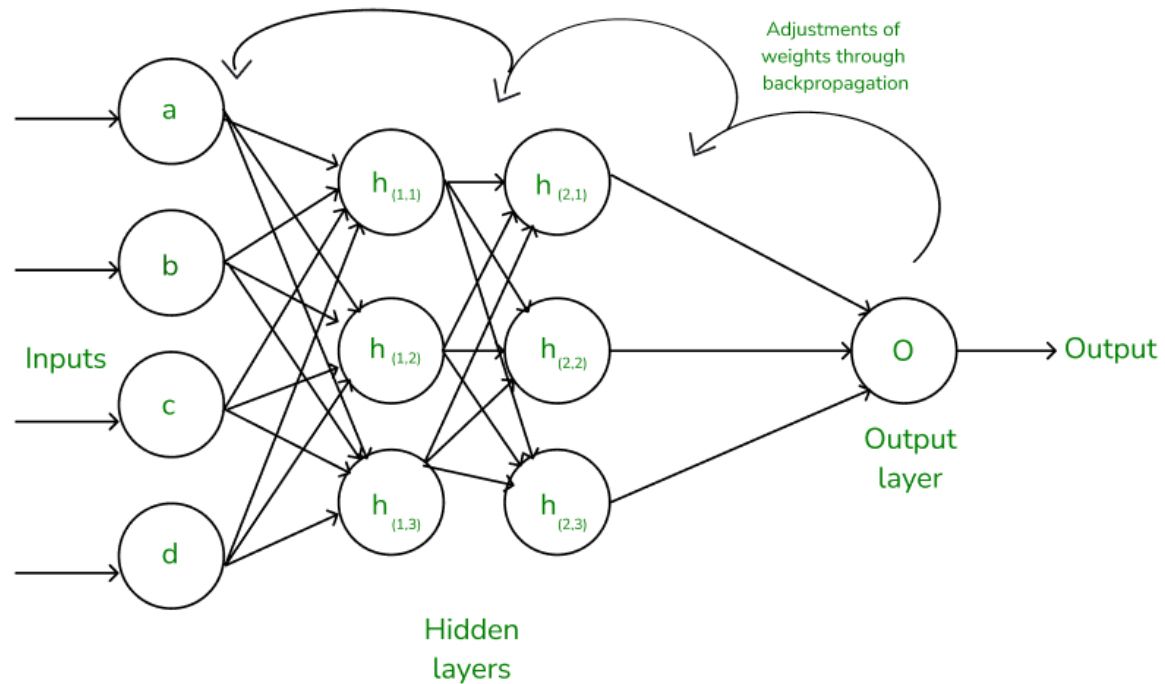
Machine learning—machines could now improve their performance over time without being explicitly programmed for every task.

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



The history of AI

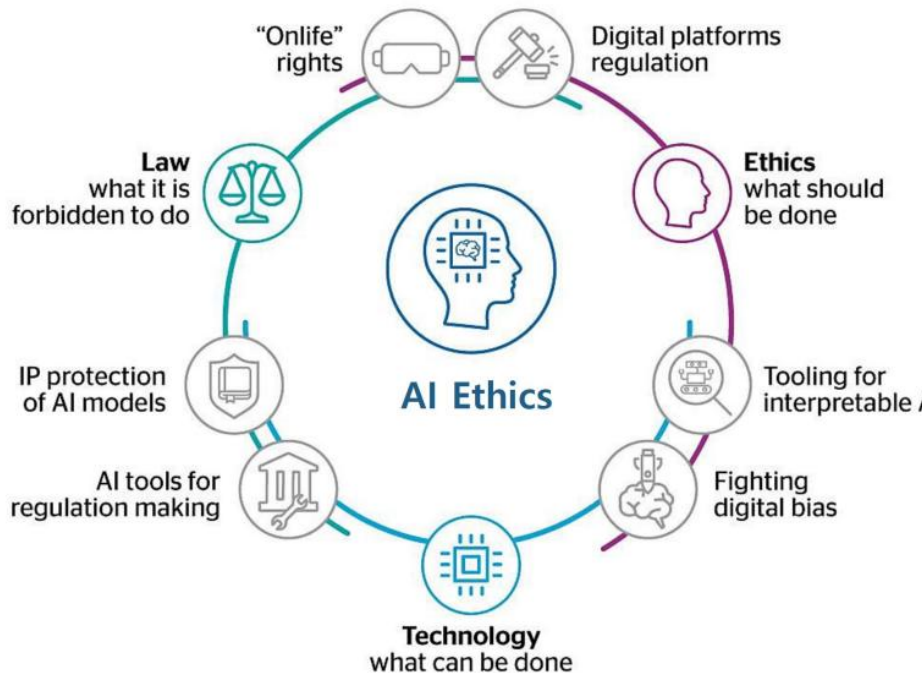
Backpropagation



The history of AI

Ethical Challenges:

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



The history of AI

Google photo of a ceo of a company

All Images News Videos Books Maps Finance More Tools

Business Office Organizational chart Profile Name Girl Hierarchy chart Owner Ranking system Building

Stever Robbins
What do CEOs do? A CEO Job Descrip...

Corporate Finance Institute
CEO (Chief Executive Officer) ...

iStock
306,000+ Business Ceo Stock Photos ...

Investopedia
Chief Executive Officer (CEO): Roles ...

Forbes
What Makes A Great CEO?

Weekly Update
5 Things every CEO should do

Getty Images
Getty Images | Executive, Female ce...

Azeus Convene
CEO vs Owner: Key Differences You ...

Personal Excellence
You Are The CEO of Your Life - Person...

Vecteezy
Smiling, Confident Female CEO Planni...

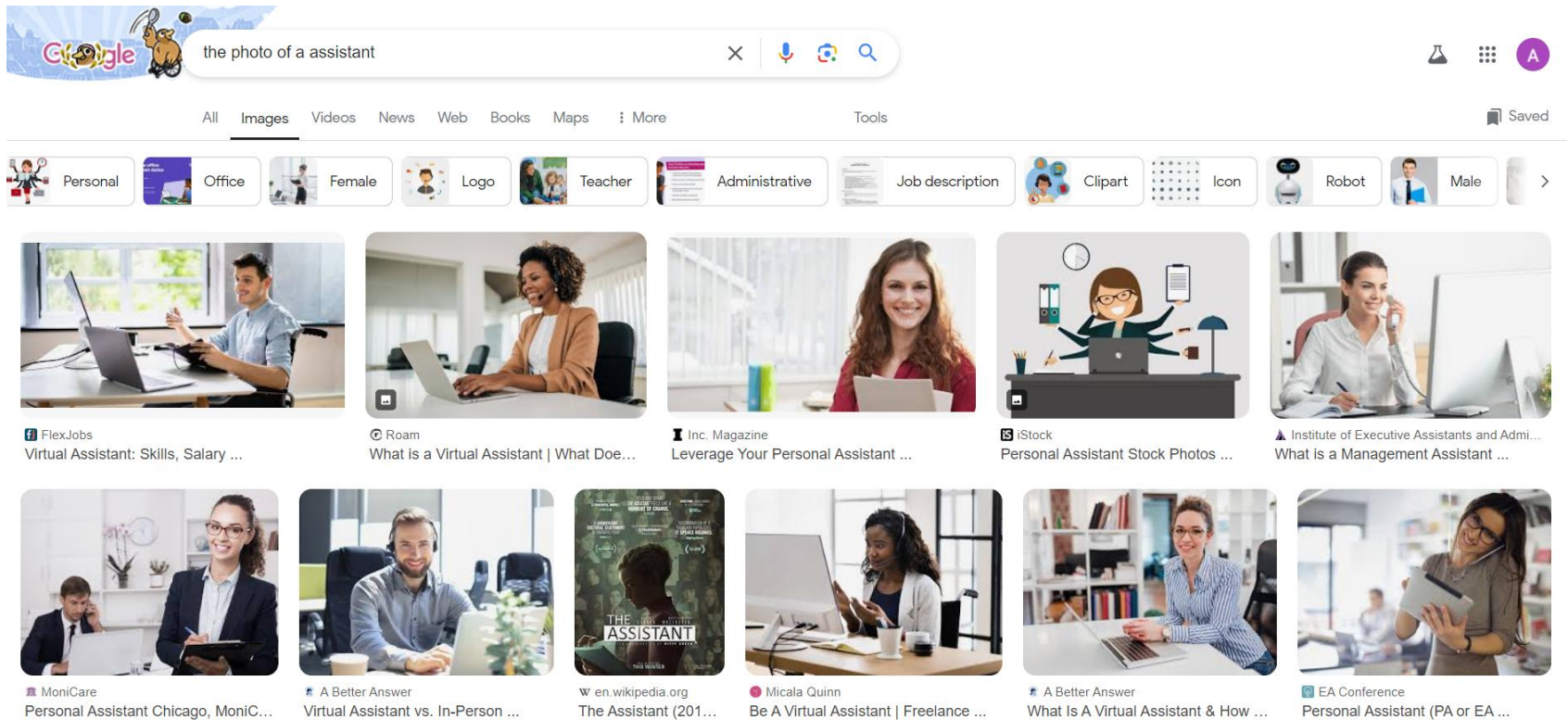
Chief Executive Officer (CEO)
[edit]

The (CEO) is the highest ranking executive in a company whose primary responsibilities usually include making major corporate decisions and managing the overall operations and resources of a company.

What does the CEO do?

- Creating and writing the company's vision and mission
- Leading the development and execution of business strategy
- Representing the company to all stakeholders
- Overseeing the entire operation of all divisions
- Developing operational policies and procedures
- Evaluating potential partnerships, acquisitions, or mergers

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