CSPE 102

Intelligent Systems

Introduction

Overview of Artificial Intelligence

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What is “intelligence”?

1. Someone’s intelligence is their ability to understand and learn things.
2. Intelligence is the ability to think and understand instead of doing things by instinct or automatically.

Can computers think, or can be intelligent?

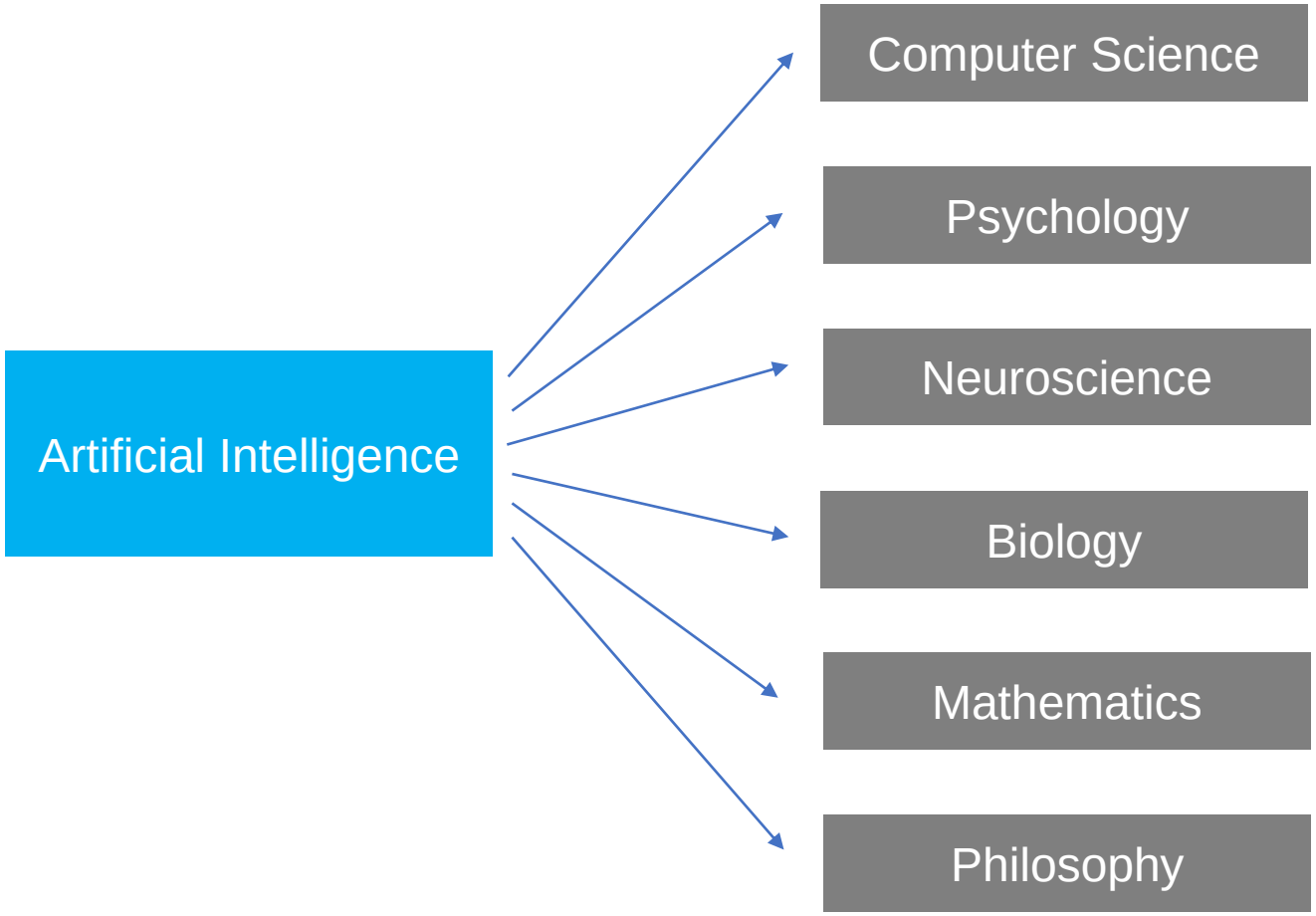
What is “Artificial Intelligence”?

- A way of making computers, a software or computer-controlled robot think intelligently.
- AI is accomplished on how humans **learn, decide, work** while trying to solve a problem.
- Can machines think? Answer: unclear (not a yes or not a no)

Goals of Artificial Intelligence

- ✓Implement human intelligence in machines.
- ✓Make machines answer problems and do things that would require intelligence done by humans.

Disciplines Important to AI



Disciplines Important to AI

Computer Science

Foundation of computer systems are built using algorithms.

Disciplines Important to AI

Psychology

Since AI mimics on how human think, it is important to understand on how people behave and perceive and on how human process information and represent knowledge.

Disciplines Important to AI

Neuroscience

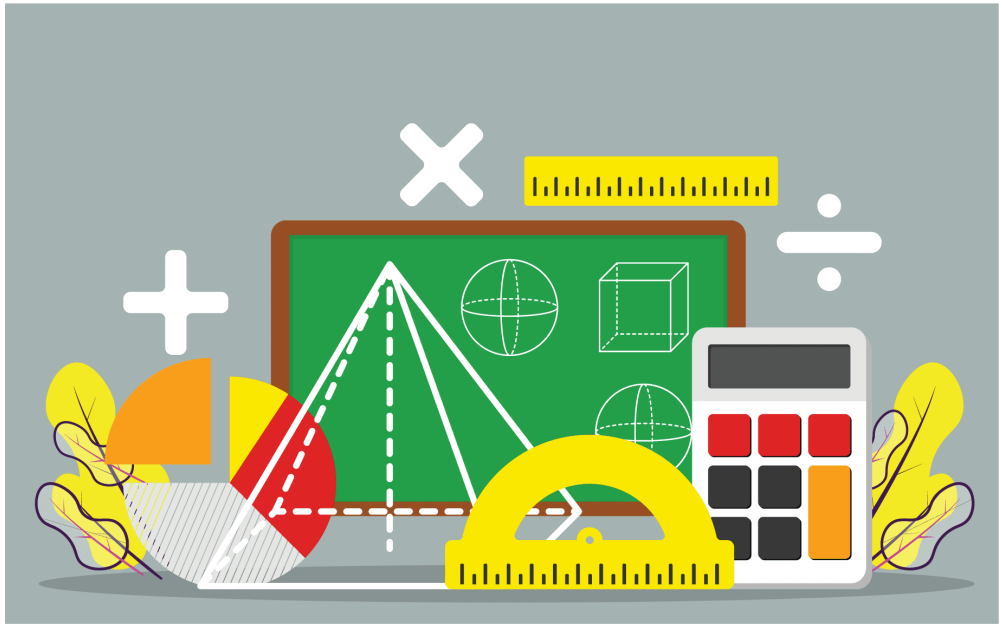
Helps in emulating human intelligence and is used to build neural networks that mimics brain structure.

Disciplines Important to AI

Biology

Often used as an inspiration to AI because it aims to create approximative models of human brain.

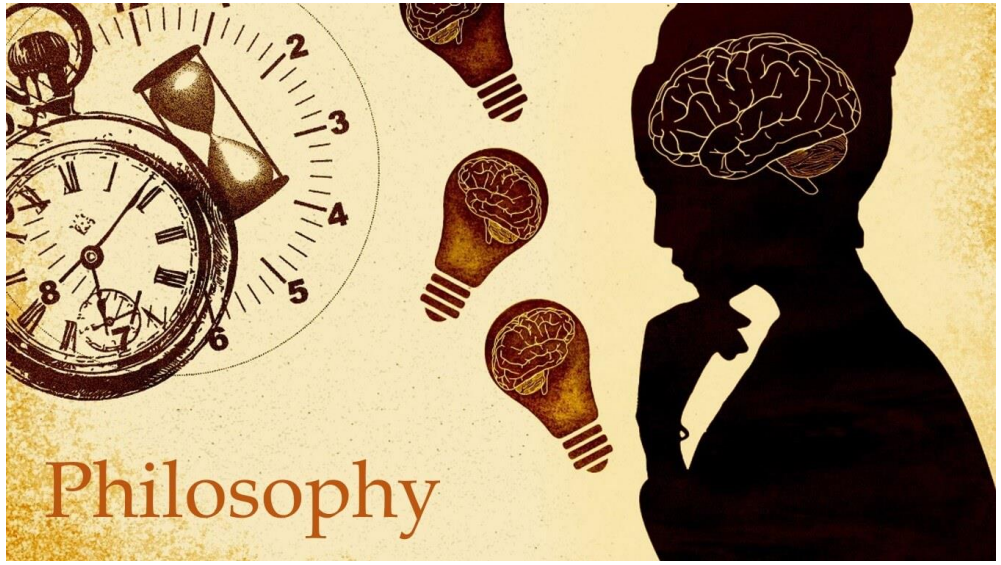
Disciplines Important to AI



Mathematics

Fundamental topics in math such as linear algebra, calculus, probability, and optimization are important in AI.

Disciplines Important to AI



Philosophy

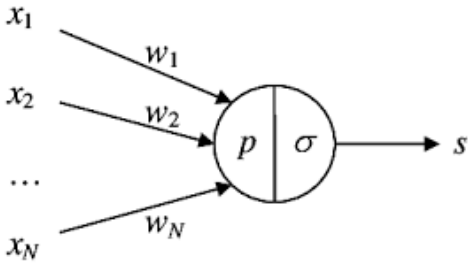
The concept of logic, methods of reasoning, language and foundation of learning are essential in stablishing on how the computers will rationalize.

Milestones in AI

1923

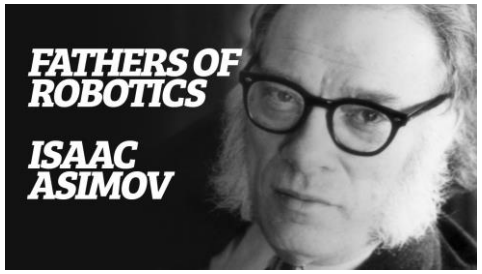
Rossum's Universal Robots

1943



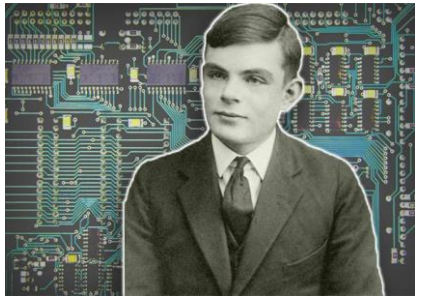
Foundation of Artificial Neural Networks

1945



Coined the term “Robotics”

1950



Turing Test

1956

Coined the term “Artificial Intelligence”

1958

LISP programming language for AI

1964

Algebra world problem solver

1965

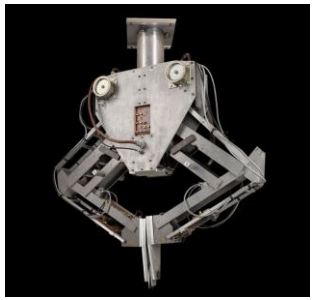
First chatbot “ELIZA”

Milestones in AI

1969

First mobile robot “Shakey”

1973

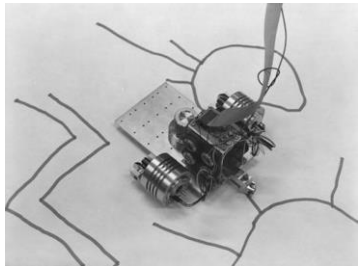


First robot with vision and hand “Freddy”

1979

First computer-controlled, autonomous vehicle “Stanford Cart”

1985



Art making AI “AARON”

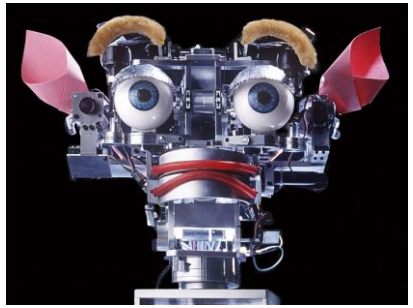
1990

Major advances in all areas of AI

1997

“Deep Blue Chess Program” beats world chess champion

2000



First social robot “Kismet”

2007

ImageNet for object recognition

What can AI do today

Robotic vehicles: self-driving cars, self-driving drones, planes etc.

Legged locomotion: BigDog, Spot, Atlas etc. by BostonDynamics

Autonomous planning and scheduling: NASA's Mars rovers, Uber, Google Maps

Machine translation: language translation in over 100 languages

Speech recognition: Alex, Siri, Cortana, and Google Assistant

Recommendations: Amazon, Facebook, Netflix, YouTube

Game Playing: Chess (Deep Blue), Dota 2 (OpenAI), Go (AlpaGO)

What can AI do today

Image understanding: Image captioning

Computer vision: face detection & recognition, image classification, object detection

Medicine: disease diagnosis (COVID-19, Cancer, Alzheimer's)

Climate science: detailed information about weather events

Risks of AI

Lethal autonomous weapons: e.g. homing missiles, killer drones

Surveillance and persuasion: e.g. cctv, social media

Biased decision making: e.g. loan applications biased race, gender, etc.

Employment/Jobs: replacing of standard worker

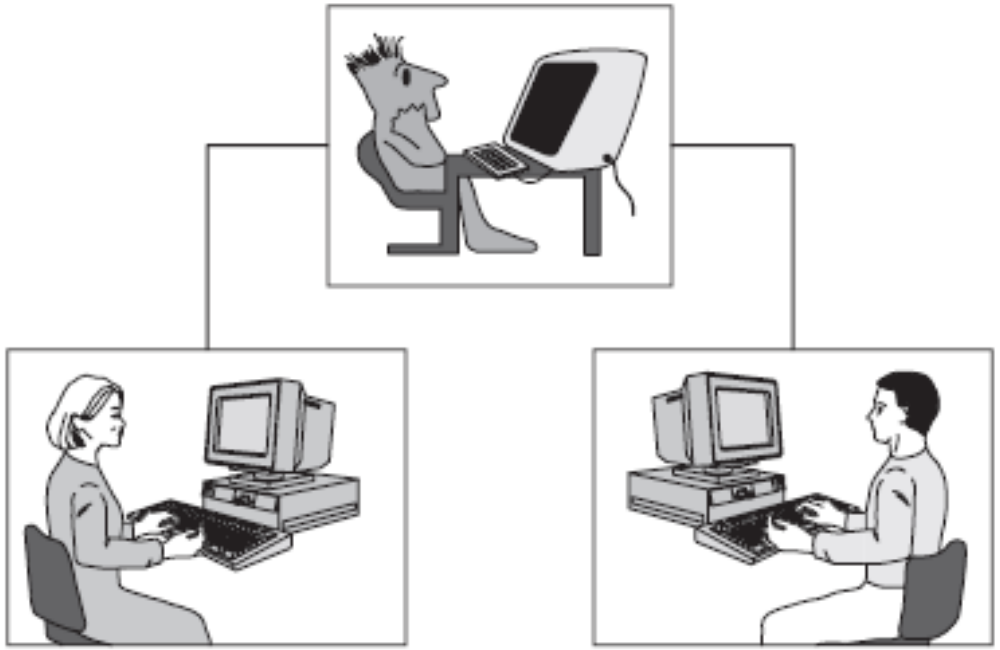
Safety-critical applications: self-driving cars (fatal accidents)

Cybersecurity: ai-powered malicious cyberattacks: blackmail, phishing

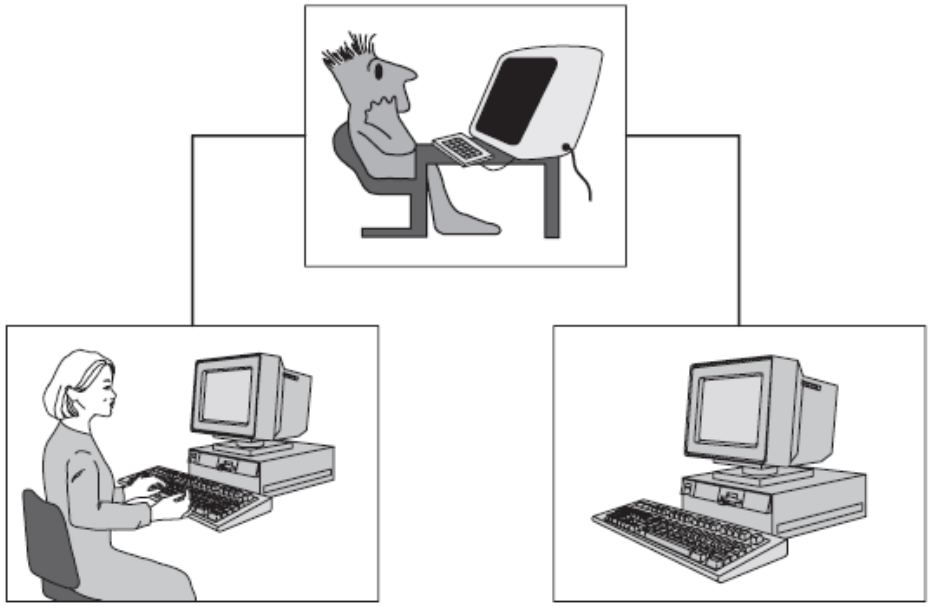
Super AI: robots dominating humans in the future?

Turing Test

First phase



Second phase



Assignment

Watch this two videos about “Chinese Room Argument and Experiment”:

https://youtu.be/htrsnpwzhmI?t=29

https://www.youtube.com/watch?v=D0MD4sRHj1M

Briefly explain the:

1. **Process of the Experiment.**
2. **Conclusion/Argument of the Experiment.**