

Lecture 1

Introduction of **Artificial Intelligence**



Course overview

- **Module:** Artificial Intelligence
- **Course ID:** CO3519
- **Number of Assessments:** 2
 - 1st assignment: (**Weightage**=50% , *Implementation of an AI algorithm*, **Release date:** TBD)
 - 2nd assignment: (**Weightage**=50% , *Advanced AI demonstration*, **Release date:** TBD)
- **Programming Language and setup:** Python, Google Collab
- **Recommended Book:** Artificial Intelligence A Modern Approach, 4th Edition (Stuart Russell, Peter Norvig)
- **Useful link for materials and lectures**
 - Blackboard



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Leading the Module (CO3519)



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Course overview



- **Learning Objectives**

- Introduce and familiarise you with the approach and techniques of AI
- Theoretical underpinnings of AI and Computing
- Apply AI approaches to solve real-world problems
- Develop, or work with, implementations of algorithms for AI problems

- **Important Directions**





Week1- Introduction of AI

Lecture 1
Introduction of Artificial Intelligence

Semester-01 Lecture Delivered on: 07/10/2024 Contents covered includes (1)-Course Overview, (2)-Learning Objectives, (3)-Introduction to AI, 4-What is AI, (5)-History of AI, (6)-Subfields in AI, (7)-Overview on different areas/field in AI, (8)-Applications.

Week2- Types of AI, Areas in AI

Lecture 2
Types of AI, Areas in AI

Semester-01 Lecture delivered on: 14/10/2024 Contents covered includes (1)-Types of Artificial Intelligence in terms of its Capability, Functionality, and technologies etc. (2)-Working areas (3)-Release of Assessment 01. (4) A-Z awareness about all the things where AI exists and places where it exists.

SLOW

Week3- Machine Learning-I

Lecture 3
Machine Learning-I

Semester-01 Lecture Delivered on: 21/10/2024 Contents covered includes (1)-Machine Learning ML, (2)-What is ML, (3)-Types of ML, (4)-Relation b/w ML and AI, (5)-Key steps in developing ML model. (6)-Examples Solved.

Week4- Machine Learning-II

Lecture 4
Machine Learning-II

Semester-01 Lecture Delivered on: 28/10/2024 Contents covered includes (1)-Key Challenges and Concepts (2)-Overfitting and Underfitting Problems (3)-Supervised Learning Algorithms (4)-Linear Regression LR, (5)-K-nearest Neighbors KNN, (6)-Examples Solved.

Week5- Supervised Learning-I

Lecture 5
Supervised Learning-I

Semester-01 Lecture Delivered on: 04/11/2024 Contents covered includes (1)-Support Vector Machine SVM, (2)-Approaches use by SVM, (3)-Underlined concepts, (4)-Types of SVM, (5)-Examples Solved.



Week6- Supervised Learning-II

Lecture 6

Supervised Learning-II

Semester-01 Lecture Delivered on: 11/11/2024 Contents covered includes (1)-Decision Tree DT, (2)-Approaches use by DT, (3)-Underlined concepts, (4)-Random Forest RF. (5)-Examples Solved.



Week7- Unsupervised Learning-I

Lecture 7

Unsupervised Learning-I

Semester-01 Lecture Delivered on: 18/11/2024 Contents covered includes (1)-Unsupervised Learning, (2)-Unsupervised Learning Problems, (3)-Clustering, (4)-Algorithms use for clustering, (5)- K-means Algorithm for Clustering, (6)-Examples Solved.



Week8- Unsupervised Learning-II

Lecture 8

Unsupervised Learning-II

Semester-01 Lecture Delivered on: 25/11/2024 Contents covered includes (1)-Dimensionality Reduction, (2)-Principle Component Analysis, (3)-Approaches in PCA, (4)-Anomaly Detection, (5)-Types of Anomalies, (6)-Anomaly in Text, Images, and Videos, (7)-Examples Solved.



Week9- Natural Language Processing

Lecture 9

Natural Language Processing

Semester-01 Guest Lecture arranged on: 02/12/2024 Presented by: Dr. Tanveer Hussain from Department of Computer Science, EdgeHill University. Contents covered includes (1)-Natural Language Processing, (2)-Sentiment Analysis, (3)-Examples Solved.

NLP

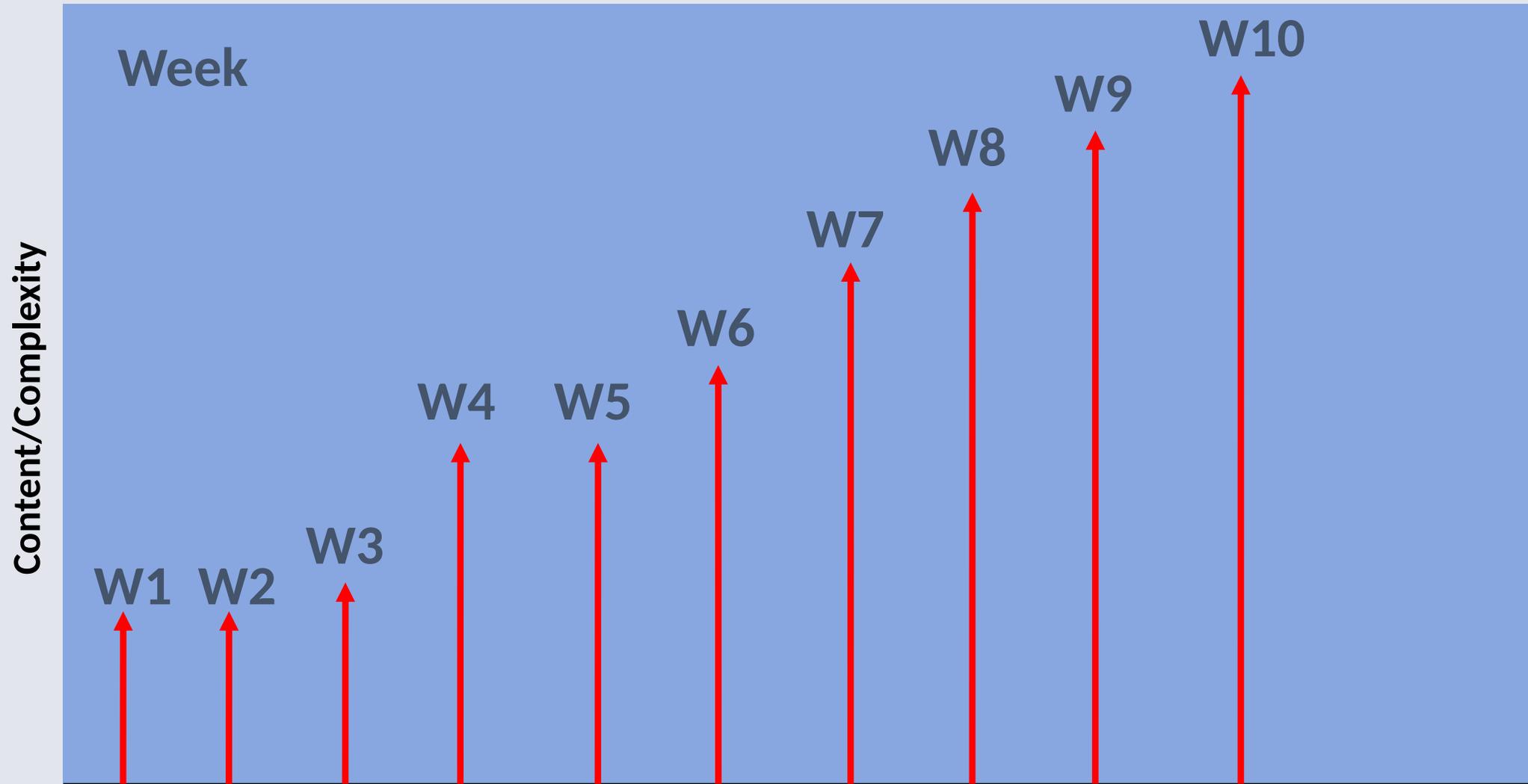


Week10- Reinforcement Learning

Lecture 10

Reinforcement Learning

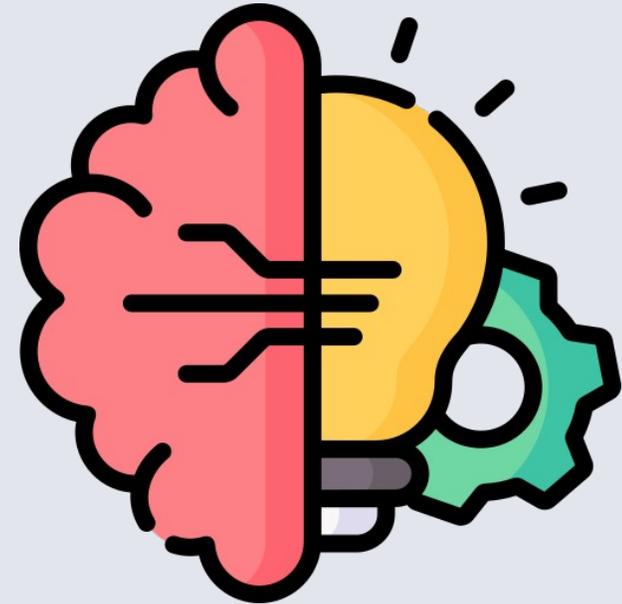
Semester-01 Lecture Delivered on: 09/12/2024. Contents covered includes: (1)- Reinforcement Learning RL, (2)- Approaches to implement RL (3)- Types of RL, (4)-How RL works? (5)-How to choose right approach, (6)-Q Learning, (7)-Examples solved.



Today's Contents



- **What is Artificial Intelligence**
- **History of Artificial Intelligence**
- **Applications of Artificial Intelligence**
- **Sub-fields in Artificial Intelligence**



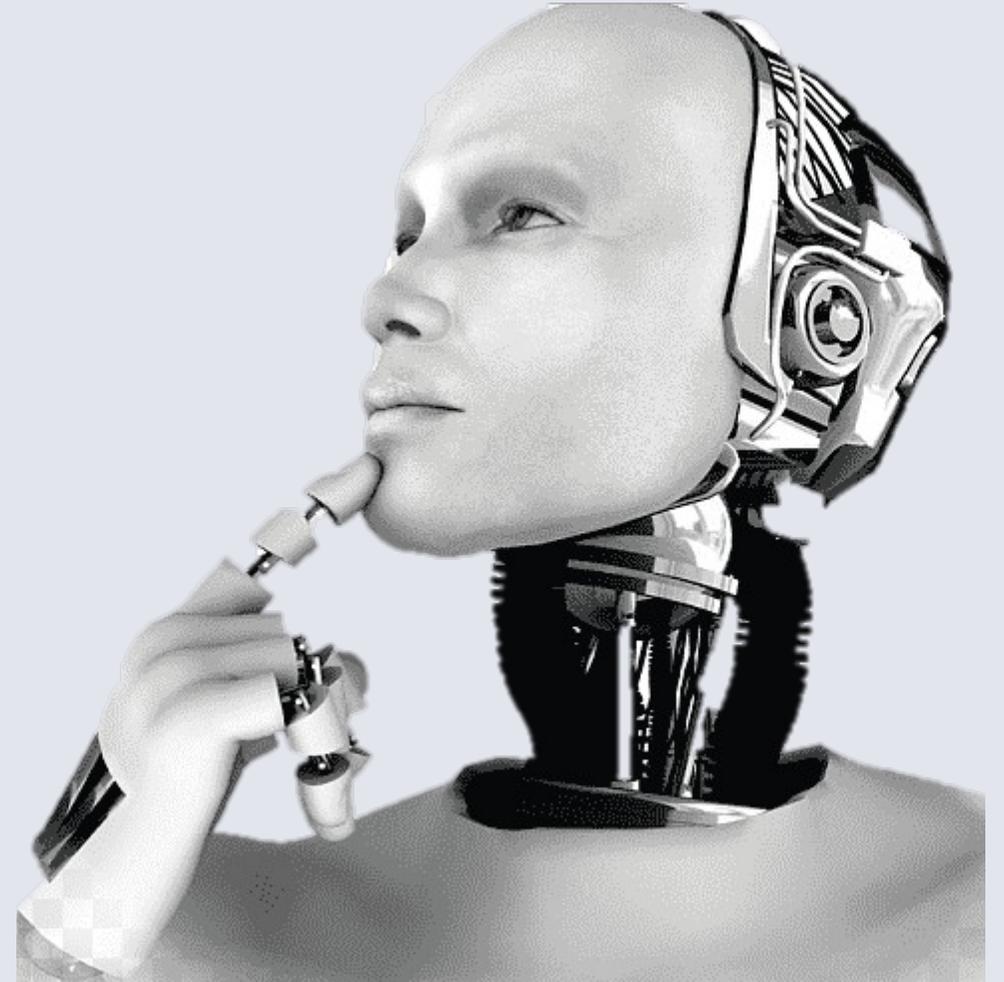
Introduction to Artificial Intelligence



What is Artificial Intelligence

Making the machine able to:

- Think like human
- Understand like human
- Behave like human



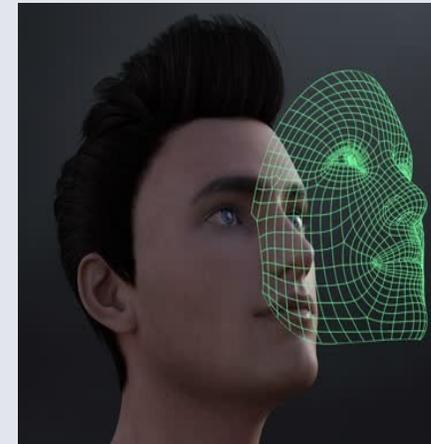
Introduction to Artificial Intelligence



What is Artificial Intelligence

AI Is Not Similar To Human Intelligence. Thinking So Could Be Dangerous. [Elizabeth Fernande et al.]

Activity recognition, Object detection, Face recognition.

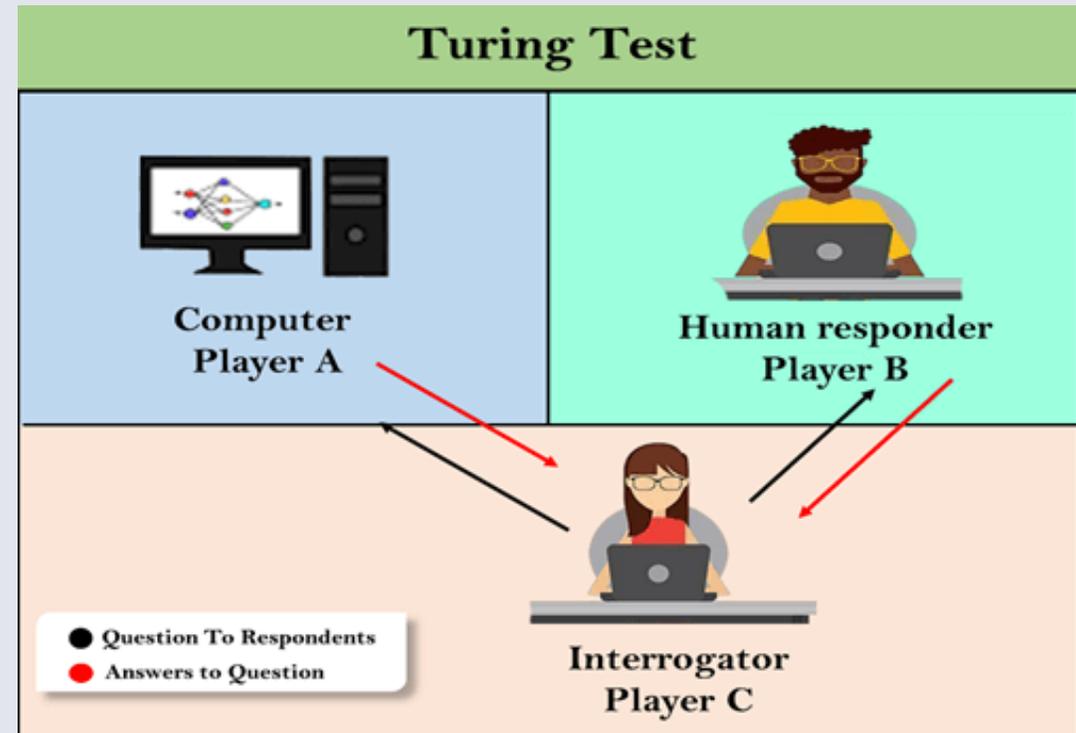


Acting Humanly: Turing Test Approach

Designed by Alan Turing (1950) as thought sidestepping the vagueness of the question “**Can a machine think?**”

Machine would need:

- Natural language processing Communicate in human language
- Knowledge representation To store what it knows or hears;
- Automated reasoning Answer questions and draw new conclusions;
- Machine learning adapt to new circumstances, detect patterns



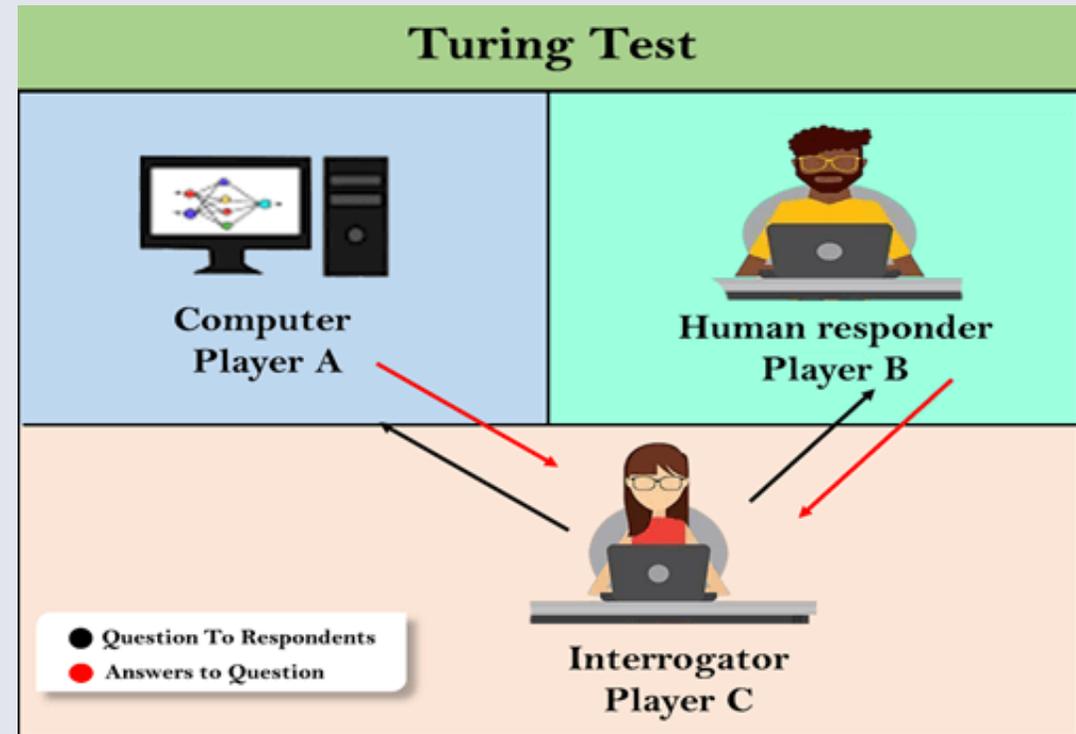
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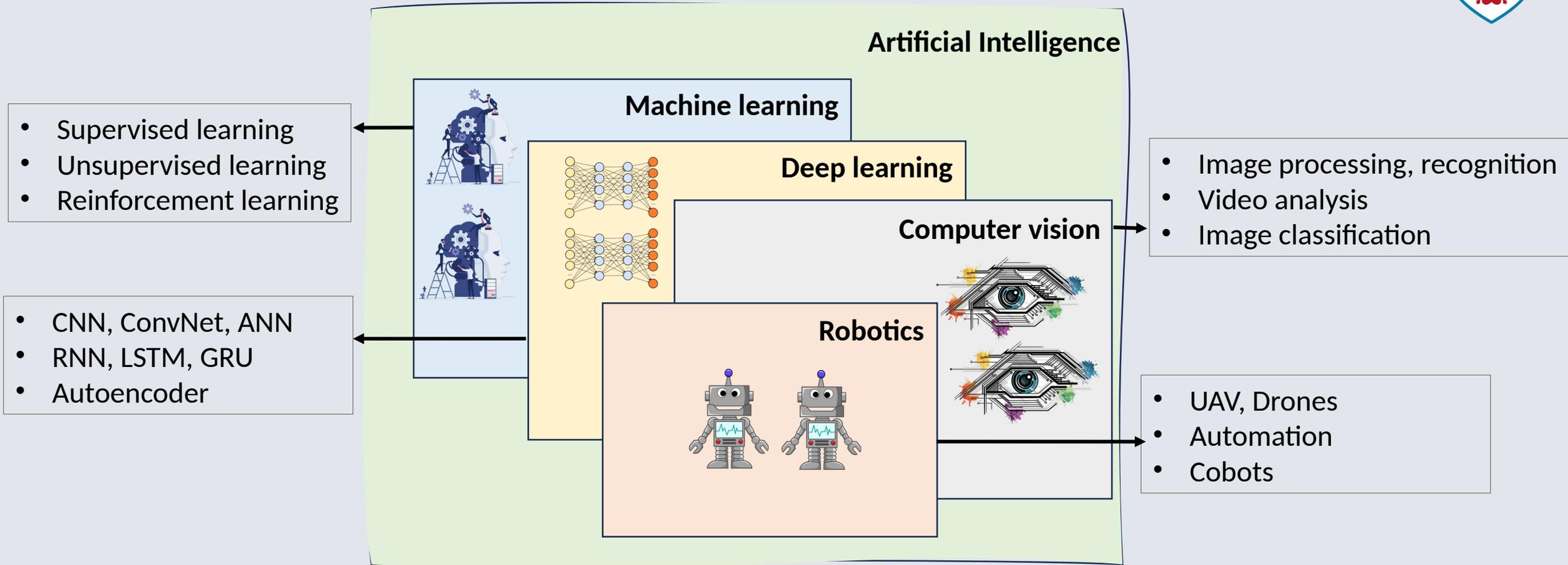
Machine would need:

- Computer Vision and speech to perceive
- Robotics to manipulate object and move

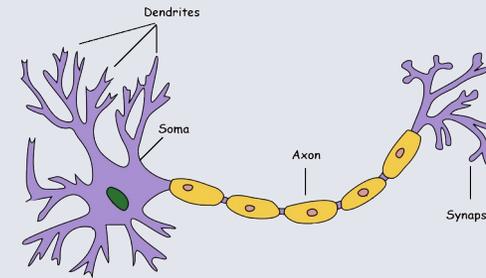
These six disciplines compose most of AI.



Introduction to Artificial Intelligence



History of Artificial Intelligence

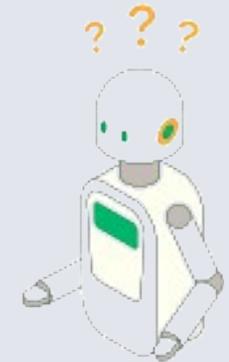


Warren McCulloch & Walter Pitts (1943)

Presented their model of artificial neurons

Alan Turing (1950)

British Mathematician: Test for machine Intelligence if a machine can think.



John McCarthy (1956)

Coined the terms “Artificial Intelligence” to describe science and engineering for making machines intelligent.

General Motors (1961)

Installed first industrial Robot **Unimate**, To replace Humans in Assembly.



History of Artificial Intelligence



Joseph Wizenbaum (1964)

Developed first NLP computer program, **ELIZA**

Shakey (1966)

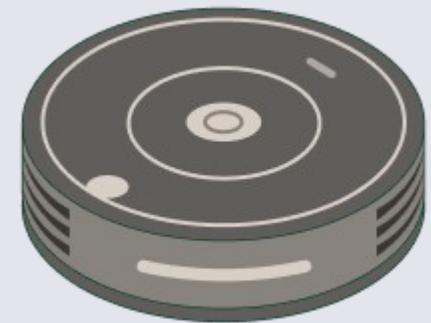
First general-purpose mob robot, capable for reasoning for actions.

IBMs (1997)

Deep Blue, supercomputer beats world chess champion Garry Kasparov.

Roomba (2002)

First mass-produced robotic Hoover sold by iRobot. (cleaning/roaming in home)



History of Artificial Intelligence



Siri (2011)

Apple integrated Siri, Virtual Assistant, into 4S.

Eugene (2014)

Comp program passed the Turing test by convincing a third of the judges participated in experiments that it was a human.



DeepMind's (2016)

DeepMind's AlphaGo programme, based on NN, beats Lee Sodol, the world Go Champion in five games.



ChatGPT (2022)

OpenAI launches an AI chatbot trained to hold conversation and answer questions.



History of Artificial Intelligence



2020-2025

2020, Launch of GPT-3 by OpenAI

2021, OpenAI's DALL-E

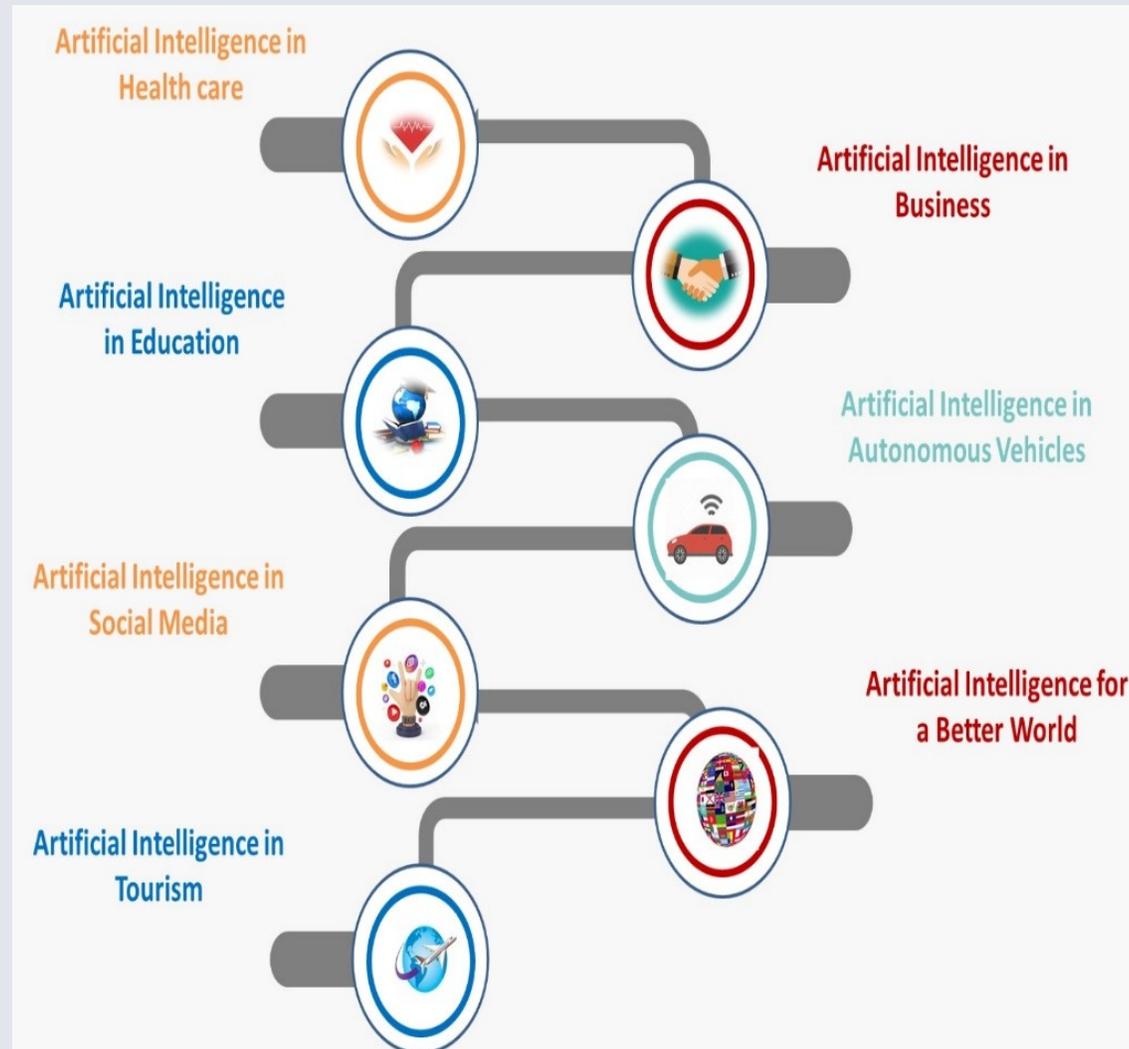
2022, Mid journey and Stable Diffusion

2023, AI landscape experienced a tectonic shift with launch of ChatGPT-4

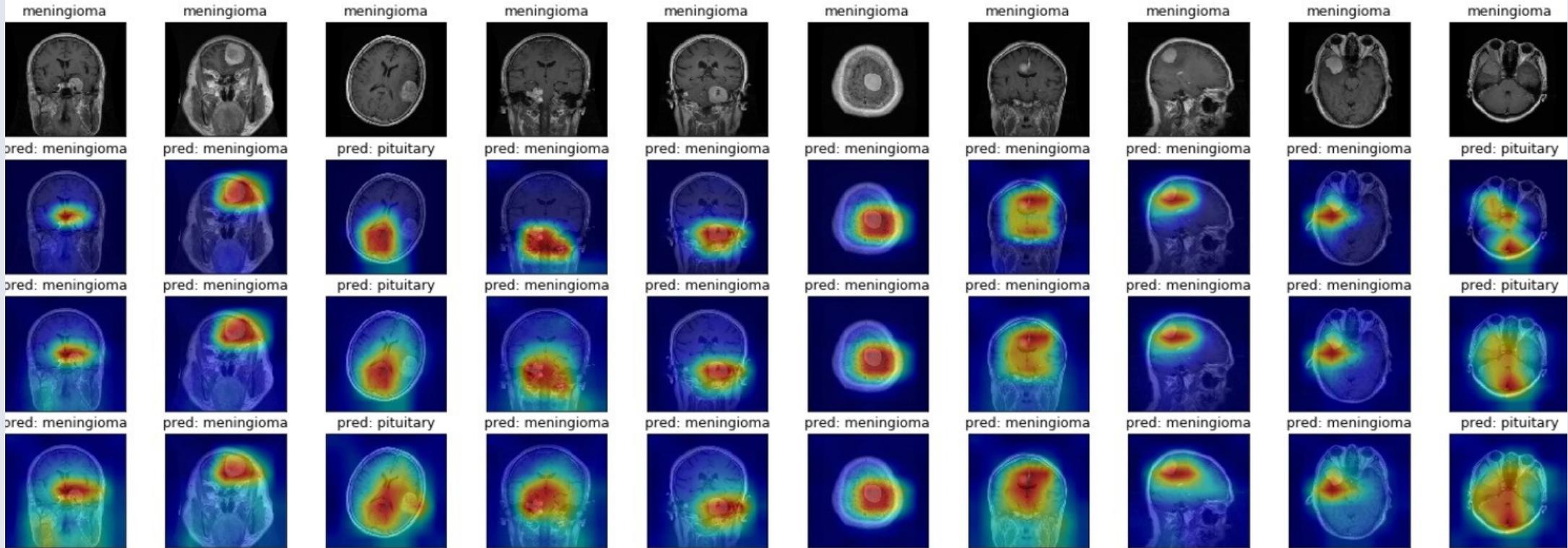
2024-2025, AI agents, multimodal models, and domain-specific???



Applications of Artificial Intelligence



Applications of Artificial Intelligence



AI is designed to help diagnose and treat complex diseases such as brain tumors by combining technologies such as big data analytics, machine learning, and deep learning. AI can detect and classify tumors by analyzing brain imaging techniques, such as Magnetic Resonance Imaging MRI.



Applications of Artificial Intelligence



← 2024 OEM Luxury Designer Sunglasses | Personalized Square Frame Shades for Women & Men More actions < >

Active

Title
2024 OEM Luxury Designer Sunglasses | Personalized Square Frame Shades for Women & M

Description

Generate product description ⓘ

Features and keywords
e.g. organic cotton, relaxed fit

Tone: Expert ↕ Generate

Products Information

Media

Status
Active

Publishing

Sales channels
● Online Store
○ Point of Sale

Markets
● European Union, International, and United Kingdom

Insights
Insights will display when the product has had recent sales

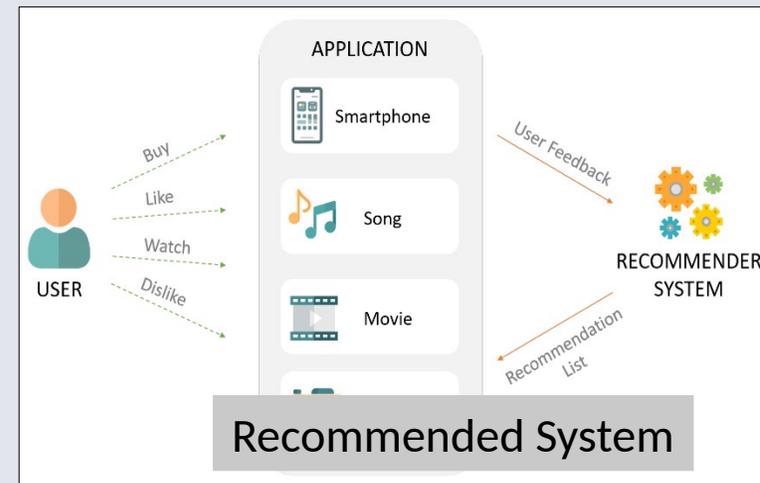
Product organization ⓘ

Product type

Vendor
FathU Store

Collections

Applications of Artificial Intelligence



Applications of Artificial Intelligence



Smart Surveillance

- Safer streets
→ **Wide range multi-view camera network to cover all the streets.**
- Information sharing
→ **Intelligent cameras network to share the information's in-between.**
- Instant alarming
→ **Generate early alarming in case of any abnormality.**



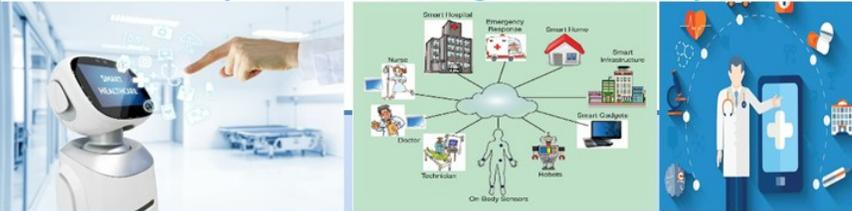
Smart Traffic

- Traffic violations
→ **Catch all type of traffic violations i.e., over speeding, accident, etc.**
- Congestion control
→ **Intelligent traffic sign network to control the congestion.**
- Short response time
→ **Instant reporting to the concern department in case of accident.**



Smart Health

- IoT smart health
→ **With the help of connectivity the citizens can easily get the advice from the concerned doctor.**
- Robots
→ **Robots have the potential to revolutionise life care, helping people to remain independent and reducing the need for hospitals.**



Smart Energies

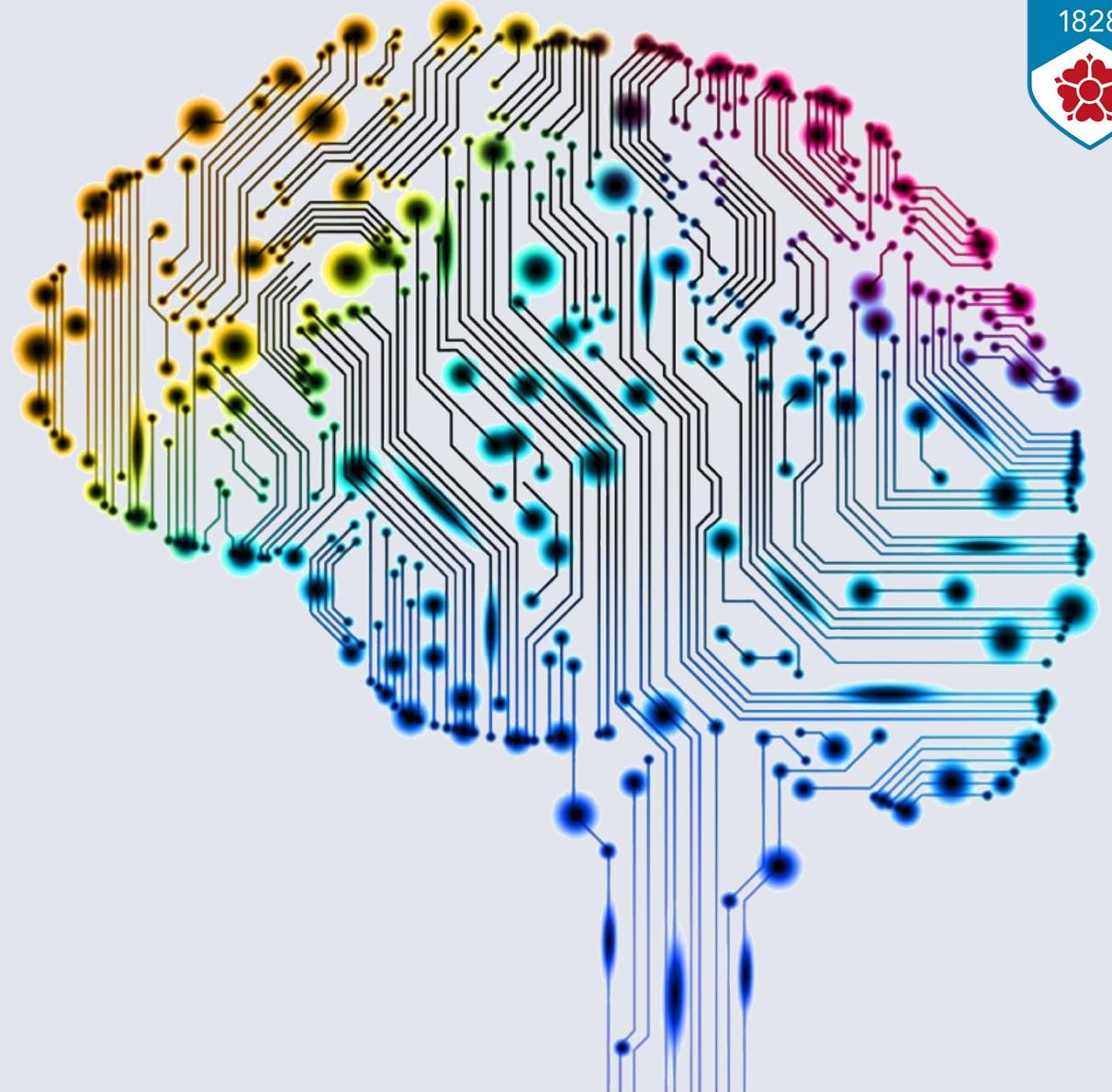
- Distributed generation
→ **Generate energies from several sources including solar, wind, biomass and fuel cells.**
- Smart homes
→ **Equipped with smart and intelligent appliances which can intelligently monitor energy resources.**



Next Week



- **Types of Artificial Intelligence**
- **Main working areas in AI.....**
- **Some applied fields.**





Any Question?