Applications of artificial intelligence

Machine Intelligence class

2nd lecture

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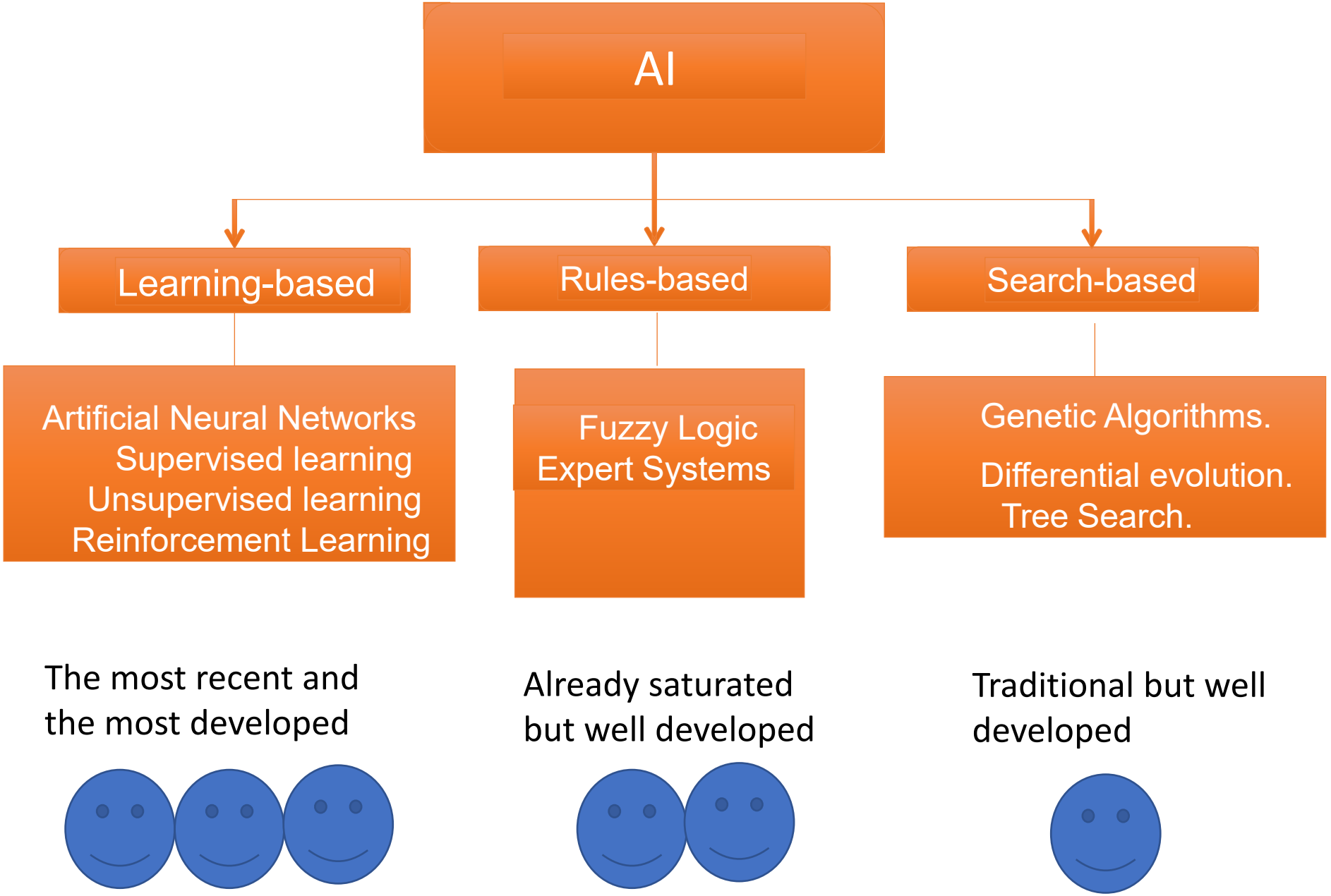
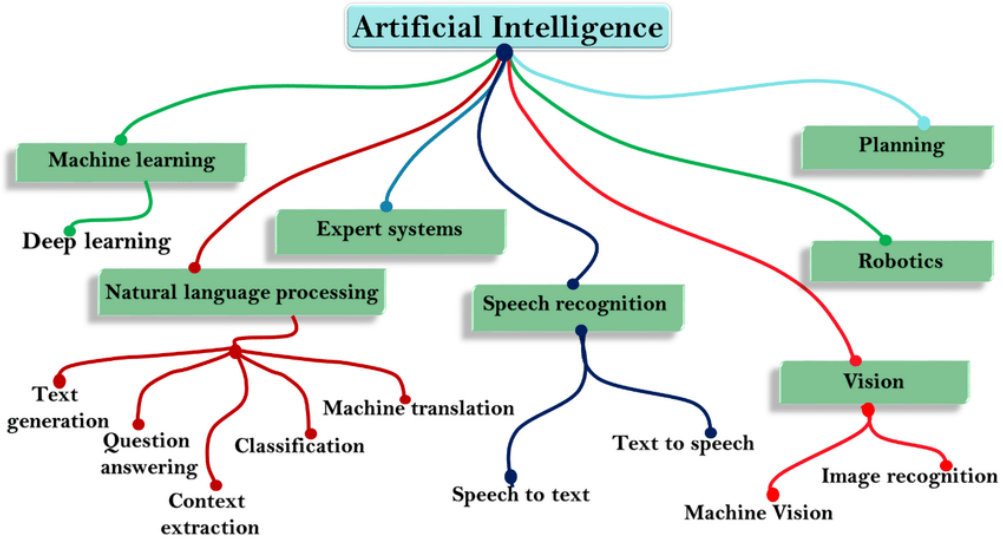
Outline

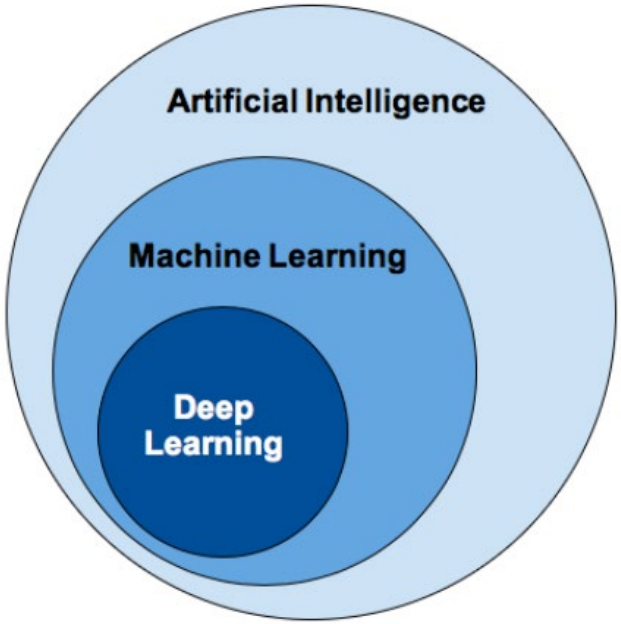
- AI methods and techniques
- AI Applications


AI
Learning-based
Rules-based
Search-based
Artificial Neural Networks
Supervised learning
Unsupervised learning
Reinforcement Learning
Fuzzy Logic
Expert Systems
Genetic Algorithms.
Differential evolution.
Tree Search.
The most recent and the most developed
Already saturated but well developed
Traditional but well developed

MACHINE LEARNING

Machine Learning is a scientific field that studies the methods and techniques **to make machines able to learn** from data and/or interactions with their environment **without being explicitly programmed**.





Machine Learning

- Machine Learning Algorithms can be divided into:

SUPERVISED LEARNING

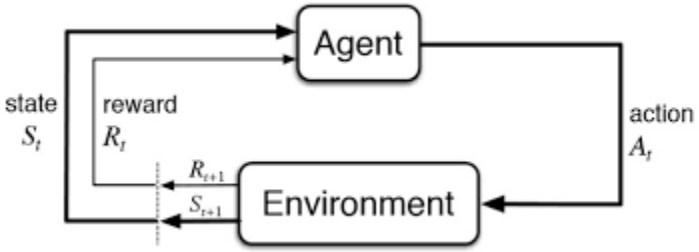
UNSUPERVISED LEARNING

REINFORCEMENT LEARNING

https://www.aitude.com/supervised-vs-unsupervised-vs-reinforcement/

Machine Learning

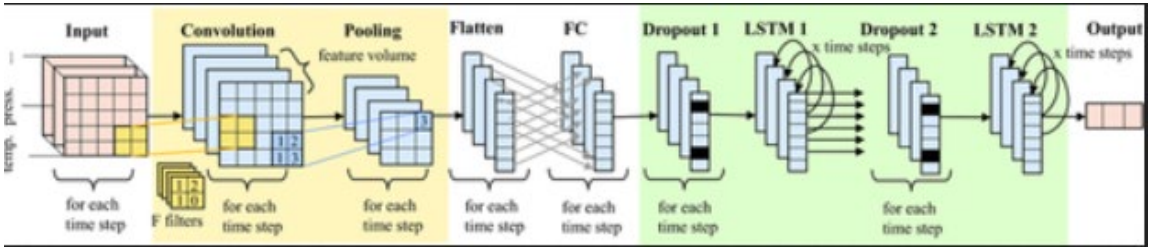
- Supervised Learning: you have the input data and its labels, and you need to teach the machine to label similar data. Example: classifying animal pictures either dog or cat.
- Unsupervised Learning: you have unlabeled data, and you need classify them into groups according to the similarities among them. Example: clustering a group of pictures according to the similar features among them.
- Reinforcement Learning: you have an agent and an environment; the agent needs to learn the set of the best actions (policy) that produce him the best future rewards.



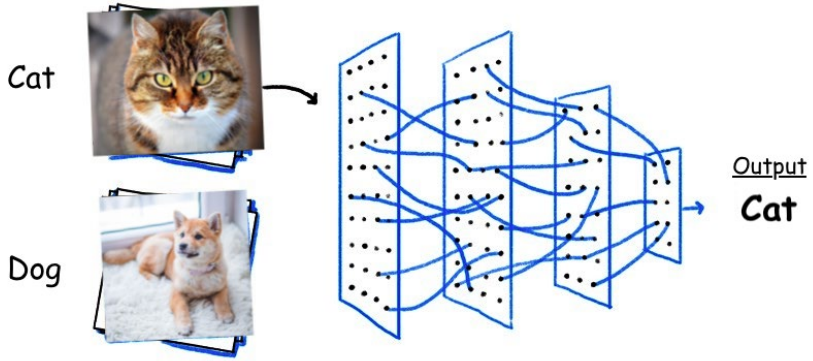
Machine learning

- Machin learning tasks can be classified as:

- Prediction/regression/approximation: estimation of a value. Ex: predicting tomorrow's weather.



- Classification: telling what a group an object belongs to. Ex: classifying the animals.

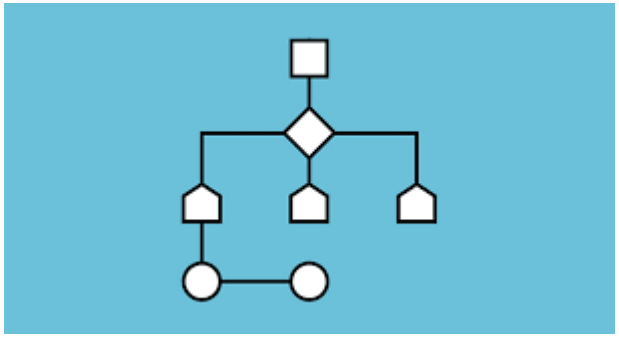


What is anAlgorithm ?

- An algorithm is a series of instructions telling a computer how to transform a set of facts about the world into useful information.

- Example: an algorithm to detect picture edges/obstacle avoidance algorithms.

- Algorithms usually involve mathematical methods and are coded into computers.



https://theconversation.com/what-is-an-algorithm-how-computers-know-what-to-do-with-data-146665

Skills Needed to work in AI?

- **Critically think** about the task AI should do and fully understand it.
- Know the **Mathematical** background required to solve the problem.
- **Design** the suggested Algorithm.
- **Program** the algorithm into the computer using your preferred programming language mostly Python, R or C++.
- **Critically analyzing** the results obtained using your engineering sense and/or experiences.
- **Reiterate** any step until your task goals are met.

AI Applications

Marketing

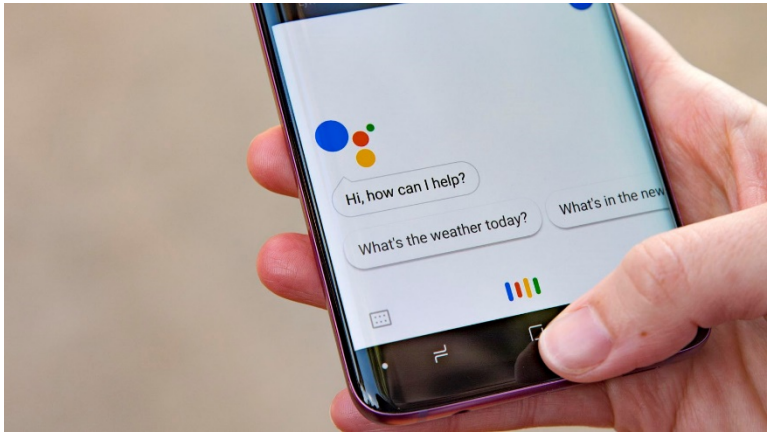
Banking and finance

Agriculture

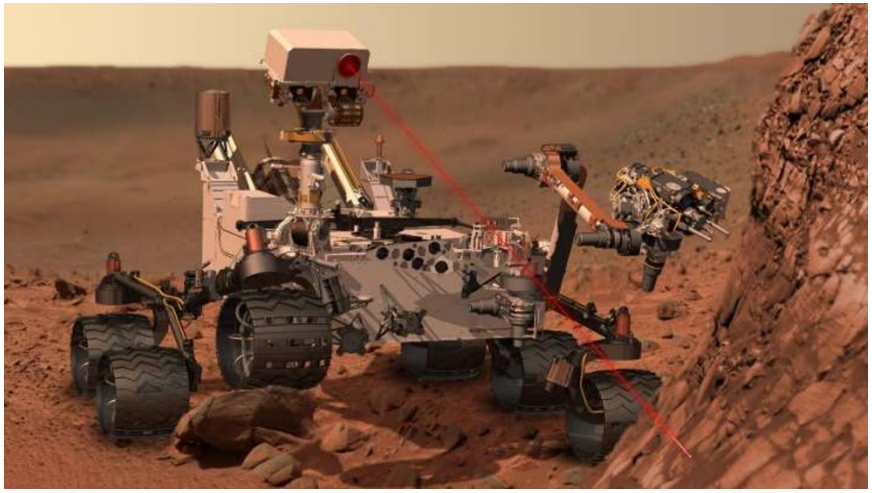
Health care

Artificial Intelligence Applications

Gaming



Chatbots and social media



Space Exploration

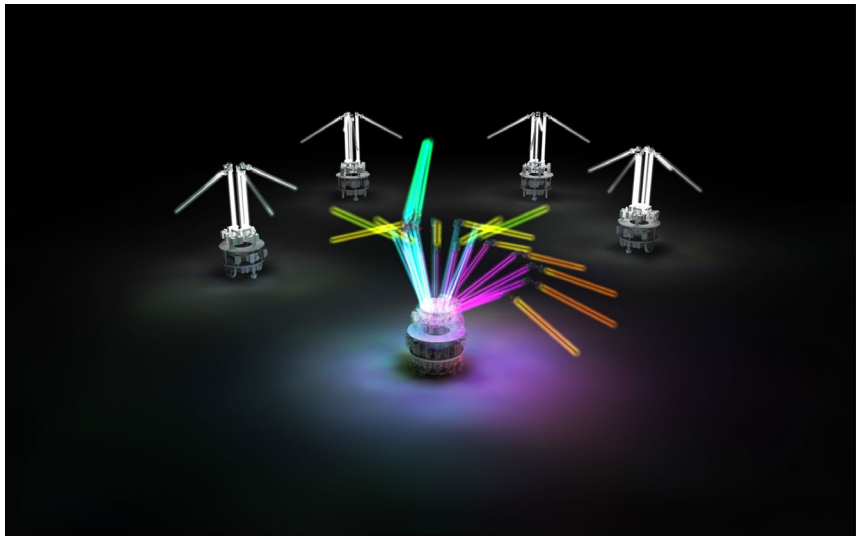
Autonomous Vehicles

https://www.edureka.co/blog/artificial-intelligence-applications

Artificial Intelligence Applications

Face recognition

Natural language processing



Artificial creativity

Artificial Intelligence Applications

Military

AI Applications in Industry 4.0

https://www.youtube.com/watch?v=02Lt0xKXM8U&list=PLrFsz7ebp6wunF6BSENxO3gtRfP4Z8ChI&index=25

Conclusions

- AI methods can be divided into three categories: learning-based, Rule-based, and search-based
- Machine Learning is a subfield of AI that is concerned with teaching machines to learn.
- Working in AI systems involves critical thinking, mathematics, algorithms, and coding.
- AI has a wide range of applications that include robotics, agriculture, video games, image recognition, medicine, and military applications.