Machine Learning

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Machine Learning

- Machine learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed.

- Machine learning focuses on the development of computer programs that can access data and use it learn for themselves.

- The primary aim is **to allow the computers learn automatically** without human intervention or assistance and adjust actions accordingly.

Why is it called machine learning?

- It used to be **called** statistical **learning** theory.

 Its because the way human learn different thing **machine** is **learning** different thing.

we are not discussing **machine** **what to do**, we are discussing **machine** **how to do**. So, **machine** will use this skill to solve next problem it will face without **explicitly programmed**.

Goal of Machine Learning?

To build new and/or leverage existing algorithms to learn from data, in order to build **generalizable models** that give **accurate predictions**,

or

To find patterns, particularly with **new** and **unseen similar data**.

Machine learning algorithms use historical data as input to predict new output values

Methods of Machine Learning

Methods of machine learning

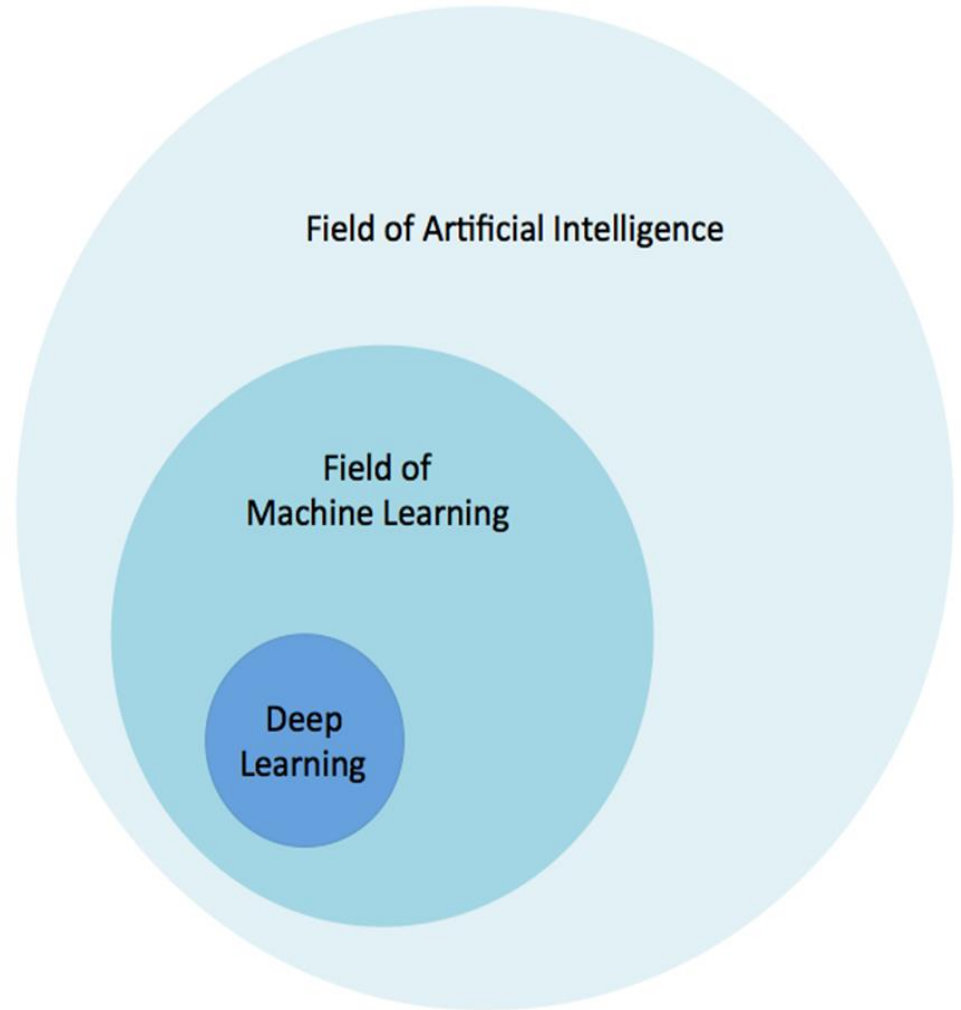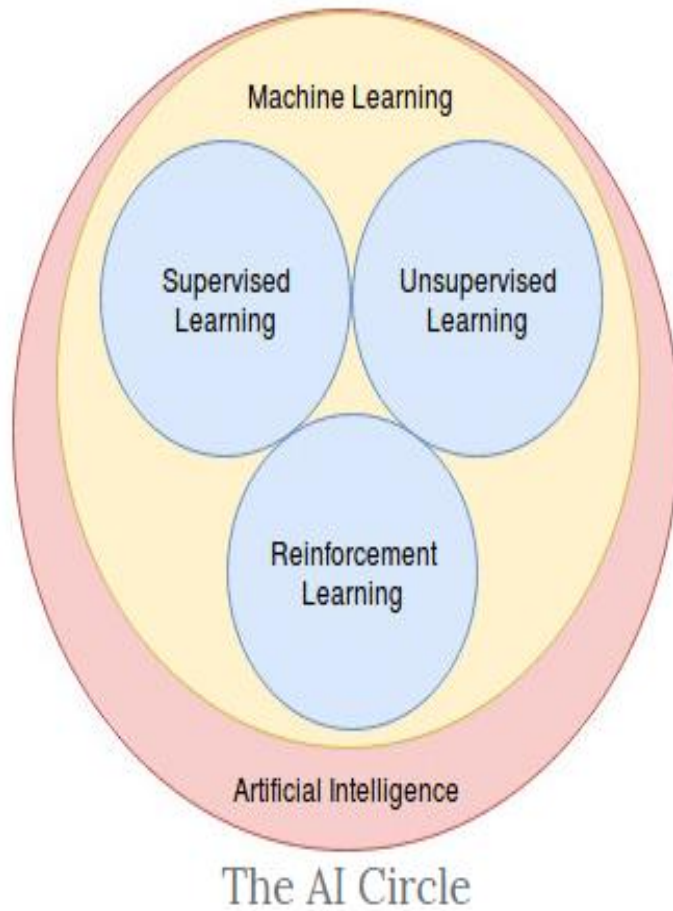Learning on examples

Learning on experience

Self-learning

Deep learning

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Relationship among AI,ML and DL

The AI Circle

Types of machine learning

Classical machine learning is often categorized by how an algorithm learns to become more accurate in its predictions. There are four basic approaches:

Supervised learning,
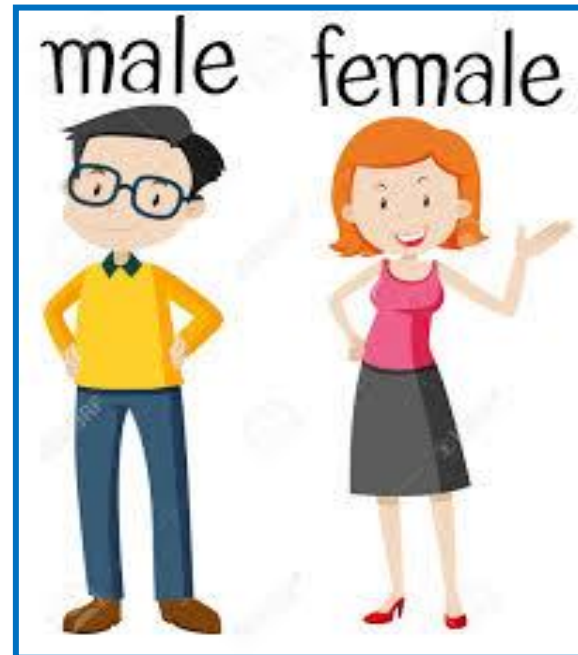
Unsupervised learning,

Semi-supervised learning and

Reinforcement learning.

The type of algorithm a data scientist chooses to use depends on what type of data they want to predict.

Supervised Learning

Supervised Learning:

It can apply what has been learned in the past to new data using labeled examples to predict future events.

● Given a set of people with and without   Corona, their their
   temperature levels are: (Supervised   Learning)

Positive cases: {8.5, 9.2, 7.4, 7.8}

o Negative cases: {15.0, 14.9, 14.2,13.8}

o Does a patient with 7.7 have **Corona**?

Classification is simple:
"Corona if $f(x) < 10$ "

o Why 10? Why not 12?

Multiple solutions. Both works well now. Future?

Unsupervised Learning

Unsupervised Learning:

     Unsupervised learning studies how systems can infer a function to describe a hidden structure from unlabeled data.

Why Unsupervised Learning?

Finds all kind of unknown patterns in data.
To find features which can be useful for categorization.
All the input data to be analyzed and labeled in the presence of learners.
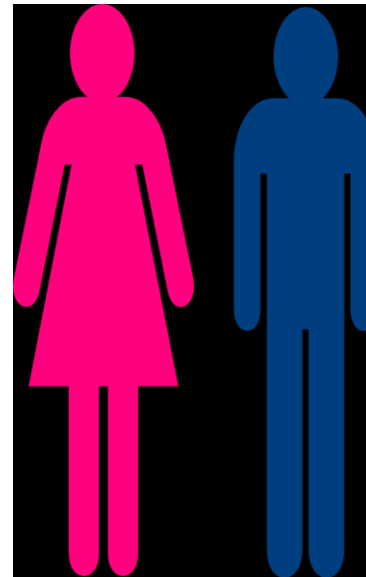
Examples-Unsupervised Learning

- Given a set of numbers{27,26,17,13,25,34,5,8,92}, partition into two sets: (Unsupervised Learning)

- **Odd (27,17,13,25,5) and Even (26,34,8,92)**

- Why this? Why not single and two digit?

- Both mine and your solutions can be right?

Semi-supervised Learning

It fall somewhere in between supervised and unsupervised learning, since they use **both labeled and unlabeled data** for training – typically a small amount of labeled data and a large amount of unlabeled data.

Cont…

- **Semi-supervised Learning**

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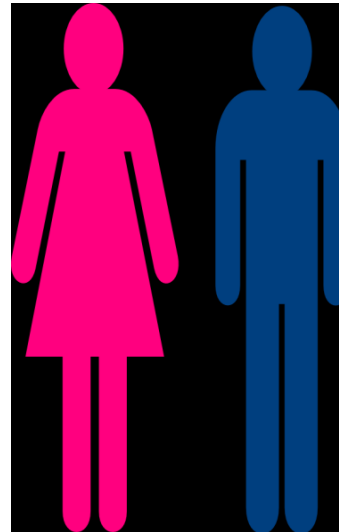
Reinforcement Learning(RL)

It enables an agent to learn in an interactive environment by trial and error using feedback from its own actions and experiences.

Examples : Playing Games ,Swimming and Kids walk etc.
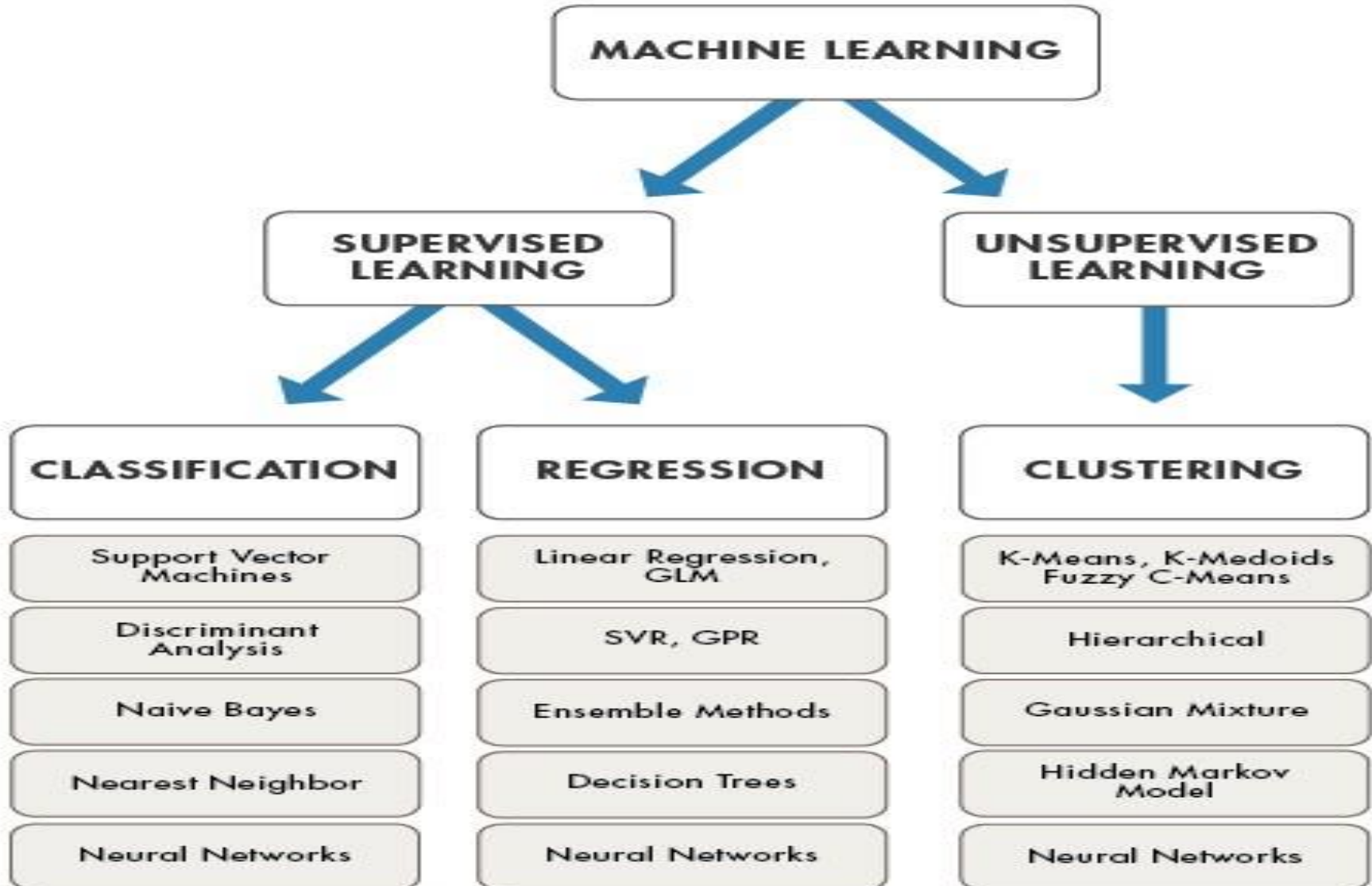

Baby starts to walk

Kids to Jump
actions
rewards
observations

environment
agent
actions
rewards
observations

Supervised and Unsupervised Learning

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AI Real-time Applications

Commercial Flights Use an AI Autopilot

Google's AI-Powered Predictions

Automated Car driving system

E-Mail spam Learners

Plagiarism check

Medical diagnosis

Other ML real time Applications

- Credit Decisions

- Image Classification

- Speech Recognition

- **Medical diagnosis**

Traditional Programming

Data
Program
→
Computer
→
Output

Machine Learning

Data (x)
Output(y)
→
Computer
→
Program

THANK YOU

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