

INTRODUCTION TO BIG DATA

ECAP456

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Learning Outcomes



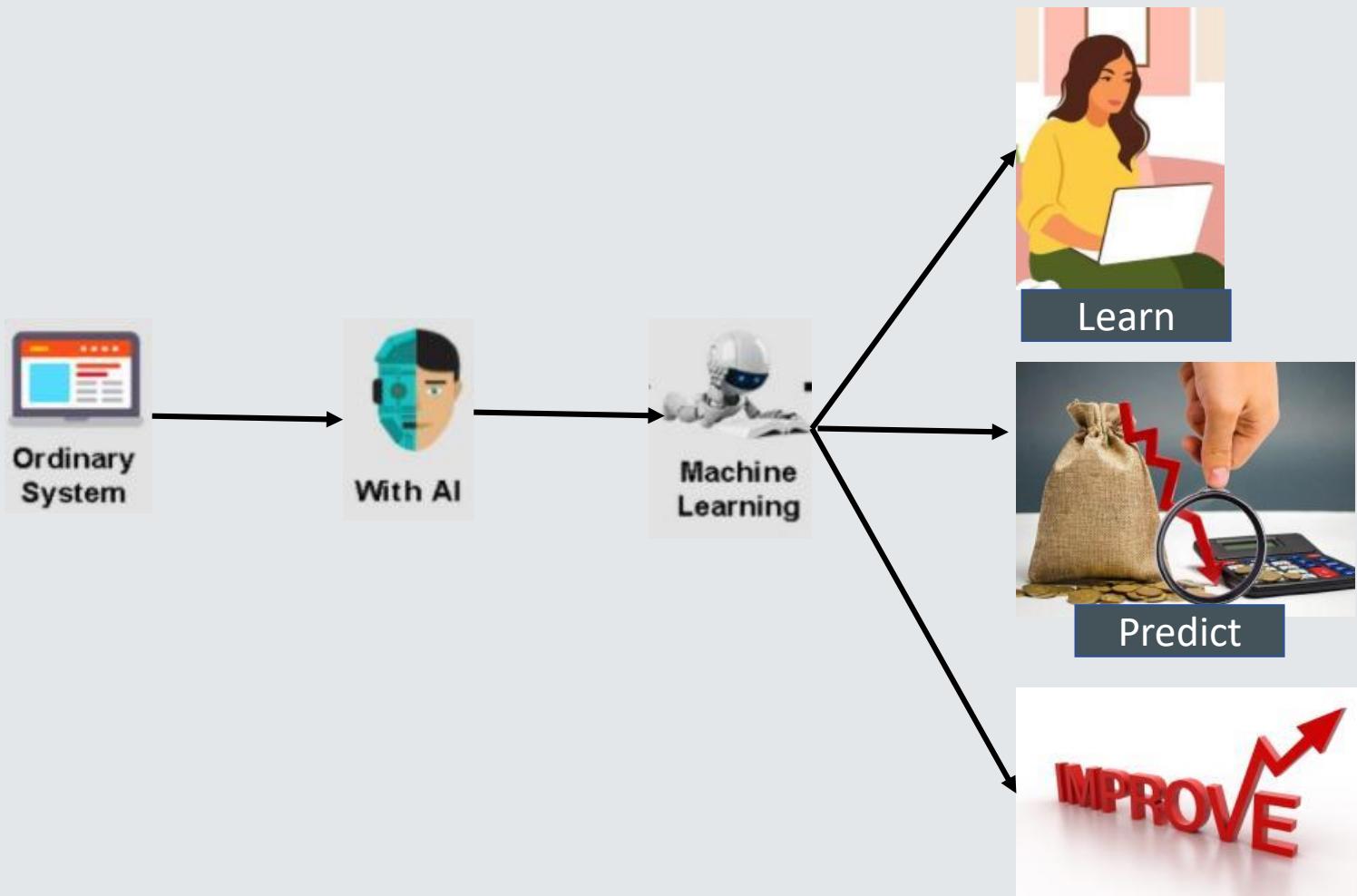
After this lecture, you will be able to

- learn concepts of machine learning.
- learn four categories of machine learning.



Artificial Intelligence

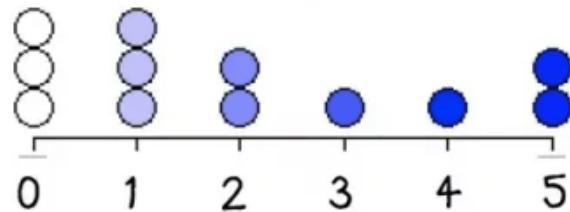
Introduction



Introduction

Find the Number of Observations in a Line Plot

How many siblings do you have? $N = 12$



Starts with observations or data

Introduction

SEQUENCE

The order in which things

happen in a story.

First

Once upon a time

At first Before

Earlier

Next Second Afterwards

Later

The next day

Once

Then

Meanwhile

After

Soon

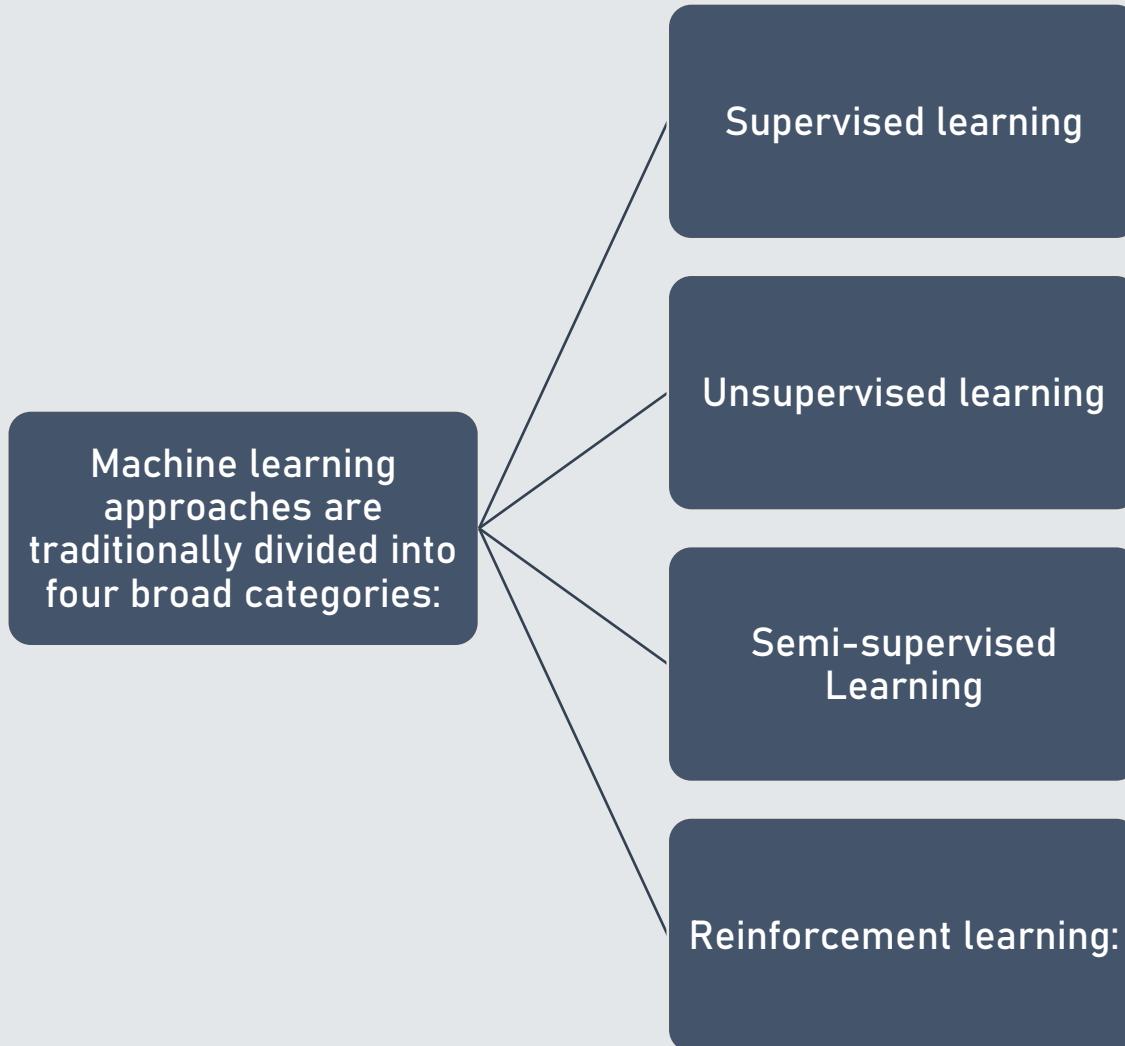
Last

At the end

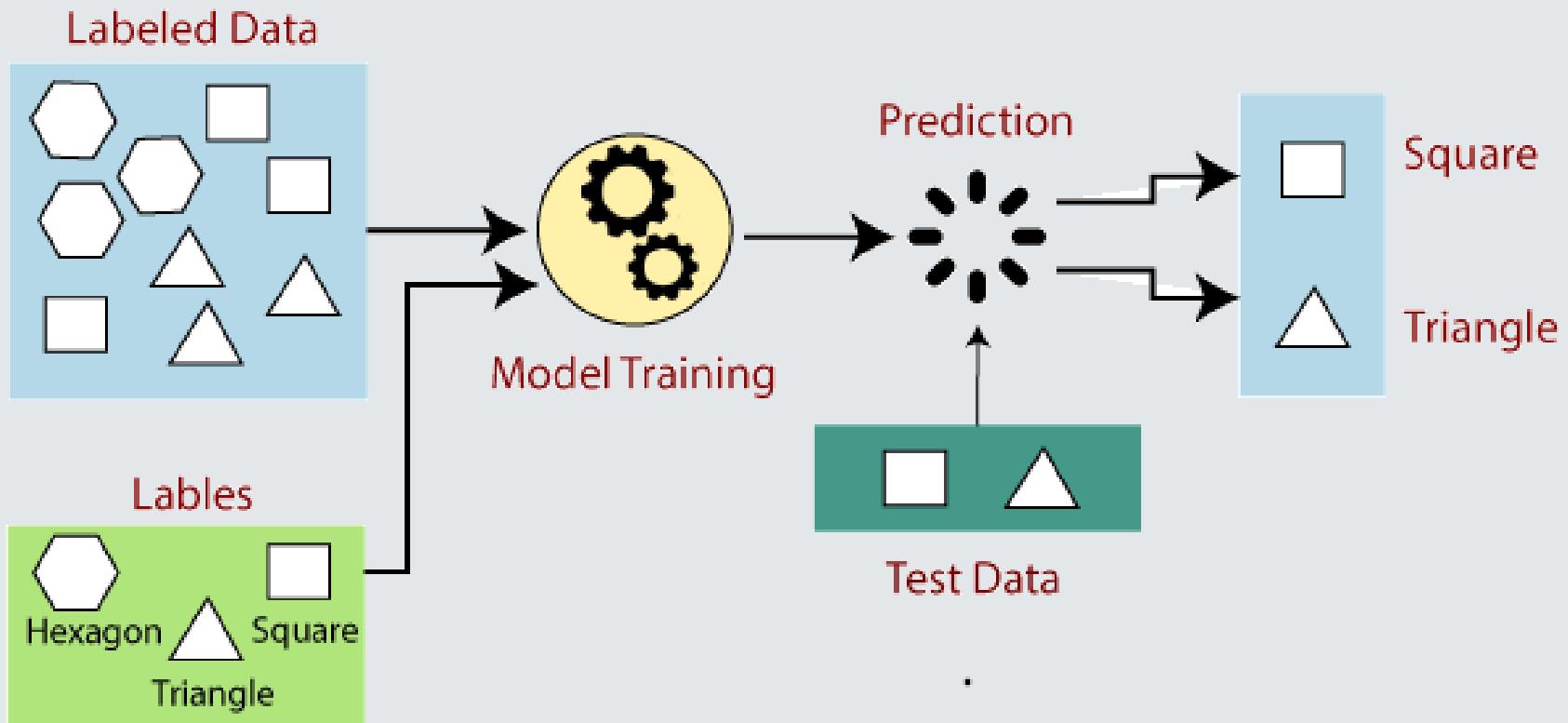
They lived happily ever after.

Finally

Machine Learning Methods

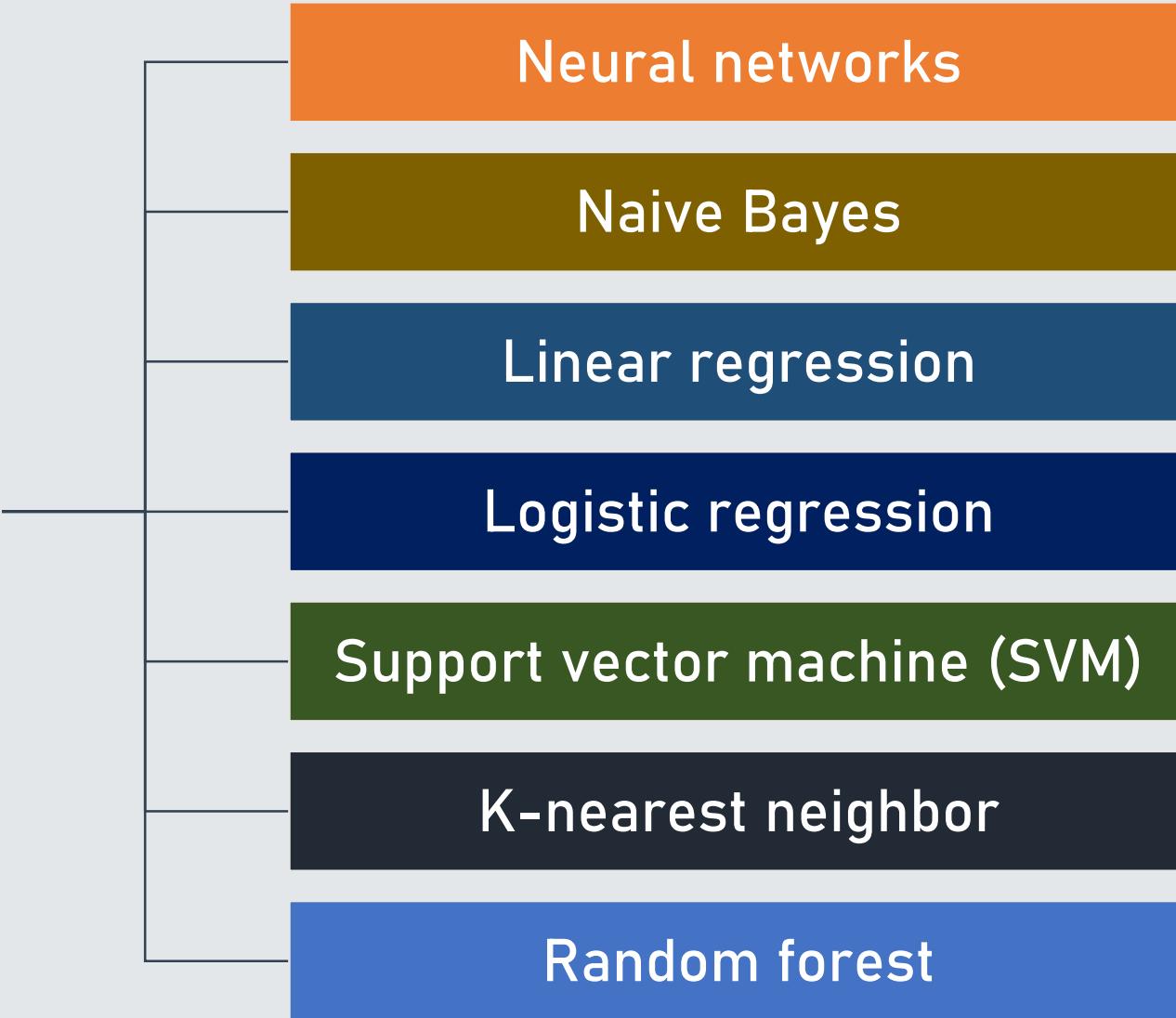


Supervised machine learning algorithms



Supervised learning algorithms

Various algorithms and computation techniques are used in supervised machine learning processes



Supervised learning examples

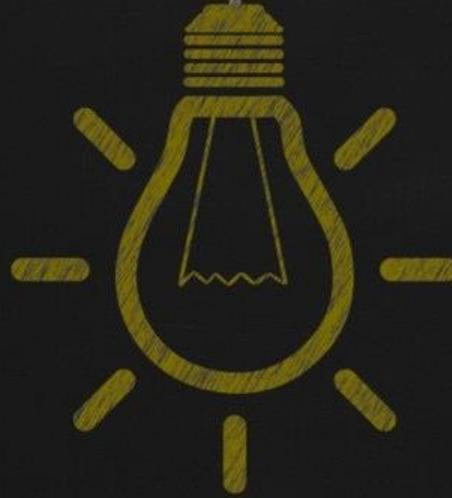
A variety of commercial applications, including the following, may be built and advanced using supervised learning models:

Image- and object-recognition

Predictive analytics

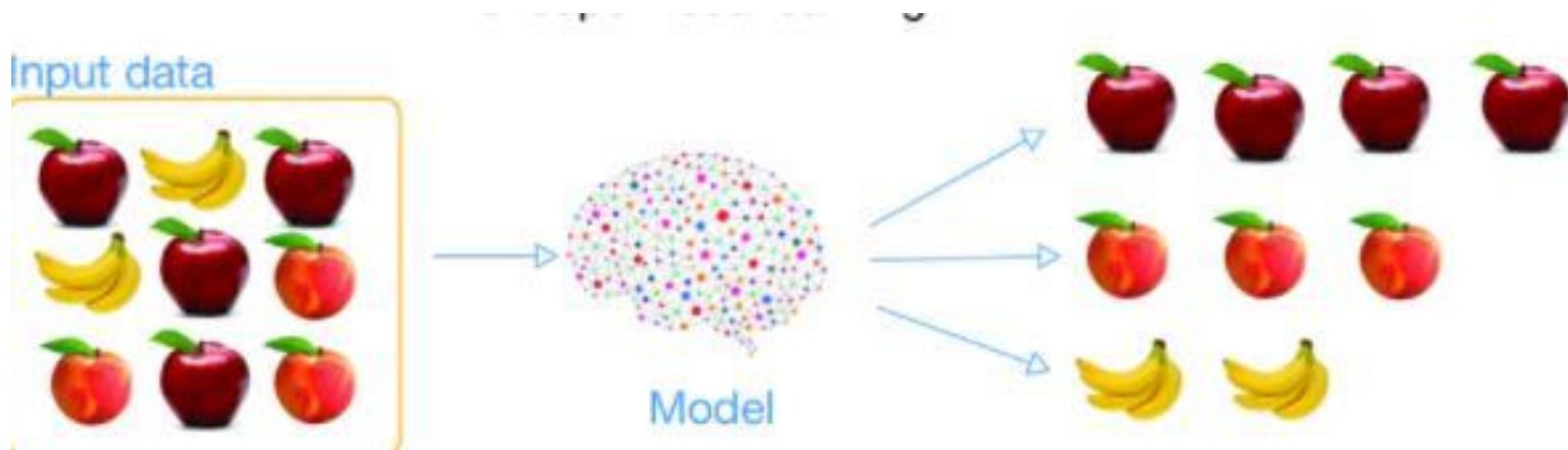
Customer sentiment analysis

Spam detection

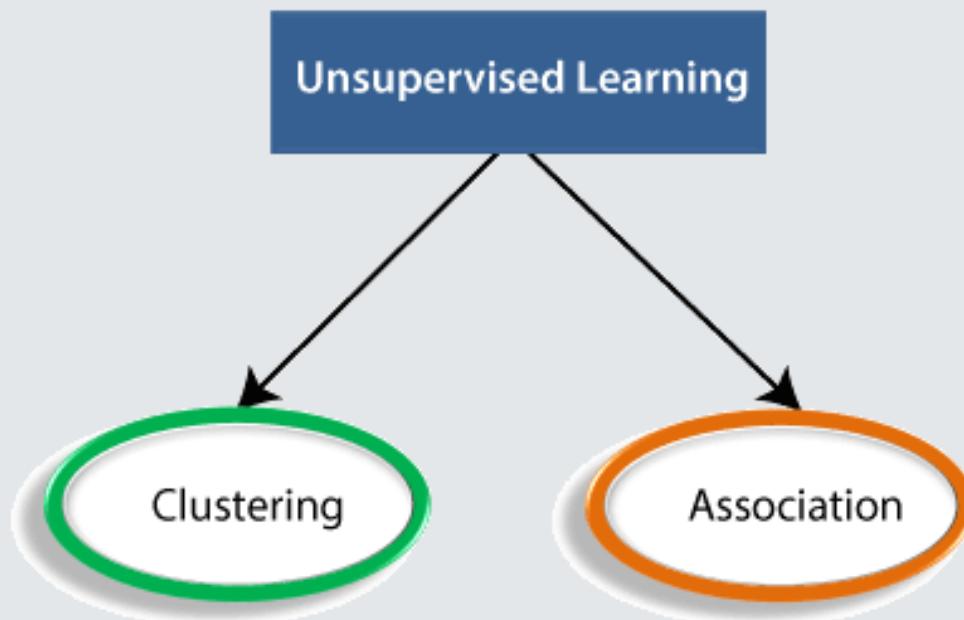


Challenges of supervised learning

Unsupervised machine learning algorithms



Types of Unsupervised Learning Algorithm



Unsupervised Learning algorithms

list of some popular unsupervised learning algorithms are:

- K-means clustering
- KNN (k-nearest neighbors)
- Hierarchical clustering
- Anomaly detection
- Neural Networks
- Principle Component Analysis
- Independent Component Analysis
- Apriori algorithm
- Singular value decomposition

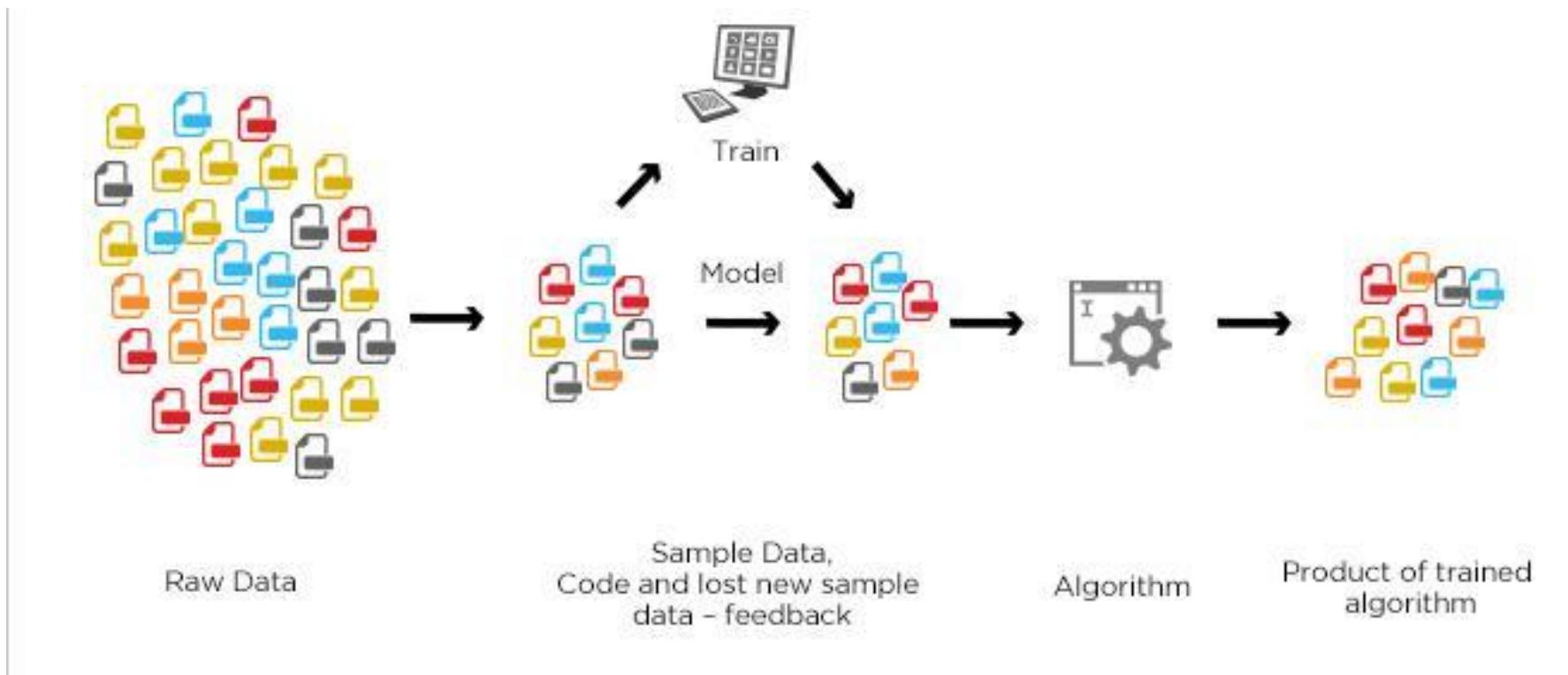
Advantages of Unsupervised Learning

- Unsupervised learning is used for more complex tasks.
- Unsupervised learning is preferable.

Disadvantages of Unsupervised Learning

- Because it lacks a comparable output.
- Because the input data is not labelled and algorithms do not know the precise output in advance.

Semisupervised machine learning algorithms



Semisupervised machine learning algorithms

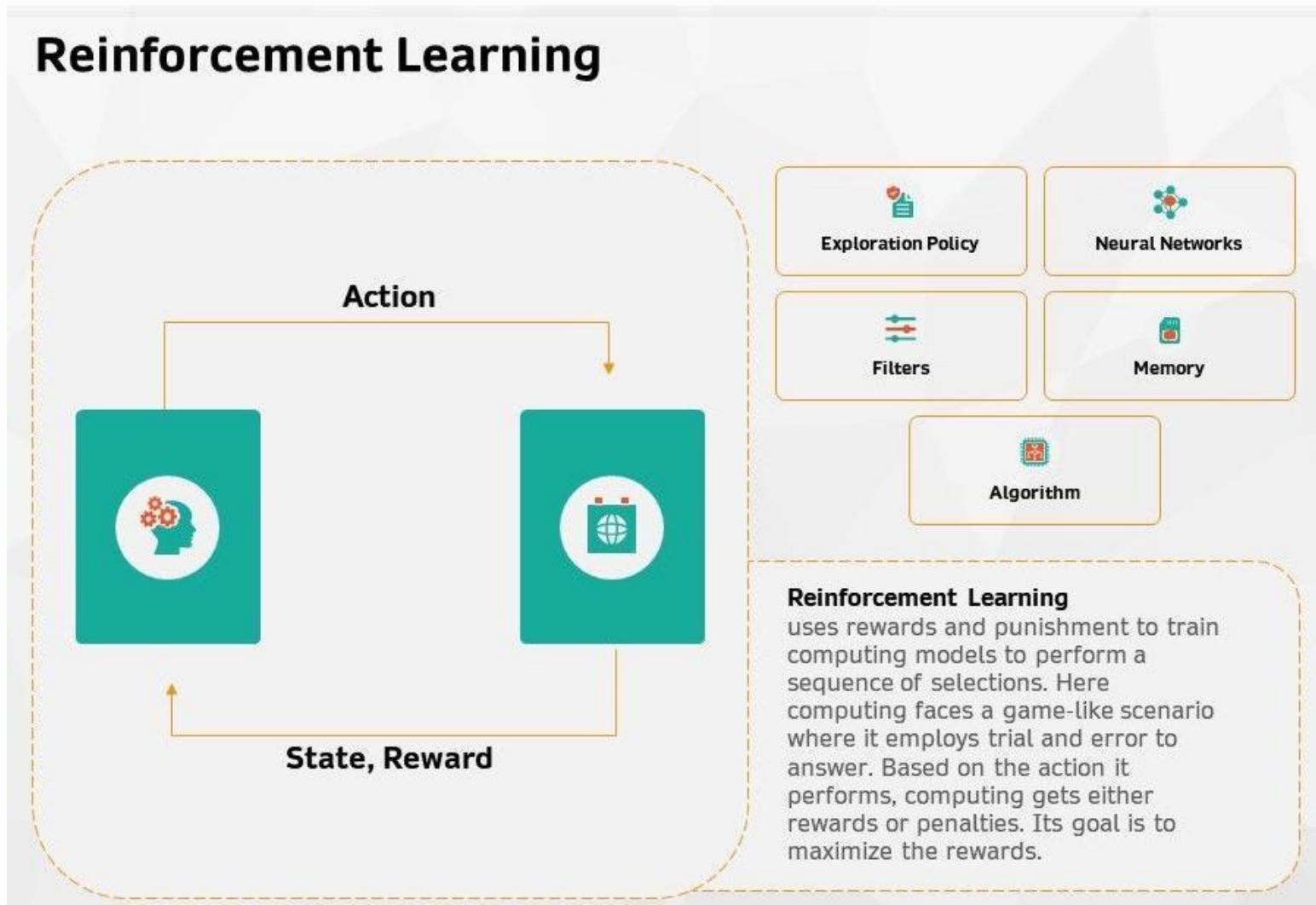
A Semi-Supervised algorithm assumes the three factors about the data

Continuity
Assumption

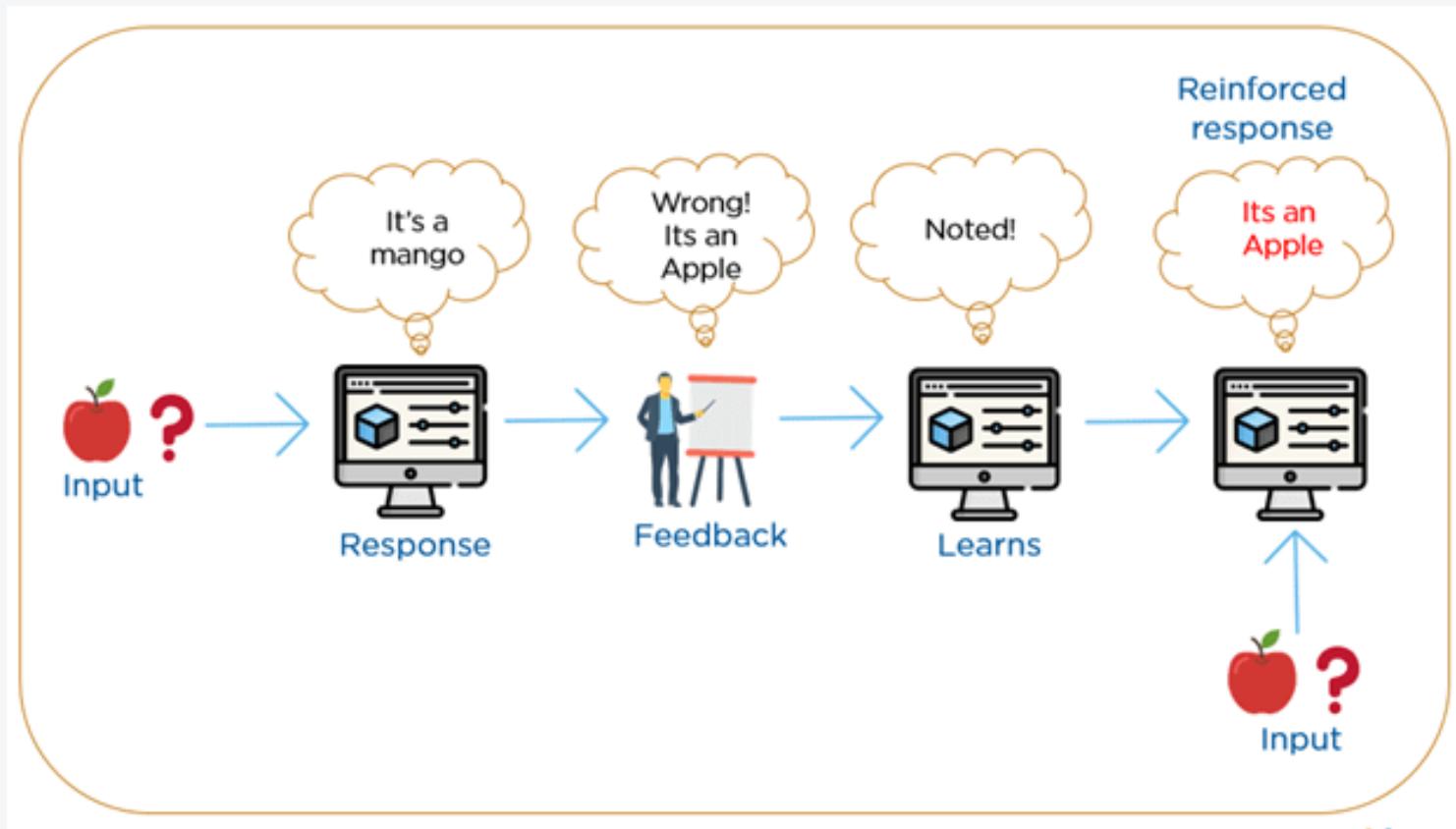
Cluster
Assumption

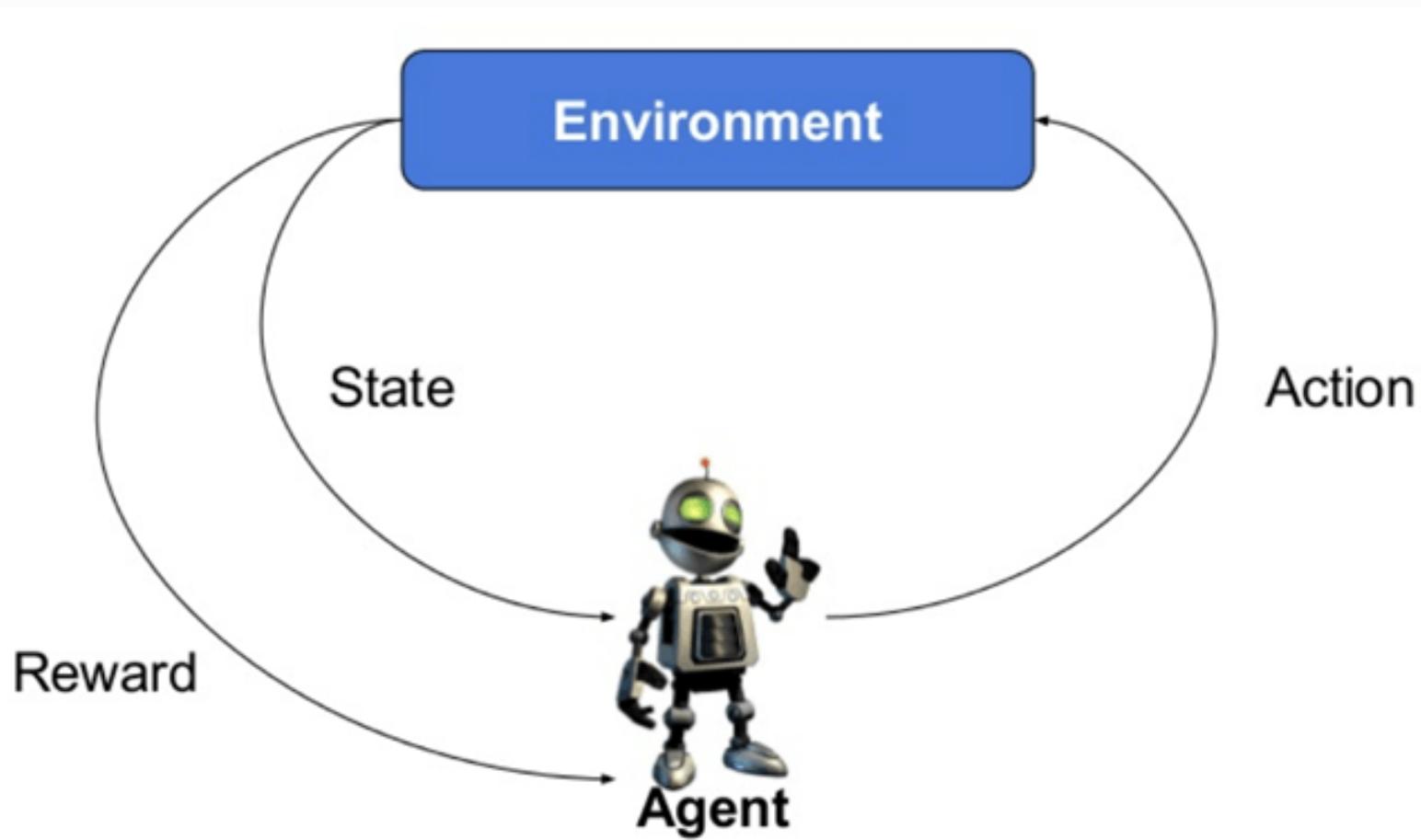
Manifold
Assumption

Reinforcement machine learning algorithms

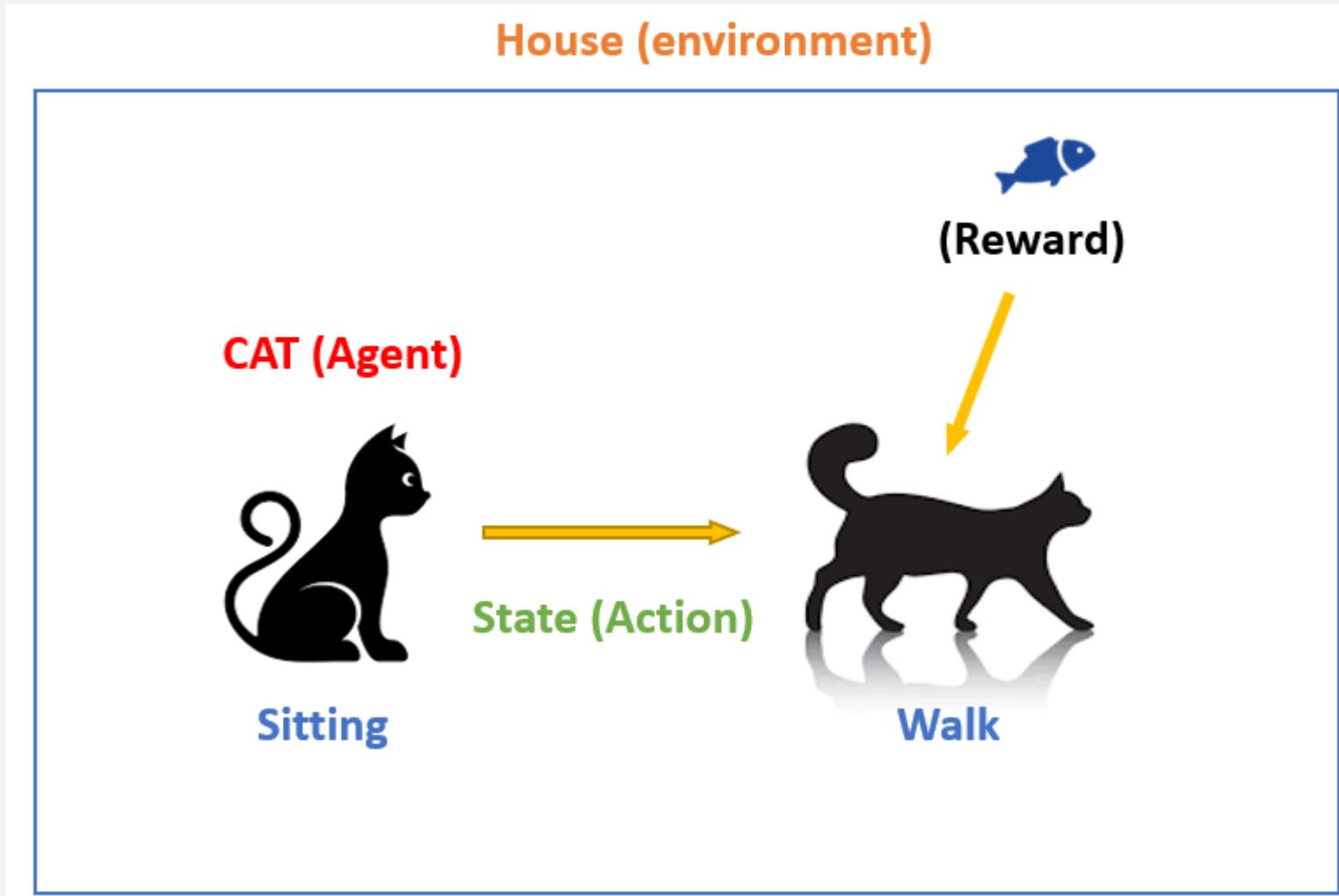


Reinforcement machine learning algorithms

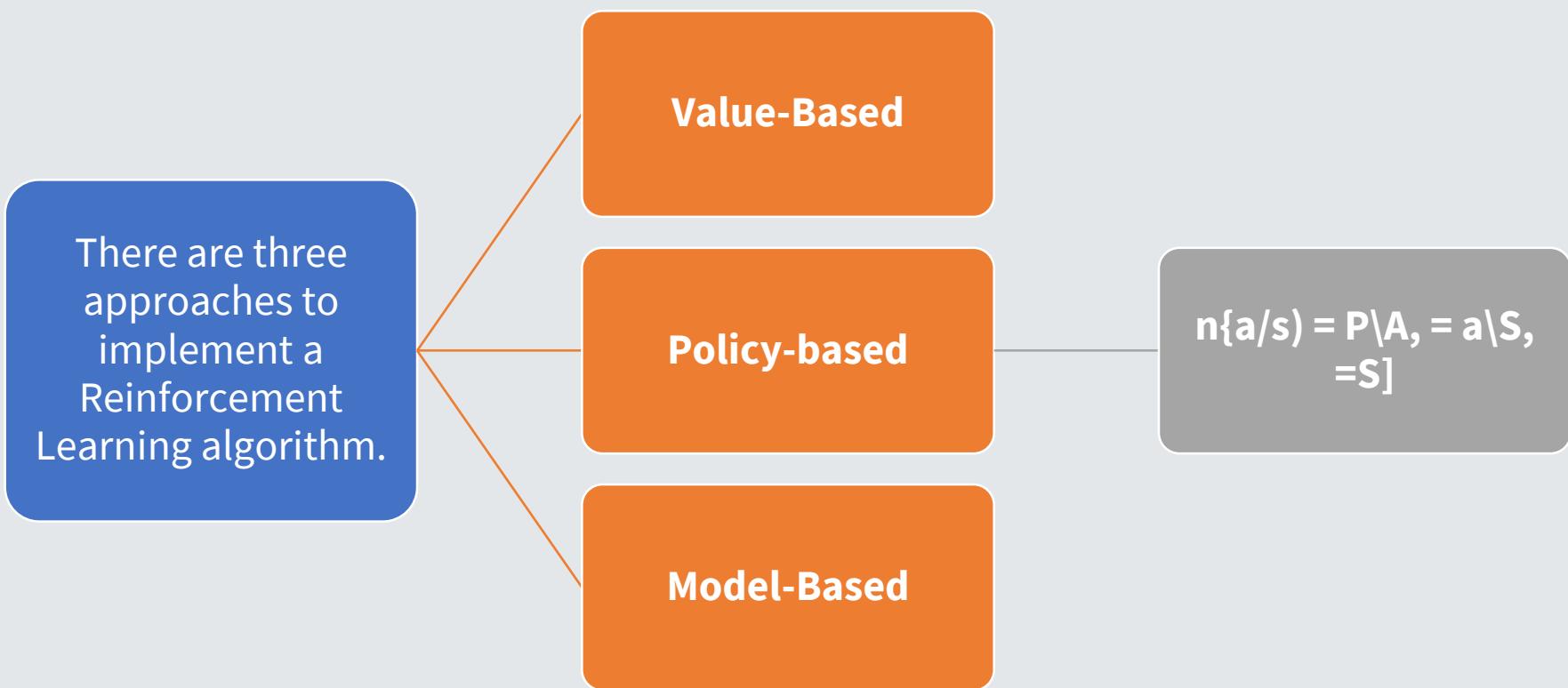




How reinforcement learning works?



Reinforcement Learning Algorithms



Characteristics of Reinforcement Learning

There is no supervisor.

Decisions in a sequential order

Time is critical.

Feedback is never immediate.

The data determined by its activities.

Types of Reinforcement Learning

Two kinds of reinforcement learning methods are:

Positive

Negative

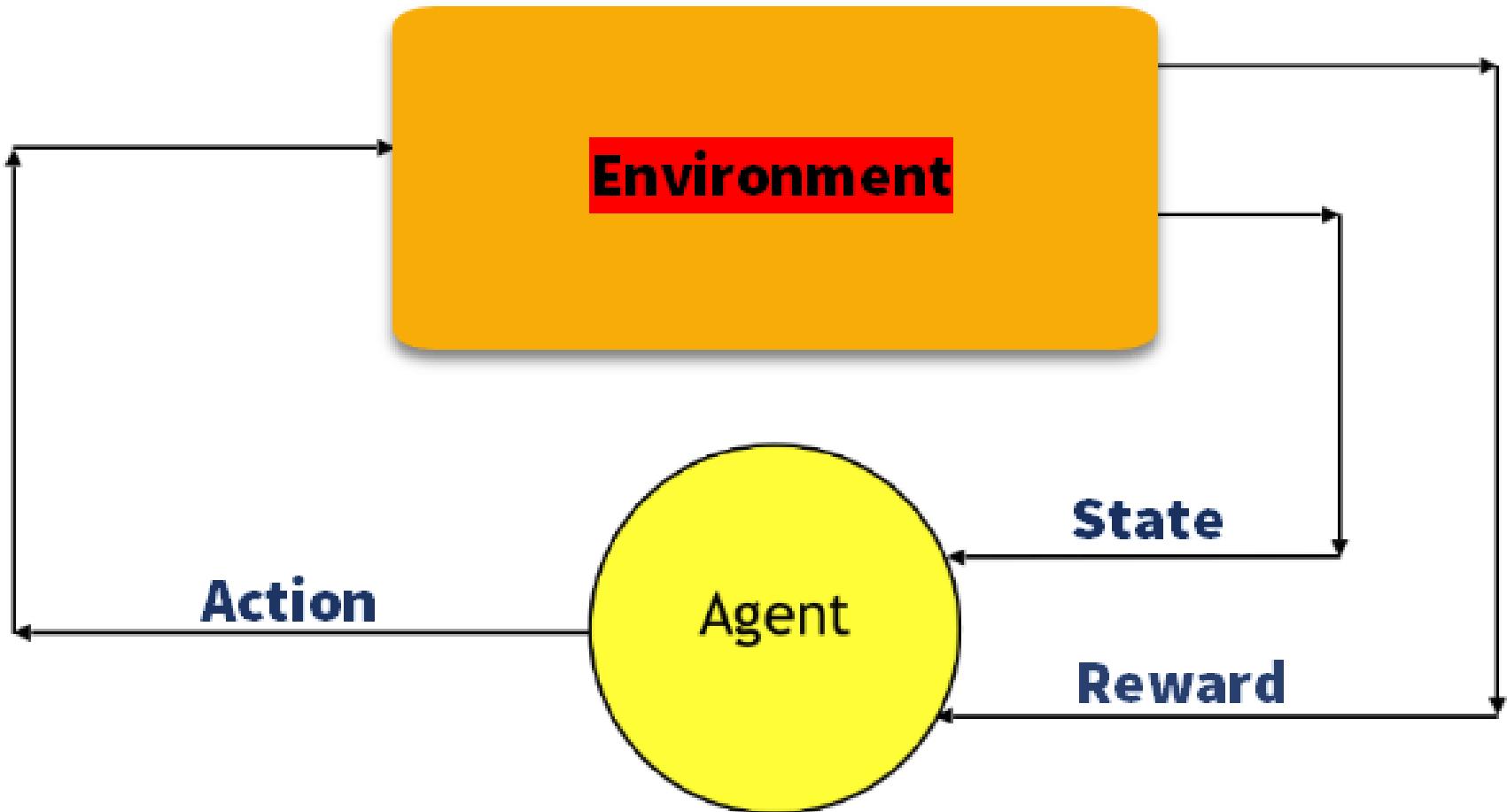
Learning Models of Reinforcement

There are two important learning models in reinforcement learning:

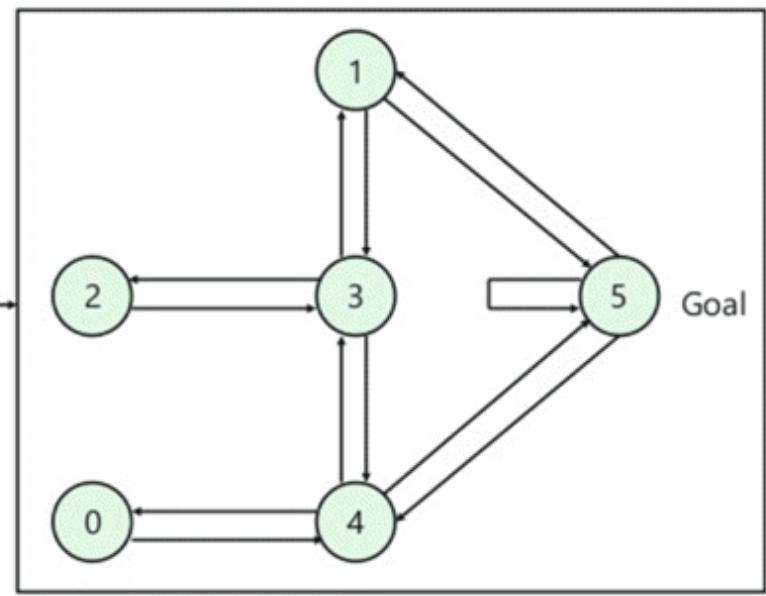
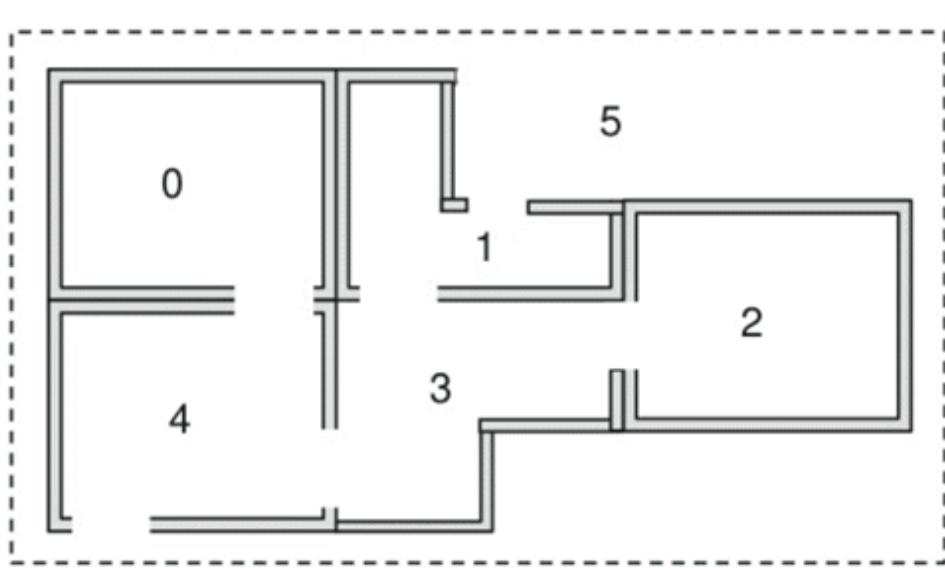
Markov Decision Process

Q learning

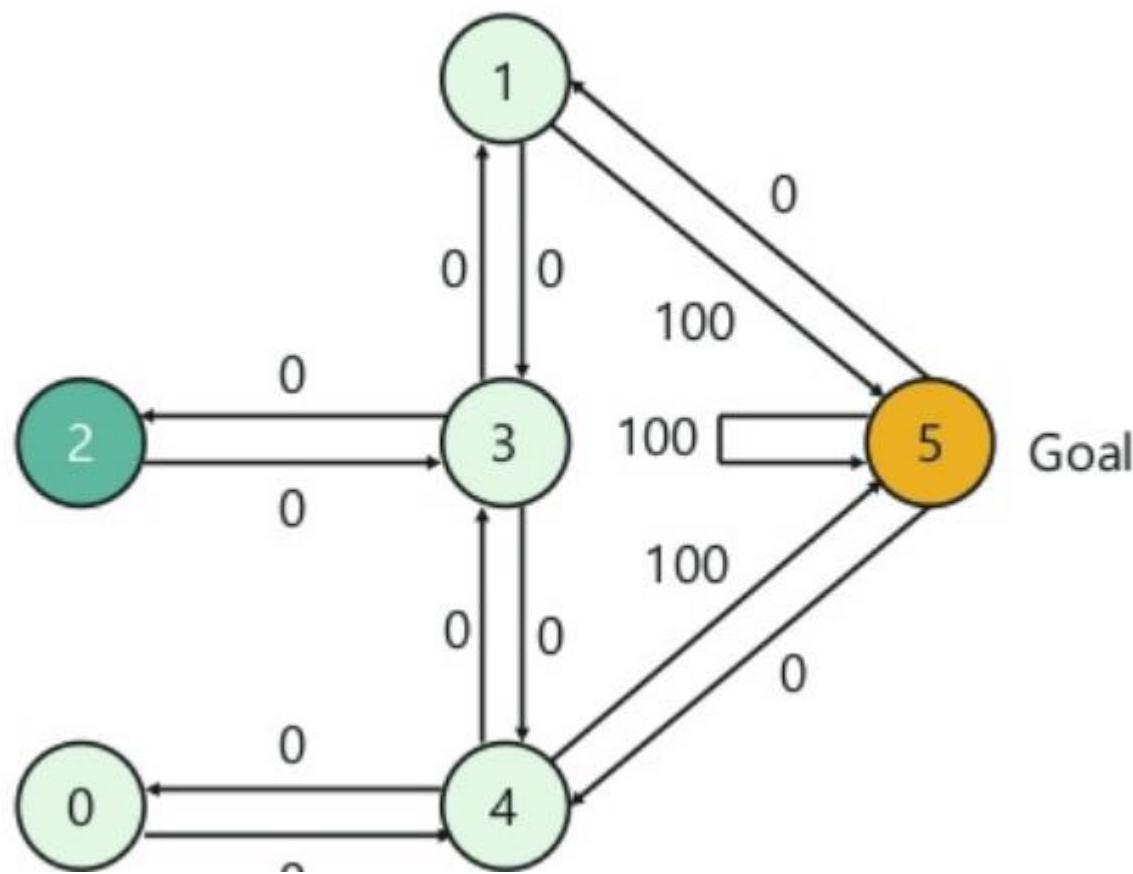
Markov Decision Process



Q-Learning



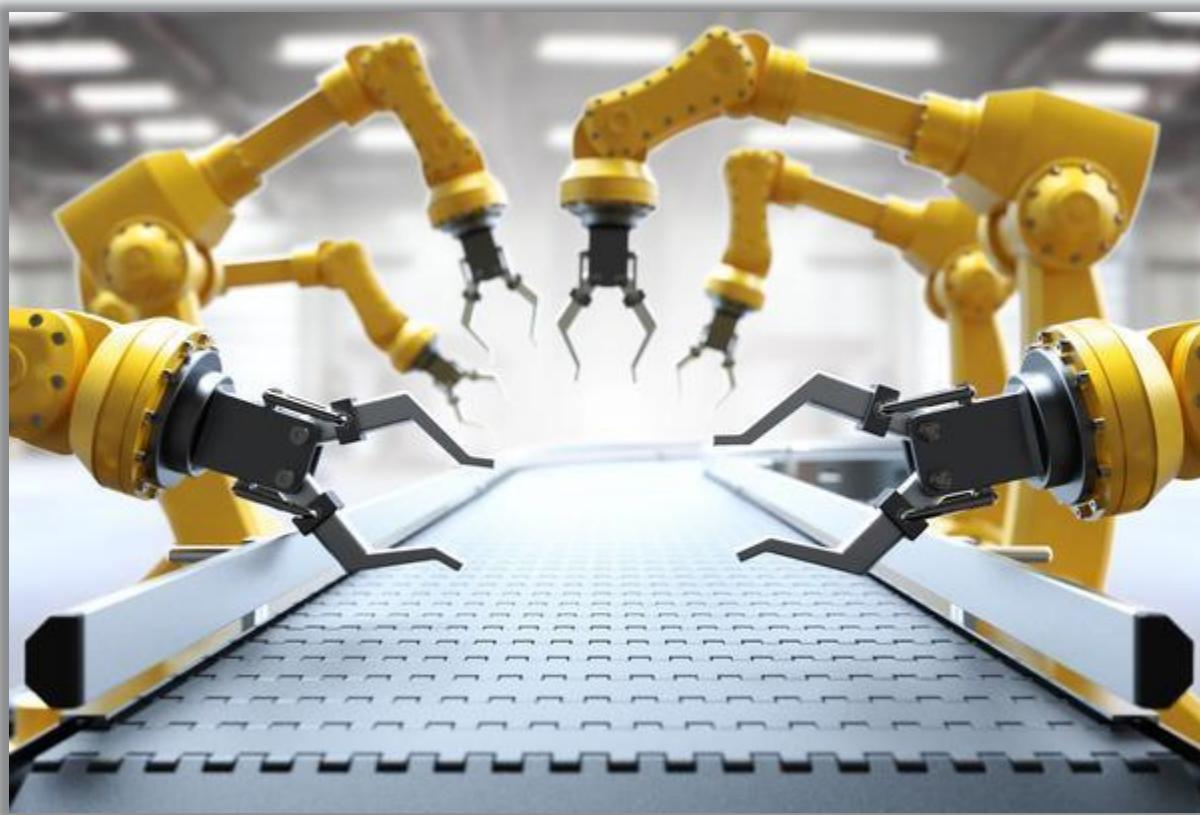
Q-Learning



Reinforcement Learning vs. Supervised Learning

Parameters	Reinforcement Learning	Supervised Learning
Decision style	Reinforcement learning enables you to make judgments in a sequential manner.	The input supplied at the start is used to make a choice in this procedure.
Works on	Interacting with the surroundings is a priority.	Works with examples or data provided as a sample.
Dependency on decision	The learning choice in the RL technique is dependent. As a result, all of the dependent decisions should be labelled.	Supervised learning of judgments that are unrelated to one another, with labels assigned to each decision.
Best suited	Supports and works better in AI if there is a lot of human contact.	It is typically controlled by a software system or apps that are interactive.
Example	Chess game	Object recognition

Applications of Reinforcement Learning



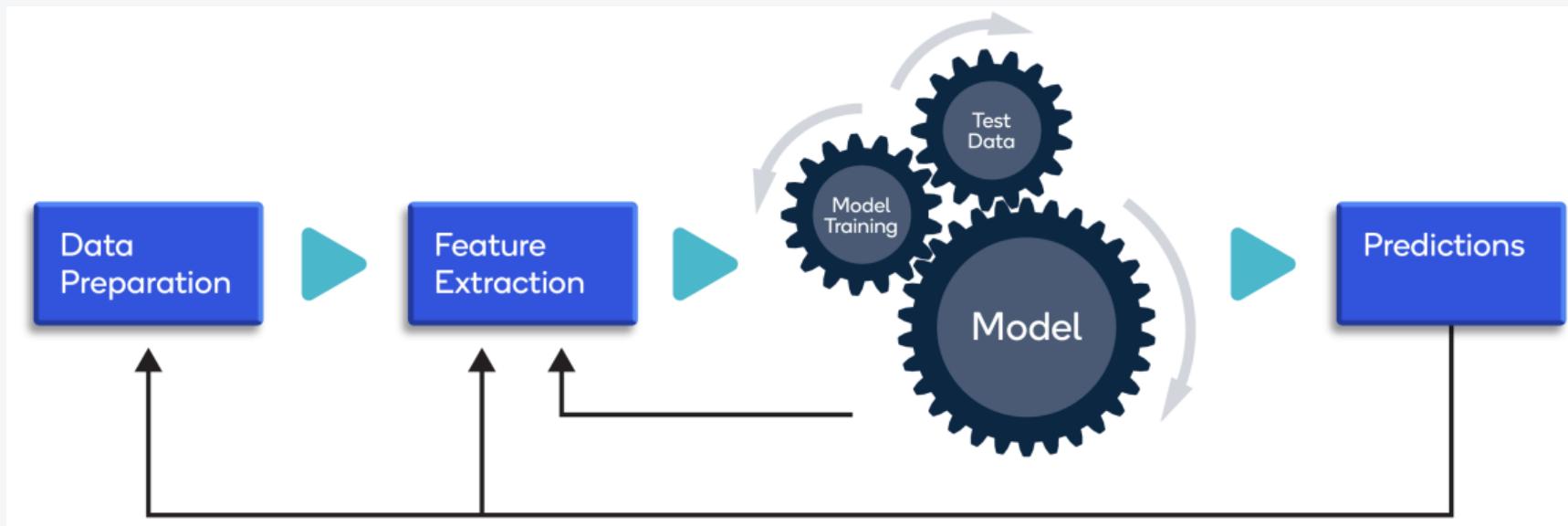
Robotics for industrial automation.

Applications of Reinforcement Learning



Business Strategy planning

Applications of Reinforcement Learning



Machine Learning and Data Processing

Applications of Reinforcement Learning



create training systems that provide
custom instruction

Applications of Reinforcement Learning



Aircraft control and robot motion control



That's all for now...