

INTRODUCTION TO BIG DATA

ECAP456

Dr. Rajni Bhalla
Associate Professor

Learning Outcomes



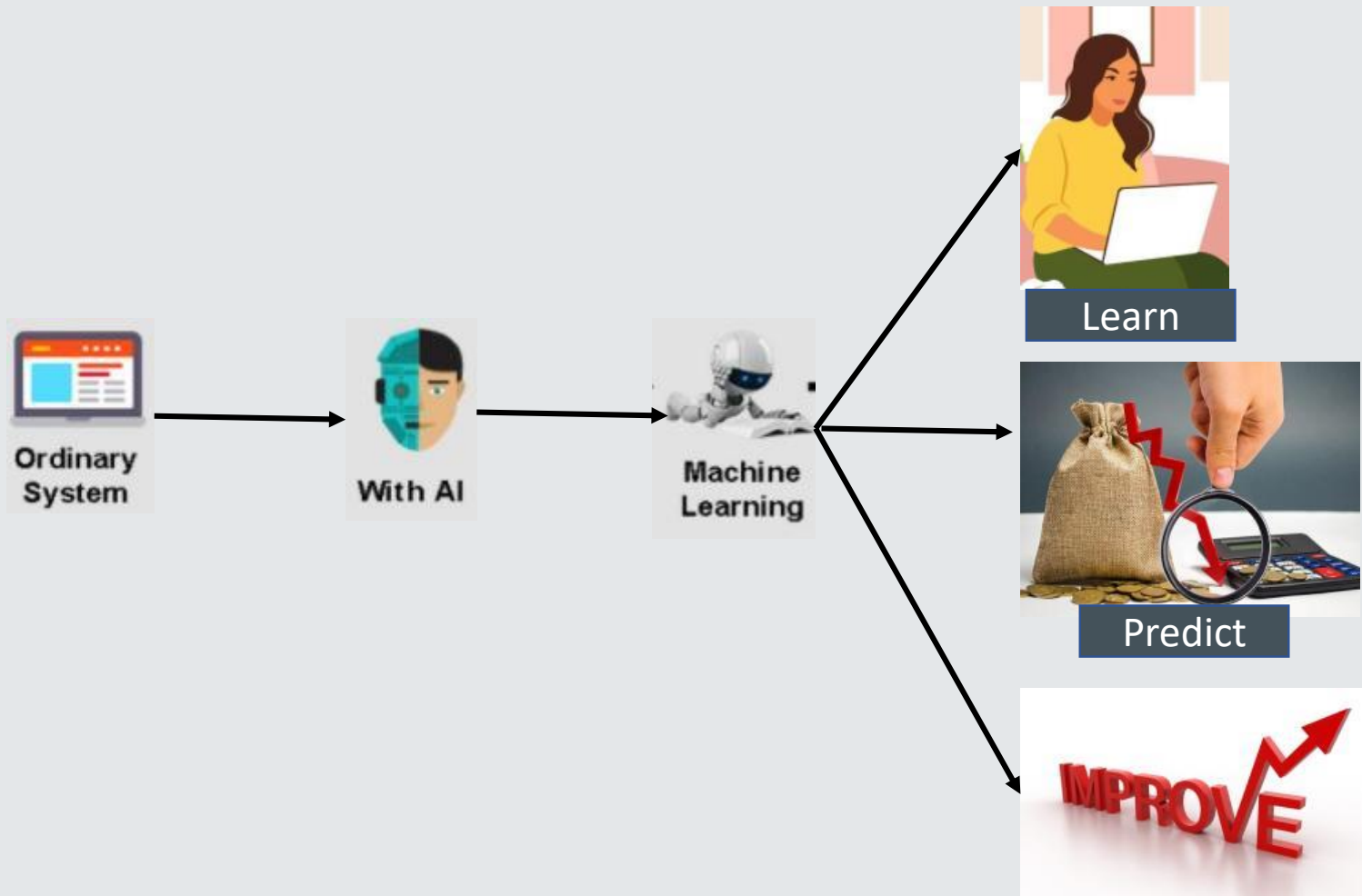
After this lecture, you will be able to

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



Artificial Intelligence

Introduction

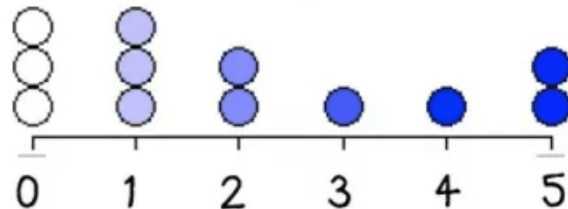


Introduction

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

Next

Earlier

Second

Afterwards

Then

Later

The next day

Once

Meanwhile

After

Soon

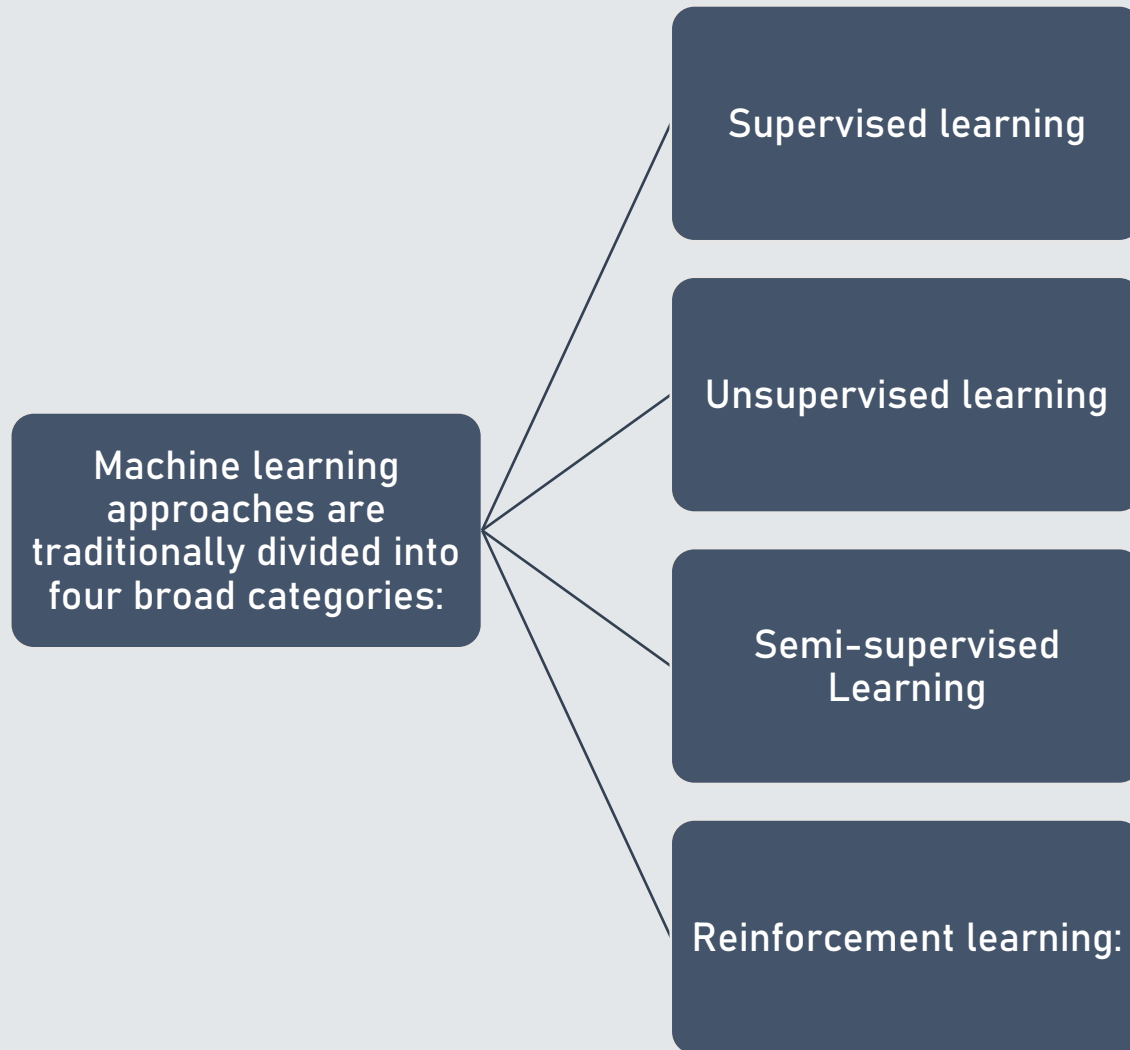
Last

At the end

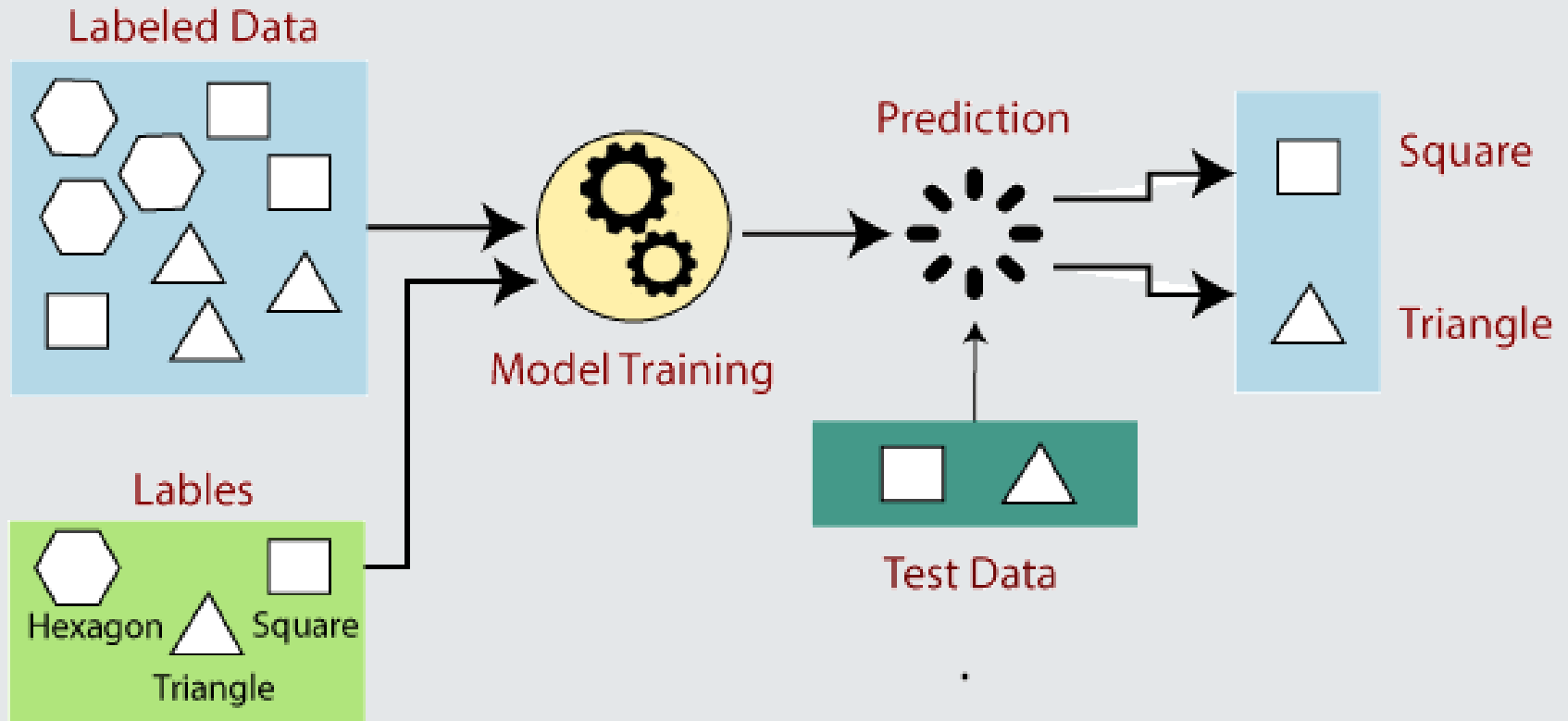
They lived happily ever after.

Finally

Machine Learning Methods



Supervised machine learning algorithms



Supervised learning algorithms

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

Neural networks

Naive Bayes

Linear regression

Logistic regression

Support vector machine (SVM)

K-nearest neighbor

Random forest

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

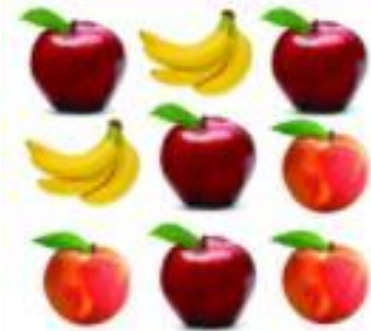
Spam detection



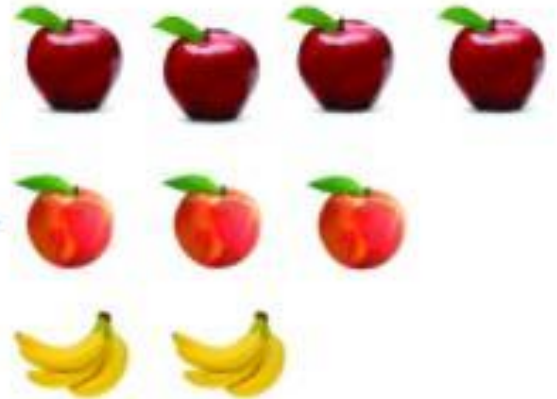
Challenges of supervised learning

Unsupervised machine learning algorithms

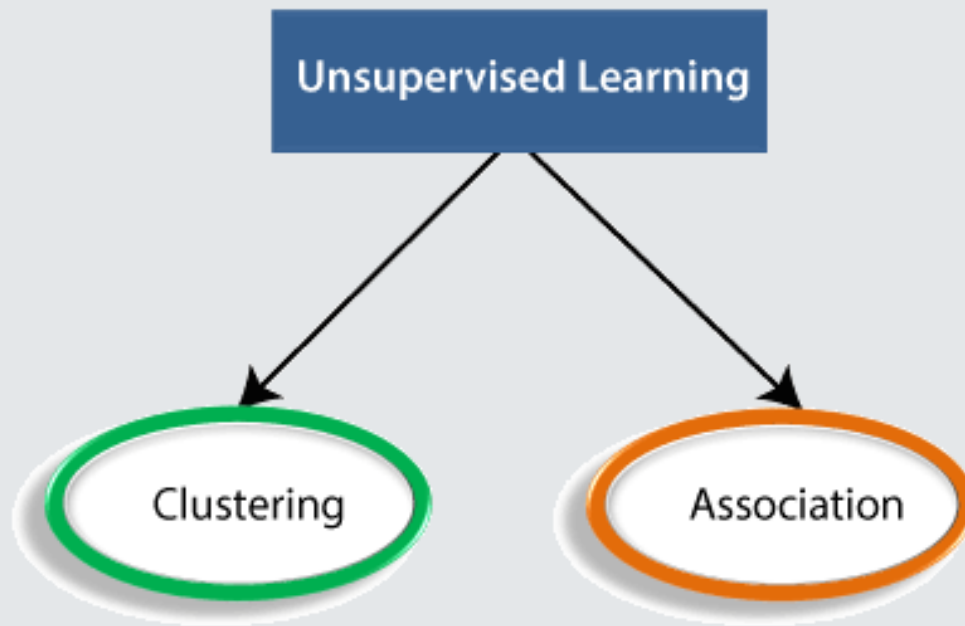
Input data



Model



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

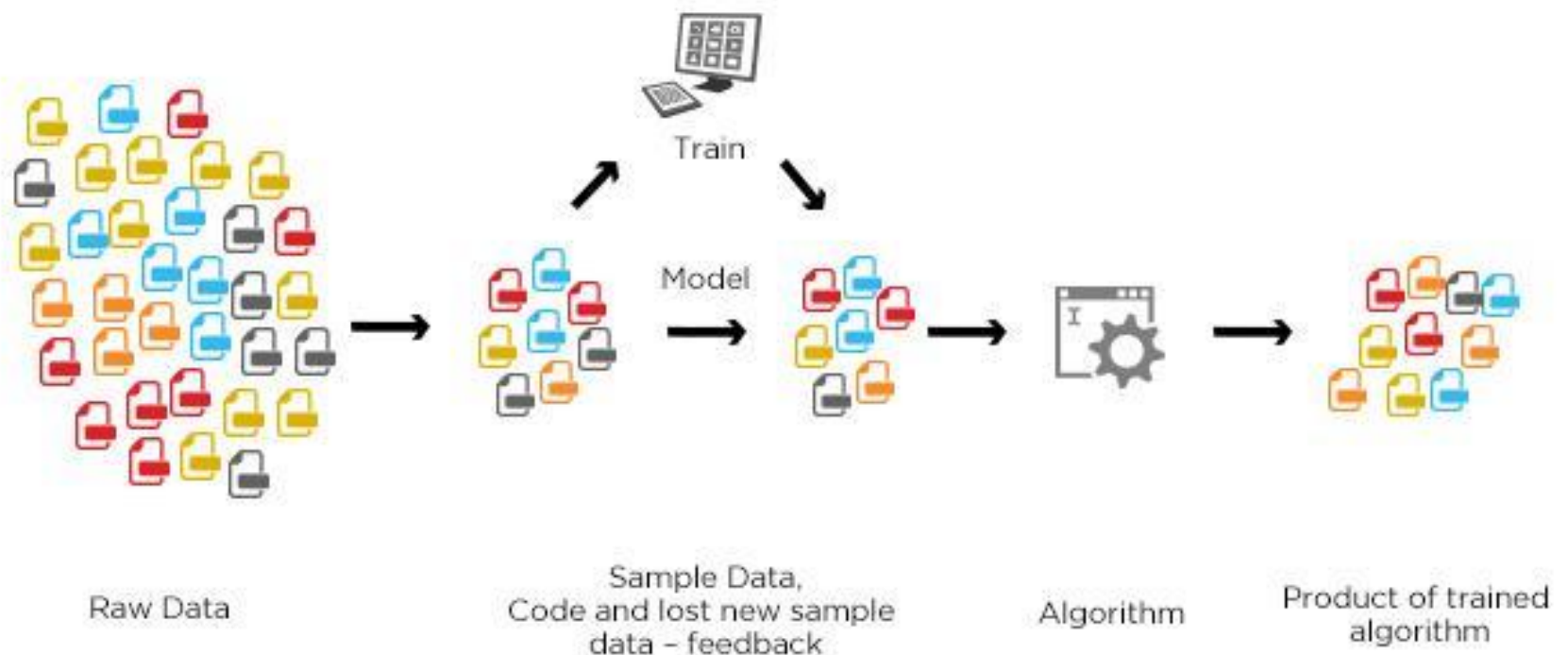
Advantages of Unsupervised Learning

- 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

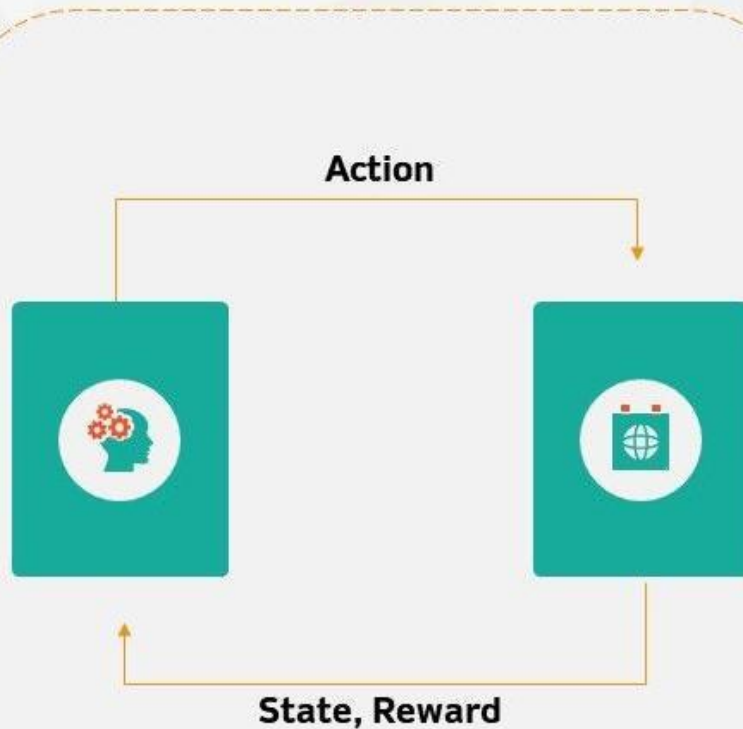
**Continuity
Assumption**


**Cluster
Assumption**

**Manifold
Assumption**

Reinforcement machine learning algorithms

Reinforcement Learning




Exploration Policy


Neural Networks


Filters

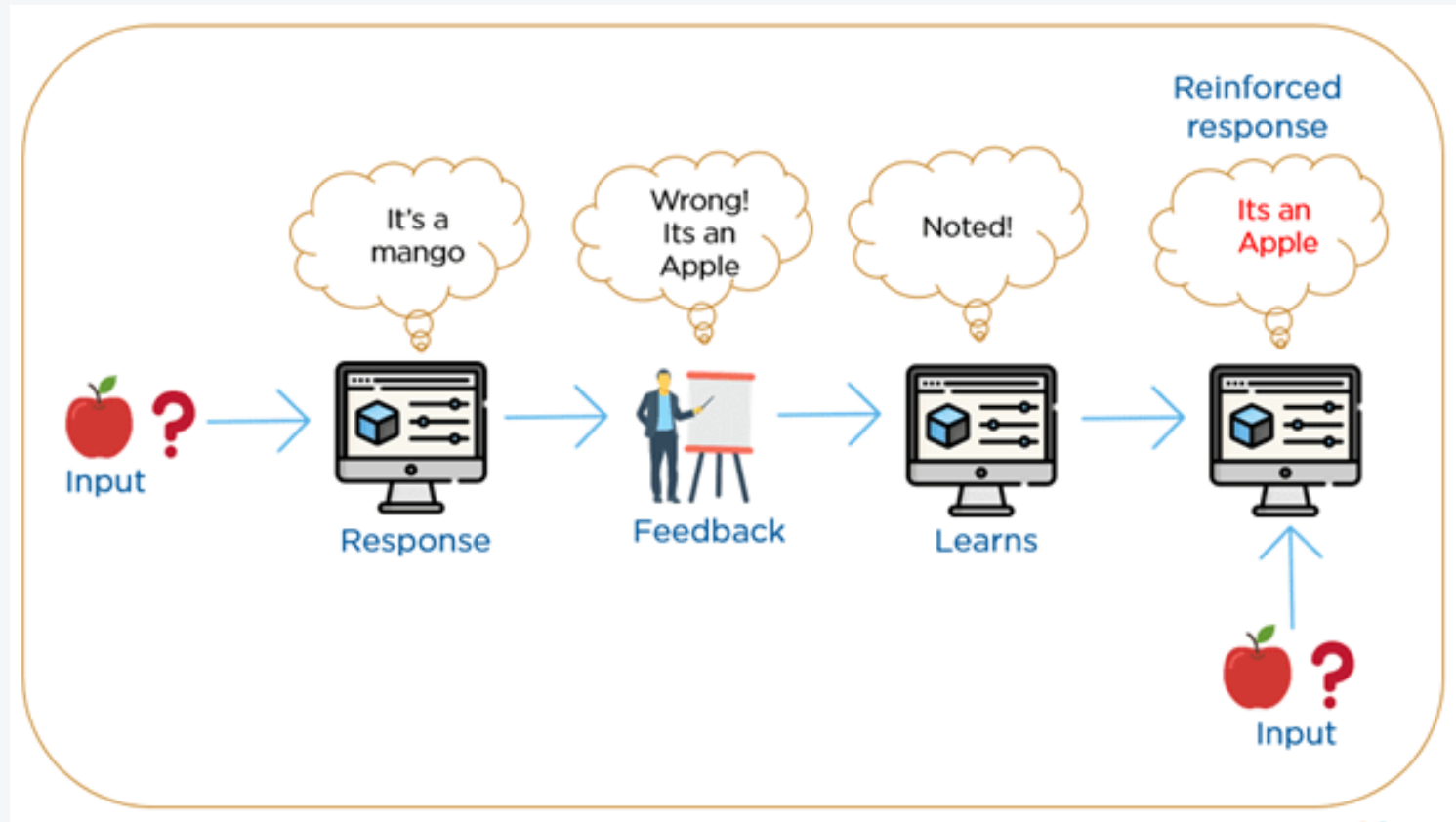

Memory

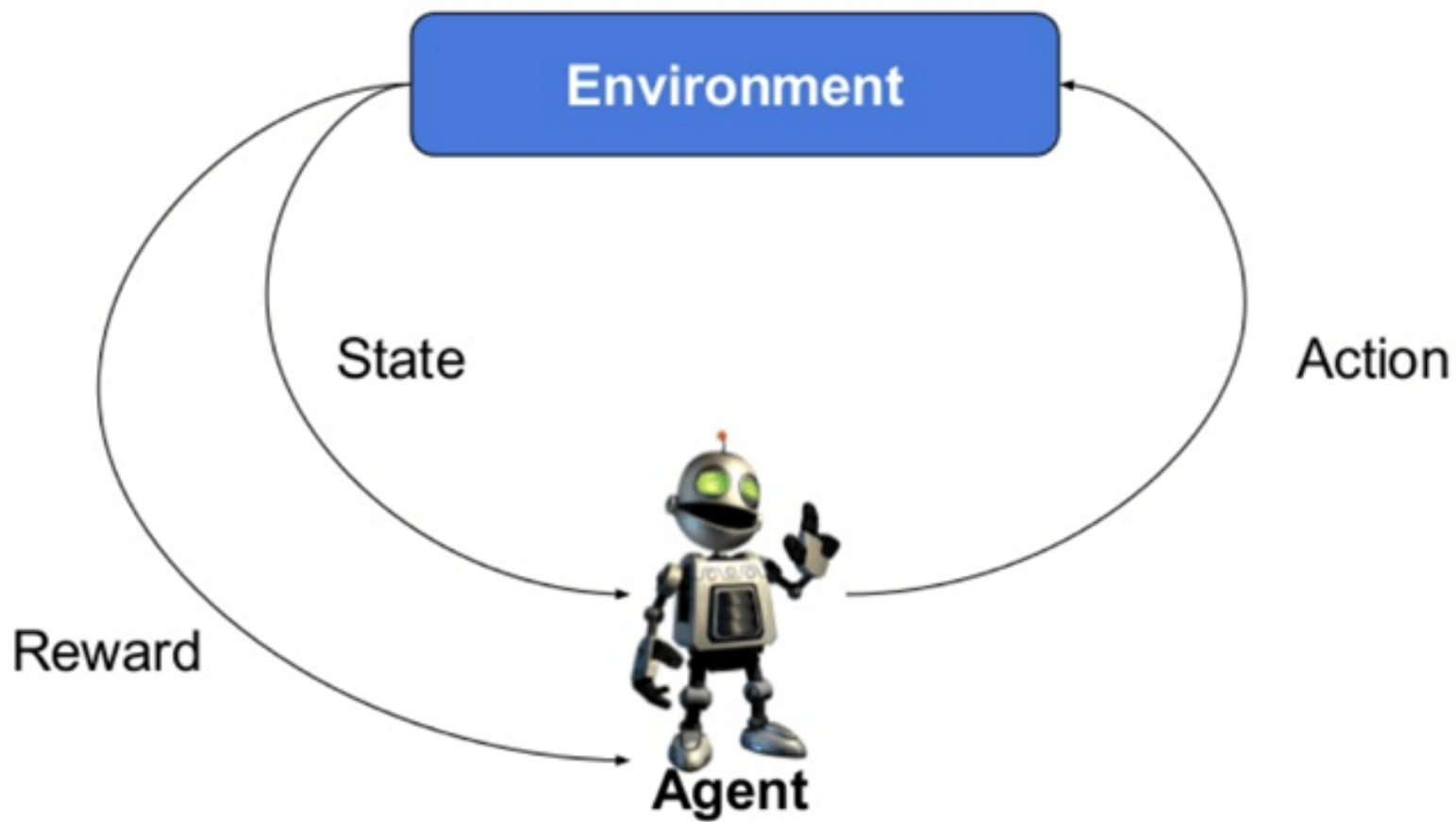

Algorithm

Reinforcement Learning

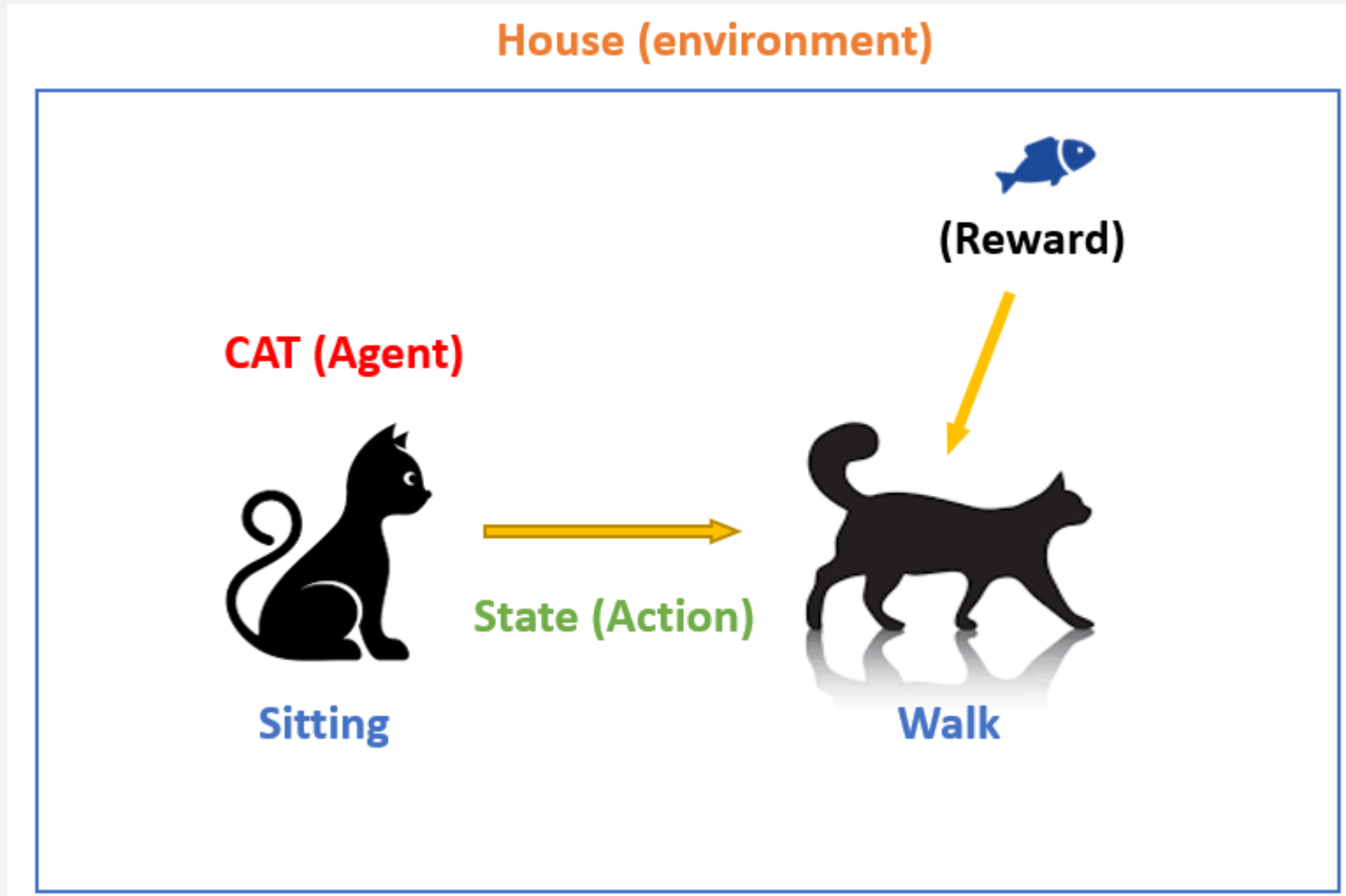
uses rewards and punishment to train computing models to perform a sequence of selections. Here computing faces a game-like scenario where it employs trial and error to answer. Based on the action it performs, computing gets either rewards or penalties. Its goal is to maximize the rewards.

Reinforcement machine learning algorithms

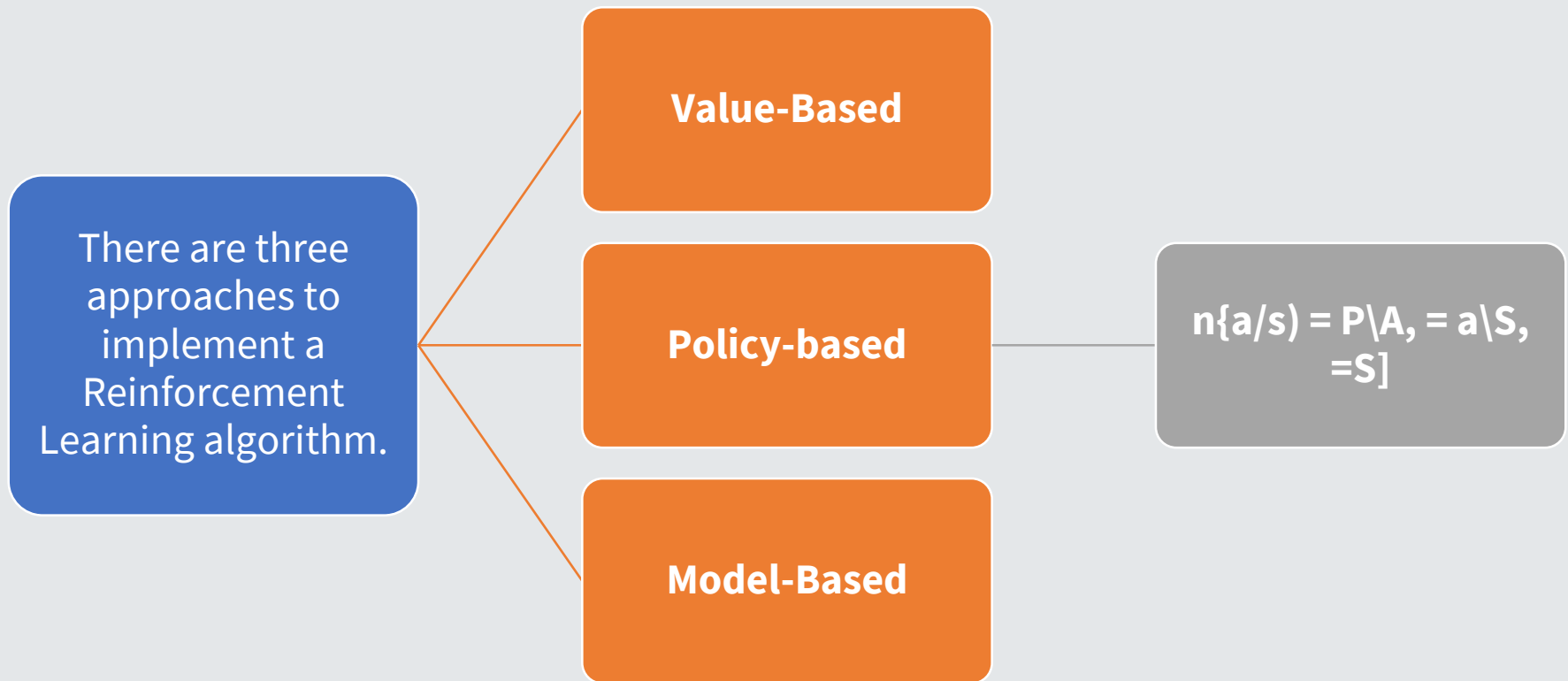




How reinforcement learning works?



Reinforcement Learning Algorithms



Characteristics of Reinforcement Learning

There is no supervisor.

Decisions in a sequential order

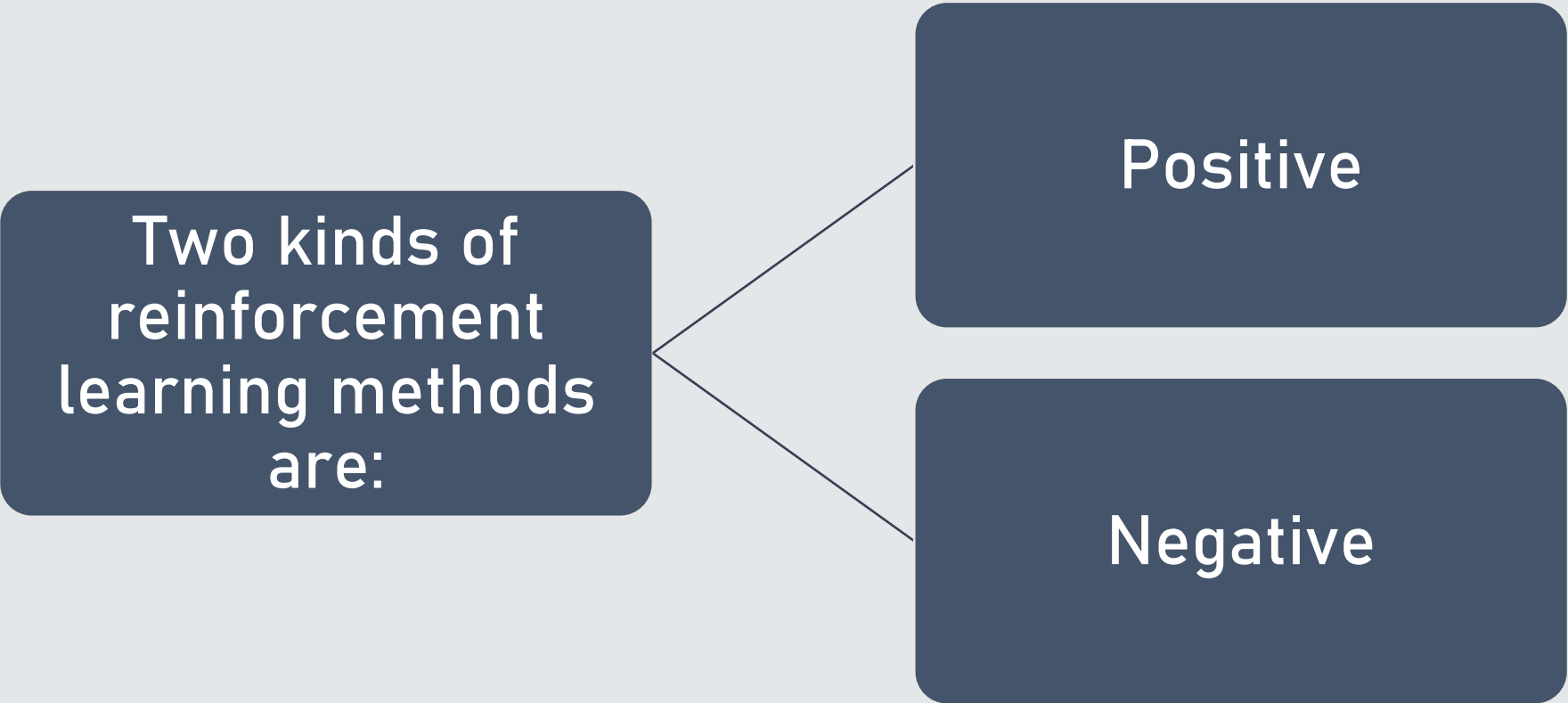
Time is critical.

Feedback is never immediate.

The data determined by its activities.

Types of Reinforcement Learning

Two kinds of reinforcement learning methods are:

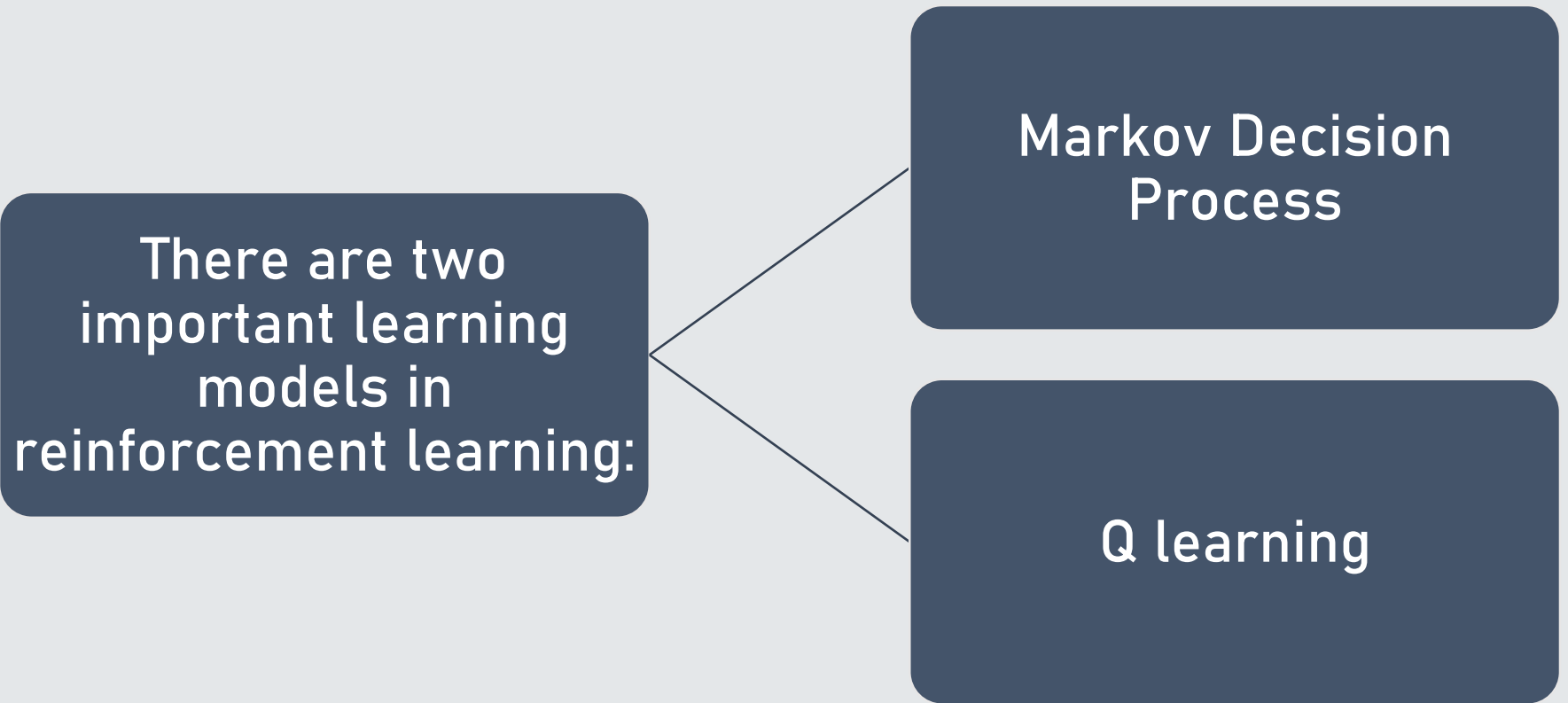


```
graph LR; A[Two kinds of reinforcement learning methods are:] --- B[Positive]; A --- C[Negative]
```

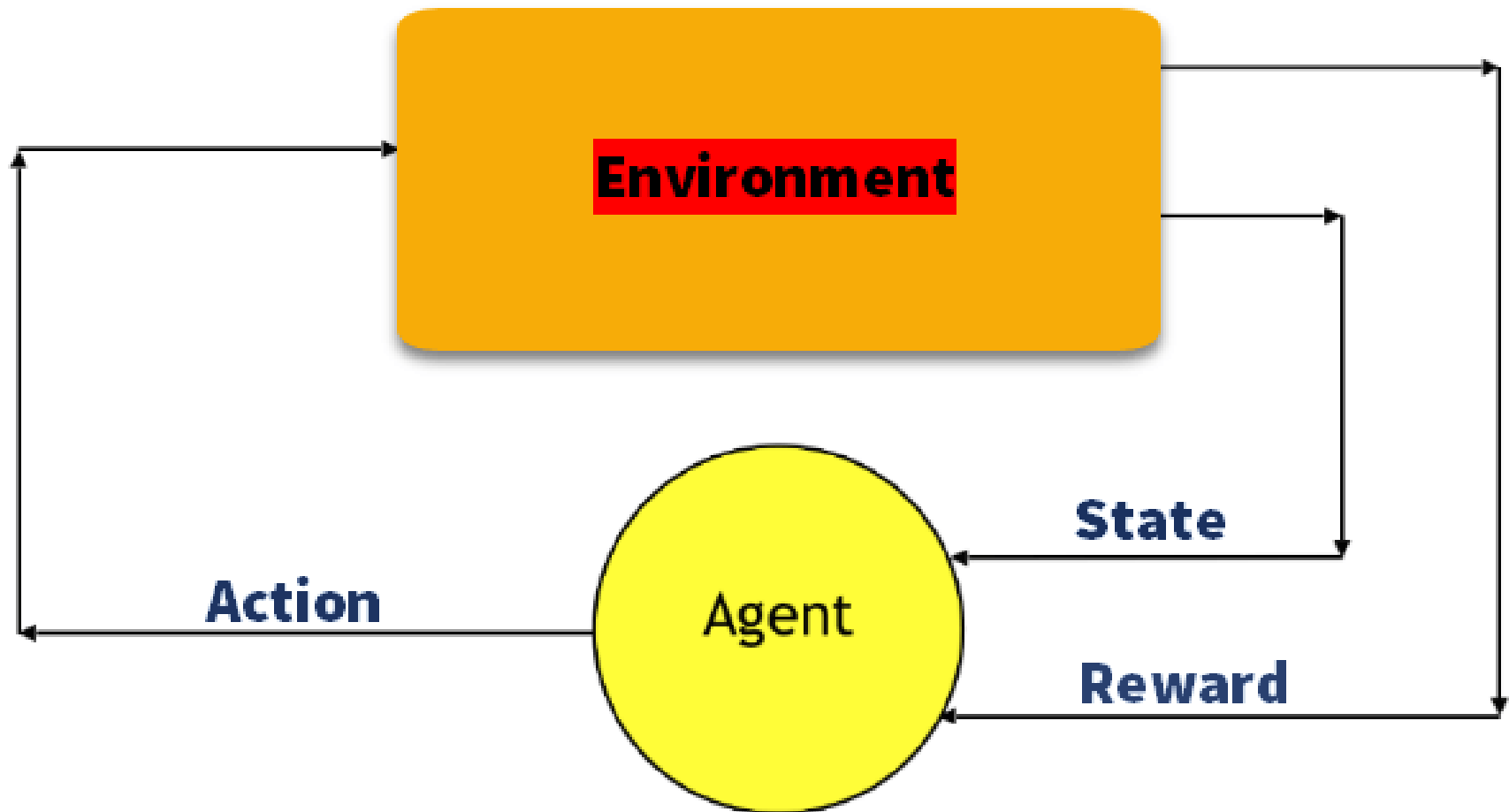
Positive

Negative

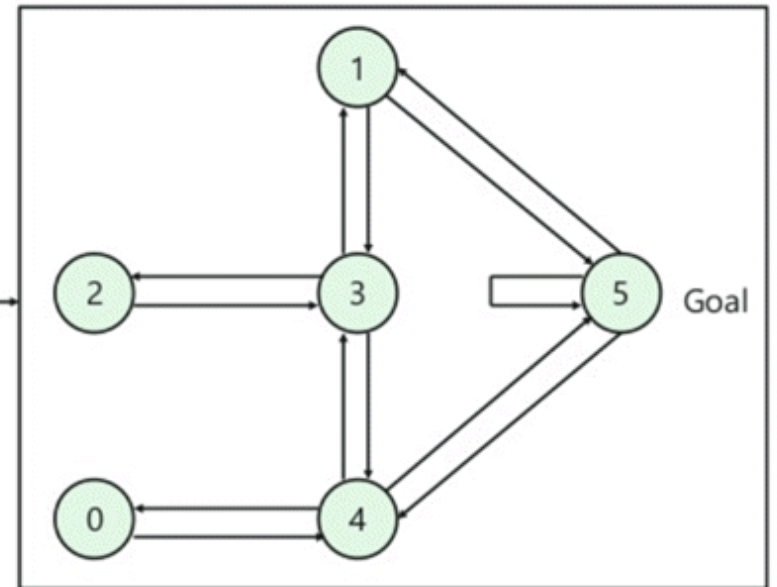
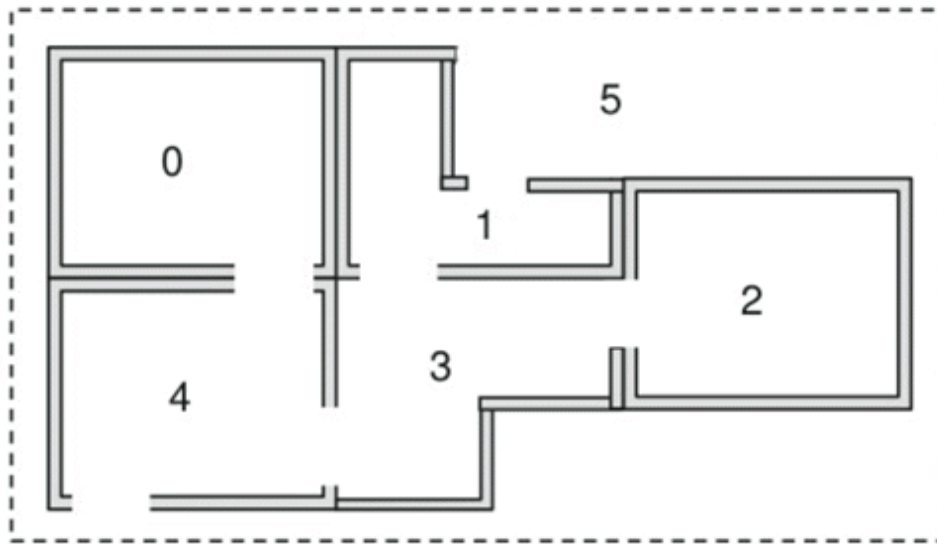
Learning Models of Reinforcement



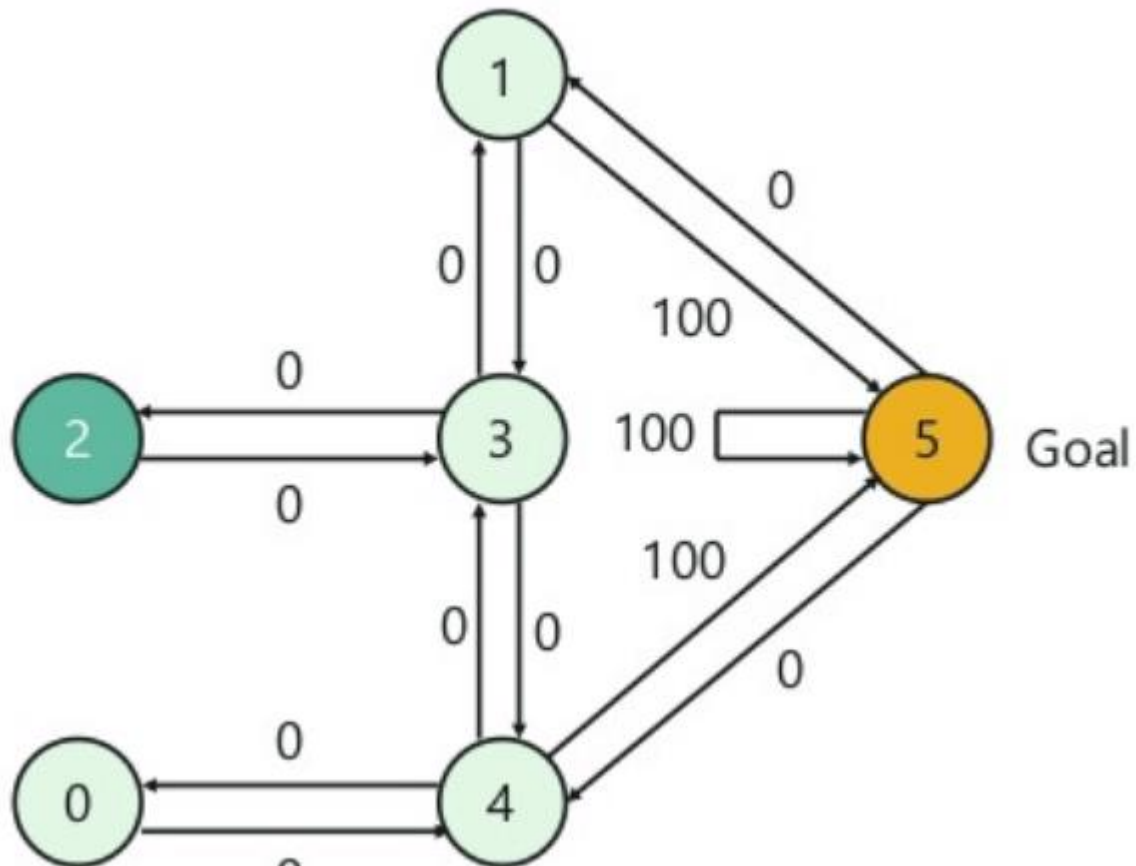
Markov Decision Process



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



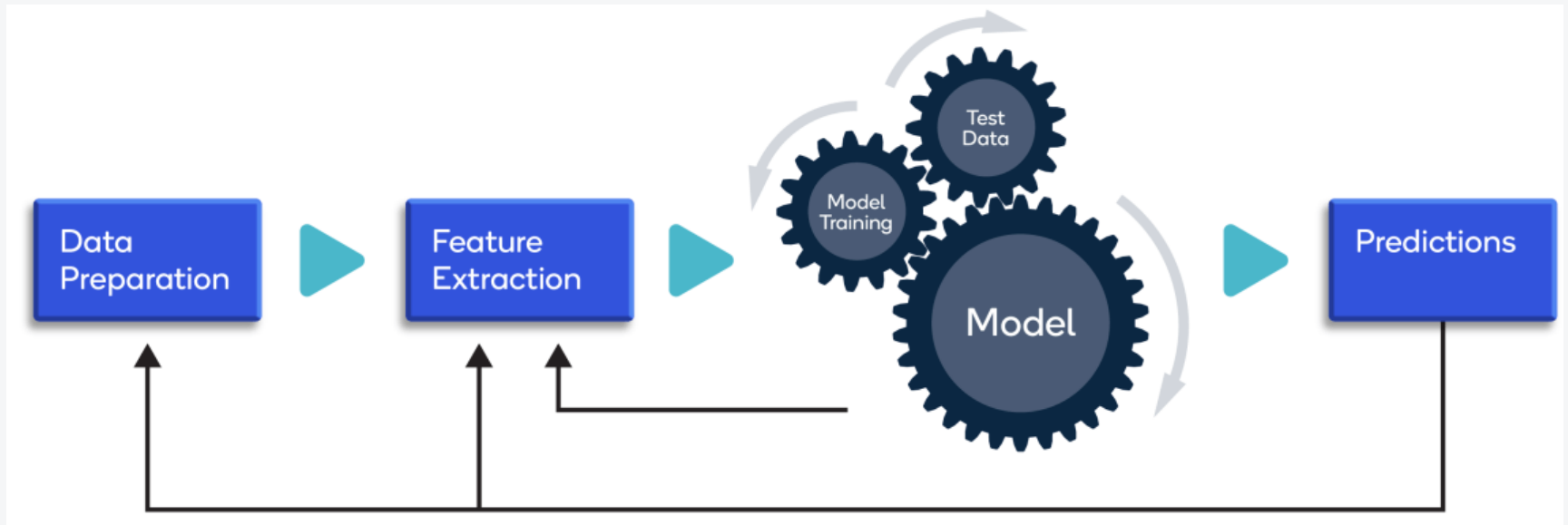
Robotics for industrial automation.

Applications of Reinforcement Learning



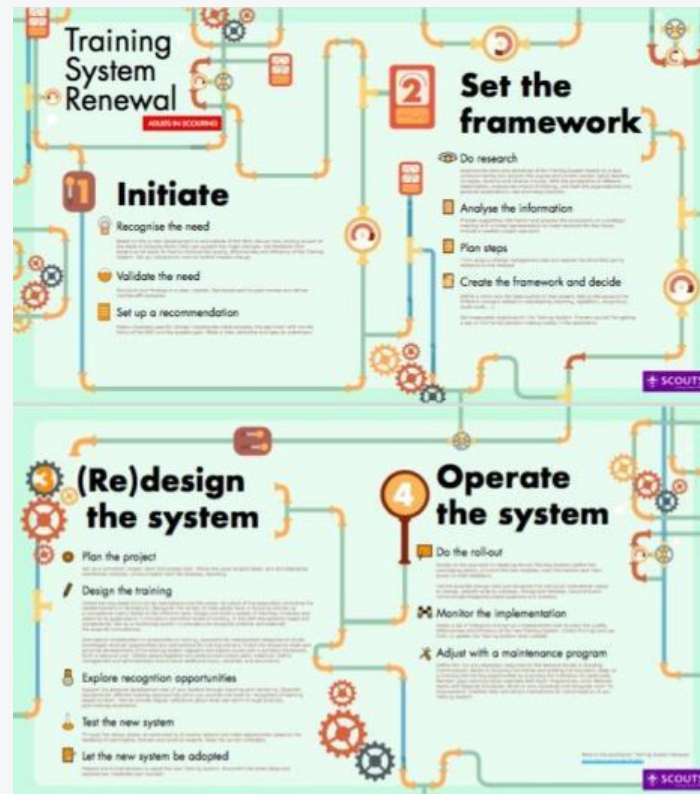
Business Strategy planning

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...