Department of AI&DS

MACHINE LEARNING
22AD2203 R/A/P

Topic:

INTRODUCTION TO MACHINE LEARNING

Session - 02

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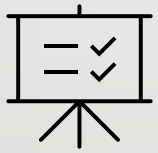
AIM OF THE SESSION

To know students about the Machine Learning and types of Machine Learning techniques.

INSTRUCTIONAL OBJECTIVES



This session is designed to:

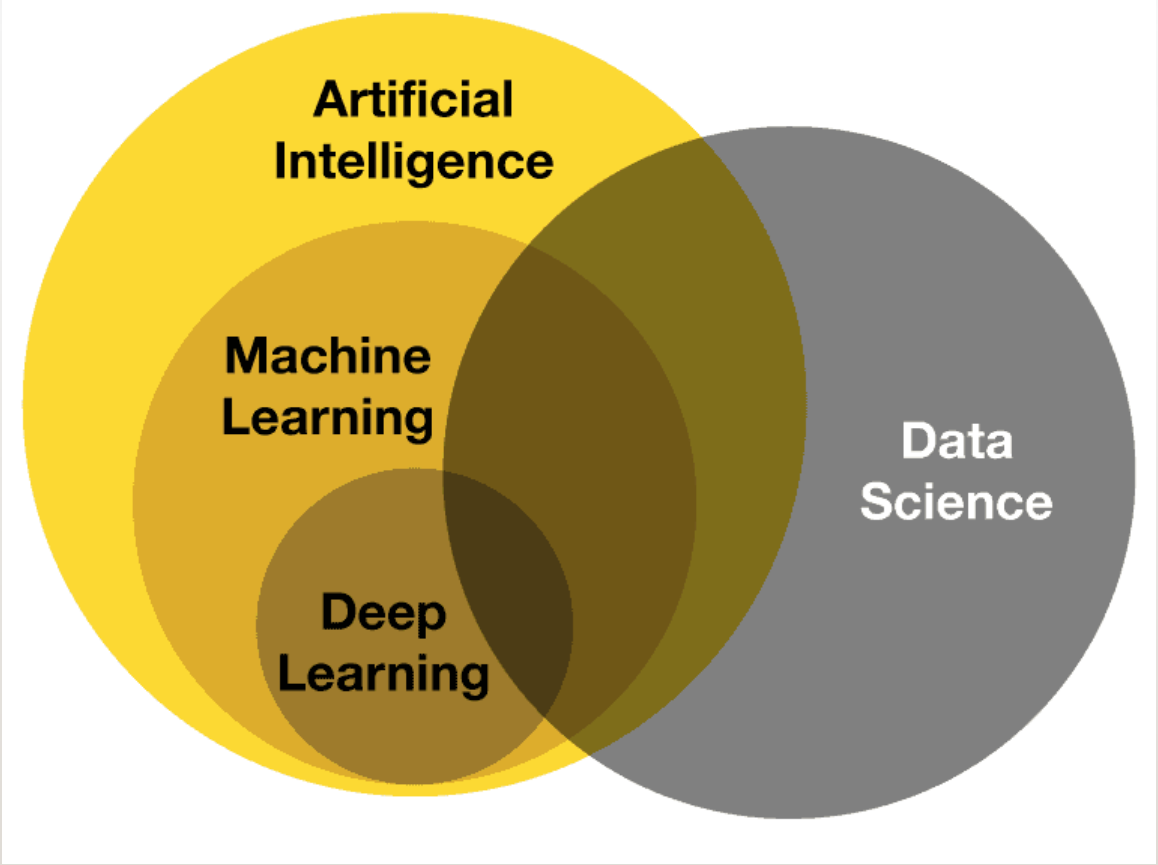
1. Understand the Machine Learning.
2. Identify the types of Machine Learning.

LEARNING OUTCOMES

At the end of this session, you should be able to:

1. Define Machine Learning, and
2. Describe the Machine Learning techniques.

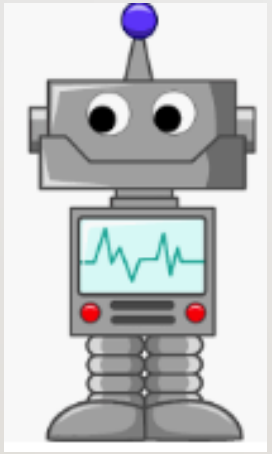
INTRODUCTION TO MACHINE LEARNING

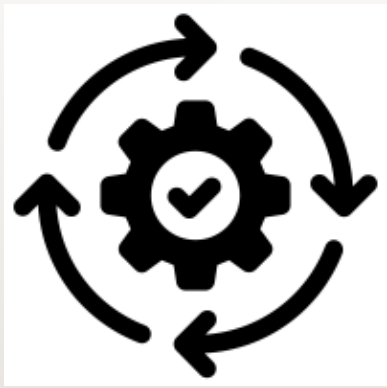
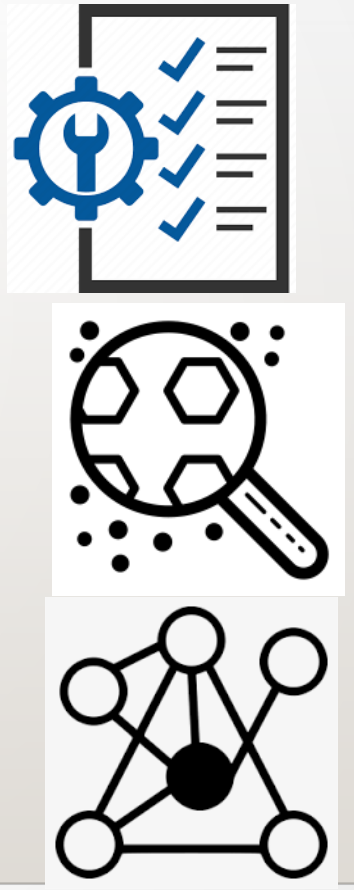
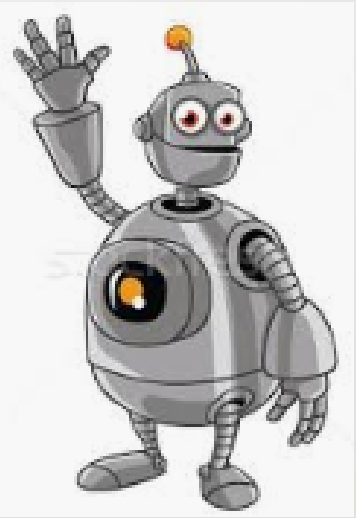


MACHINE LEARNING

- **Machine learning** a branch of artificial intelligence, is about the construction and study of systems that can learn from data.
- Machine Learning can impower computers learn and behave more intelligently.
- Machine learning explore algorithms/build model:
  - Learn from data.
  - Use the model for prediction, decision making or solving some task.

MACHINE LEARNING



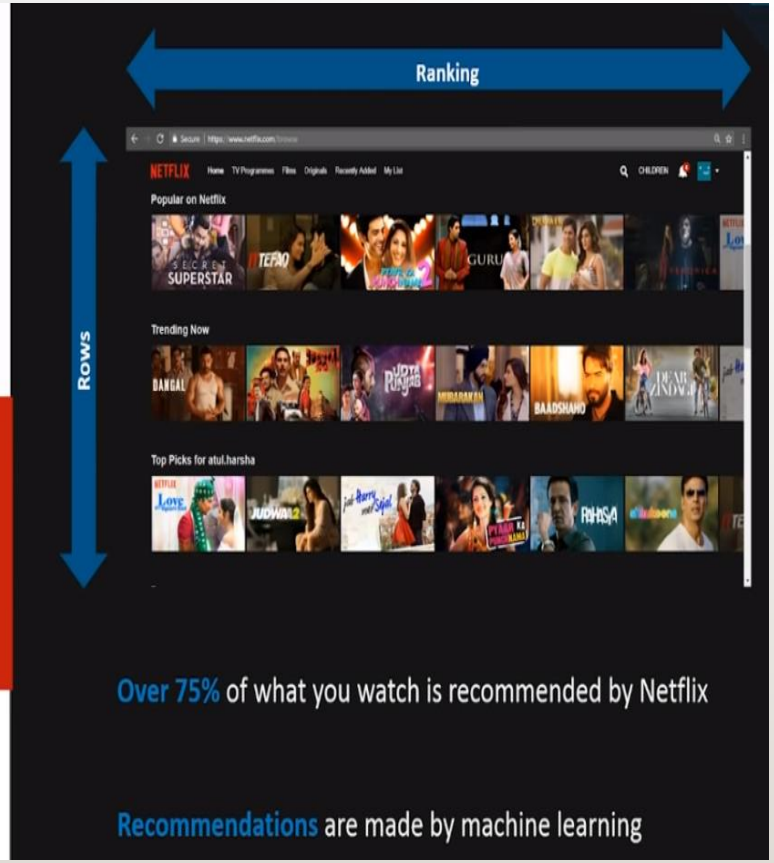
MACHINE LEARNING

- For example, a machine learning system could be trained on email messages to learn to distinguish between spam and non-spam messages. After learning, it can then be used to classify new email messages into spam and non-spam folders.

- There is a wide variety of machine learning tasks and successful applications. Optical character recognition, in which printed characters are recognized automatically based on previous examples, is a classic example of machine learning.

REAL LIFE EXAMPLES

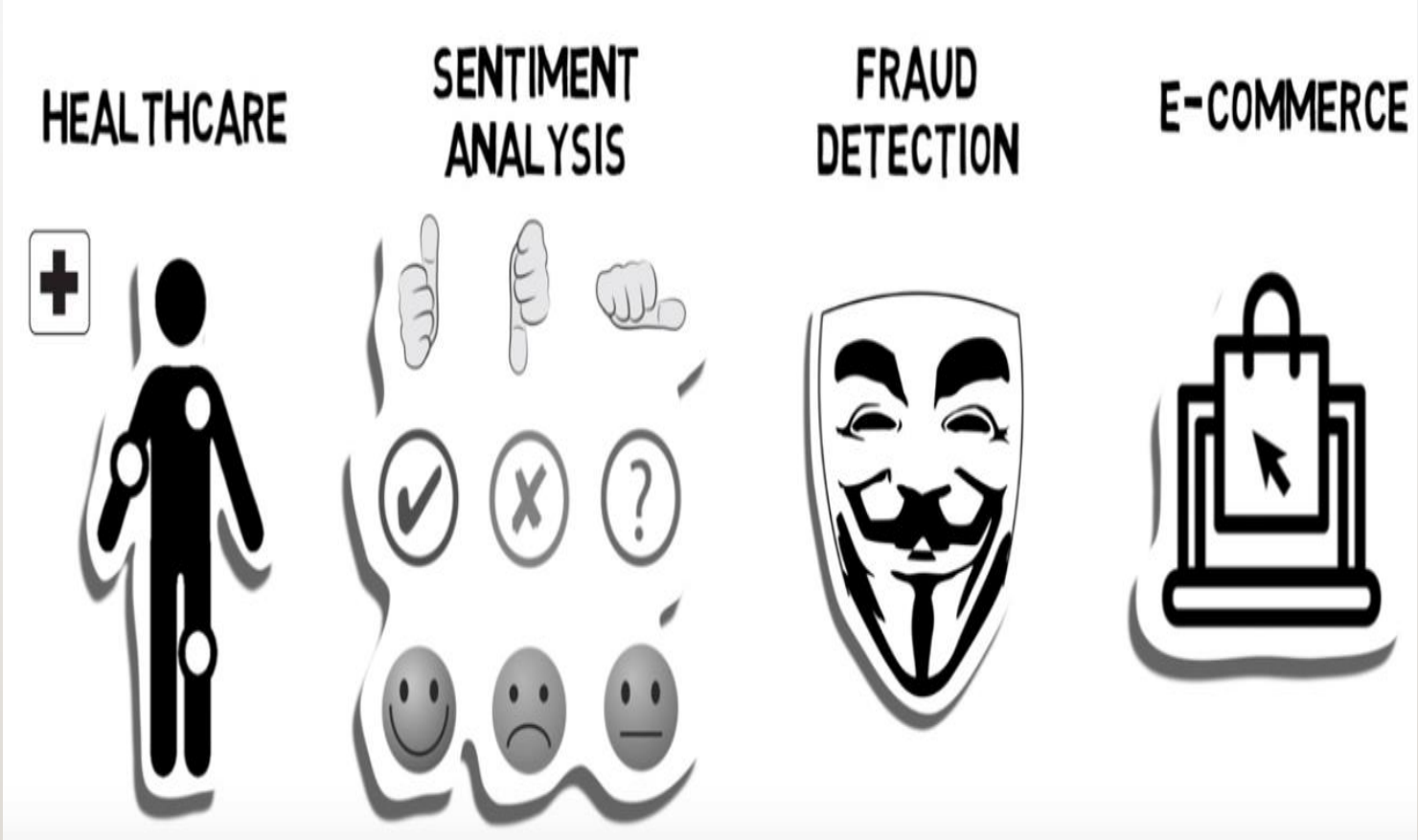
1



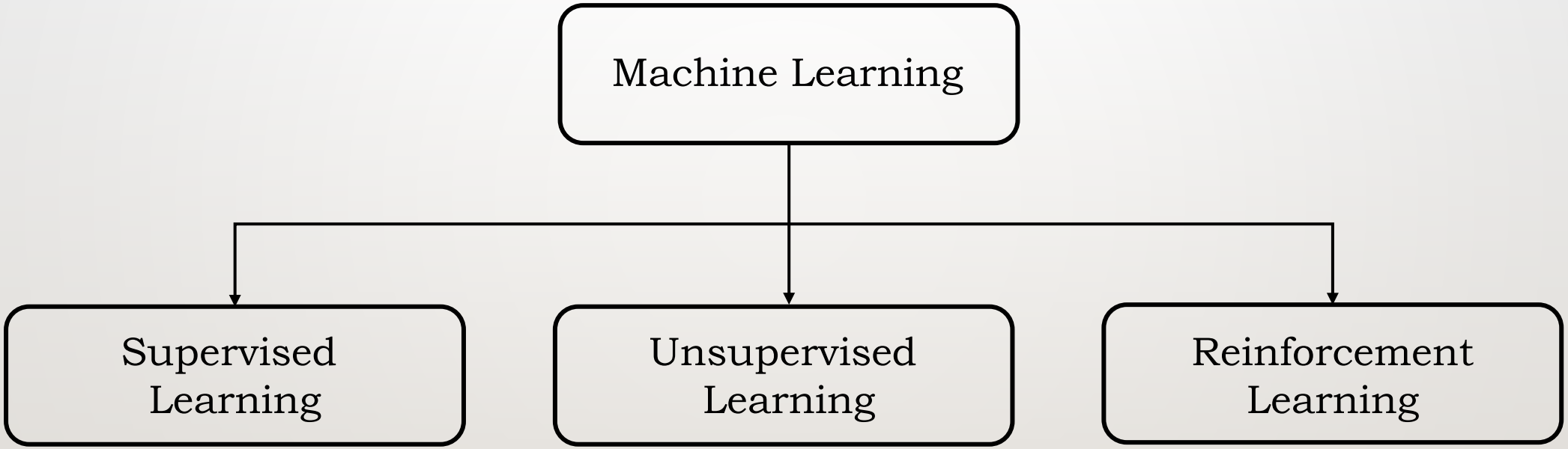
2

3

APPLICATION OF MACHINE LEARNING



TYPES OF MACHINE LEARNING



SUPERVISED LEARNING

- In supervised learning, we need something called a Labelled Training Dataset.
- In supervised learning, a labeled training dataset with the correct responses is provided, and based on this training dataset, the algorithm generalizes to respond correctly to all possible inputs.

SUPERVISED LEARNING


CAR


CAR

+


BIKE

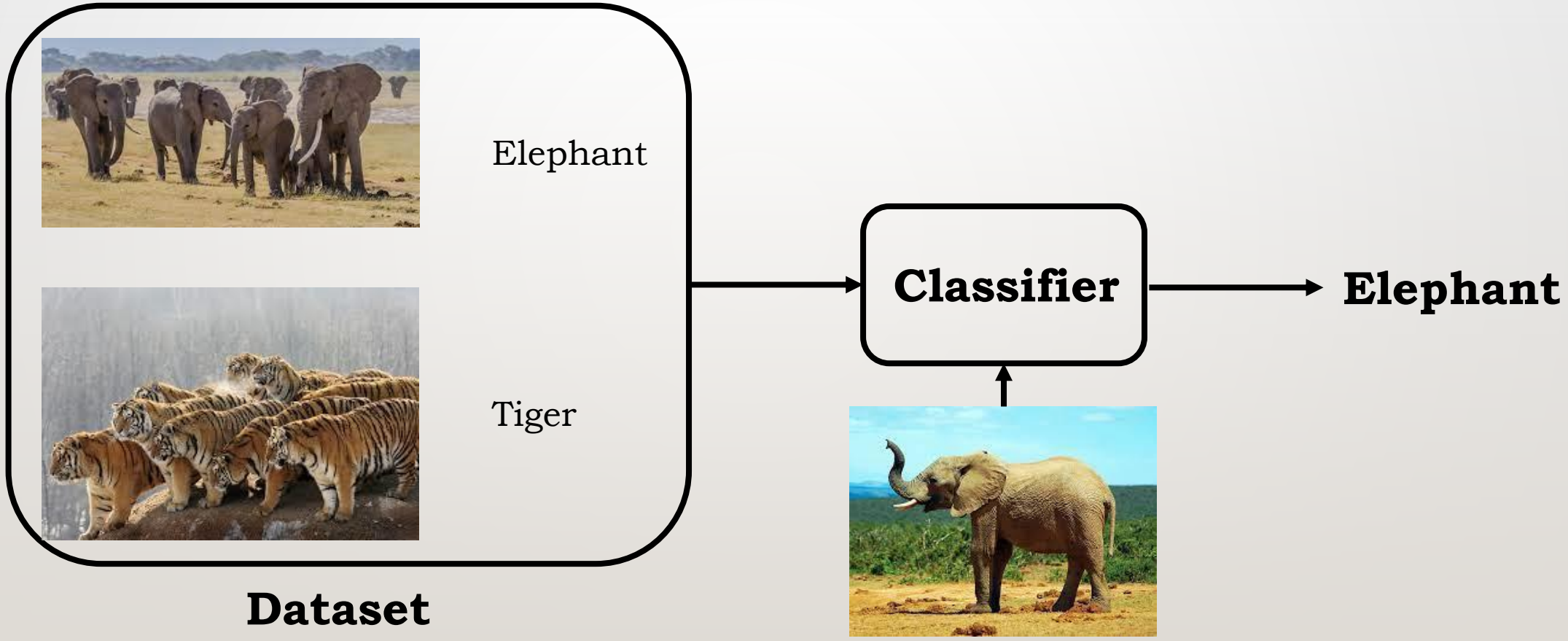

BIKE

Samples Labels

= Training Dataset

$f($  ,  $)$ = CAR

CLASSIFICATION



REGRESSION

Dataset

$f(\square, \text{  }) = 10400.00$

REGRESSION

- If the possible output values of the function are continuous real values, then it is called Regression.
- The Classification and Regression problems are supervised, because the decision depends on the characteristics of the ground truth labels or values present in the dataset, which is defined as experience.

UNSUPERVISED LEARNING

- In unsupervised learning, correct responses are not provided.
- The algorithm tries to identify similarities between the inputs so that inputs that have something in common are categorized together.
- The task is to identify the patterns like group the similar objects together.

UNSUPERVISED LEARNING



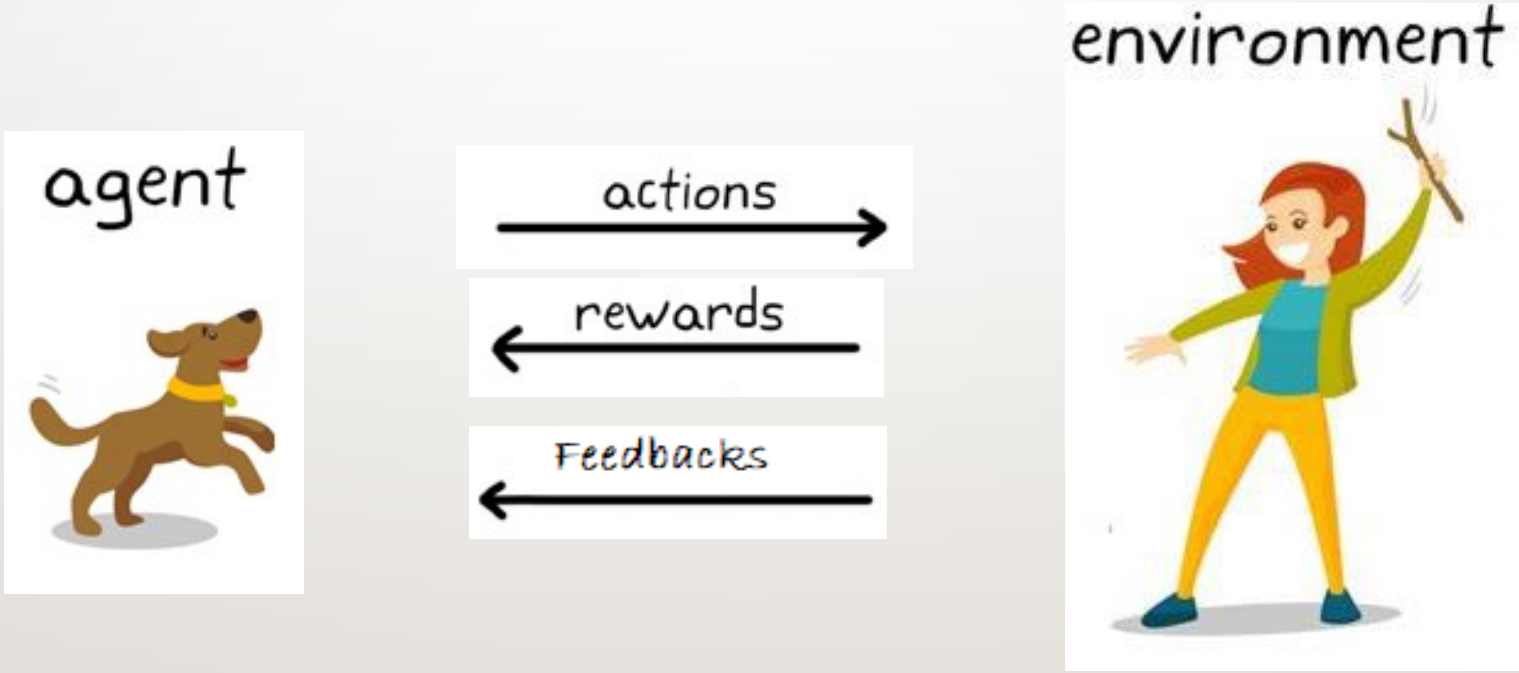

Samples

Dataset

Clustering

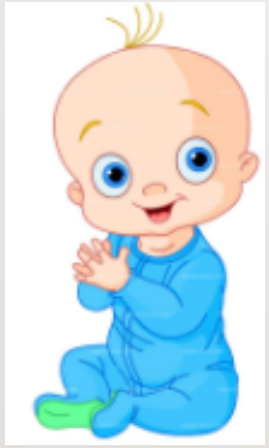
REINFORCEMENT LEARNING

- It is also known as learning from trials and errors.

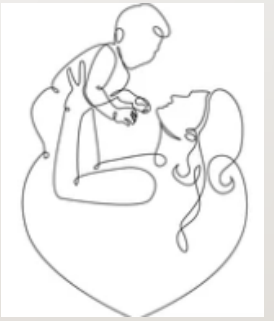


REINFORCEMENT LEARNING

- Baby learn from the trials and errors.



Punishment



Reward

Self-Assessment Questions

1. Machine learning is a subset of which of the following?

(a) Data science
(b) Data learning
(c) Deep learning
(d) Artificial Intelligence

2. Among the following identify the one which is not a type of machine learning paradigm.

(a) Supervised learning
(b) Unsupervised learning
(c) Semi-supervised learning
(d) Reinforcement learning

Self-Assessment Questions

3. Identify the type of learning in which labeled training data is used.

(a) Supervised learning
(b) Unsupervised learning
(c) Semi-supervised learning
(d) Reinforcement learning

4. Which of the following are common classes of problems in machine learning?

(a) Classification
(b) Regression
(c) Clustering
(d) All of the above

REFERENCES FOR FURTHER LEARNING OF THE SESSION

Text Books:

1. Mitchell, Tom. Machine Learning. New York, NY: McGraw-Hill, 1997. ISBN: 9780070428072.
2. MacKay, David. Information Theory, Inference, and Learning Algorithms. Cambridge, UK: Cambridge University Press, 2003. ISBN: 9780521642989.

Reference Books:

1. EthemAlpaydin "Introduction to Machine Learning ", The MIT Press (2010).
2. Stephen Marsland, "Machine Learning an Algorithmic Perspective" CRC Press, (2009).

Sites and Web links:

1. Data Science and Machine Learning: https://www.edx.org/course/data-science-machinelearning.
2. Machine Learning: https://www.ocw.mit.edu/courses/6-867-machine-learning-fall-2006/.

THANK YOU

Team – MACHINE LEARNING