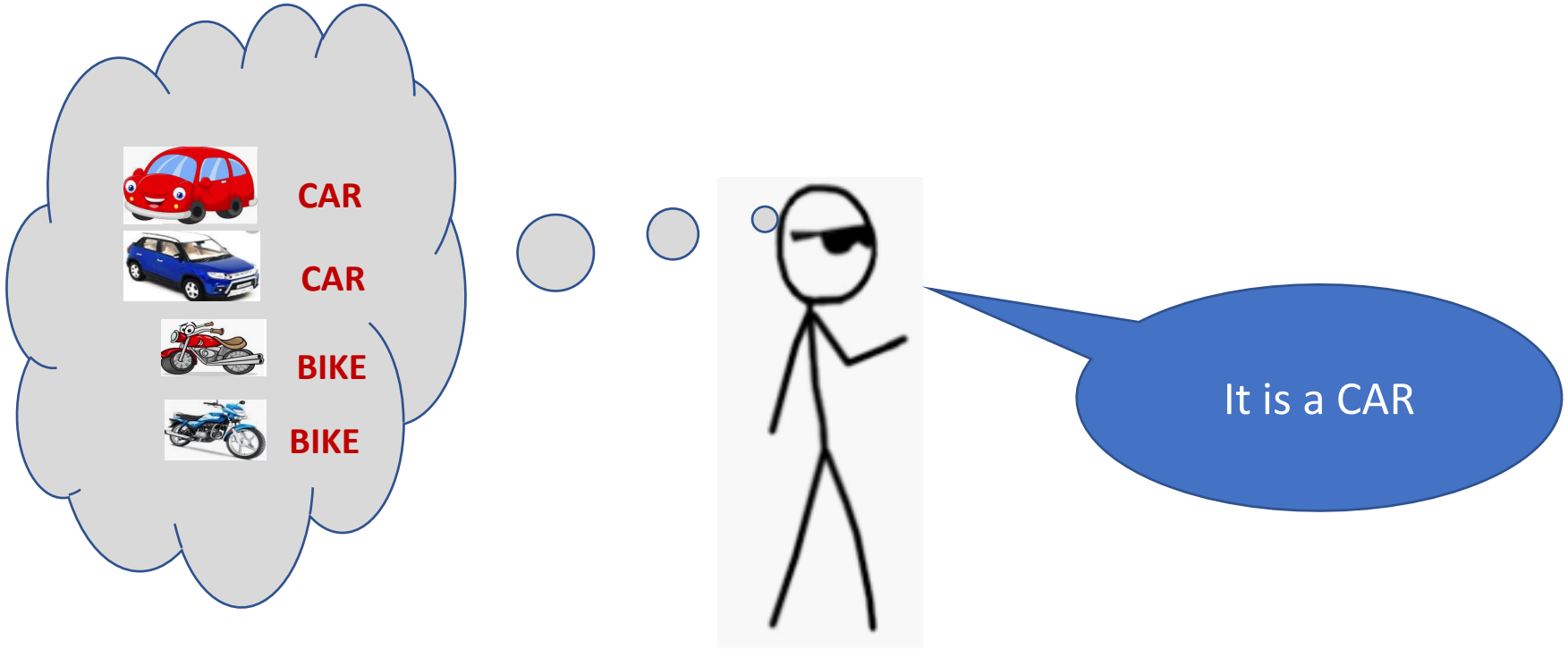
Lesson: 1

What is Machine Learning? (Layman's term)

Human can learn from past experience
and make decision of its own

What is this object?

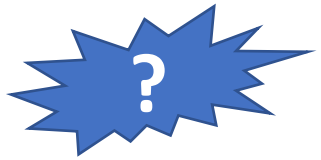
What is this object?



Let us ask the same question to him

What is this object?

Let us ask the same question to him



What is this object?

[But, he is a human being. He can observe and learn]

Let us make him learn

show him

Let us make him learn

show him

CAR

CAR

BIKE

BIKE

Let us ask the same question now

What is this object?

CAR

CAR

BIKE

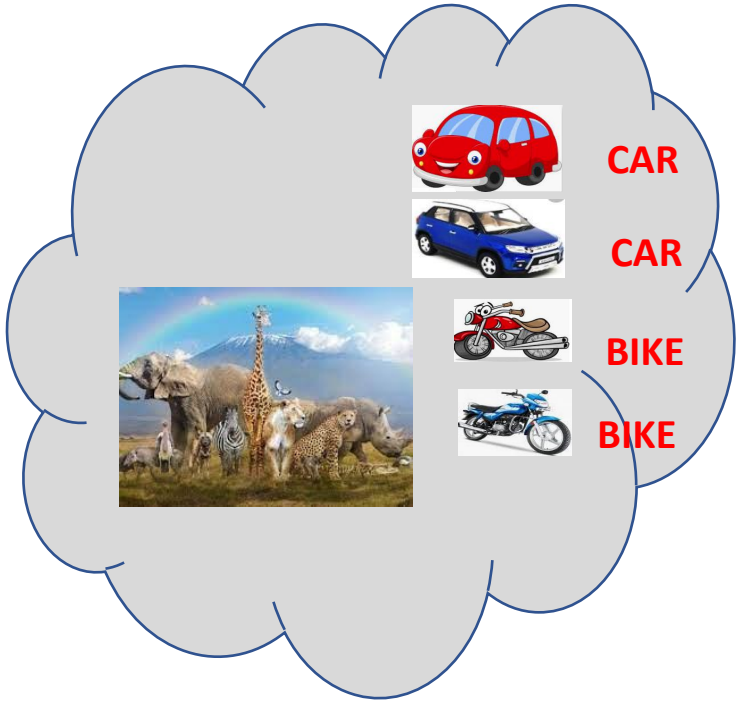
BIKE

Past experience

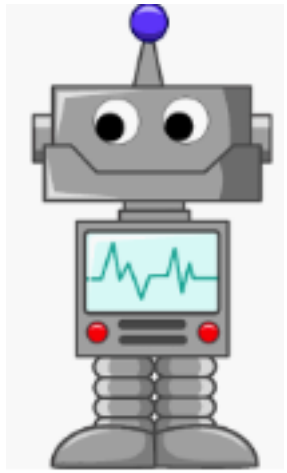
Let us ask the same question now

CAR

What is this object?



What about a Machine ?



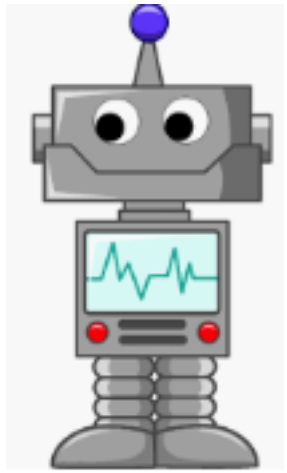
Machines follow instructions

[It can not take decision of its own]

What about a Machine ?

We can ask a machine

- To perform an arithmetic operations such as
  - Addition
  - Multiplication
  - Division



Machines follow instructions

What about a Machine ?

- Comparison
- Print
- Plotting a chart

Machines follow instructions

What is Machine Learning?

[We want a machine to act like a human]

What is Machine Learning?

[to identify this object.]

What is Machine Learning?

Price in 2025?

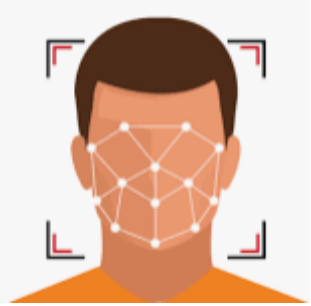
[predict the price in future]

What is Machine Learning?

I ~~made~~ met him yesterday

[Natural Language understand, and correct grammar]

What is Machine Learning?



recognize face

[Recognize Faces]

What is Machine Learning?

[What do we do?

Just like, what we did to human,

we need to provide experience to the machine.

]

What is Machine Learning?

+

Dataset

[
This what we called as Data or Training dataset

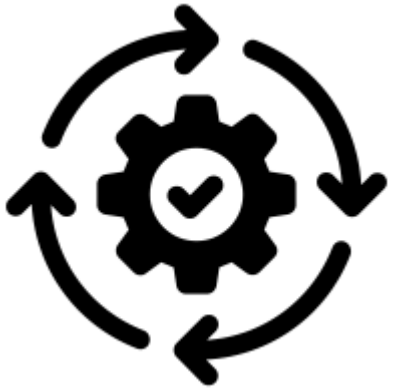
So, we first need to provide training dataset to the machine
]

What is Machine Learning?

+

Dataset

+



[Then, devise algorithms and execute programs on the data

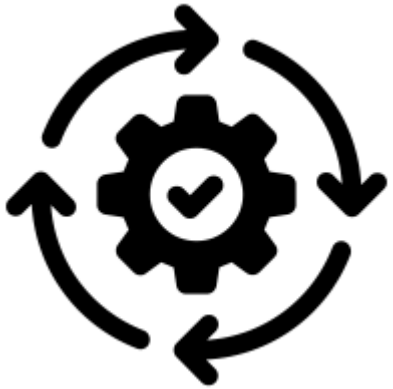
With respect to the underlying target tasks]

What is Machine Learning?

+

Dataset

+



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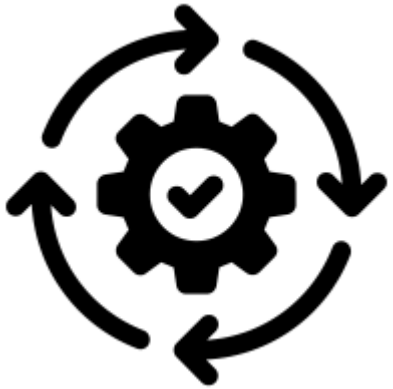
[Then, using the programs, Identify required rules]

What is Machine Learning?

+

Dataset

+



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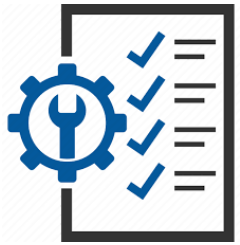


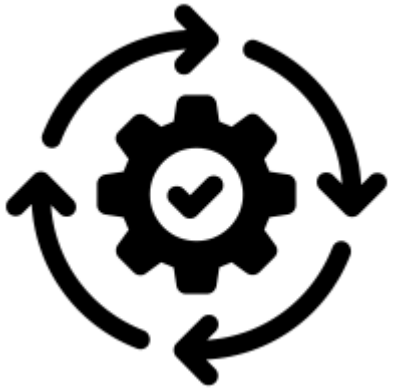
[extract required patterns]

What is Machine Learning?

+

Dataset

+



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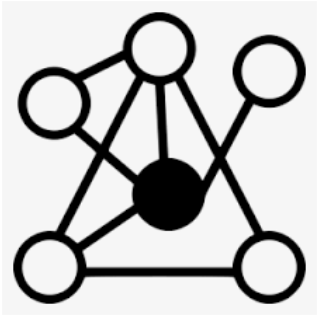
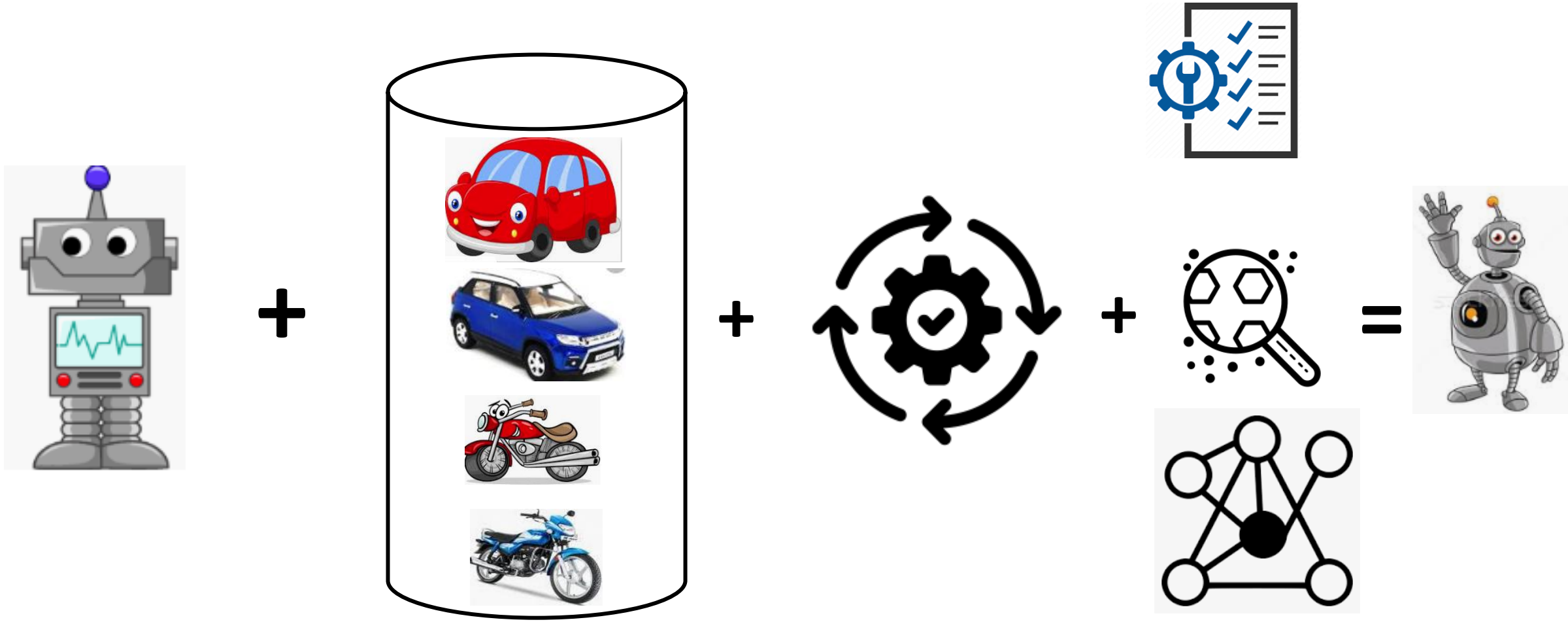


[Identify relations]

What is Machine Learning?



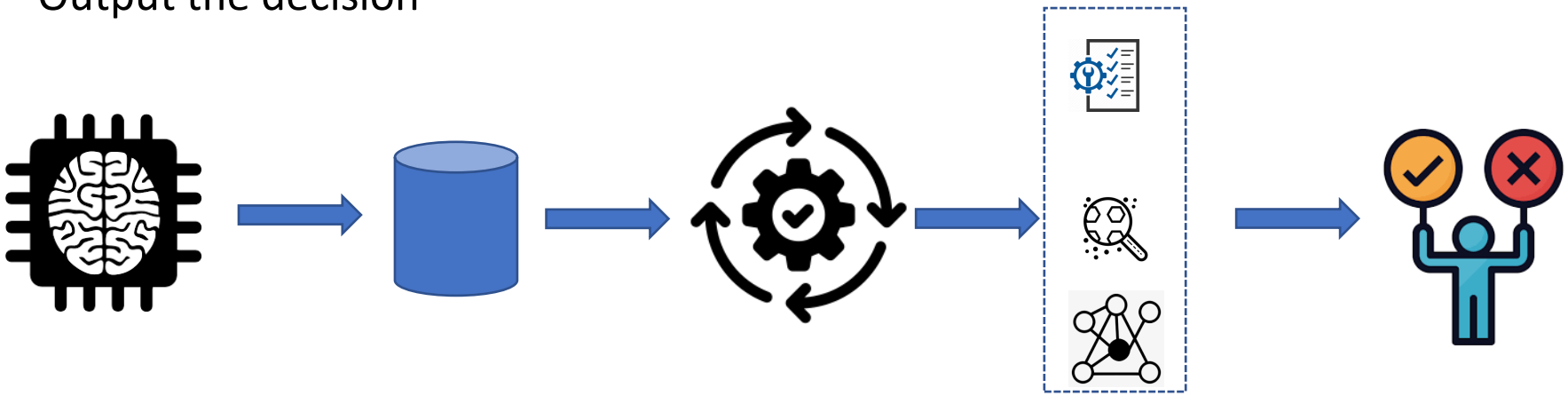
Dataset

[So that machine can derive inferences from the data]

In summary, what is machine learning?

Given a machine learning problem

- Identify and create the appropriate dataset
- Perform computation to learn
  - Required rules, pattern and relations
- Output the decision



Machine Learning Paradigms

- Supervised
- Unsupervised Learning
- Reinforcement learning

[We as human being solve various types of problem in our day-to-day life, <pause> Various decisions need to be taken.
Depending on the nature of the problem, machine learning tasks can be broadly divided in]

What is Supervised Learning?

CAR

CAR

+

BIKE

BIKE

Samples

Labels

= **Training Dataset**

[In supervised learning, we need some thing called a Labelled Training Dataset]

What is Supervised Learning?




CAR

CAR

BIKE

BIKE

Samples

Labels

Training Dataset

$f($  $,\quad\quad)=$

[Given a labelled dataset, the task is to devise a function which takes the dataset, and a new sample, and produces an output value.]

What is Supervised Learning?




CAR

CAR

BIKE

BIKE

Samples

Labels

= Training Dataset

$f($  ,  $)=$

[Given a labelled dataset, the task is to devise a function which takes the dataset, and a new sample, and produces an output value.]

What is Supervised Learning?


CAR


CAR

\+


BIKE


BIKE

Samples Labels

= **Training Dataset**

$f($  ,  $)$ = CAR

[Given a labelled dataset, the task is to devise a function which takes the dataset, and a new sample, and produces an output value.]

What is Supervised Learning?




CAR

CAR

BIKE

BIKE

Samples

Labels

Training Dataset

Classification

$f($  ,  $)=$ CAR

[If the possible output values of the function are predefined and discrete/categorical, it is called Classification

What is Supervised Learning?




CAR

CAR

BIKE

BIKE

Samples

Labels

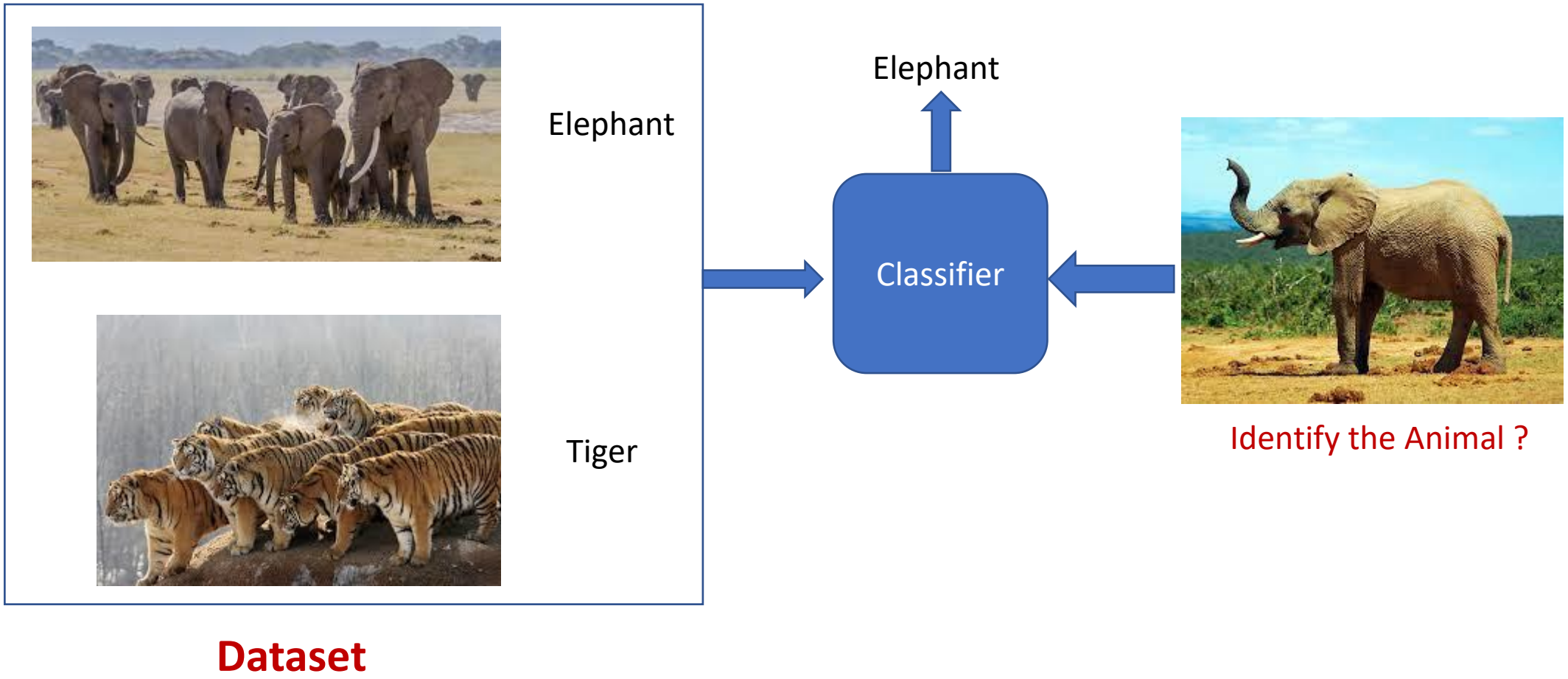
Training Dataset

Classification

$f($  ,  $)=$ CAR

[Predefined classes means, it will produce output only from the labels defined in the dataset. For example, even if we input a bus, it will produce either CAR or BIKE]

Classifier


Elephant
Tiger
Dataset
Classifier
Elephant
Identify the Animal ?

Regression

Dataset

Regression

$f($  ,  $) = 20500.50$

[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 we define as experience
]

What is Unsupervised Learning


CAR


CAR


BIKE


BIKE

Dataset

[In the unsupervised learning, we do not need to know the labels or Ground truth values]

What is Unsupervised Learning

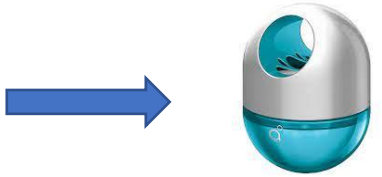
Dataset

Clustering

[The task is to identify the patterns like group the similar objects together]

What is Unsupervised Learning

Dataset



Association Rules Mining

[Association rules like]

More Example Unsupervised Learning

Dataset

More Example Unsupervised Learning

Dataset

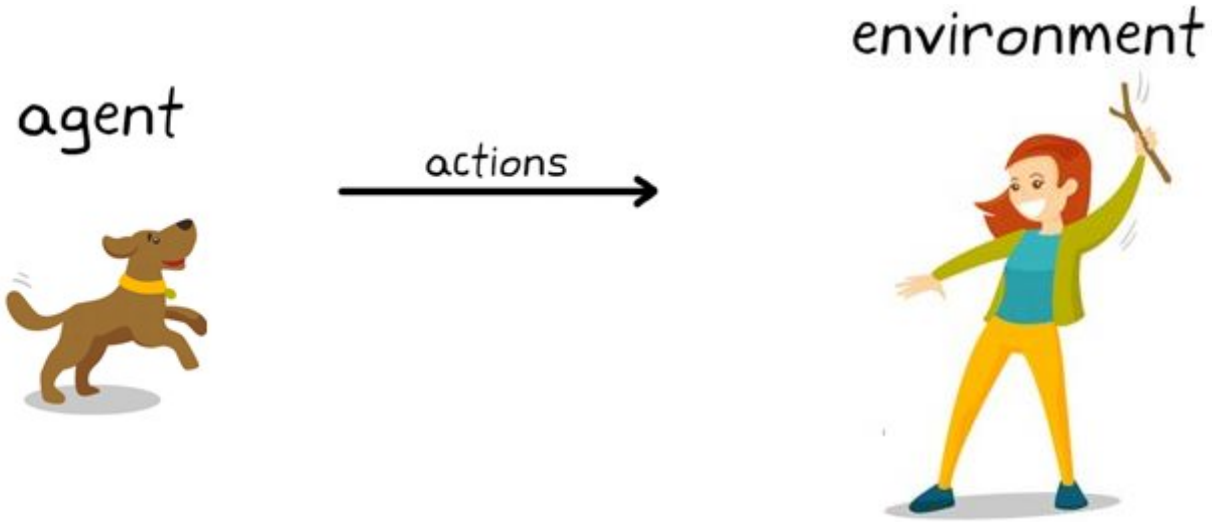
More Example Unsupervised Learning

What is Reinforcement Learning

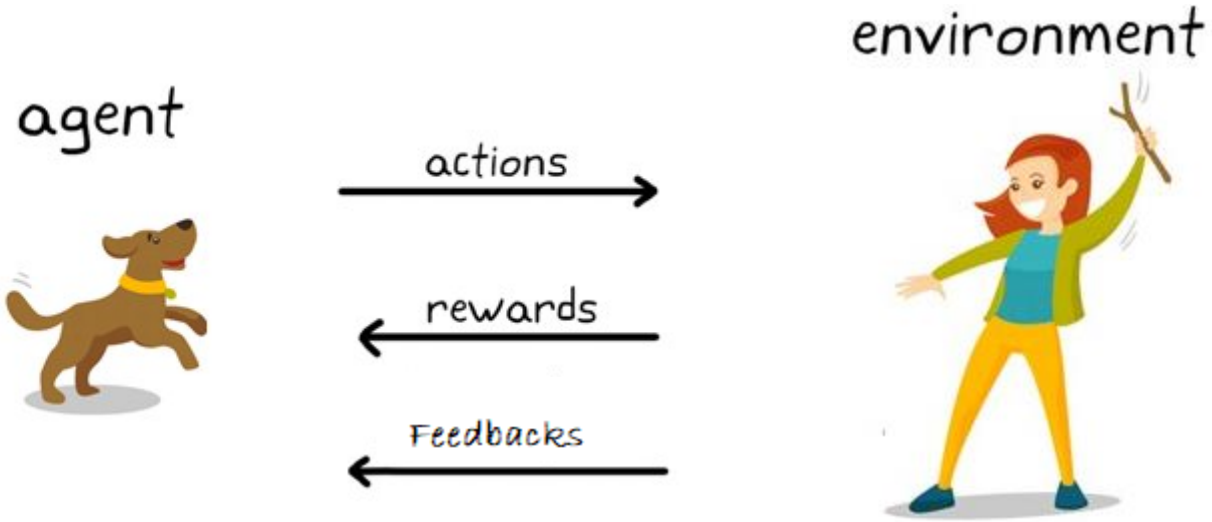
[It is also known as learning from trials and errors]

What is Reinforcement Learning

What is Reinforcement Learning



What is Reinforcement Learning



Another Example

Agent

Task

Environment

Reinforcement Learning

Punishment

Reinforcement Learning

Reward

Reinforcement Learning

Reward

Baby Learn from the Trials and Errors

Reinforcement Learning

Summary

what is machine learning

what are the machine learning paradigms

[In this lesion, we have learnt]