

Introduction to Machine Learning

APSSDC

Artificial Intelligence



Machine Learning

Machine Learning is a subtopic of Artificial Intelligence(AI) that the Machine have an ability to learn from the data and improve from experience.



Arthur Lee Samuel

Types of Machine Learning

Supervised Learning

- Makes machine Learn explicitly
- Data with clearly defined output is given
- Direct feedback is given
- Predicts outcome/future
- Resolves classification and regression problems



Unsupervised Learning

- Machine understands the data (Identifies patterns/structures)
- Evaluation is qualitative or indirect
- Does not predict/find anything specific



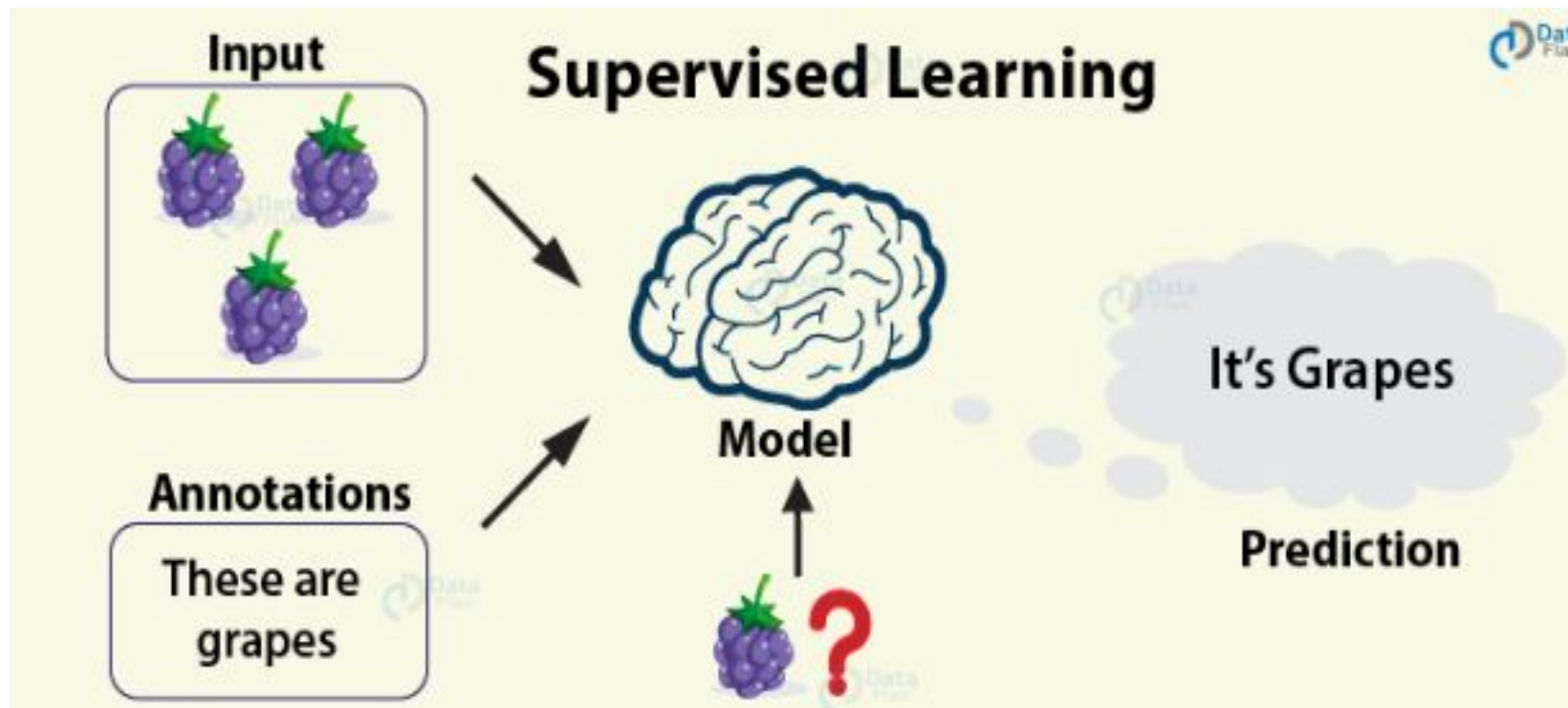
Reinforcement Learning

- An approach to AI
- Reward based learning
- Learning form +ve & +ve reinforcement
- Machine Learns how to act in a certain environment
- To maximize rewards





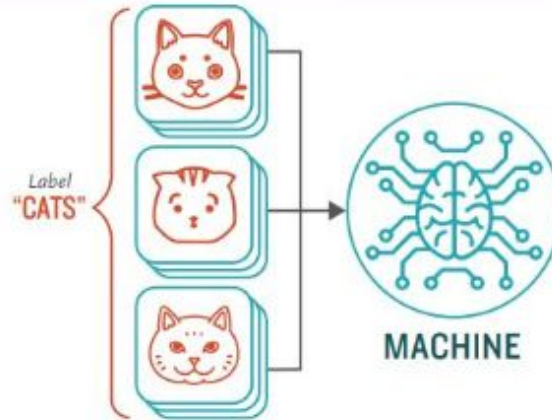
#1
Supervised
learning



How Supervised Machine Learning Works

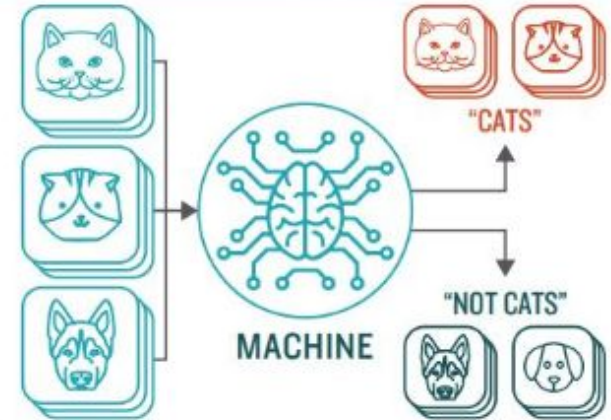
STEP 1

Provide the machine learning algorithm categorized or "labeled" input and output data from to learn

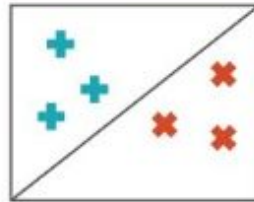


STEP 2

Feed the machine new, unlabeled information to see if it tags new data appropriately. If not, continue refining the algorithm

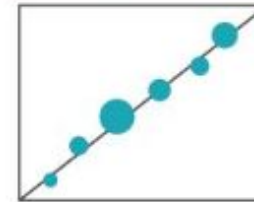


TYPES OF PROBLEMS TO WHICH IT'S SUITED



CLASSIFICATION

Sorting items
into categories



REGRESSION

Identifying real values
(dollars, weight, etc.)



#2

Unsupervised
learning

Unsupervised Learning



Input

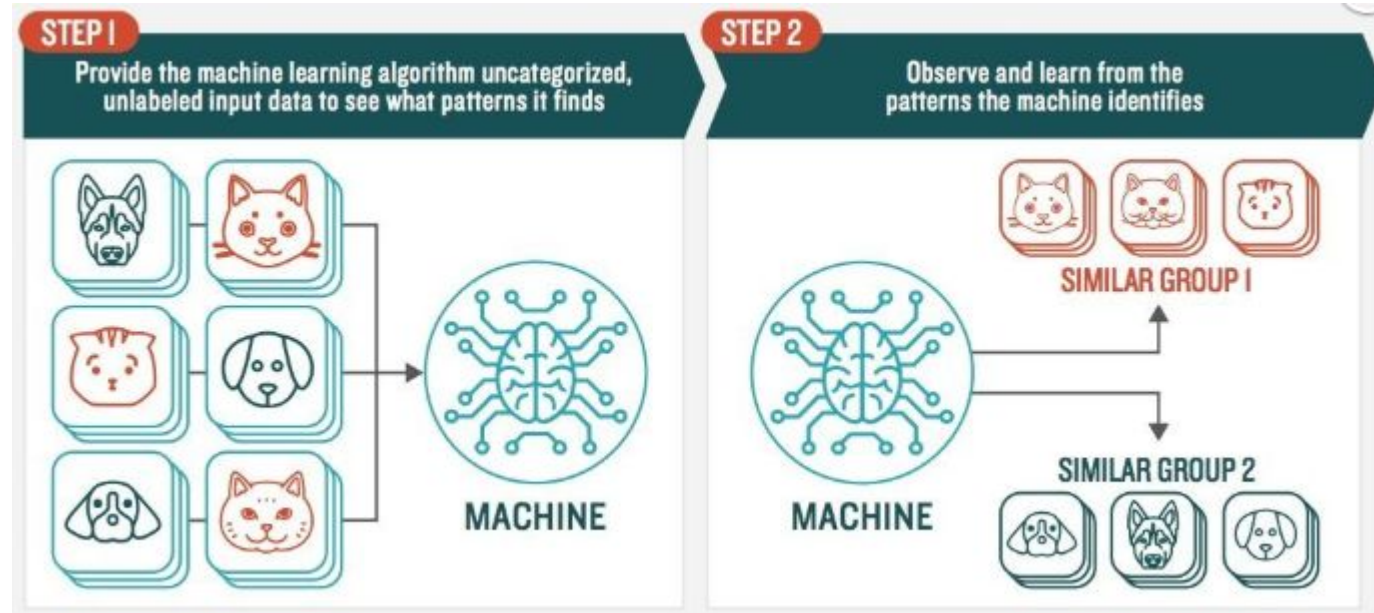


Model

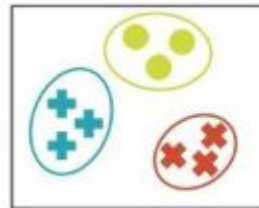


Output

How Unsupervised Machine Learning Works



TYPES OF PROBLEMS TO WHICH IT'S SUITED



CLUSTERING

Identifying similarities in groups

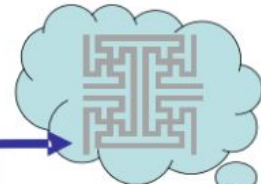
For Example: Are there patterns in the data to indicate certain patients will respond better to this treatment than others?



#3

Reinforcement
Learning

internal state



learning rate α
inverse temperature β
discount rate γ



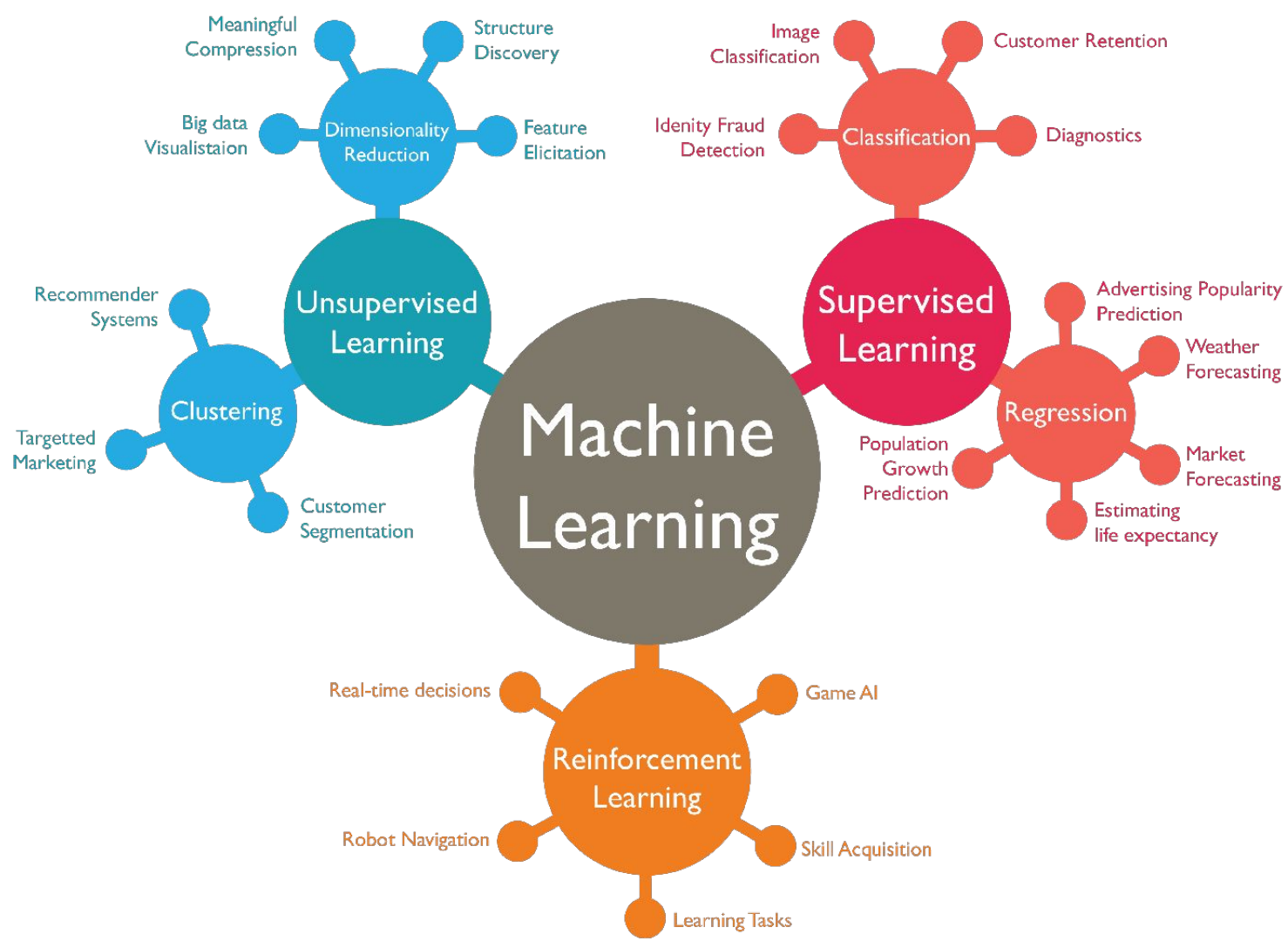
reward

environment



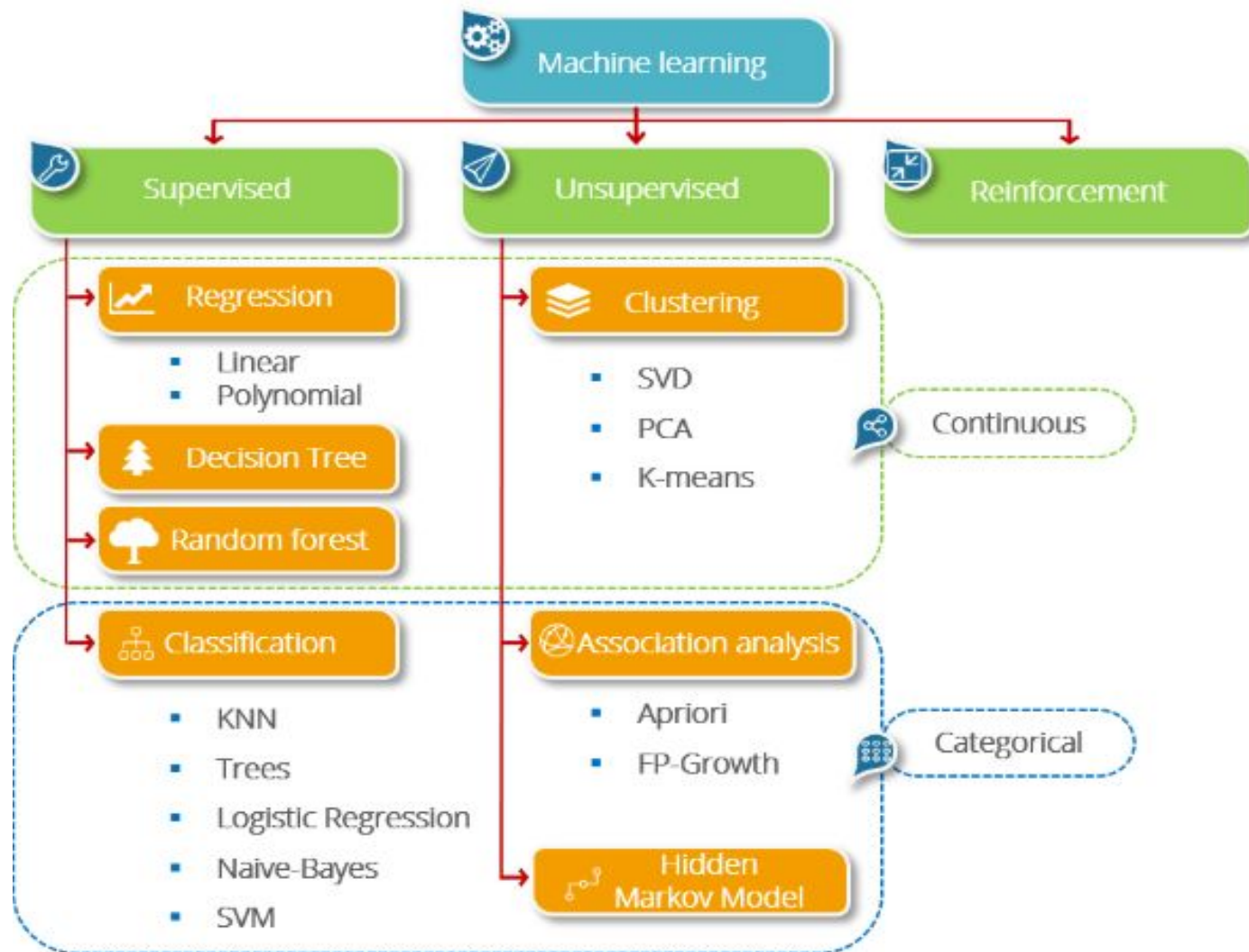
action





Algorithms

In Machine Learning



Classification

- Logistic Regression
- K Nearest Neighbours
- Trees (Random Forest)
- Naive Bayes
- SVM





#1
Supervised
learning



Happy



Sad

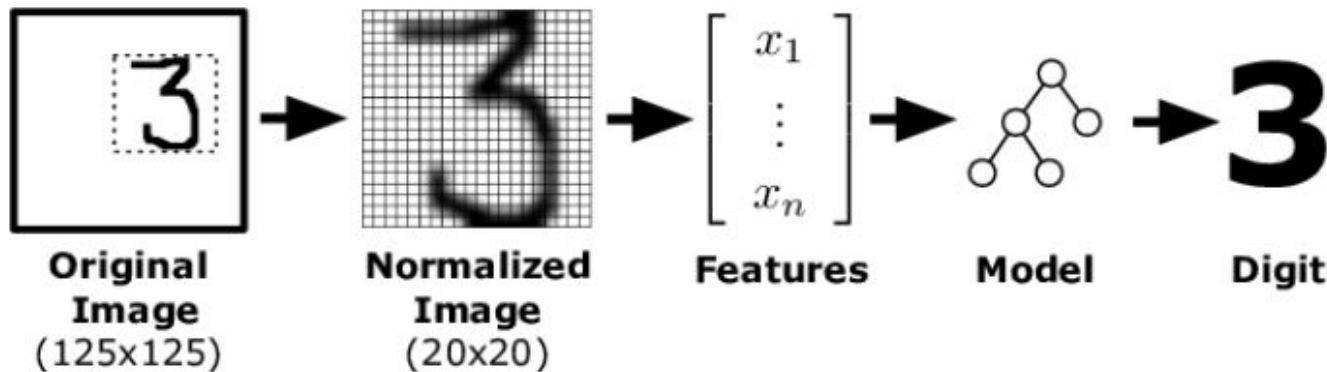
MNIST Handwritten Digits



0
1
2
3
4
5
6
7
8
9

Digit Classification

- Collect Images or Data
- Extract features from the images
- Apply statistical machine learning algorithms
- Evaluate the effectiveness of their system



Regression

- Simple Linear Regression
- Polynomial Regression





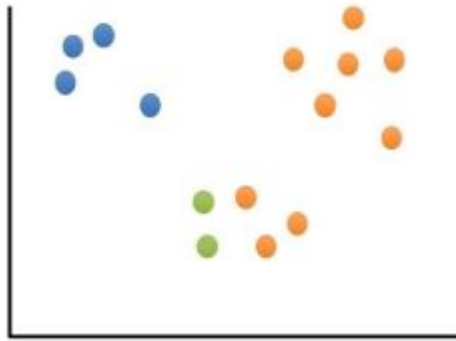
#1

Supervised
learning

House Price Prediction

Clustering

- K - means algorithm
- Gaussian distributions



Social Network Analysis



#2

Unsupervised
learning



netflix top 100 movies



All

News

Images

Videos

Shopping

More

Settings

Tools

Movies > Netflix



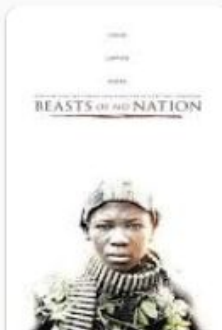
The Irishman
2019



Roma
2018



Marriage Story
2019



Beasts of No
Nation
2015



Mudbound
2017



The Ballad of
Buster Scruggs
2018

100 Best Movies on Netflix Right Now (January 2020) - Vulture

[https://www.vulture.com > article > best-movies-on-netflix-right-now](https://www.vulture.com/article/best-movies-on-netflix-right-now)

Dec 2, 2019 - The **best movies** on **Netflix** include Pulp Fiction, Raging Bull, Black Panther, Roma, The Irishman, and many more. We list the **100 best films** on ...

Netflix Movie Recommen- dation

Features / Independent Variables

Gender	Head Size
male	4112
female	3690
female	4557
male	3986
female	3299
male	4723

Target / Dependent Variables

Brain Weight
1590
1366
1588
1411
1237
1569

Thank You