5. Data Science – Machine Learning – Types of the Models

Contents

5. Data Science – Machine Learning – Types of the Models

- ✓ In Machine learning there are mainly 3 types of models exists,
    - ✓ Supervised learning
    - ✓ Unsupervised learning
    - ✓ Reinforcement learning

Best tip

- ✓ Before understanding the types of algorithms let's try to understand terminology

1. Feature and label

1.1. Features

- ✓ Features are simply the columns of the table
- ✓ These features describes the about the data
- ✓ In the given data, Age, Gender, Experience and Salary are features

Age	Gender	Experience	Salary
20	M	4	40000
24	F	5	50000

1.2. Label

- ✓ The output we will get after training the model is called as a Label

- ✓ Requirement
  - Suppose I wanted to predict the salary who had 6 years of experience
  - We prepared a model and that model predicted the salary.
  - Here salary is called as a label

- ✓ Simple
  - We are trying to predict a feature based on the others, that feature is the label.

2. Label Example

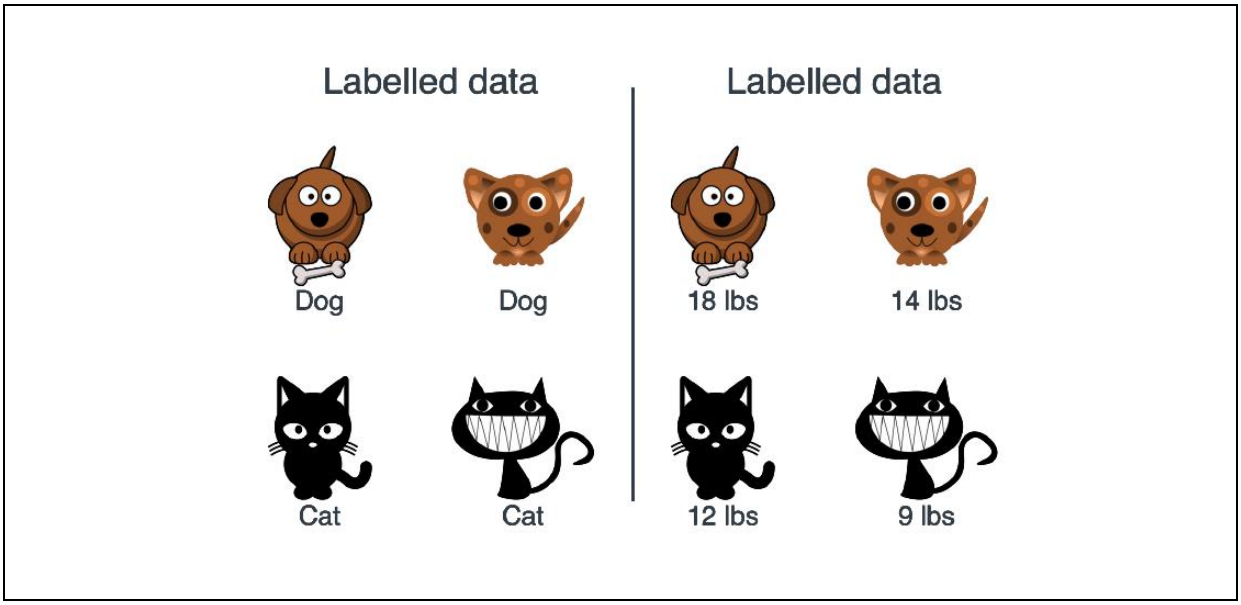
- ✓ If we are trying to predict the type of pet for example cat or dog based on information then that is the label.
- ✓ If we are trying to predict if the pet is sick or healthy based on symptoms and other information, then that is the label.
- ✓ If we are trying to predict the age of the pet, then the age is the label.

3. Labelled and unlabeled data

- ✓ According to the label, data is divided into two types
  - Labelled data
  - Unlabeled data

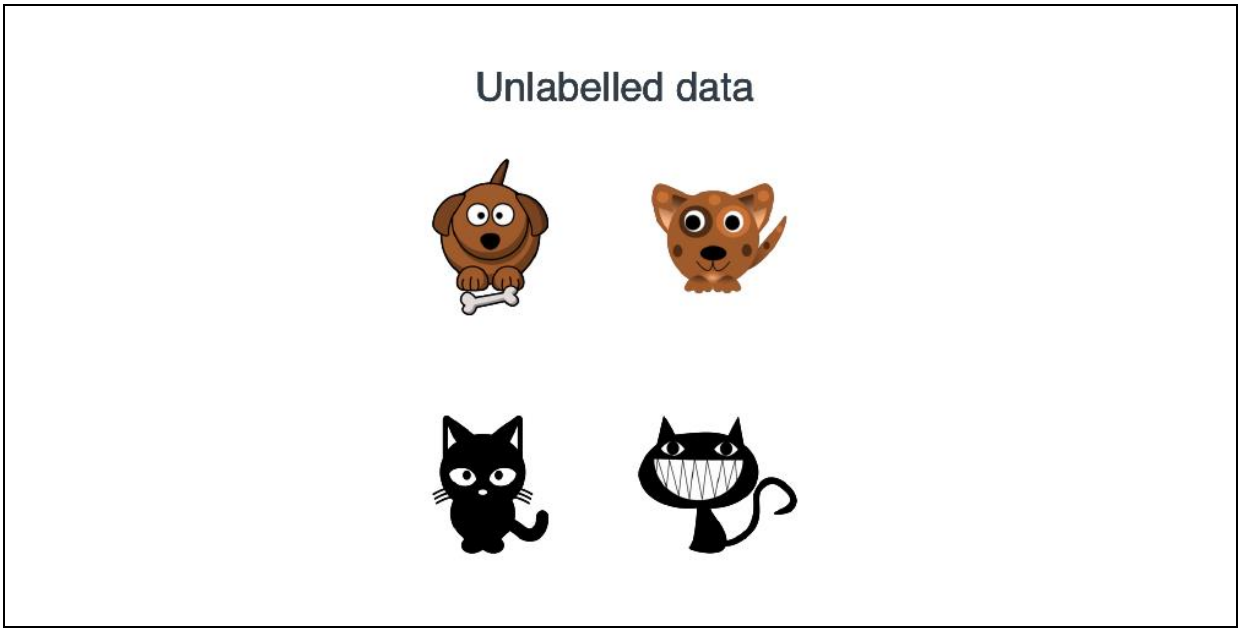
3.1. Labelled Data:

- ✓ Labelled data comes with a tag or label, like a name, a type, or a number.



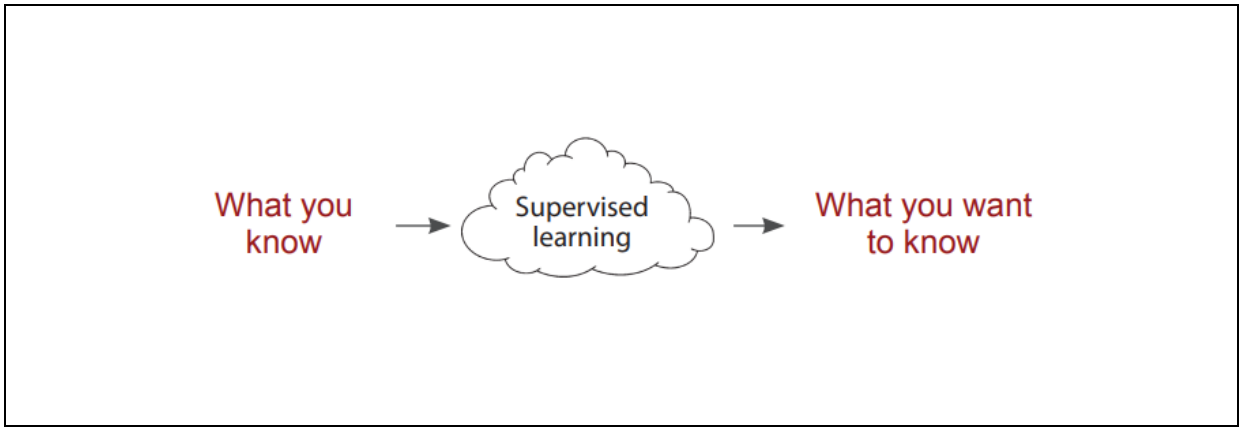
3.2. Unlabeled Data

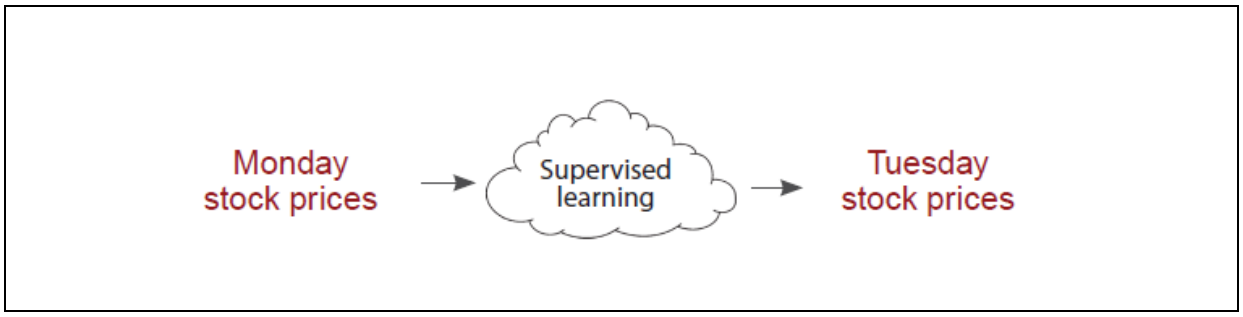
- ✓ Unlabeled data have no tag or label



4. Supervised learning definition

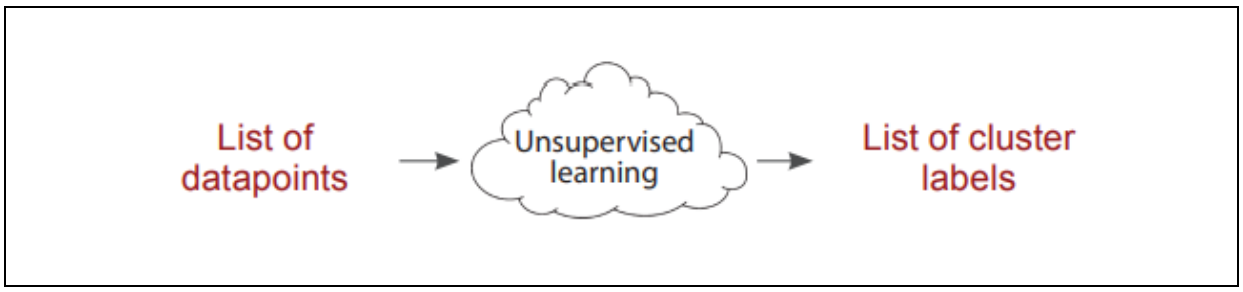
- ✓ In supervised learning, we will train the models by using input features and labels

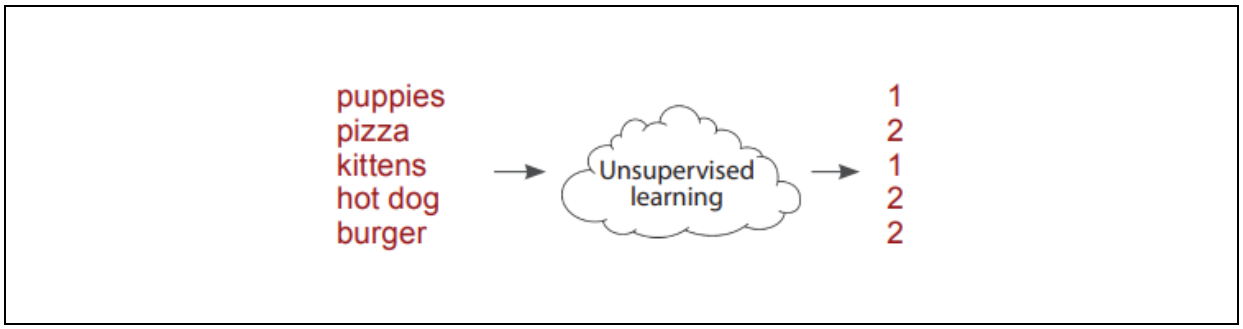


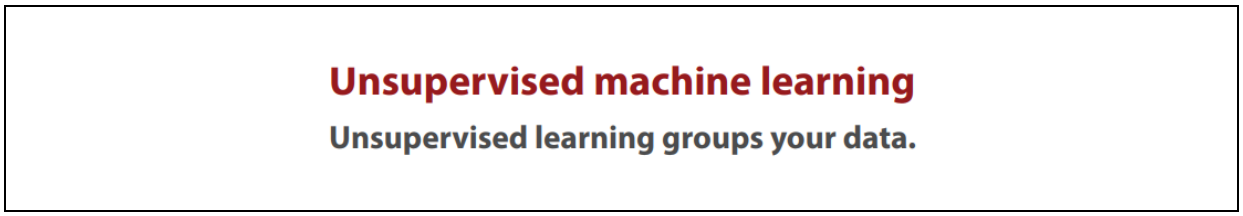


5. Unsupervised learning definition

- ✓ In unsupervised learning, we will train the models by using only input features and there is not labels







6. Supervised learning example

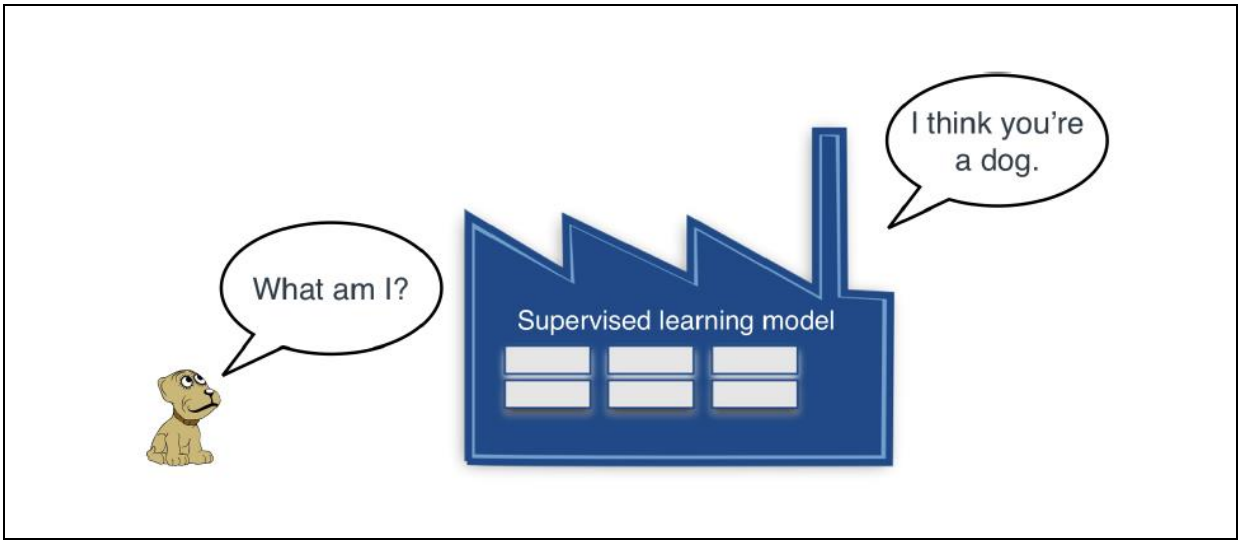
- ✓ Now a days it is very commonly using for all applications
- ✓ Supervised learning = features + label.

Examples

- ✓ Image recognition,
- ✓ Text processing,
- ✓ Recommendation systems & many more.

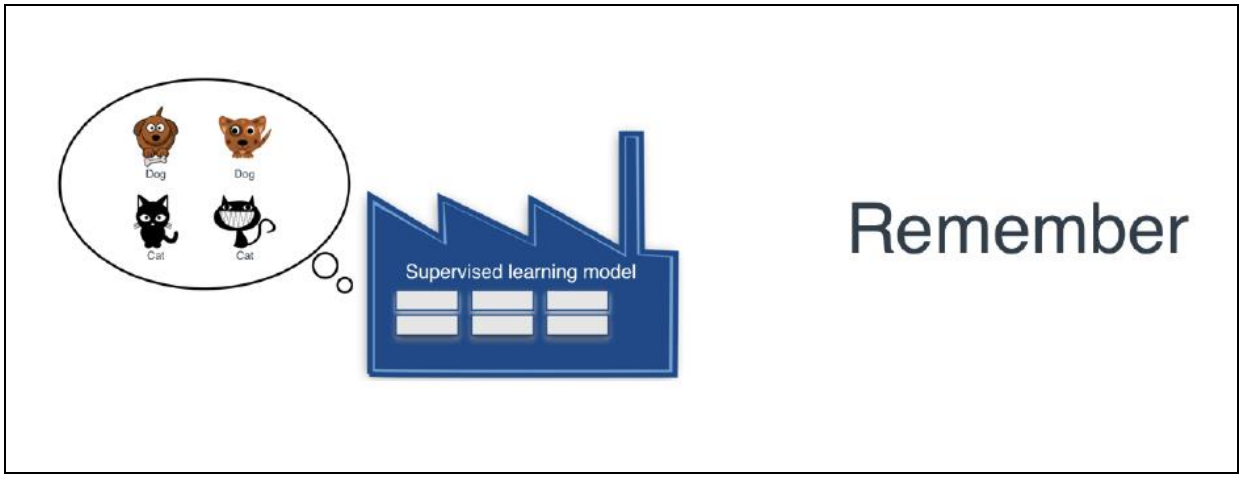
Scenario

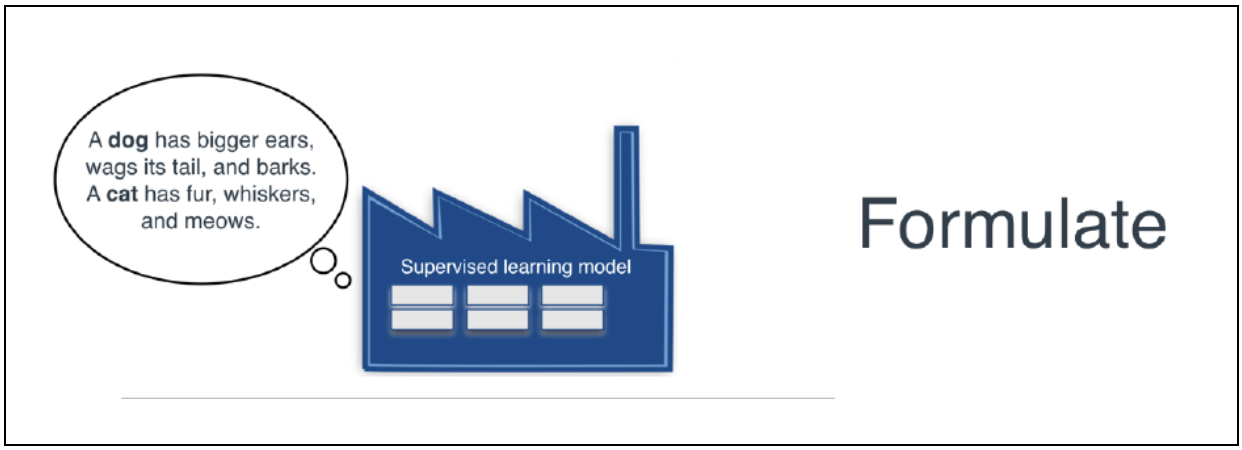
- ✓ In previous images, we have an images data about dogs and cats.
- ✓ Labels in the image are 'dog' and 'cat'.
- ✓ The machine learning model use previous data in order to predict the label of new data points.

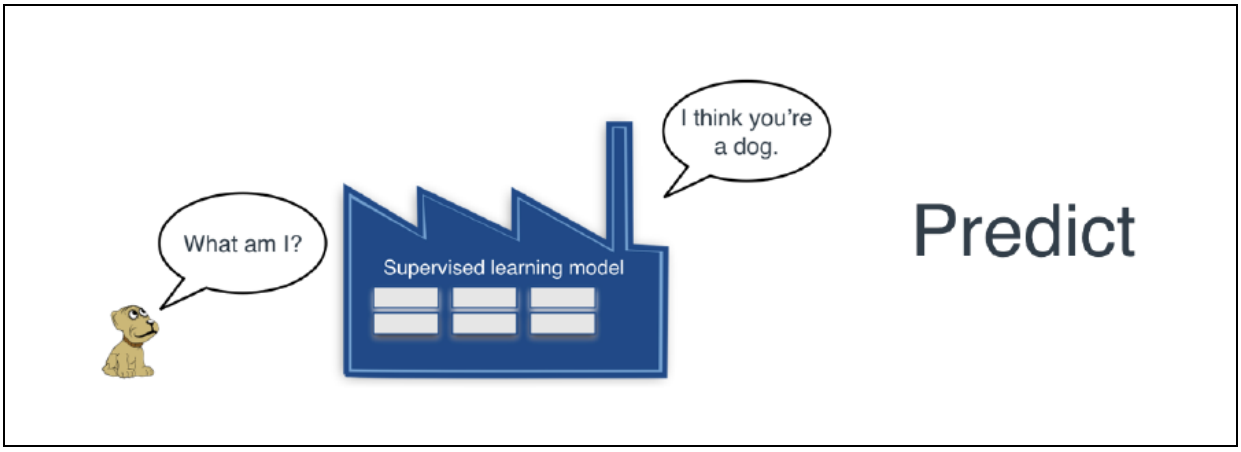


7. Remember – Formulate - Predict.

- ✓ Supervised learning works in remember – formulate – predict
- ✓ The model first remembers the dataset of dogs and cats.
- ✓ Then model formulates a model for what is a dog and what is a cat.
- ✓ Whenever a new image comes in, the model makes a prediction about what the label of the image weather cat or dot






What am I?
Supervised learning model
I think you're a dog.
Predict

8. Types of Supervised learning models

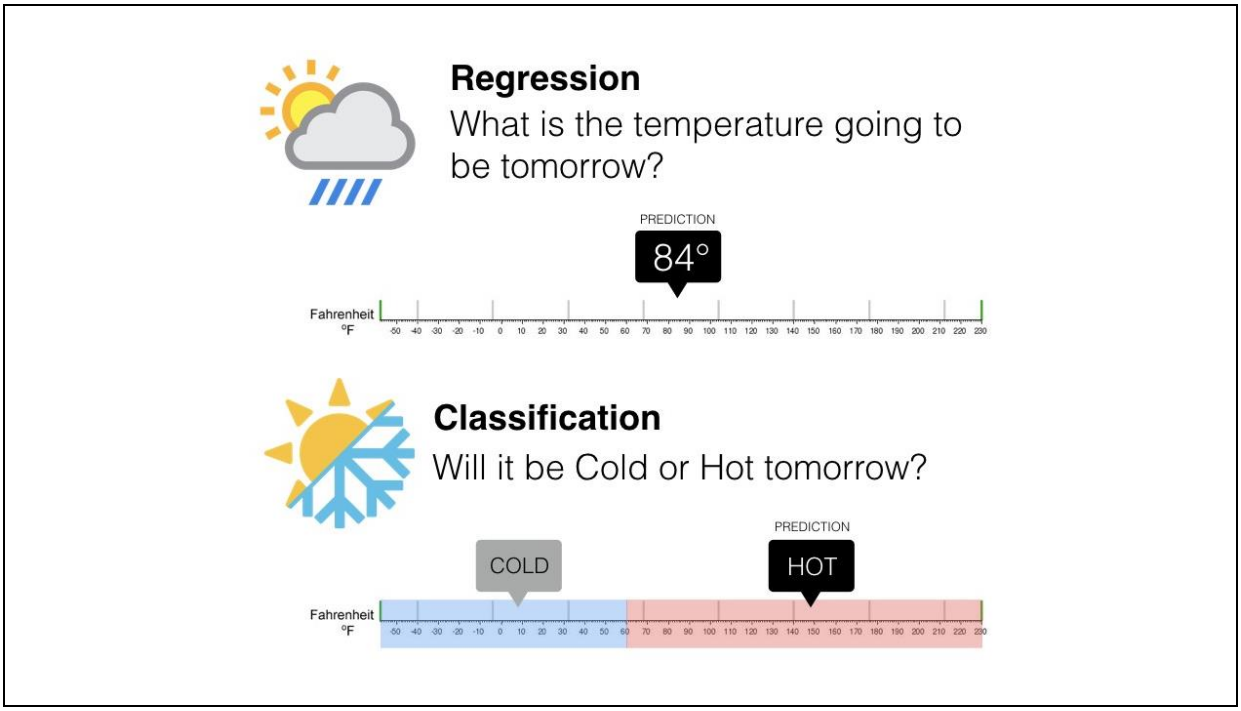
- ✓ Supervised learning models are divided into two types
  - Regression models
  - Classification models

8.1. Regression models

- ✓ Regression models used to predict a **number**
- ✓ The output of a regression model is a **continuous**, since the prediction can be any real value.
- ✓ Examples:
  - Weight of the animal
  - Employee salary
  - Students marks
  - Stock market
  - Number of sales
  - Predicting price of house & etc

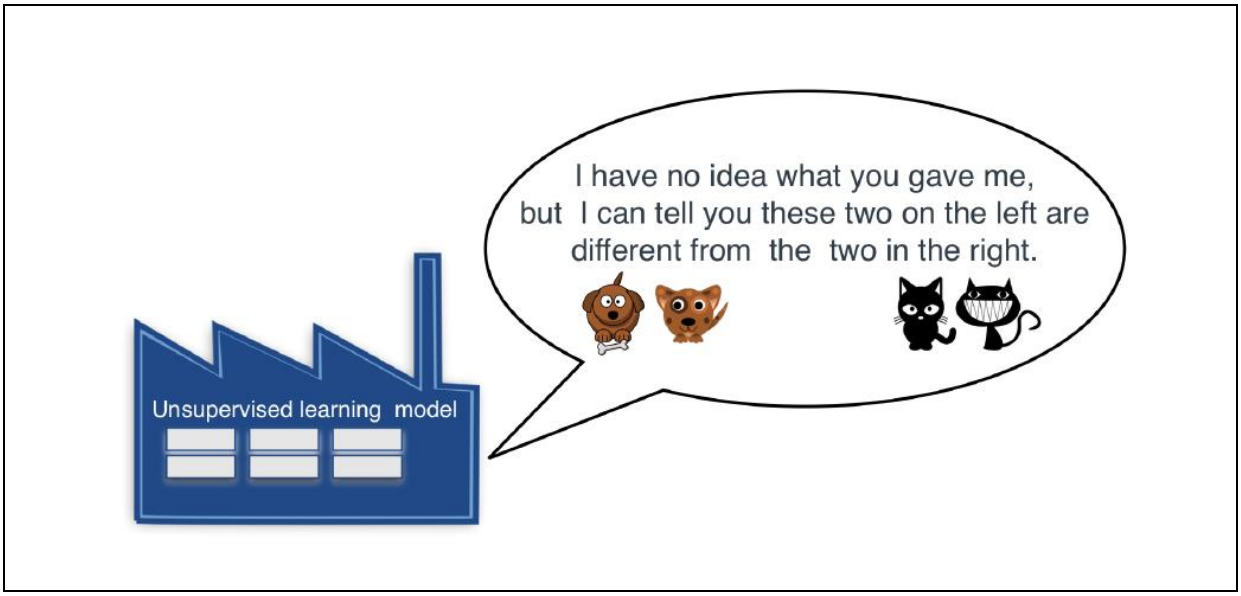
8.2. Classification models

- ✓ These are the types of models that predict the class or state.
- ✓ Examples
  - Type of animal (cat or dog),
  - Type of human being means male or female,
  - Biryani taste: good or bad or not good
  - Mail id spam or ham



9. Unsupervised learning example

- ✓ In unsupervised learning, we will train the models by using only input features but there are no labels
- ✓ Unsupervised learning is grouping the data based on similarities

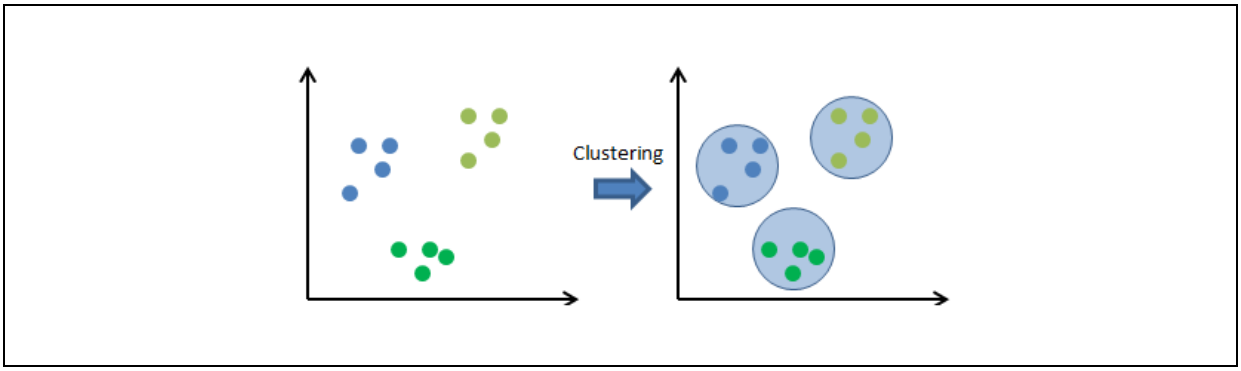


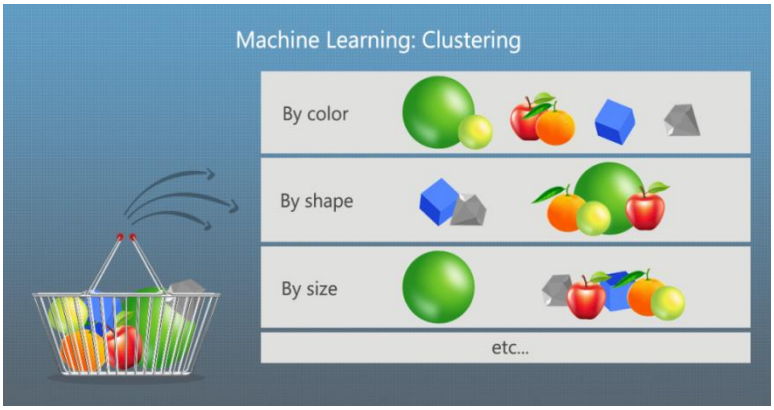
10. Types of unsupervised learning models

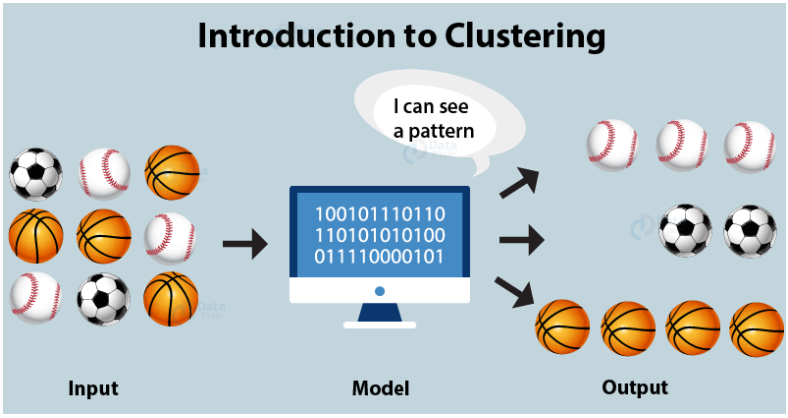
- ✓ Unsupervised learning models are divided into two types
  - Clustering
  - Dimensionality reduction

10.1. Clustering

✓ This is the task of grouping our data into clusters based on similarity.







10.2. Dimensionality reduction

- ✓ This is the task of simplifying our data and describing it with fewer features, without losing much generality.
- ✓ The dimensionality reduction algorithms will find ways that group them, losing as little information as possible.