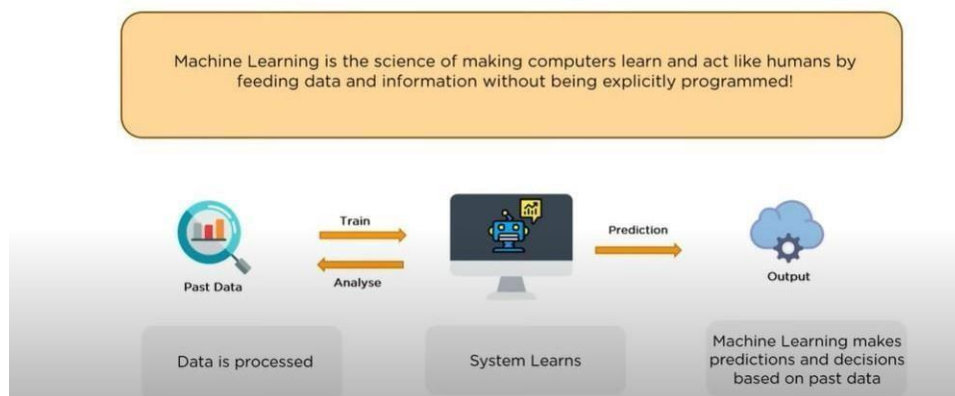| Team ID	PNT2022TMID06615
Project Name	Car resale value prediction

PRIOR KNOWLEDGE

Machine learning

Machine learning is defined as a branch of artificial intelligence (AI) a computer science which focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy.
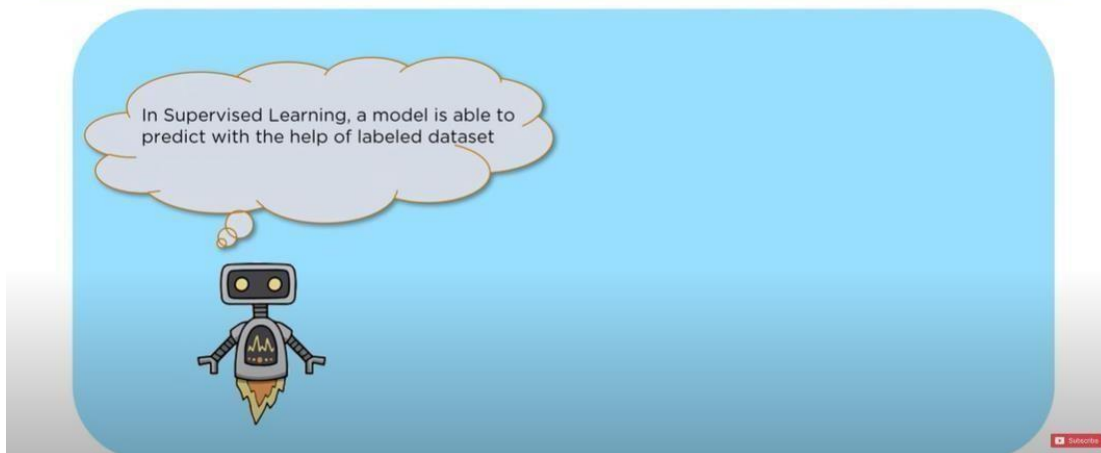

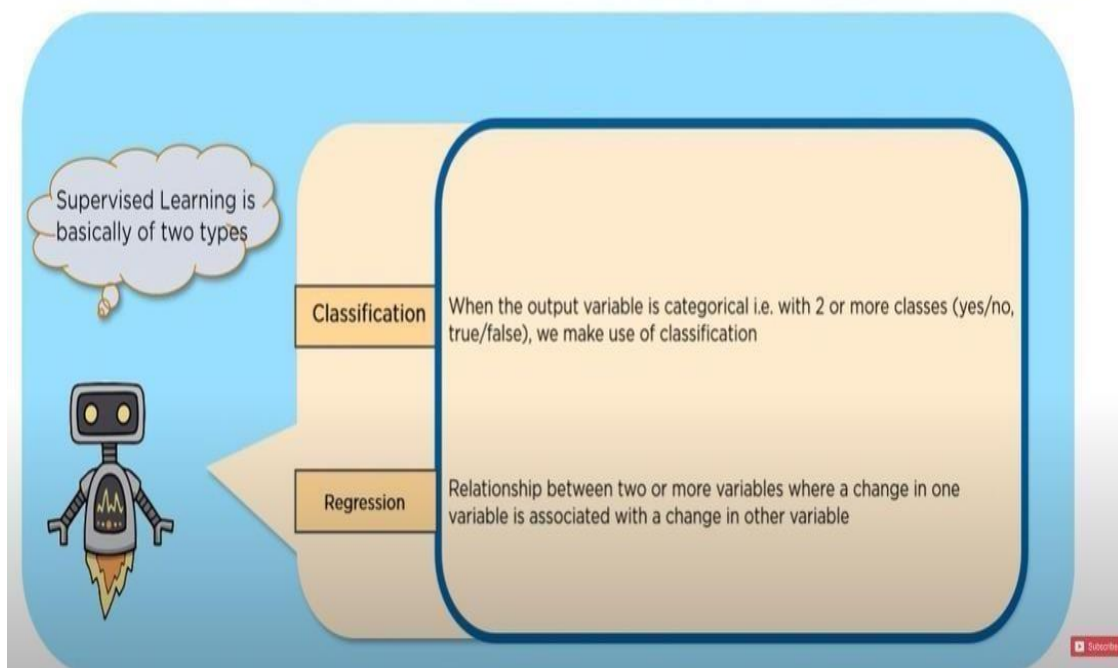There are two types of learning in machine learning.

1. Supervised learning.
2. Unsupervised learning.

Supervised Learning

It is defined by its use of labelled datasets to train algorithms that to classify data or predict outcomes accurately. As input data is fed into the model, it adjusts its weights until the model has been fitted appropriately, which occurs as part of the cross-validation process. Supervised learning helps organizations solve for a variety of real-world problems at scale, such as classifying spam in a separate folder from your inbox.

Two types of supervised learning

Types of Supervised Learning

Supervised Learning is basically of two types

| Classification | When the output variable is categorical i.e. with 2 or more classes (yes/no, true/false), we make use of classification |
| Regression | Relationship between two or more variables where a change in one variable is associated with a change in other variable |

1. Classification

DataCamp — Introduction to Machine Learning

Classification Problem

Goal: predict category of new observation

Earlier Observations → **Estimate** → CLASSIFIER

Unseen Data → **CLASSIFIER** → Class

Classification Applications

- **Medical Diagnosis**
- **Animal Recognition**

Important:

- Qualitative Output
- Predefined Classes

2. Regression

Regression

PREDICTORS → **REGRESSION FUNCTION** → RESPONSE
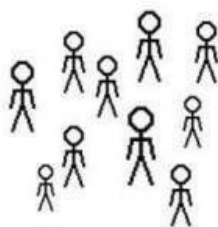
- Relationship: **Height** - **Weight**?
- Linear?
- Predict: **Weight** ⟶ **Height**

Regression Model

Fitting a **linear** function

$$\text{Height} \approx \beta_0 + \beta_1 \times \text{Weight}$$

- **Predictor:** Weight
- **Response:** Height
- **Coefficients:** β_0, β_1
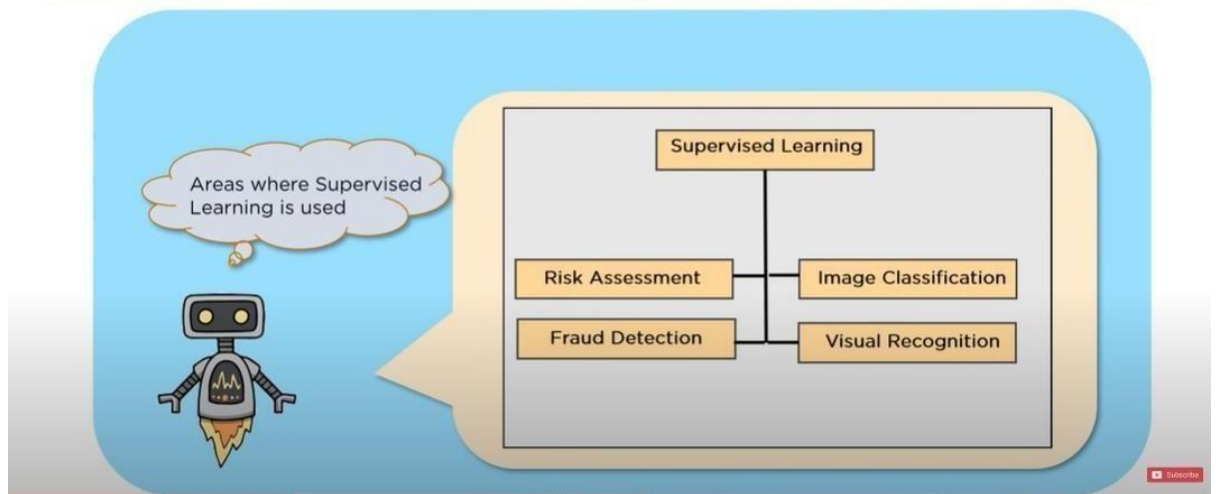
Estimate on previous input-output

```
> lm(response ~ predictor)
```

Regression Applications

- Payments $\longrightarrow$ Credit Scores
- Time $\longrightarrow$ Subscriptions
- Grades $\longrightarrow$ Landing a Job

- Quantitative Output
- Previous **input-output** observations
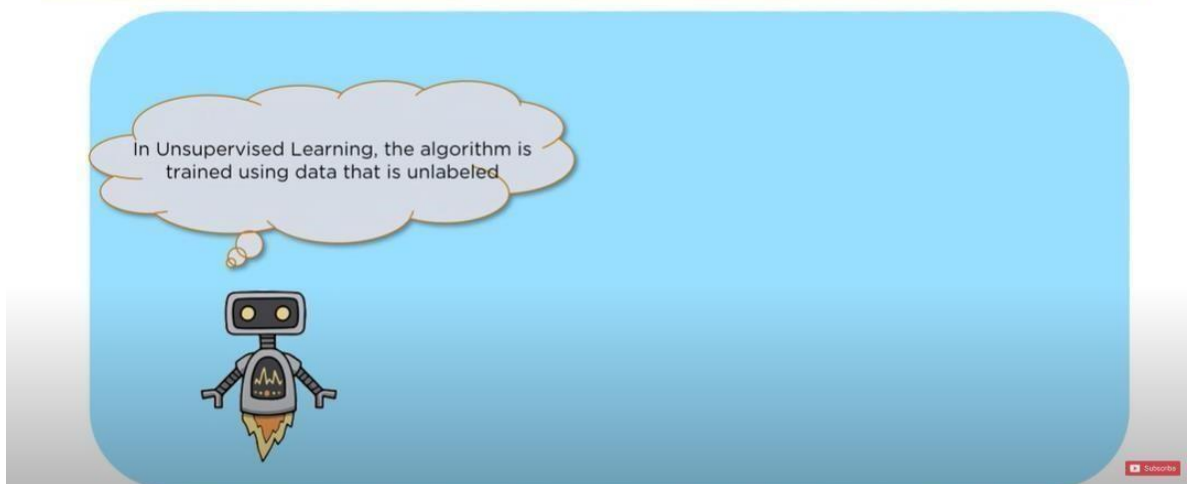
Applications of supervised learning

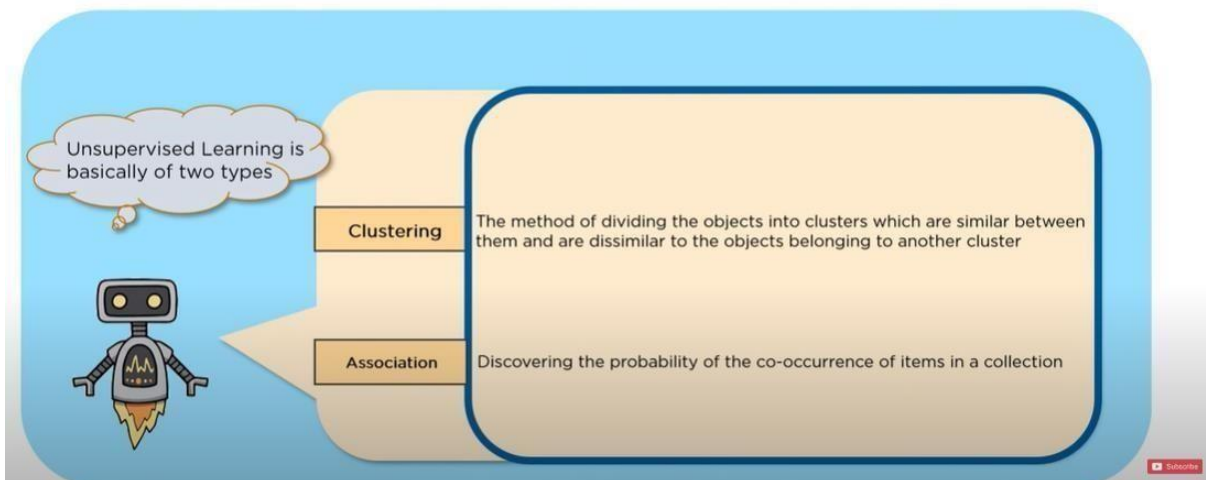Applications of Supervised Learning

3. Unsupervised learning

In unsupervised learning, an algorithm separates the data in a data set in which the data is unlabelledbased on some hidden features in the data.

Unsupervised Learning

Types of unsupervised learning
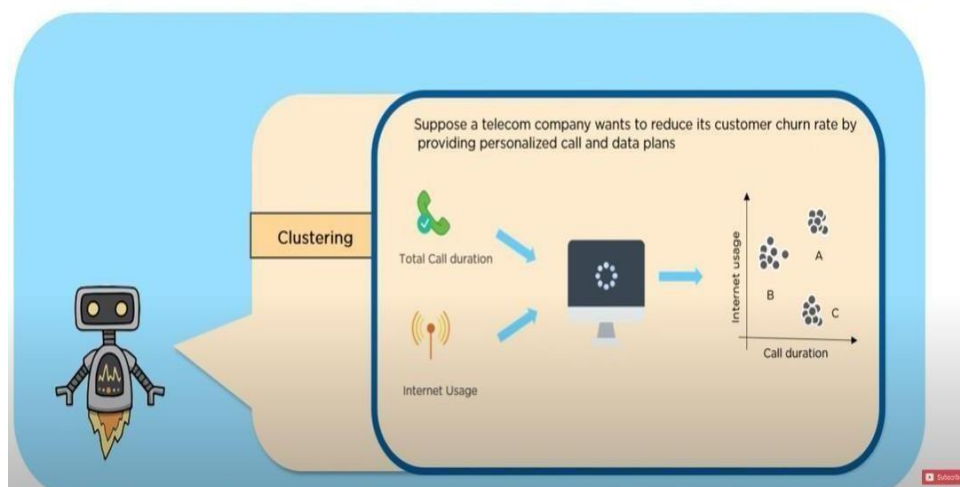
Types of Unsupervised Learning

a) Clustering

b) Association

Association learning is a rule-based machine learning and data mining technique that finds important relations between variables or features in a data set.

Applications of unsupervised learning