

# Introduction to Machine Learning



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# What is Machine Learning ?



- Machine learning is an application of **artificial intelligence (AI)** that provides systems the **ability to automatically learn** and improve from experience **without** being **explicitly programmed**.

# Machine Learning Methods



Machine  
Learning

Supervised

Task driven  
(Regression /  
Classification)

Unsupervised

Data driven  
( Clustering )

Reinforcement

Algorithm learns to  
react to an  
environment

# What Is Supervised Learning?



- Learning a task under supervision
  - Having a full set of labelled data while training an algorithm.
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- Example
    - Ice cream Flavours
    - Bag of Fruits
    - News Paper agency.
    - Animal image labelling based on visual features.

# Classification of Supervised Learning Algorithms



Supervised Learning

Regression Analysis

Where Continuous  
Outcome is Expected

Dependent Variable is  
Continuous in nature

Classification

Where Discrete  
Outcome is Expected

Dependent Variable is  
Discrete in nature

# What Is Unsupervised Learning?



- Data With No Labels / True Values / Correct Answer
- Clustering, Anomaly detection, Association
  
- Example :-
  - Grouping Data in clusters based on data patterns like shape,etc
  - Animal image Clustering/Grouping based on visual features.
  - Anomaly detection.

# Classification of Un-Supervised Learning



Un-Supervised Learning

Clustering

Association Rule  
Mining

Groups Data Based  
On Similar Patterns

To Find Hidden  
Patterns

# Example Association Rule Mining



## Example : SuperMarket

### Transaction Database

transaction ID	milk	bread	butter	beer	diapers
1	1	1	0	0	0
2	0	0	1	0	0
3	0	0	0	1	1
4	1	1	1	0	0
5	0	1	0	0	0



# What Is Reinforcement Learning?



- Learn from the experience and react accordingly.
- Video games are full of reinforcement clues.  
Complete a level and earn a badge.
- Defeat the bad guy in a certain number of moves and earn a bonus.
- Example
  - Automated Robotic Application.
  - Self Driving cars
  - Video Games.

# Predictive and Descriptive modelling



- Predictive Modelling :
  - Constructing model that can accurately predict future outcomes.
- Descriptive Modelilng
  - refers to a mathematical model that describes historical events.
  - yesterday when I went to the store to buy milk, it cost me \$1.00 a litre, last month it was 95 cents, last year it was 80 cents.. Based on historical events, I assume it will cost me roughly \$1.05 to buy a litre of milk next month.

# Machine Learning and Business



- **Product Suggestions** (Recommendation)
- **Data Entry** (ex :- Grammerly)
- **Medicine** ( Diagnosis and Prescription )
- **Identifying Spam** (Classifying Emails )
- **Image recognition** ( Computer Vision )
- **Financial analysis** (Credit Card Fraud Detection)

# What is Model Building ?

