ML: a method of data analysis that automates analytical model building. It is a branch of AI based on the idea that systems can learn from data, identify patterns and make decisions with minimal human intervention.

DL: a class of **ML** algorithms that uses multiple layers to progressively extract higher level features from the raw input.

Data Pre-processing

DR: the process of reducing the number of random variables under consideration, by obtaining a set of principal variables.

ANN: a computing system vaguely inspired by the biological neural networks that constitute animal brains.

Machine Learning (ML)

- Point (Pixel) operations
- Brightness & contrast examples
- Neighbourhood operations
- Noise reduction and enhancement

Deep Learning (DL)

Classification: a process related to categorization, the process in which ideas and objects are recognized, differentiated and understood.

KD: the process of discovering useful knowledge from a collection of data.

Pattern Recognition (PR)

- Introduction: Pattern Recognition (PR)
- Pattern Recognition Models
- Simple Classifier

Dimension Reduction (DR)

Why?

PCA/LDA /2DPCA

Classification

- K-Nearest Neighbor (KNN)
- Support Vector Machine (SVM)
- Sparse Representation-based Classification (SRC)

Knowledge Discovering (KD)

- What is Data?
- Data Measurement
- Data Exploration
  - Clustering: K-Means
  - Linear Regression
- Data Mining (**DM**)

ANN

- Why/What ANN?
- Hebb Net
- Perceptron
- Back-propagation

DL

- DL: History
- Convolutional NN (**CNN**)
- CNN Example

RL

- Human feedback
- How to adapt?
- Example: Reinforce learning (**RL**)

PR: the process of recognizing **patterns** by using ML algorithm.

PCA: Principal component analysis
LDA: Linear Discrimination Analysis

CNN: a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other.

Three basic machine learning paradigms: Supervised learning, Unsupervised learning & Reinforcement learning.