Artificial Intelligence
&
Deep Learning

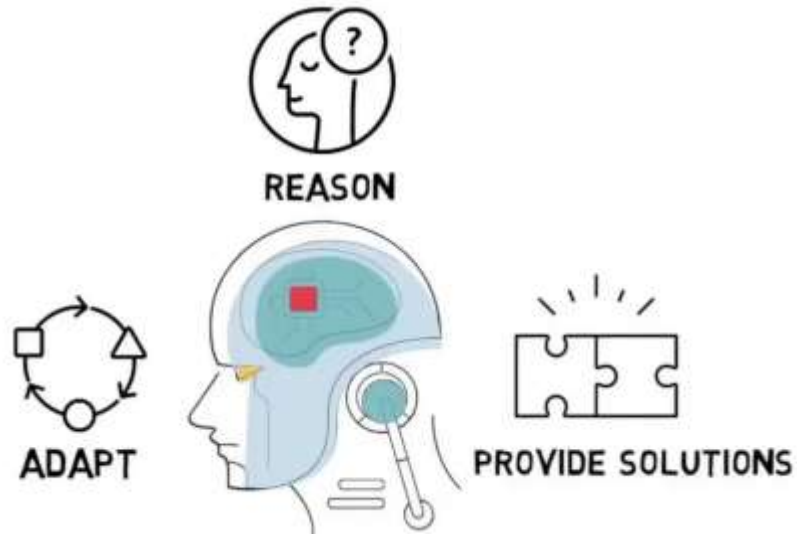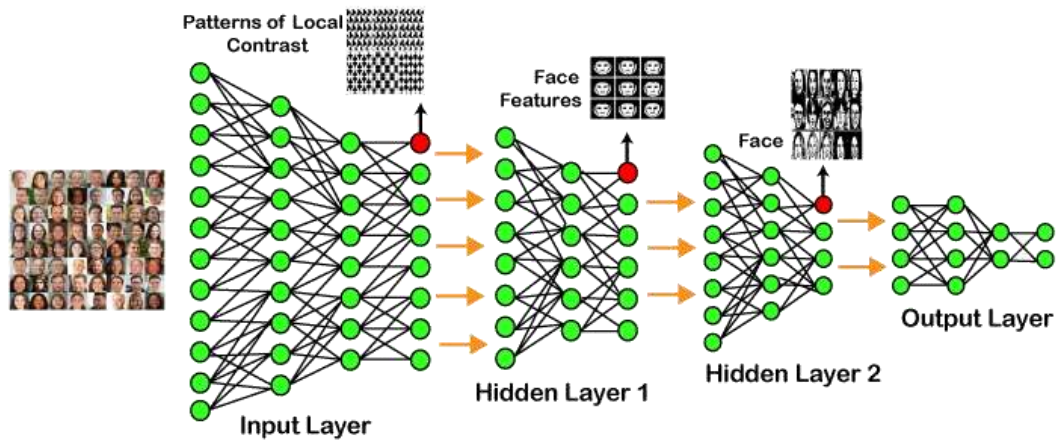# Artificial Intelligence

Artificial intelligence (AI) is intelligence demonstrated by machines, as opposed to intelligence displayed by humans or by other animals. "Intelligence" encompasses the ability to learn and to reason, to generalize, and to infer meaning.

Deep Learning

Deep learning is a collection of statistical techniques of machine learning for learning feature hierarchies that are based on artificial neural networks.
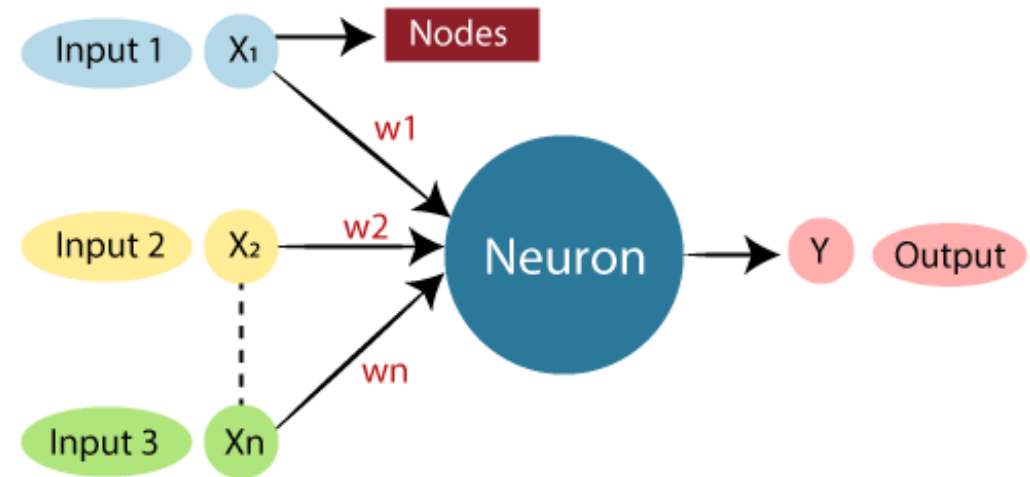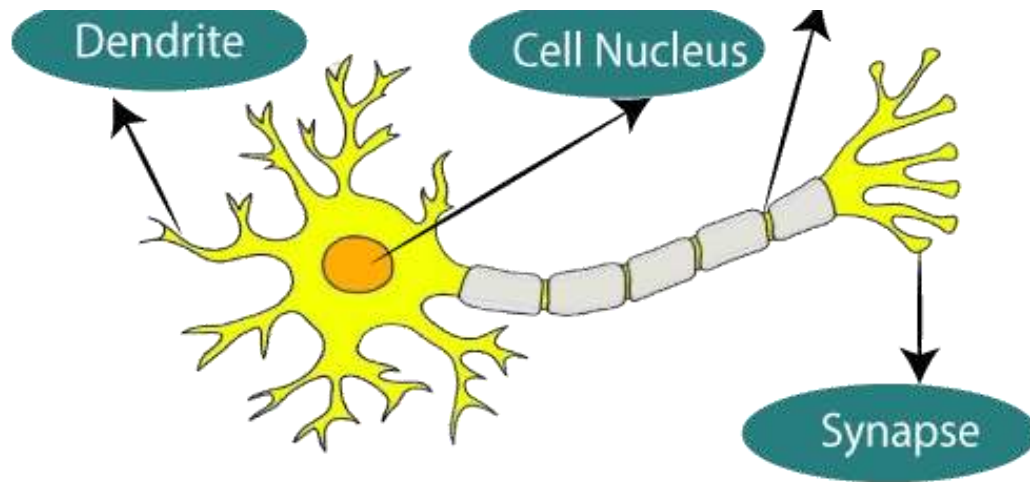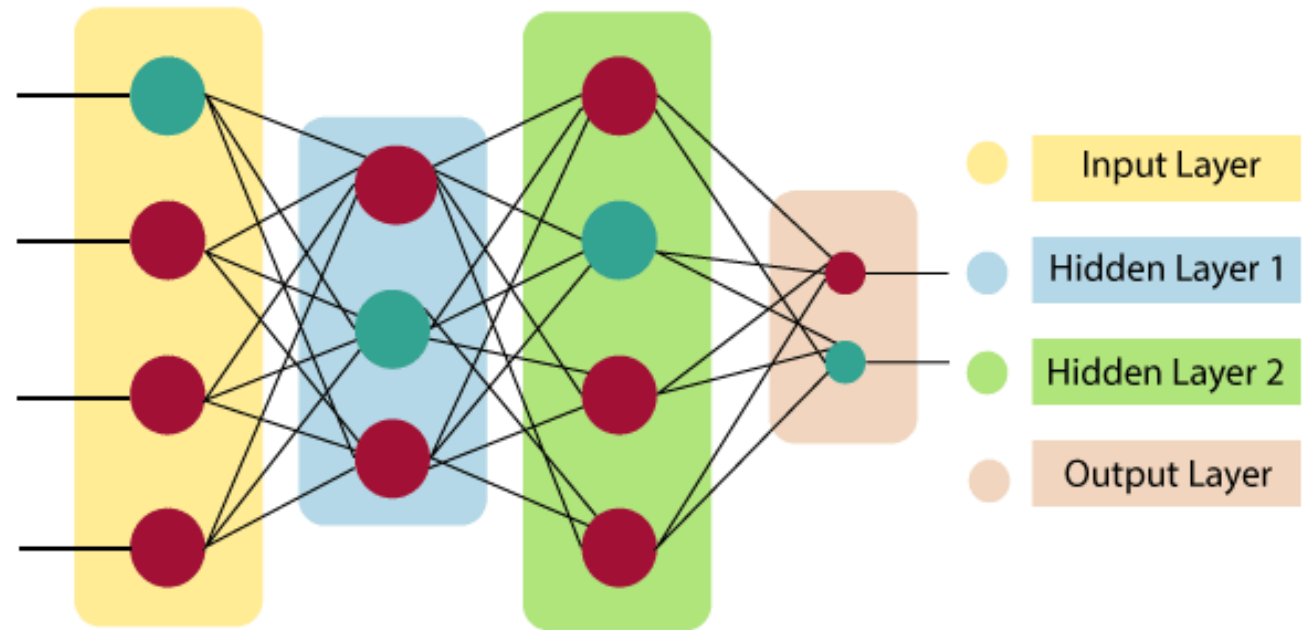
Artificial Neural Network

Artificial Neural Networks (ANNs) are a class of machine learning models inspired by the biological neural networks that constitute animal brains. They consist of interconnected layers of artificial neurons, where each neuron processes input data, performs computations, and passes information to the next layer.

Architecture of an Artificial Neural Network

Input Layer
Hidden Layer 1
Hidden Layer 2
Output Layer

Relation Between AI, ML and DL

Artificial intelligence
Any technique which enables computers to mimic human behaviour

Machine learning
Subset of AI techniques which use statistical methods to enable machines to improve with experiences

Deep learning
Subset of ML which make the computation of multi-layer neural networks feasible

Artificial intelligence

Machine learning

Deep learning
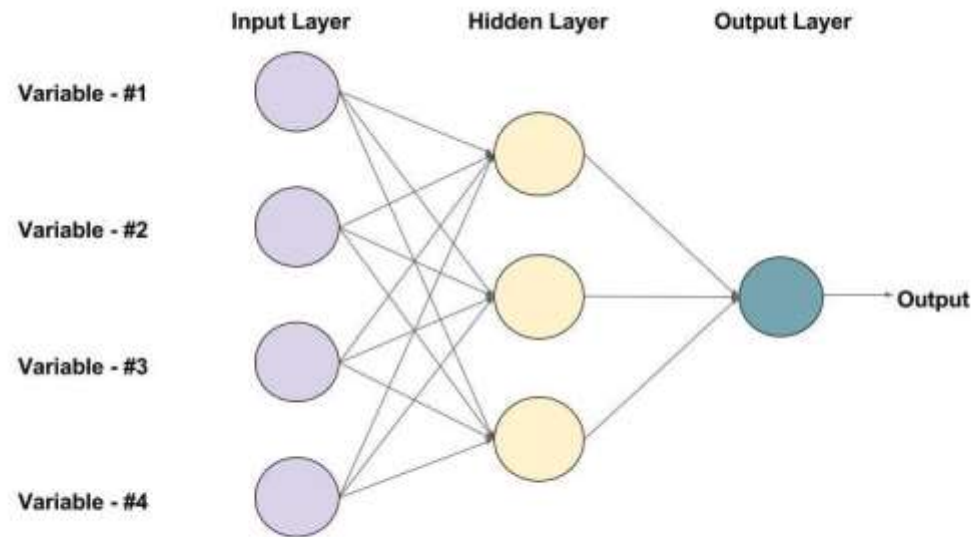
Types of Deep Learning Networks

1. Feed Forward Neural Network
2. Recurrent Neural Network
3. Convolutional Neural Network
4. Restricted Boltzmann Machine
5. Autoencoders

An example of a Feed-forward Neural Network with one hidden layer (with 3 neurons)

Feed Forward Neural Network

A Feed Forward Neural Network (FFNN) is a type of artificial neural network where the connections between nodes do not form a cycle. It is the simplest form of artificial neural network, mainly used for supervised learning tasks. In a FFNN, information moves in one direction—forward—from the input nodes, through the hidden nodes (if any), and to the output nodes. There are no cycles or loops in the network.
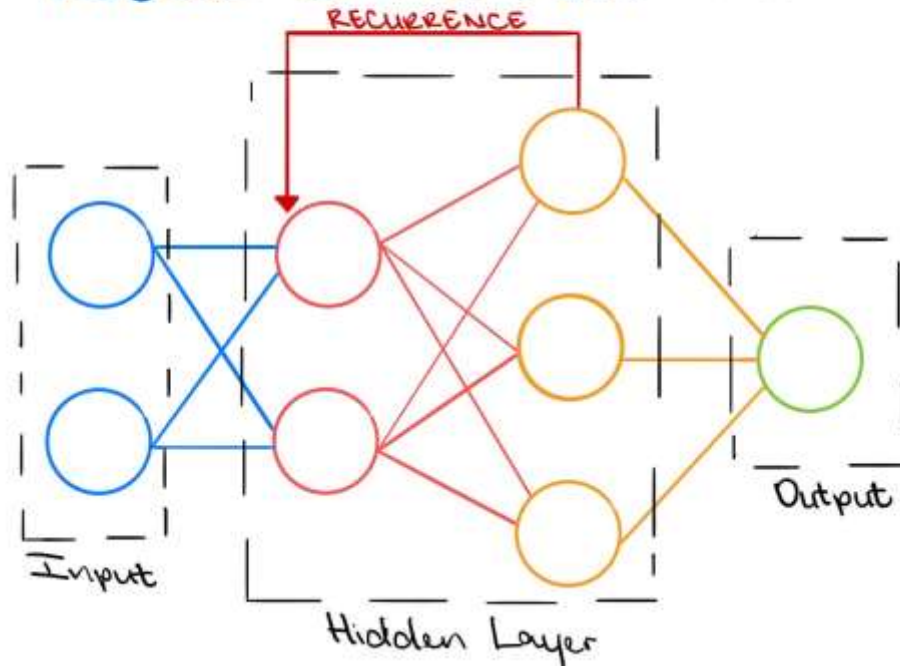
Recurrent Neural Network

A Recurrent Neural Network (RNN) is a type of artificial neural network designed to recognize patterns in sequences of data, such as time series, language, or video frames. Unlike Feed Forward Neural Networks (FFNN), RNNs have connections that loop back on themselves, allowing information to persist.
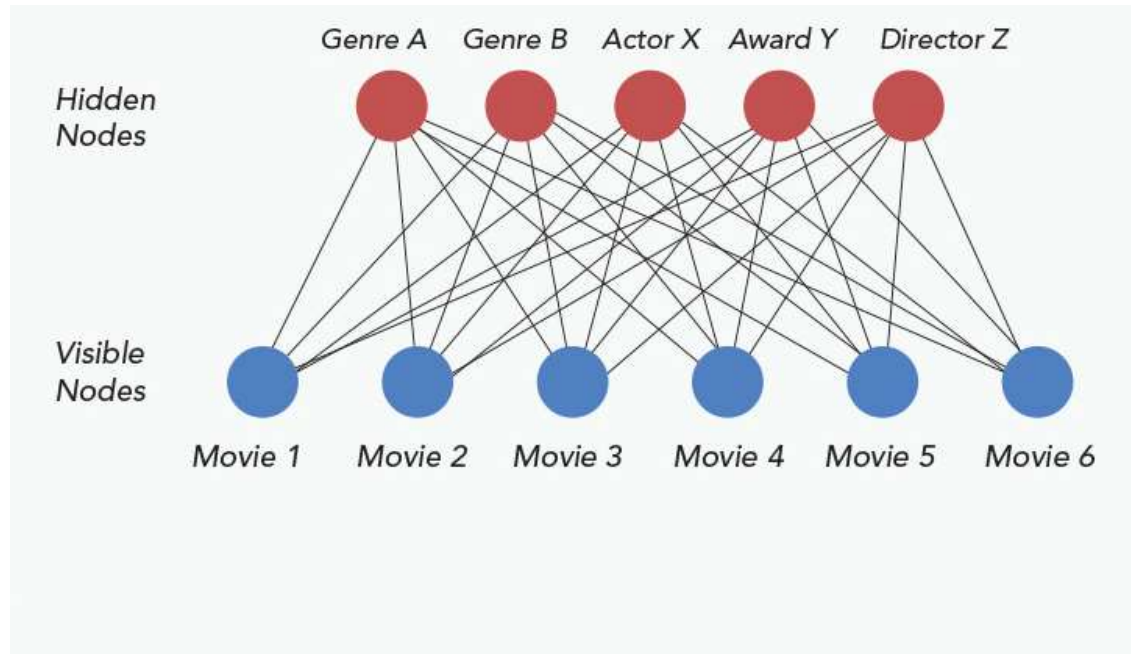
Restricted Boltzmann Machine

A Restricted Boltzmann Machine (RBM) is a type of stochastic artificial neural network that is used to learn a probability distribution over a set of inputs. RBMs are useful for unsupervised learning tasks such as dimensionality reduction, feature extraction, and collaborative filtering (e.g., recommendation systems).

Autoencoders
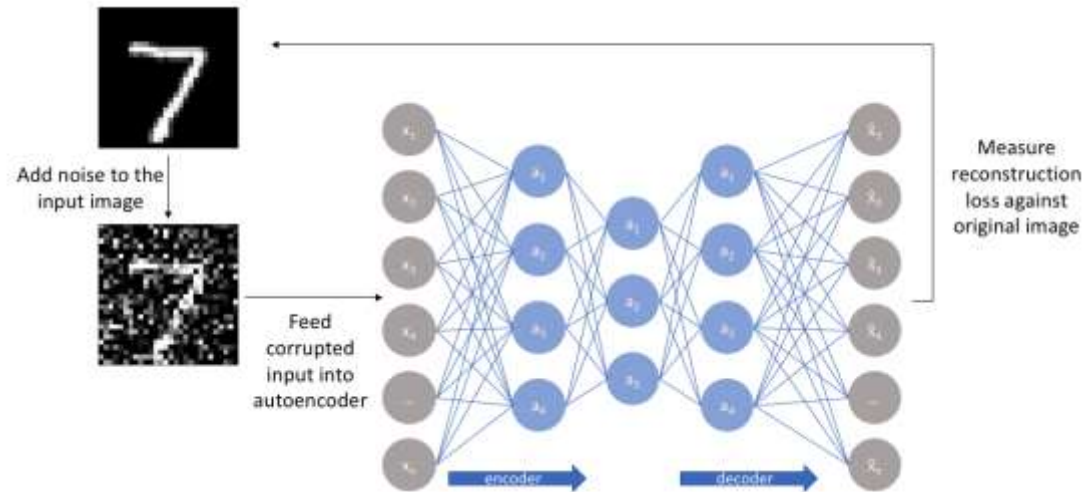
An autoencoder is a type of artificial neural network used to learn efficient codings of input data in an unsupervised manner. The objective of an autoencoder is to learn a compressed representation (encoding) for a set of data, typically for the purpose of dimensionality reduction or feature extraction. Autoencoders are composed of two main parts: the encoder and the decoder.

Thank You