DEEP LEARNING

BASICS

What is DEEP LEARNING ?

- Deep learning is a subset of machine learning in artificial intelligence that has networks capable of learning unsupervised from data that is unstructured or unlabeled .These networks mimics the network of neurons in a brain.
- Also known as deep neural learning or deep neural network.
- **Deep learning** AI is able to **learn** without human supervision, drawing from data.

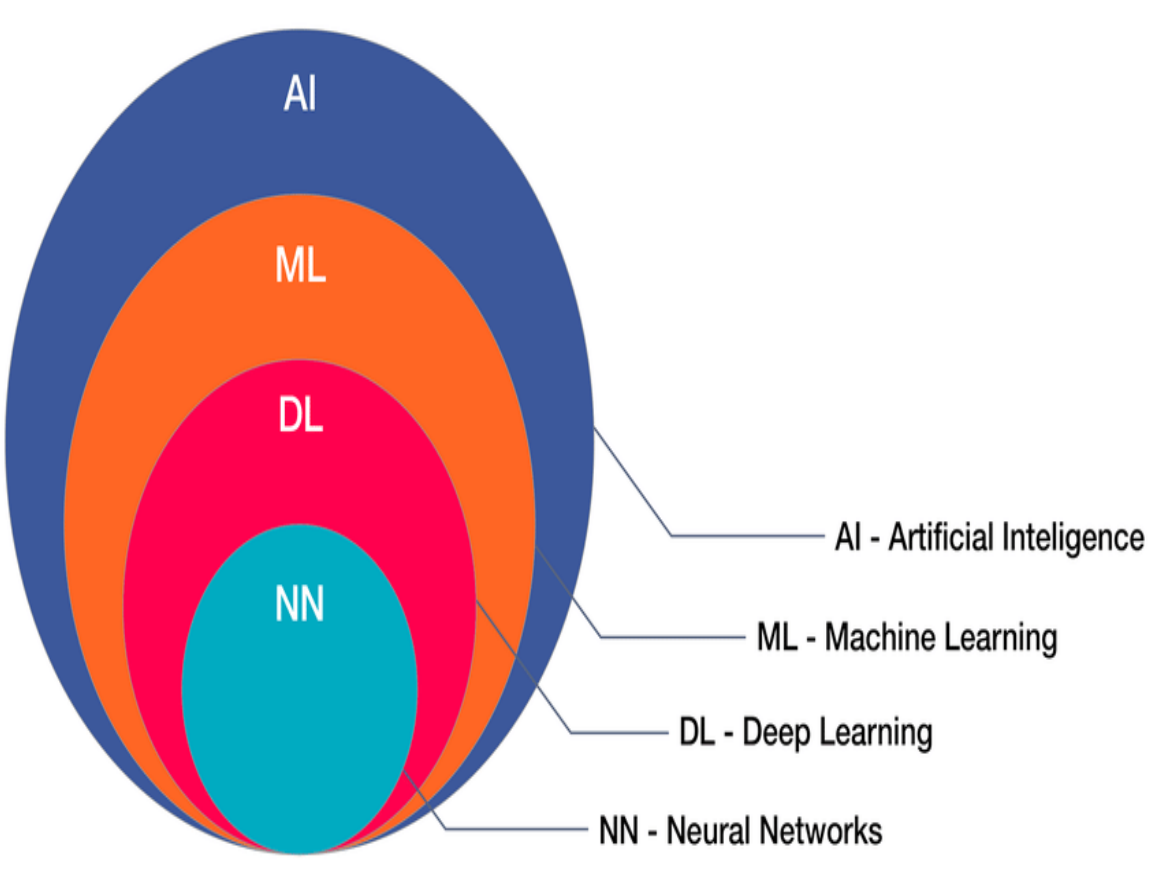
Neural network

Neural networks are a set of algorithms, modeled loosely after the human brain, that are designed to recognize patterns. The patterns they recognize are numerical, contained in vectors, into which all real-world data, be it images, sound, text or time series, must be translated.

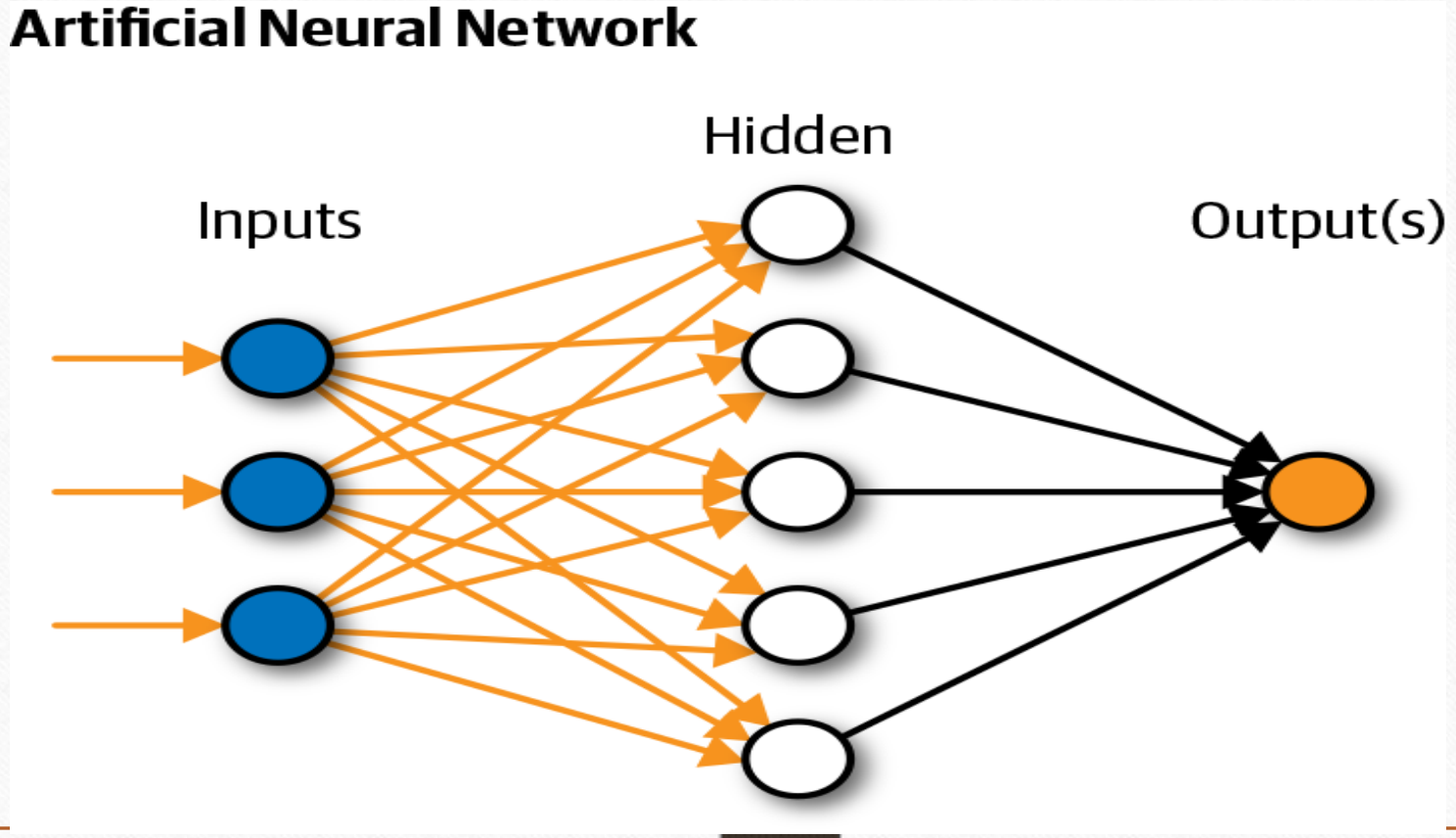
The “deep” part of deep learning refers to creating deep neural networks. This refers a neural network with a large amount of layers — with the addition of more weights and biases, the neural network improves its ability to approximate more complex functions.

Deep Learning Algorithms use something called a neural network to find associations between a set of inputs and outputs.

A neural network or Artificial neural network is composed of input, hidden, and output layers — all of which are **composed of "nodes"**. **Input layers** take in a numerical representation of data (e.g. images with pixel specs), **output layers** output predictions, while **hidden layers** are correlated with most of the computation.



Artificial Neural Network, or ANN, is a group of multiple perceptrons/ neurons at each layer. ANN is also known as a **Feed-Forward Neural network** because inputs are processed only in the forward direction:



A **deep neural network** (DNN) is an artificial **neural network** (ANN) with multiple layers between the input and output layers.

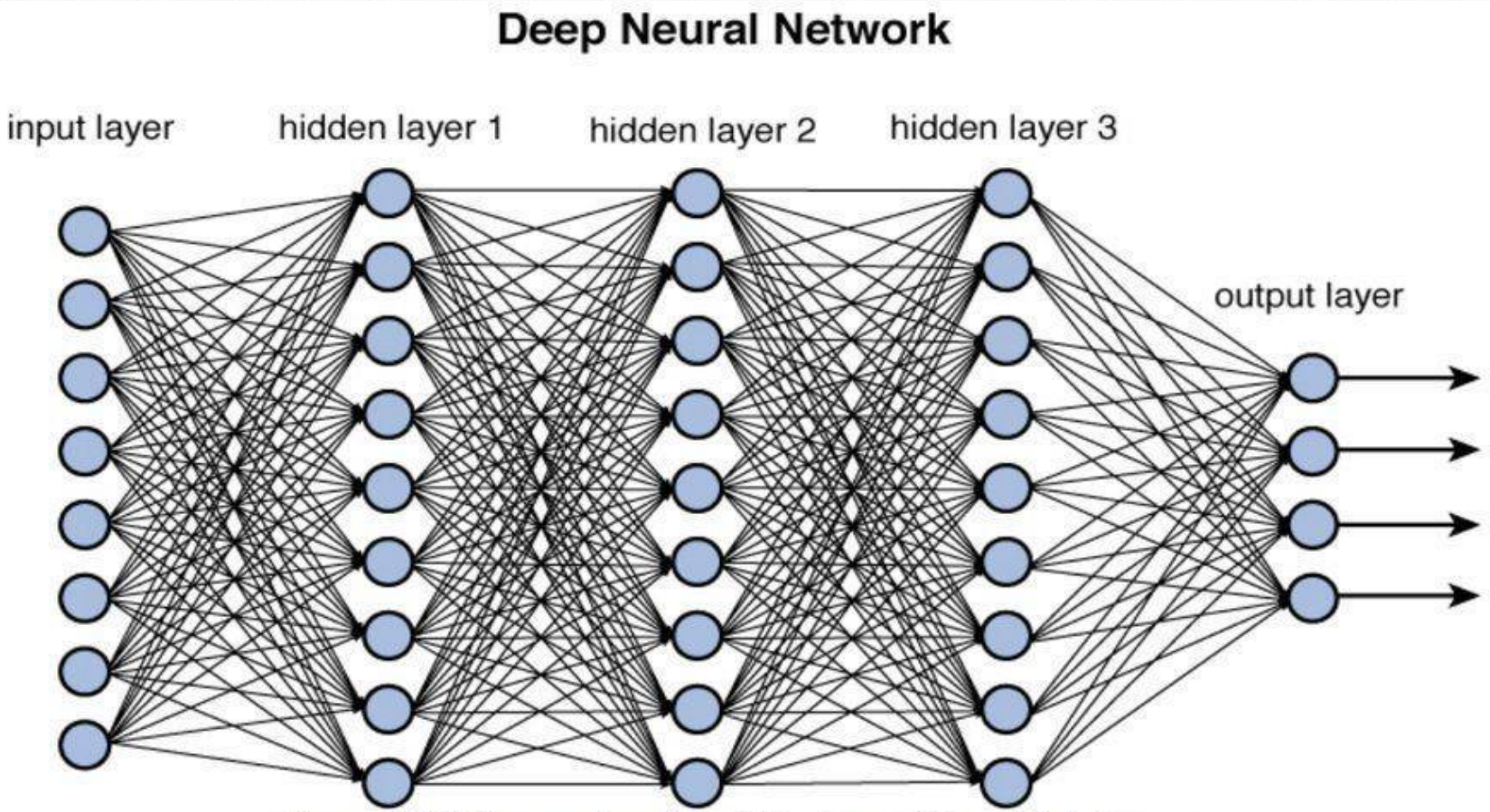
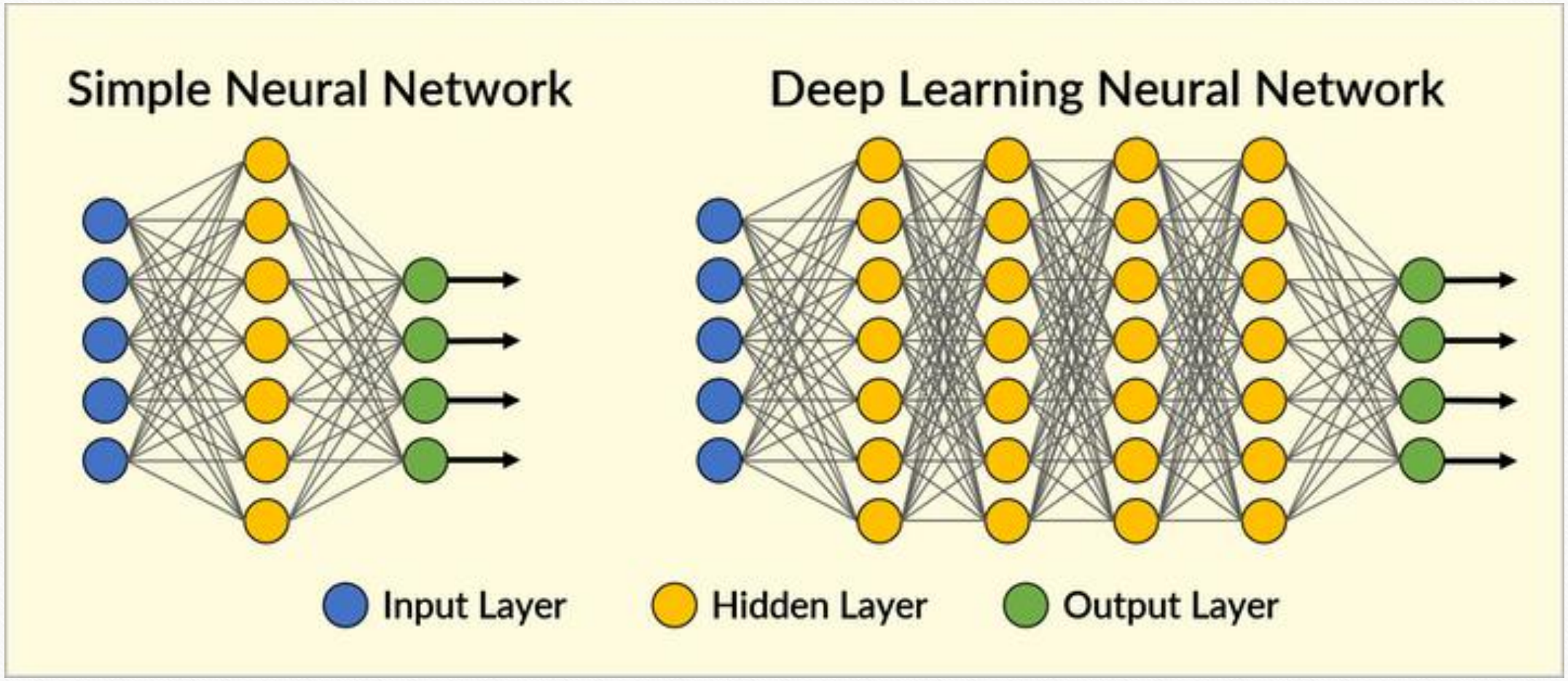


Figure 12.2 Deep network architecture with multiple layers.


Simple Neural Network
Deep Learning Neural Network
Input Layer
Hidden Layer
Output Layer

Artificial neural networks are computational models that work similarly to the functioning of a human nervous system. There are several kinds of artificial neural networks.:

FFNN: Feed forward neural networks: It is simplest forms of ANN, where the data or the input travels in one direction. The data passes through the input nodes and exit on the output nodes. This neural network may or may not have more than one the hidden layers.

CNN- Convolutional neural networks

These CNN models are being used across different applications and domains, and they're especially prevalent in image and video processing projects.

RNN –recurrent neural networks

Recurrent Neural Network(RNN) are a type of Neural Network where the output from previous step are fed as input to the current step. In traditional neural networks, all the inputs and outputs are independent of each other