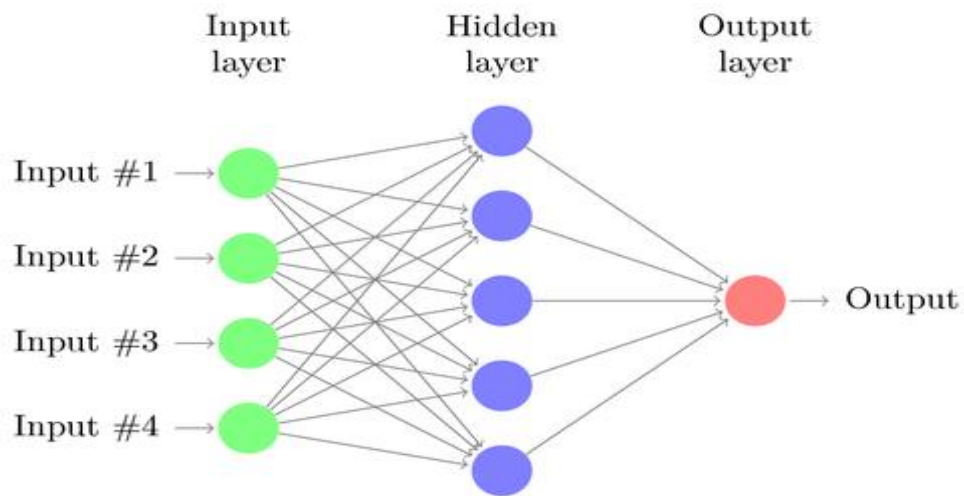# Deep Learning for Image Search

WEEK_1

Basic Definition:

- **Artificial Intelligence:**
  It is the general field that covers everything that has anything to do with imbuing machines with "intelligence," with the goal of emulating a human being's unique reasoning faculties.

- **Machine learning :**
  It is a category within the larger field of artificial intelligence that is concerned with conferring upon machines the ability to "learn."

- **Deep Learning:**
  Deep learning is a subset of machine learning – a field that examines computer algorithms that learn and improve on their own.

Learning Outcomes:

- Artificial Intelligence mainly works using neural networks which is inspired by **the neurons** in the brain.
- Neural Networks comprise layers (neurons) that are connected in adjacent layers to each other. The more layers, the "deeper" the network.
- Most ANNs contain some form of 'learning rule' which modifies the weights of the connections according to the input patterns that it is presented with. In a sense, ANNs learn by example as do their biological counterparts; a child learns to recognize dogs from examples of dogs.
- The delta rule is often utilized by the most common class of ANNs called **'backpropagational neural networks'** (BPNNs).
- In short, when a neural network is initially presented with a pattern it makes a random 'guess' as to what it might be. It then sees how far its answer was from the actual one and makes an appropriate adjustment to its connection weights.

EXAMPLE:

Input layer   Hidden layer   Output layer

Input #1 →
Input #2 →
Input #3 →
Input #4 →

Output

Every neuron in hidden layer can get multiple input values from different neurons and an associated weight is added to each input and summed up to produce output. This output is passed to next hidden layer and the same operation is repeated.

As a final step, If the error(Difference between actual output you just got and learned model output) you get is way off, then you adjust your weight coefficients at each level to minimize error. The function which calculates the values at each neuron is called **Sigmoid** function.