


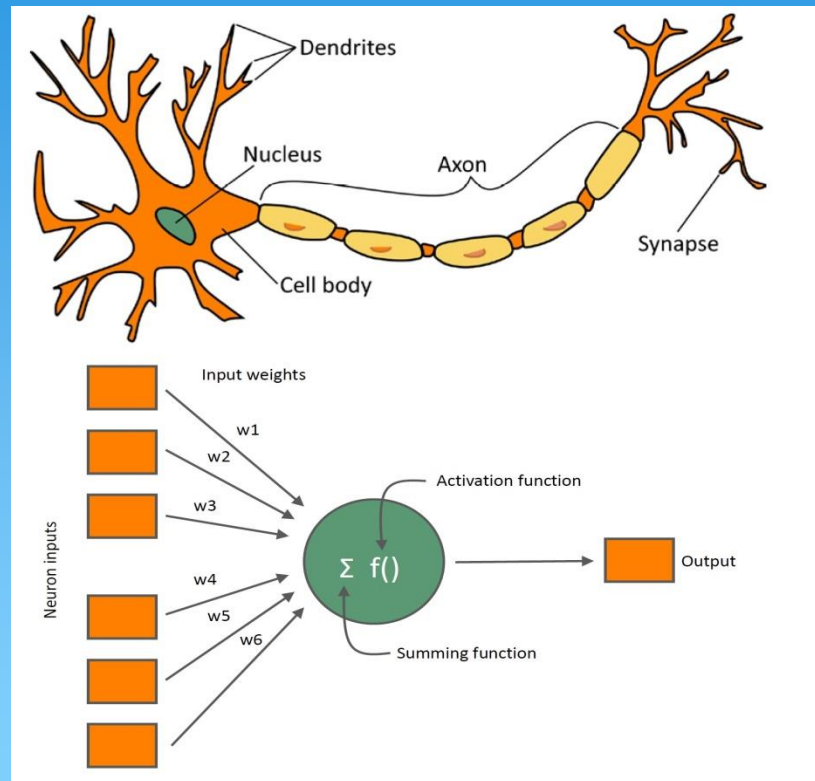
# Artificial Intelligence, Machine Learning and Deep Neural Networks

By  
Sumukh Bharadwaj



A **neural network** is made up of cells that work together to produce a desired result, although each individual cell is only responsible for solving a small part of the problem.<sup>8</sup>

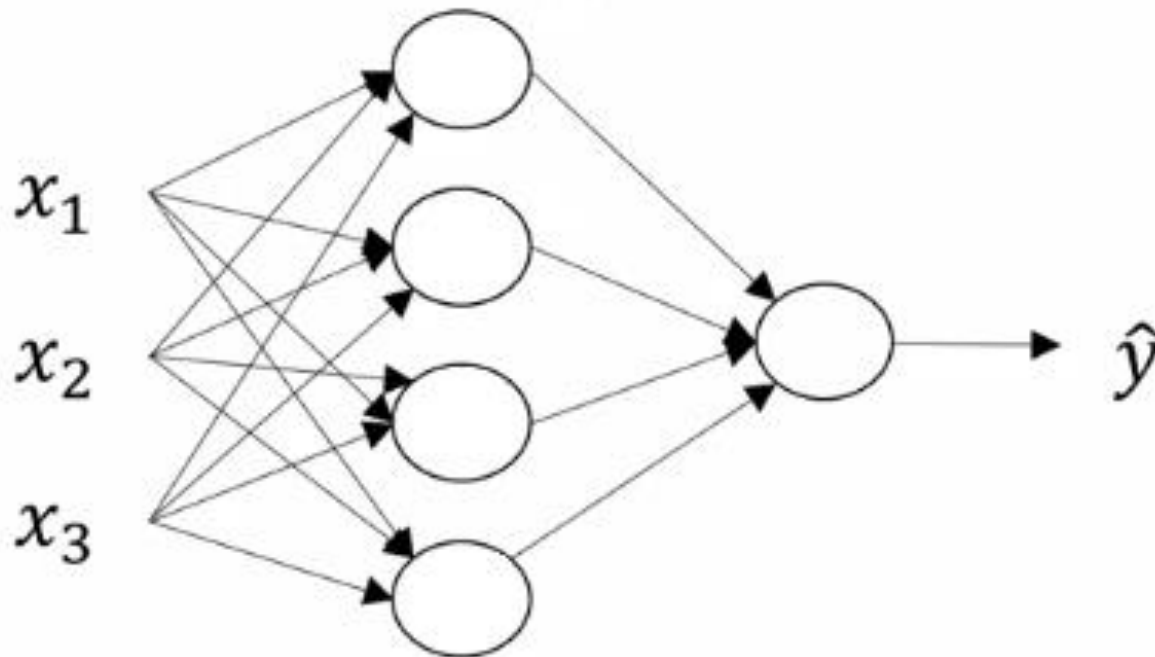
# Neuron and Neural Network



# *Lets start with NN*

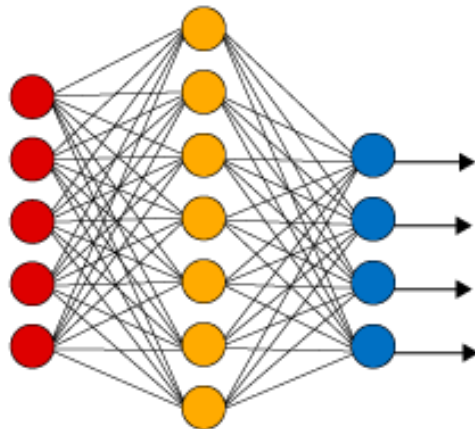
The Universal Approximation Theorem (UAT) declares that only one hidden layer, with a finite number of neurons, is enough for approximating any looked-for function.

# Shallow network



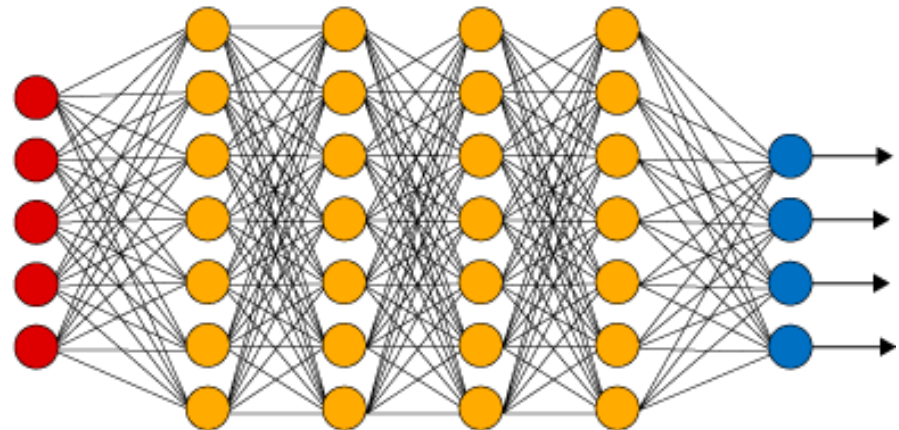
# Deep Neural Network

**Simple Neural Network**



● Input Layer

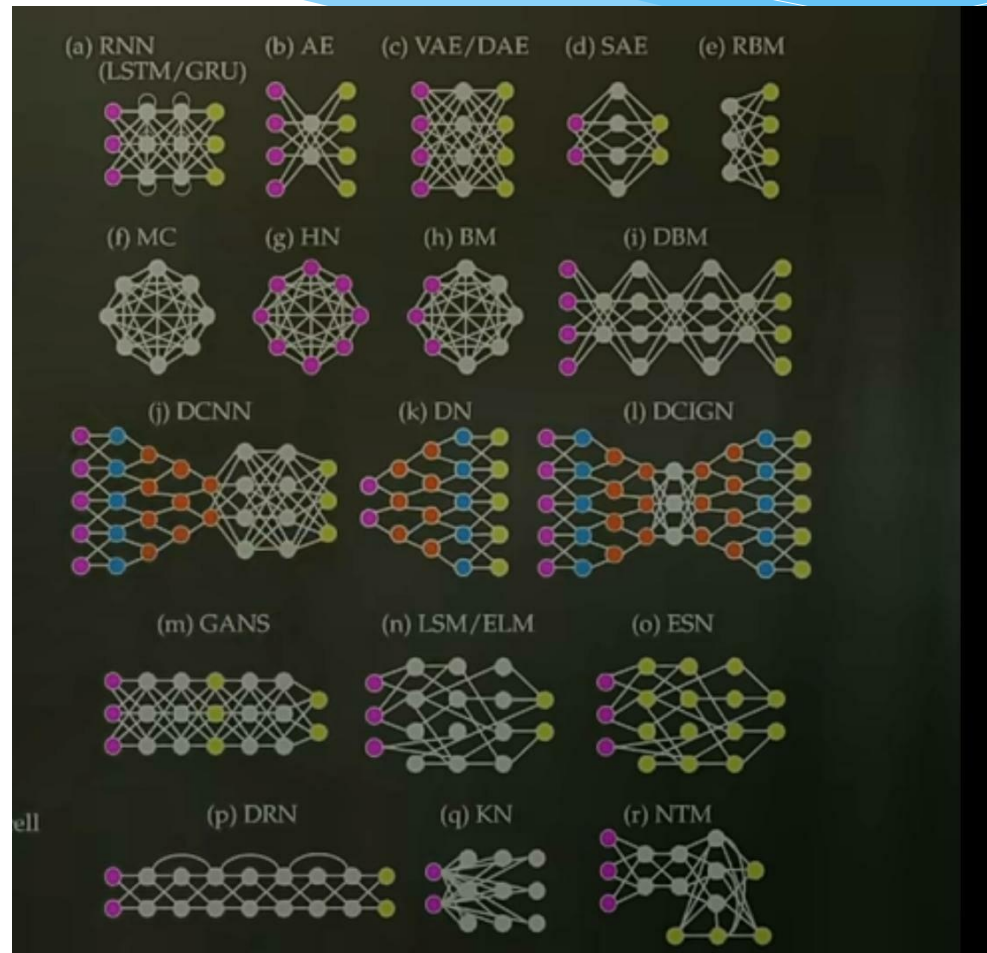
**Deep Learning Neural Network**



● Hidden Layer

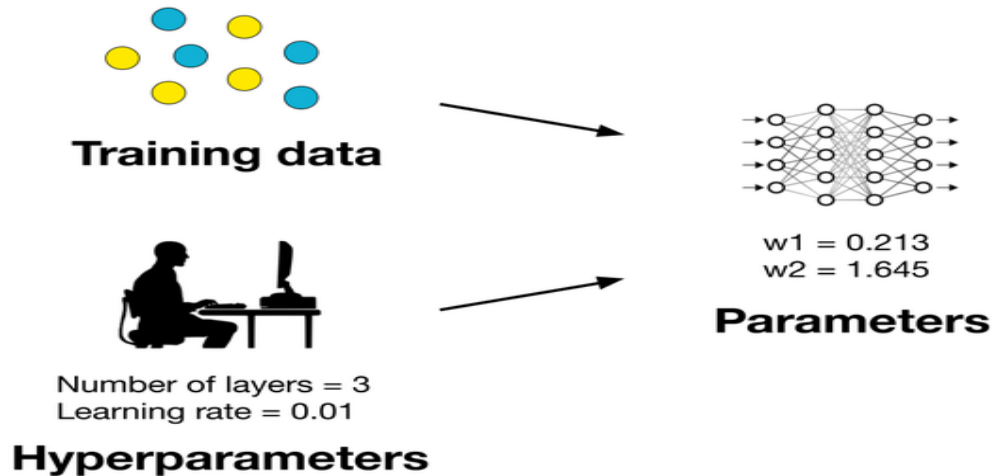
● Output Layer

# Types of networks



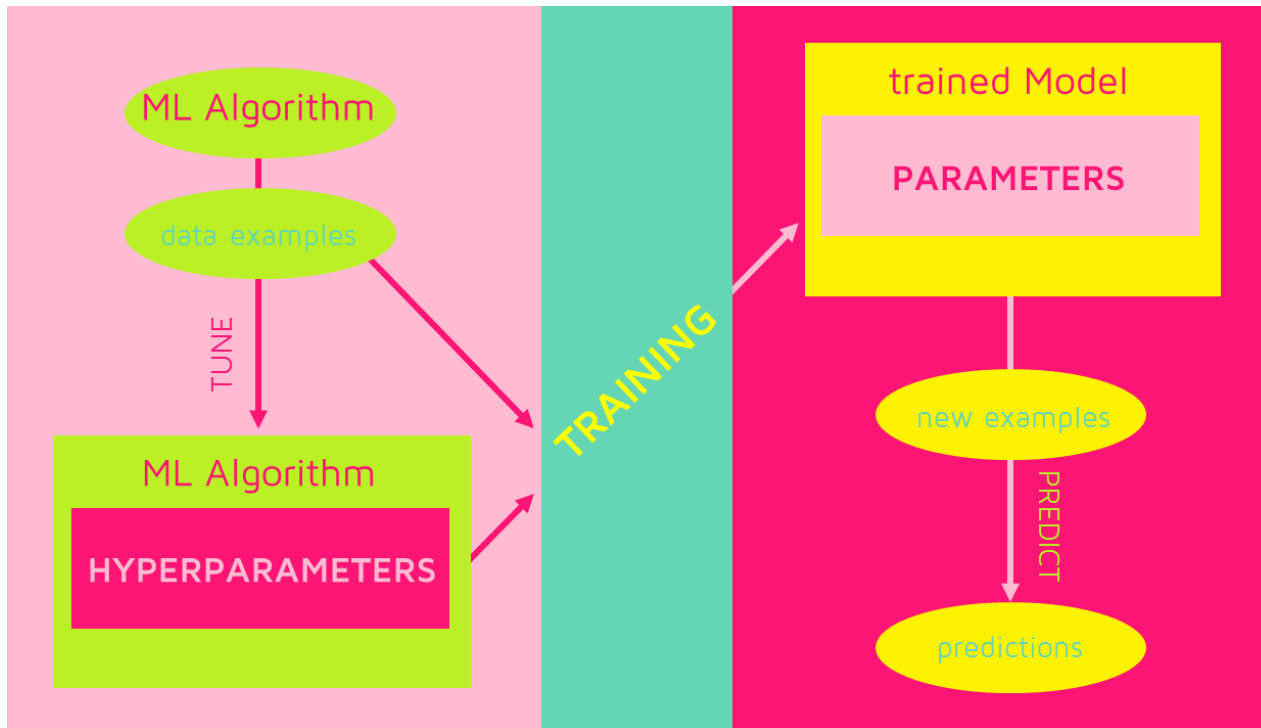
# Into the networks..

## ● Parameters vs. Hyperparameters





# ML Parameters



# Why are they Important



**Hyperparameters**

⚙️ `n_layers = 3`  
`n_neurons = 512`  
`learning_rate = 0.1`

⚙️ `n_layers = 3`  
`n_neurons = 1024`  
`learning_rate = 0.01`

⚙️ `n_layers = 5`  
`n_neurons = 256`  
`learning_rate = 0.1`



**Parameters**



Weights  
optimization



Weights  
optimization



Weights  
optimization



**Score**

85%

80%

92%

# Feature extraction

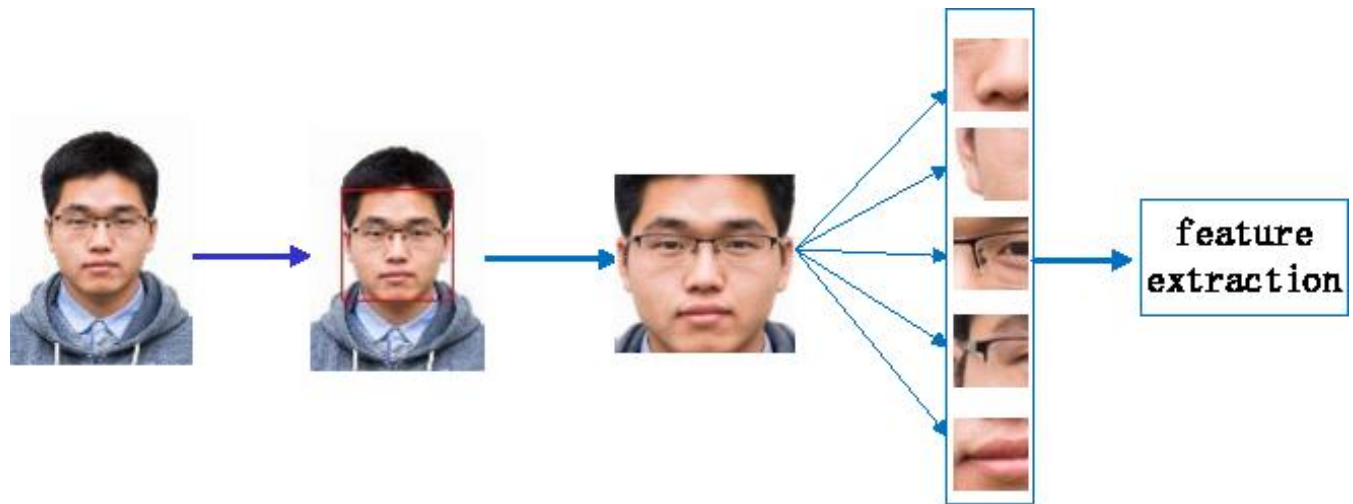
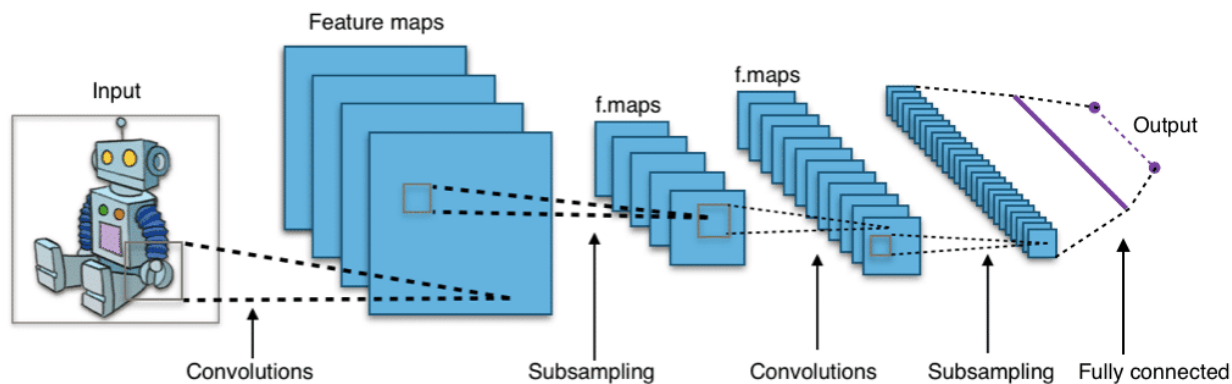
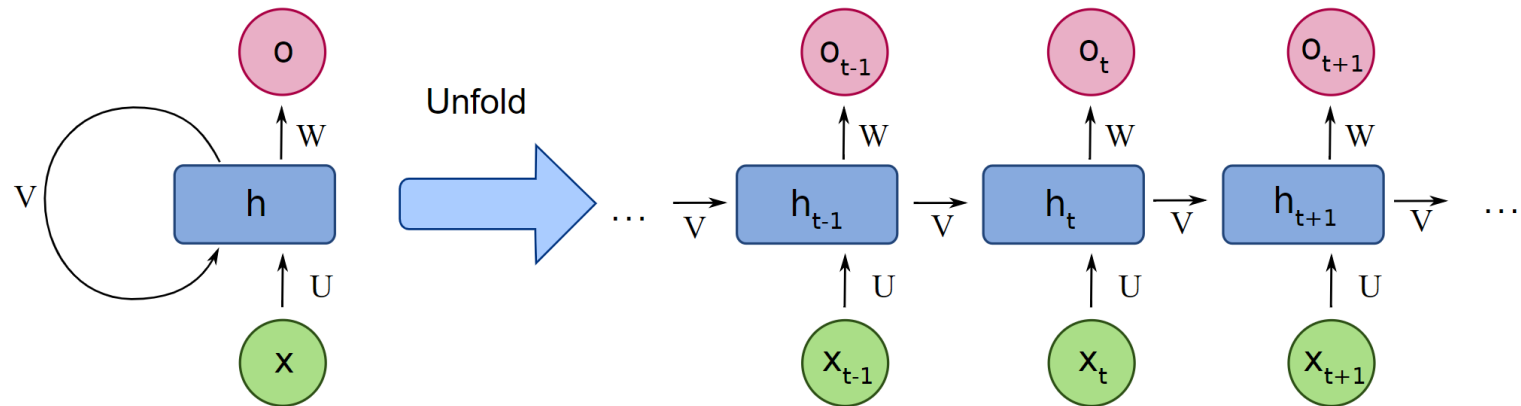


Fig. 5 Threshold clipping.

# Convolutional Neural Network



# Recurrent Neural Network



# Difference between ML and Deep learning

