Artificial Intelligence

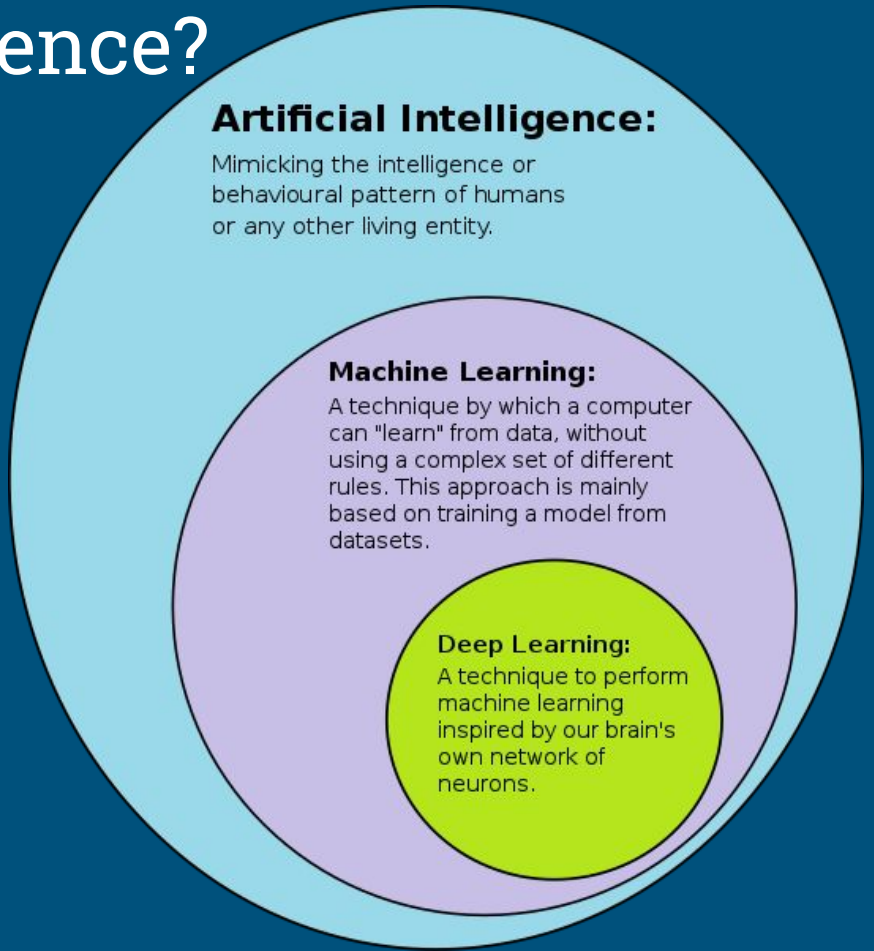
Key notes

What is Artificial Intelligence?

AI ➡ Any technique that enables computers to mimic human intelligence

ML➡ A subset of AI that includes abstruse statistical techniques that enable machines to improve at tasks with experience.

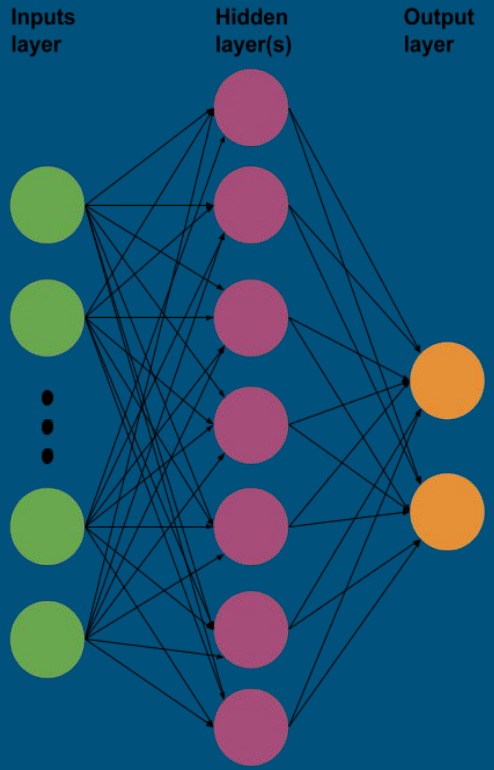
DL➡ The subset of ML composed of algorithms that permit software to train itself to perform tasks by exposing multilayered neural networks to vast amount of data,



ANN and DNN

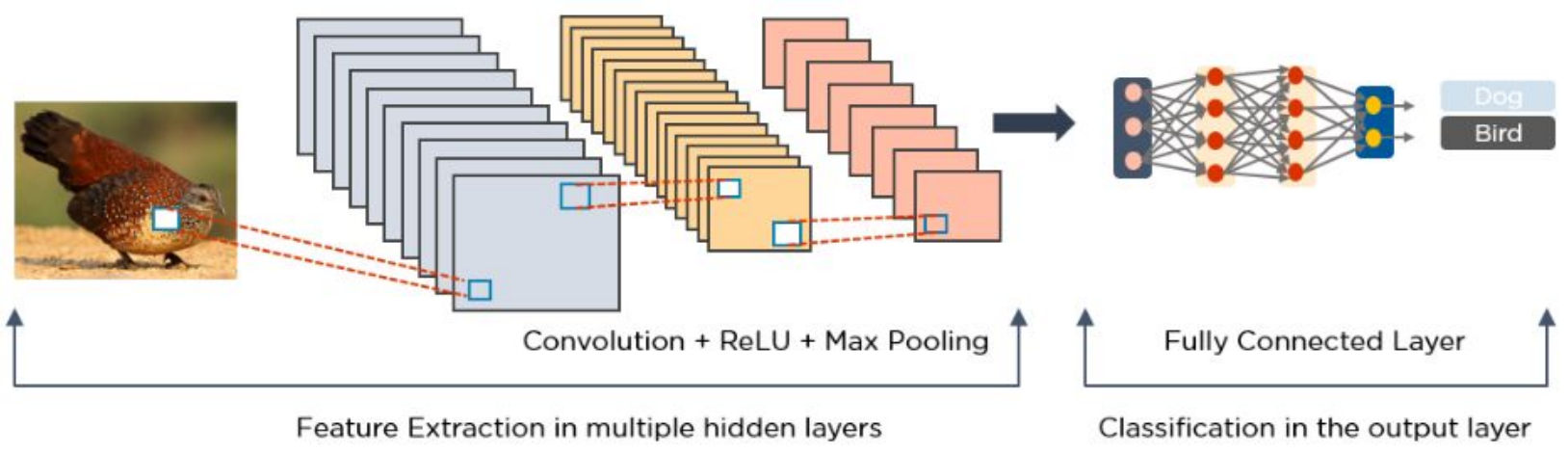
ANN → or else NN,are computing systems inspired by the biological neural networks that constitute animal brain. An ANN is based on a collection of connected units or notes (artificial neurons).

ANN has just one hidden layer, while **deep neural networks** are consider those with more than one hidden layers



Convolutional Neural Networks (CNNs)

CNN → consist of multiple layers that process and extract features from data. It is a specific architecture of neural Networks that are extremely effective at dealing with image data.



Convolutional Neural Networks (CNNs)

Convolution Layer → has several filters to perform the convolution operation.

Rectified Linear Unit (ReLU) → performs operations on elements, the output is a rectified feature map.

Pooling Layer → is a down-sampling operation that reduces the dimensions of the feature map. The pooling layer then converts the resulting 2D arrays from the pooled feature map into a single, long, continuous linear vector by flattening it.

Fully connected Layer → forms when the flattened matrix from the pooling layer is fed as an input, which classifies and identifies the images.

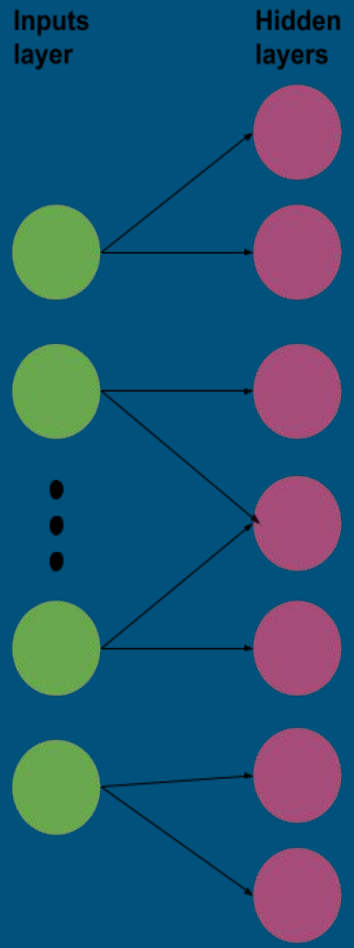
Convolutional layer

A convolutional layer is created when we apply multiple image filters to the input images.

The layer will then be trained to figure out the best filter weight values.

A CNN helps reduce parameters by focusing on local connectivity.

Not all neurons will be fully connected. Instead, neurons are only connected to a subset of local neurons in the next layer (these end up being the filters)



Tensorflow, Keras and PyTorch

TensorFlow is an end-to-end open source deep learning framework developed by Google.

Keras is an effective high-level NN application programming interface (api).

Keras acts as an interface for the tensorflow library

PyTorch is a low-level API developed by Facebook for natural language processing and computer vision. It is more powerful version of numpy.

Tensorflow, Keras and PyTorch

- High and low level API
- Very fast
- Complex architecture and is hard to use
- Big datasets, hard debugging
- Hard to develop and write code
- Easy to deploy

- High level API
- Very slow (works on top of TF)
- Simpler architecture, simple to use
- Smaller datasets, easy debugging
- Easy to develop and best for newbies
- Deploy as tf or Flask

- low level API
- Very fast
- Complex architecture
- Big datasets, easier than tf to debug
- Easier to learn than TF
- Easy to deploy but not as tf