ANN AND DEEP LEARNING (CS636)

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Introduction

Neural Network

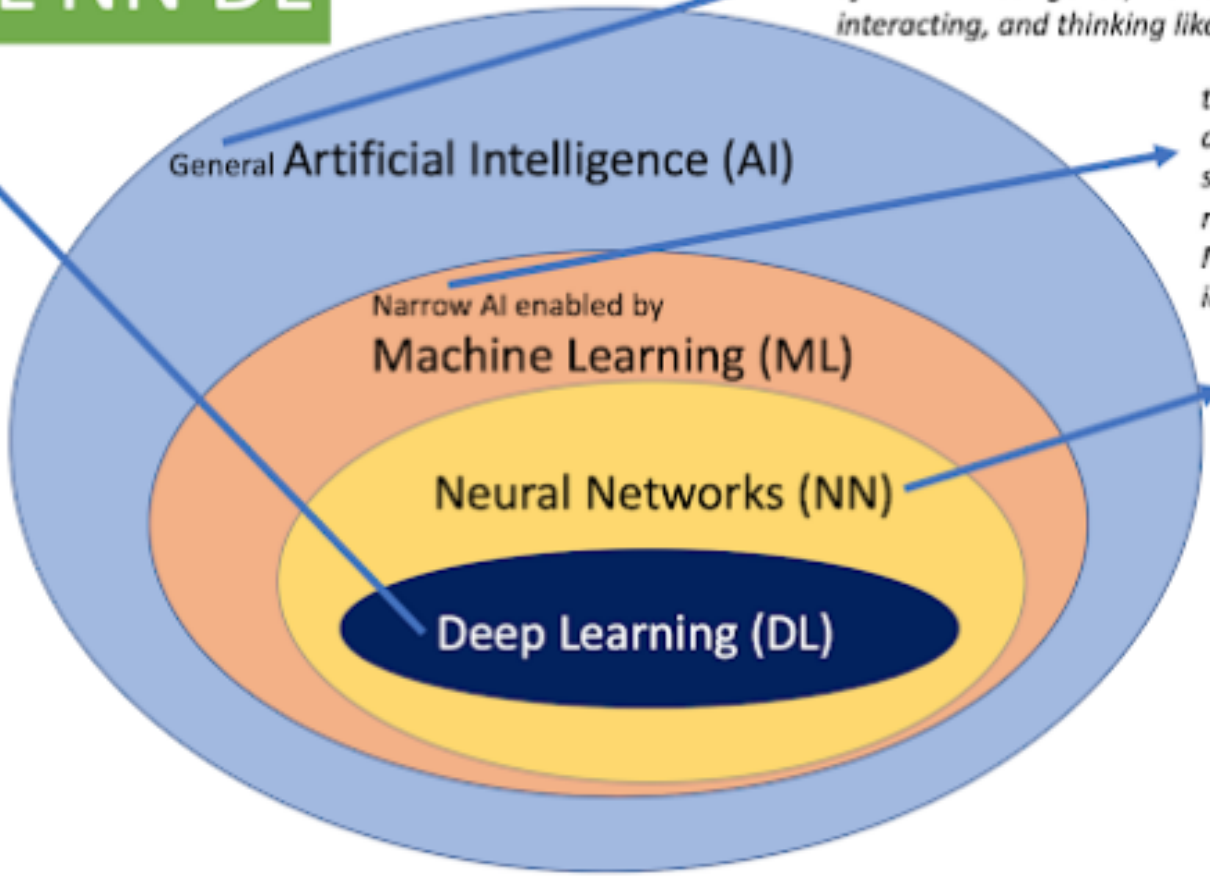
- A neural network is a massively parallel distributed processor made up of simple processing units that has a natural propensity for storing experiential knowledge and making it available for use. It resembles the brain in two respects:
  - Knowledge is acquired by the network from its environment through a learning process
  - Interneuron connection strengths, known as synaptic weights, are used to store the acquired knowledge

Neural Network

- *Neural network* is a machine that is designed to *model* the way in which the brain performs a particular task or function of interest; the network is usually implemented by using electronic components or is simulated in software on a digital computer.
- To achieve good performance, neural networks employ a massive interconnection of simple computing cells referred to as “neurons” or “processing units.”
- The procedure used to perform the learning process is called a *learning algorithm*, the function of which is to modify the synaptic weights of the network in an orderly fashion to attain a desired design objective.

ML	NN
Feature based	Example Based
Conscious Learning	Sub-conscious Learning
Eg: Fruit -> Shape, colour, texture	Eg: Different Pictures of fruits
Algorithms to parse data, learn from that data, and make informed decisions based on what it has learned	Structures algorithms in layers to create an “artificial neural network” that can learn and make intelligent decisions on its own

AI ML NN DL



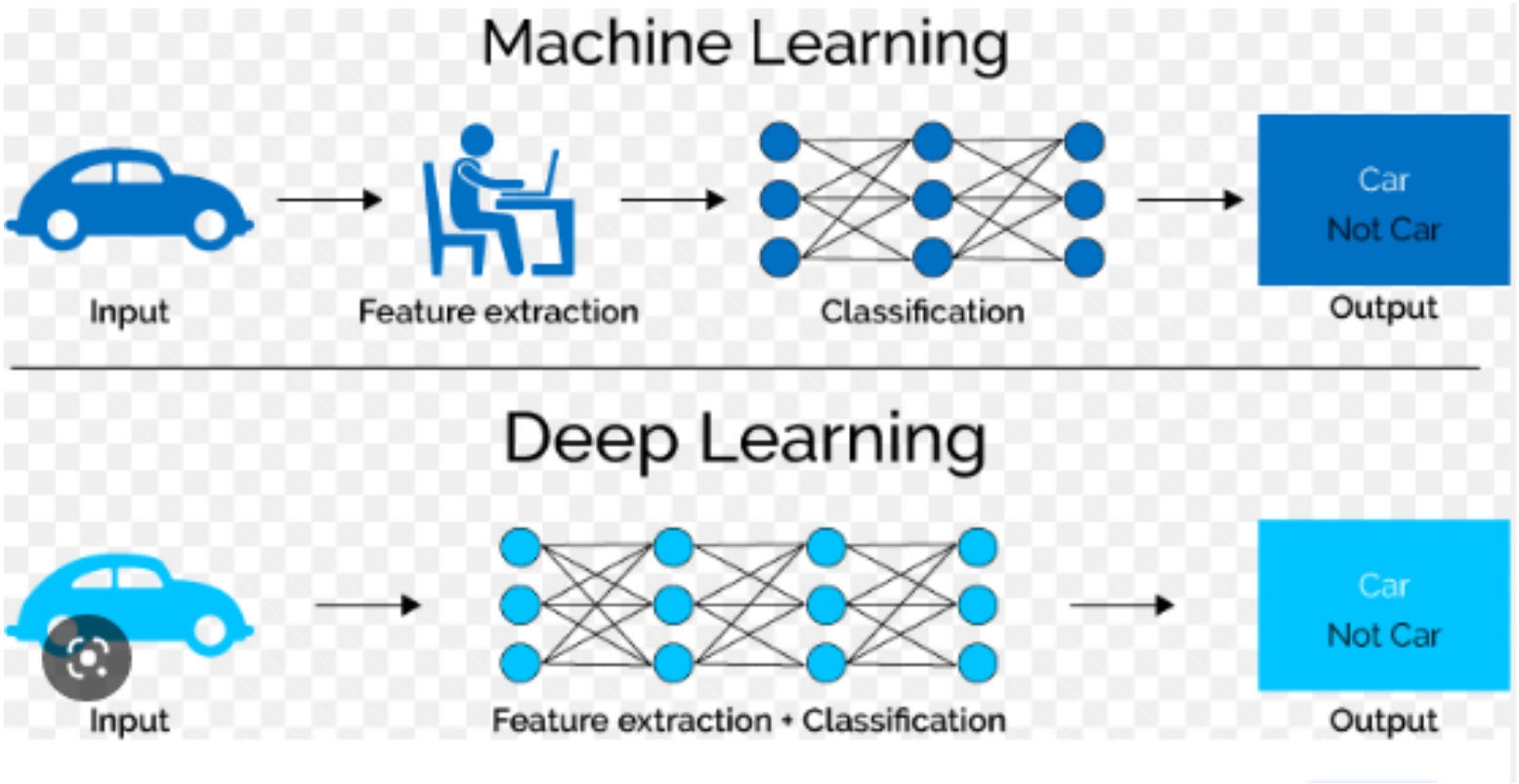
computers possessing the same characteristics of human intelligence, including reasoning, interacting, and thinking like we do

technologies that can accomplish specific tasks such as playing chess, recommending your next Netflix TV show, and identifying spam emails

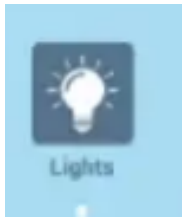
neural networks are a specific group of algorithms used for machine learning that model data using graphs of Artificial Neurons. Those neurons are a mathematical model that "mimics approximately how a neuron in the brain works"

the word "deep" comes from the fact that DL algorithms are trained/run on deep neu ral networks. These are just neural networks with (usually) three or more "hidden" layers

ML vs NN


Machine Learning
Input
Feature extraction
Classification
Car
Not Car
Output
Deep Learning
Input
Feature extraction + Classification
Car
Not Car
Output

Application



ML

Dark

Switch On Lights

Input

Output

NN

Can't see

The light switch won't work

....

Switch on the Lights

Input

Output

Thank You!