1. Deep learning – Introduction

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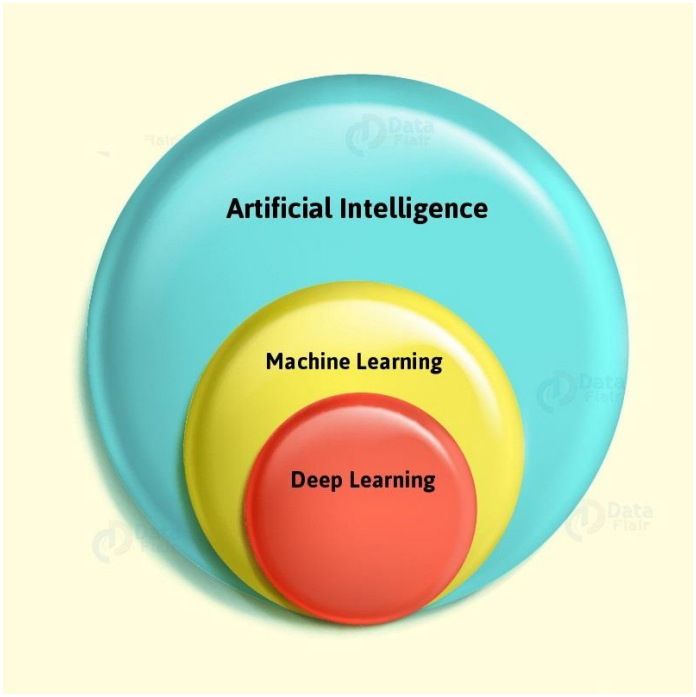
1. Deep learning – Introduction

1. Artificial intelligence vs Machine Learning vs Deep Learning



1.1. Machine learning

- ✓ Machine learning is a part of artificial intelligence
- ✓ Machine Learning is a technique to learn from the data and apply the prediction on new data

Examples

- ✓ Amazon using machine learning to give better product choice recommendations to their costumers based on their preferences.
- ✓ Netflix uses machine learning to give better suggestions to their users of the TV series or movie or shows that they would like to watch & many more

1.2. Deep learning

- ✓ Deep learning is a subset of machine learning.
- ✓ The main difference between deep and machine learning is, machine learning models works better but the model still needs some guidance.
- ✓ If a machine learning model returns an inaccurate prediction then the programmer needs to fix that problem explicitly.
- ✓ In the case of deep learning, the model does it by itself.

Example

- ✓ Automatic car driving system is a good example of deep learning.

1.3. Artificial intelligence

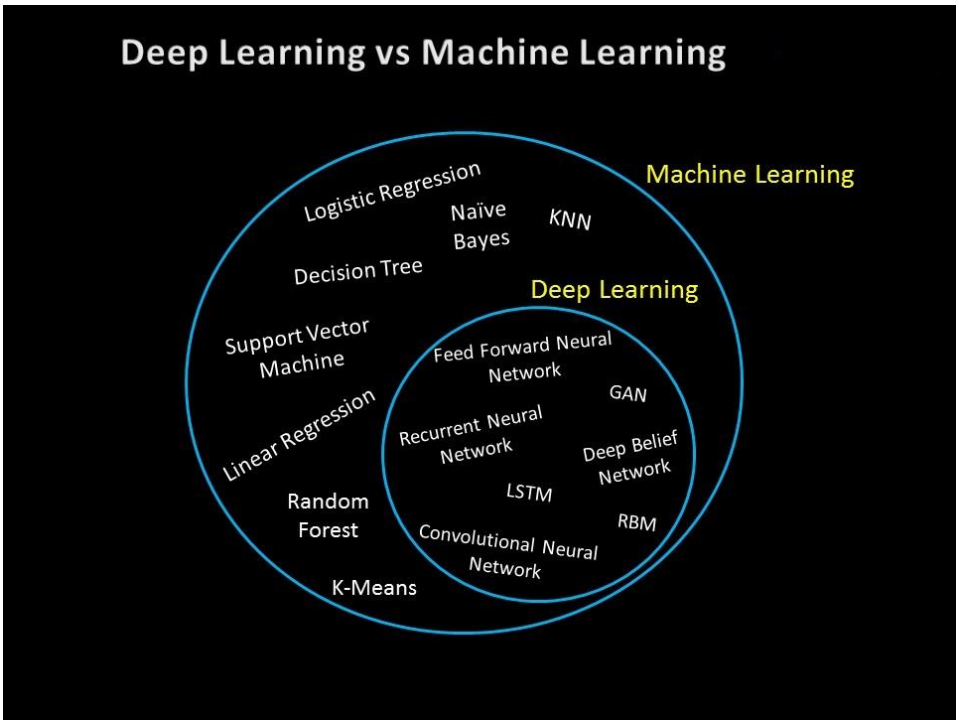
- ✓ AI means the ability of computer program to function like a human brain.
- ✓ Machine learning and deep learning are the subsets of AI
- ✓ The MOTO of AI is to replicate a human brain, the way a human brain thinks, works and functions.
- ✓ Currently AI is not yet fully implemented but we are very near to establish that too.

Example

- ✓ Sophia, the most advanced AI model present today.

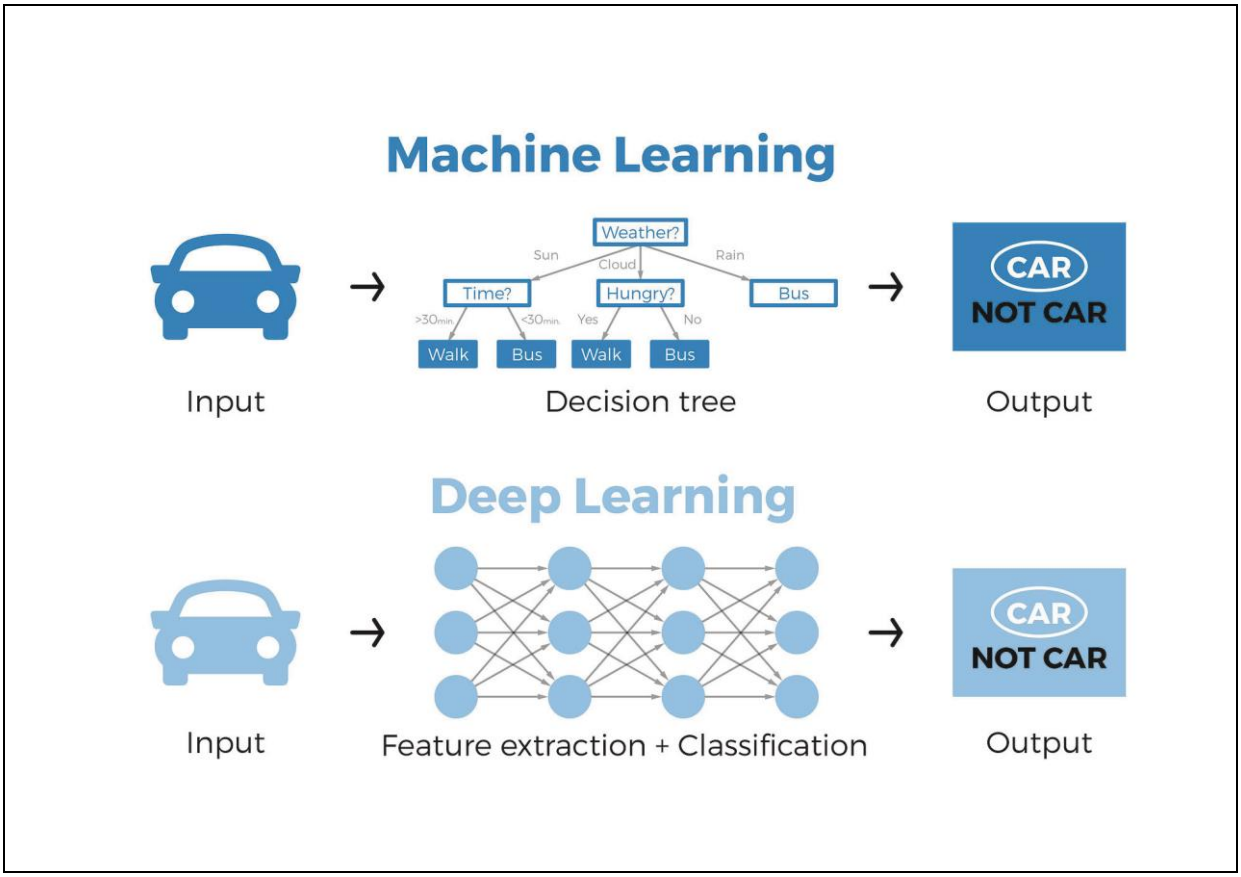
2. Different models

- ✓ In ML we have worked with different models like linear regression, logistic regression, KNN, Decision Tree & etc



3. Let's understand Deep learning

- ✓ Deep learning is a subset of machine learning mainly using in Artificial Neural Networks, which are inspired by the human brain.
- ✓ Deep learning is able to capture required features automatically and solving the problems.
- ✓ DL is the technique that comes closest to the way humans learn.
- ✓ Deep learning methods use neural network architecture.
- ✓ That is why deep learning is often referred to as "deep neural networks"



4. Differences between Deep Learning and Machine Learning

4.1. Data

- ✓ Deep learning models works with very huge data
- ✓ The more data you give to neural network, it will show much greater accuracy than other machine learning models.

4.2. Computational Hardware CPU, GPU

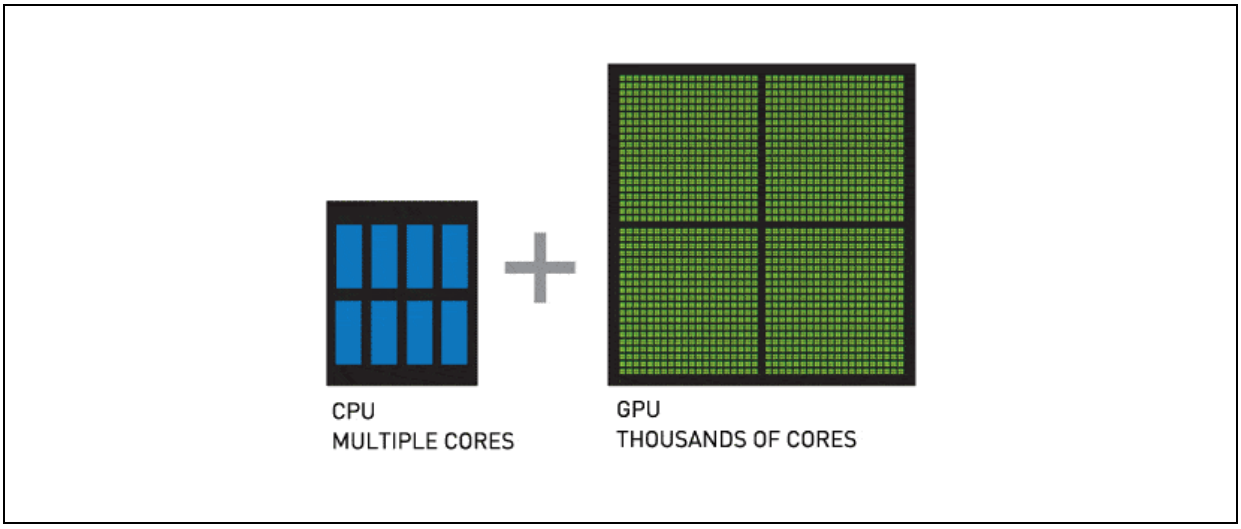
- ✓ ML models works with CPU[Central Processing Units]
- ✓ DL models works with GPU[Graphical Processing Units] and TPS[Tensor Processing Units]
    - These are highly advanced processing systems

4.3. CPU

- ✓ It is Central Processing Unit
- ✓ It is a brain to the computer
- ✓ Processing serial instructions
- ✓ Good at speed during processing
- ✓ Consumes more memory during processing
- ✓ Companies like Intel, ARM and AMD produce the CPU and companies

4.4. GPU

- ✓ It is Graphical Processing Unit
- ✓ Processing parallel instructions
- ✓ Having very good speed compare to CPU
- ✓ Consumes very less memory
- ✓ Companies like Nvidia, AMD's ATI produce the GPU

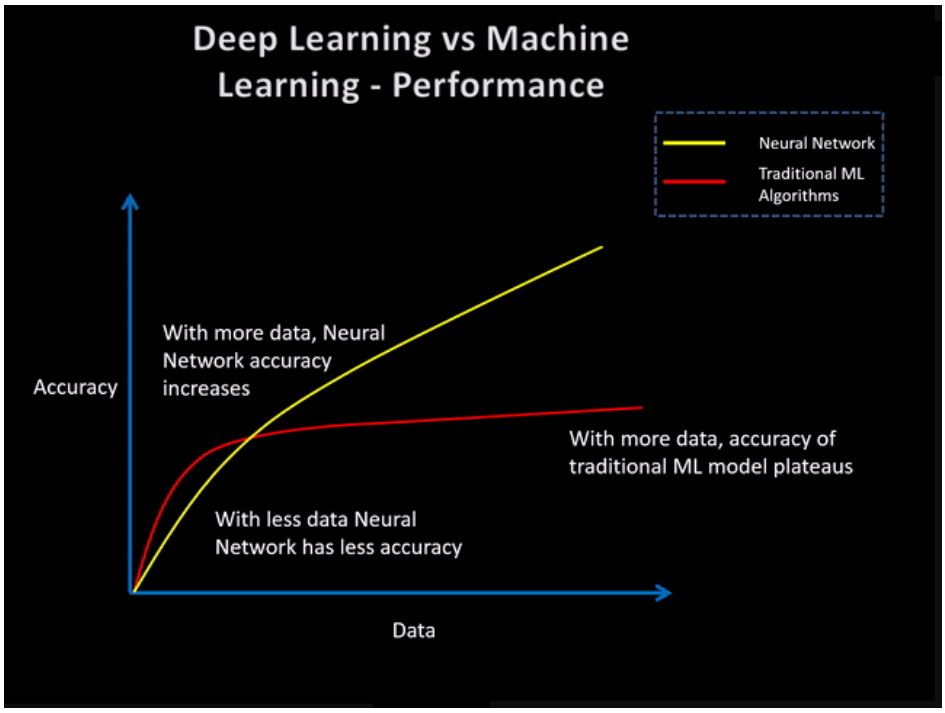


5. Feature selection

- ✓ In deep learning neural networks take care of the feature selection automatically.
- ✓ It decides a particular feature is important or not, and reduces the corresponding weights to almost zero.
- ✓ In machine learning algorithm, feature selection plays an important role and we need to do keep focus on this

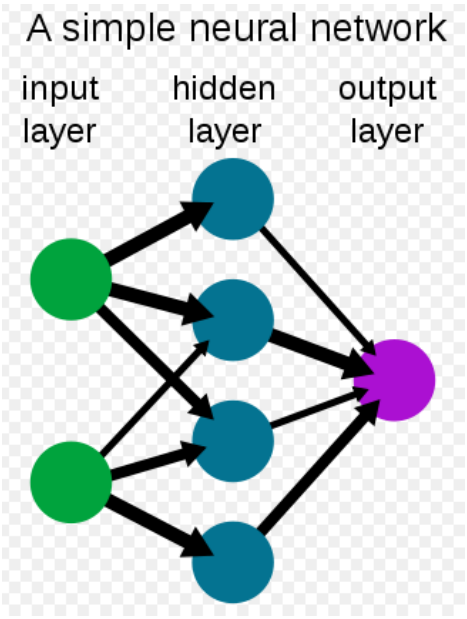
6. Performance

- ✓ Deep learning gives very good performance compare to machine learning



7. Neural networks

- ✓ Deep learning is implemented with the help of Neural Networks.
- ✓ A neural network is a network or circuit of neurons to solve the problem.
- ✓ The idea behind Neural Network is the biological neurons, which is nothing but a brain cell.
- ✓ Neural networks may have multiple hidden layers.



8. Types of neural networks

- ✓ There are mainly 3 types of neural networks in deep learning
    - Artificial Neural Networks (ANN) or Feed-Forward Neural network
    - Convolution Neural Networks (CNN)
    - Recurrent Neural Networks (RNN)

8.1. Deep learning applications

- ✓ Self Driving Cars
- ✓ Fraud News Detection
- ✓ Natural Language Processing
- ✓ Virtual Assistants
- ✓ Entertainment
- ✓ Visual Recognition
- ✓ Fraud Detection
- ✓ Healthcare
- ✓ Language Translations & etc