Intro to Deep Learning

Background

Why now ?

How now ?

Objectives

Learn the theory, background and intuitions of a neural network

To be able to train a neural network to achieve industrial quality results

Be industry ready for a deep learning position

Few classes of intense content

Need collaborative effort from each other

Post on Linkedin, medium

Today we shall write a small piece of content about anything you learned from class today on Linkedin

Quiz after session

What we will be learning

1. What is Deep Learning and how is it different from machine learning
2. Theory of neural networks
3. Writing your first neural network
4. More complex neural networks
5. Training a neural network to reach industrial quality results on a popular dataset
6. Apply deep learning for NLP

Some myths

Machine learning is not prerequisite for Deep Learning

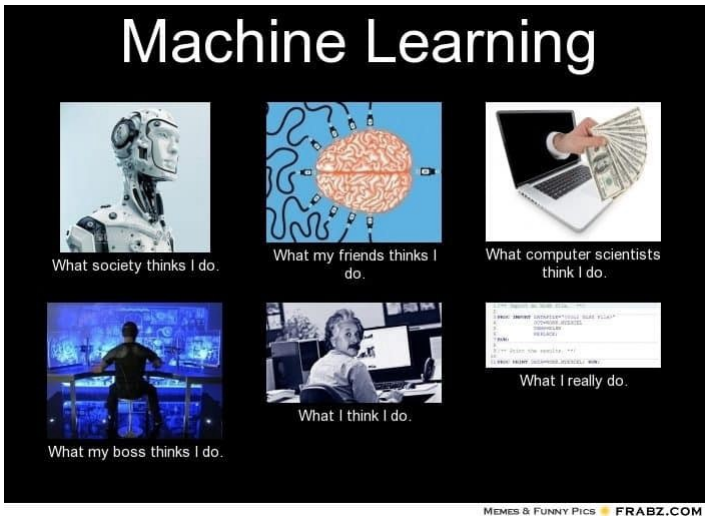
Maths is compulsory for deep learning(Intuition is)

Need to do a lot of certifications online to be good at ML/DL

Need 1-2 years of preparation to be good at deep learning

Not possible for changing career paths in between

What is machine learning

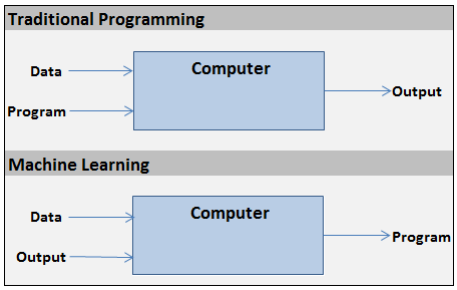


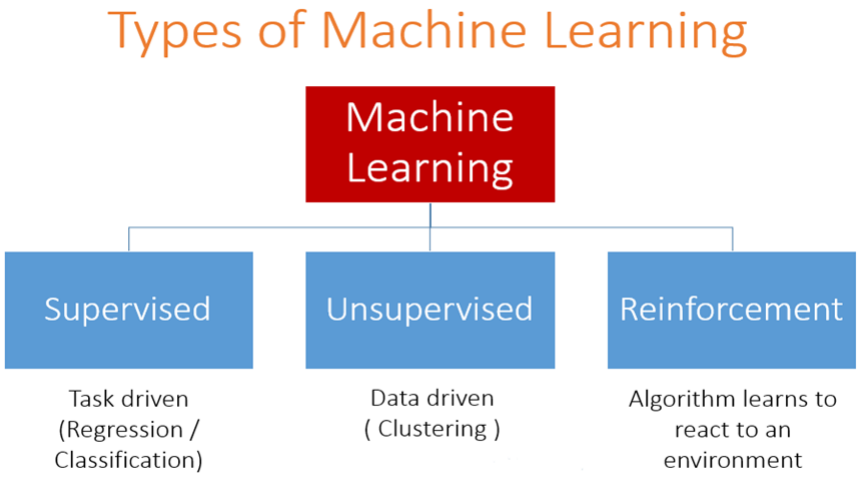
```
if(speed<4){
    status=WALKING;
}
```

```
if(speed<4){
    status=WALKING;
} else {
    status=RUNNING;
}
```

```
if(speed<4){
    status=WALKING;
} else if(speed<12){
    status=RUNNING;
} else {
    status=BIKING;
}
```

```
// Oh crap
```



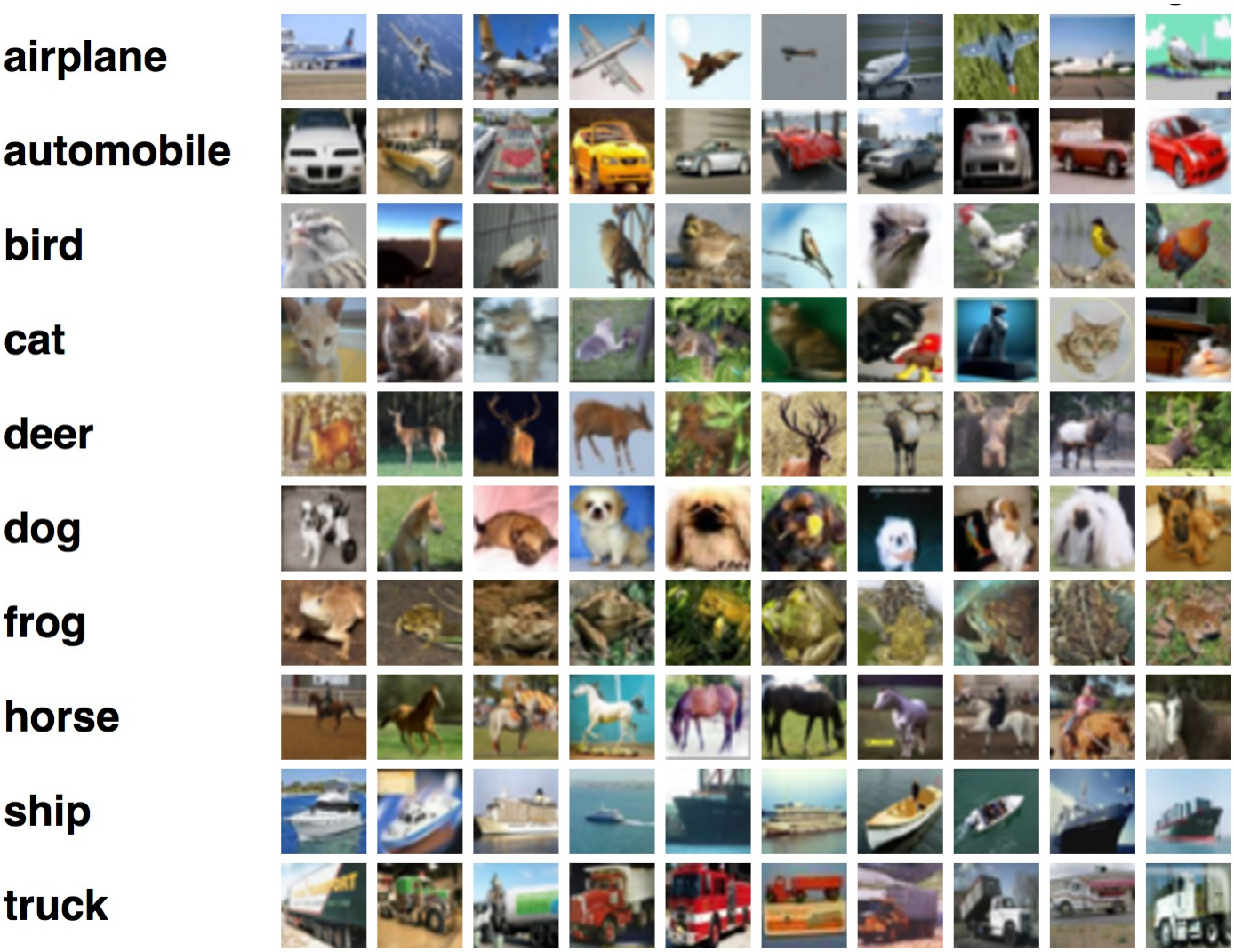


Supervised Learning

Classification

or

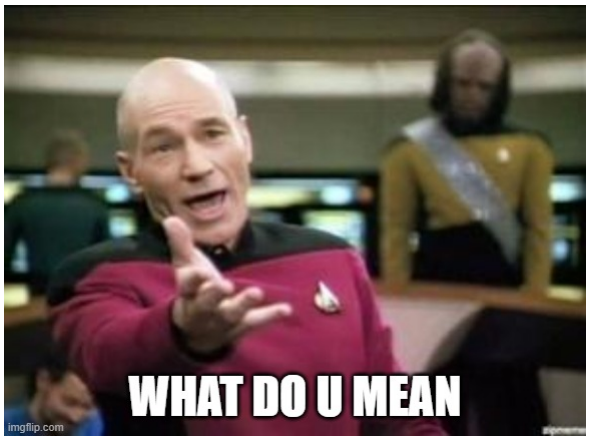
image by Kaggle



What is Deep Learning

Deep learning (also known as **deep structured learning**) is part of a broader family of machine learning methods based on artificial neural networks with representation learning. Learning can be supervised, semi-supervised or unsupervised.

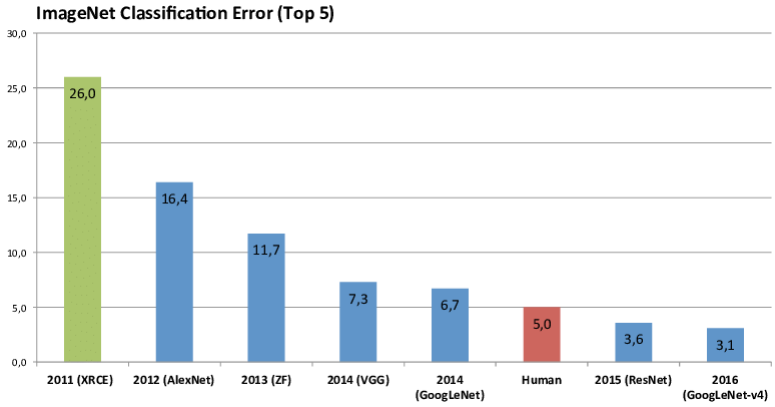
AI > ML > DL

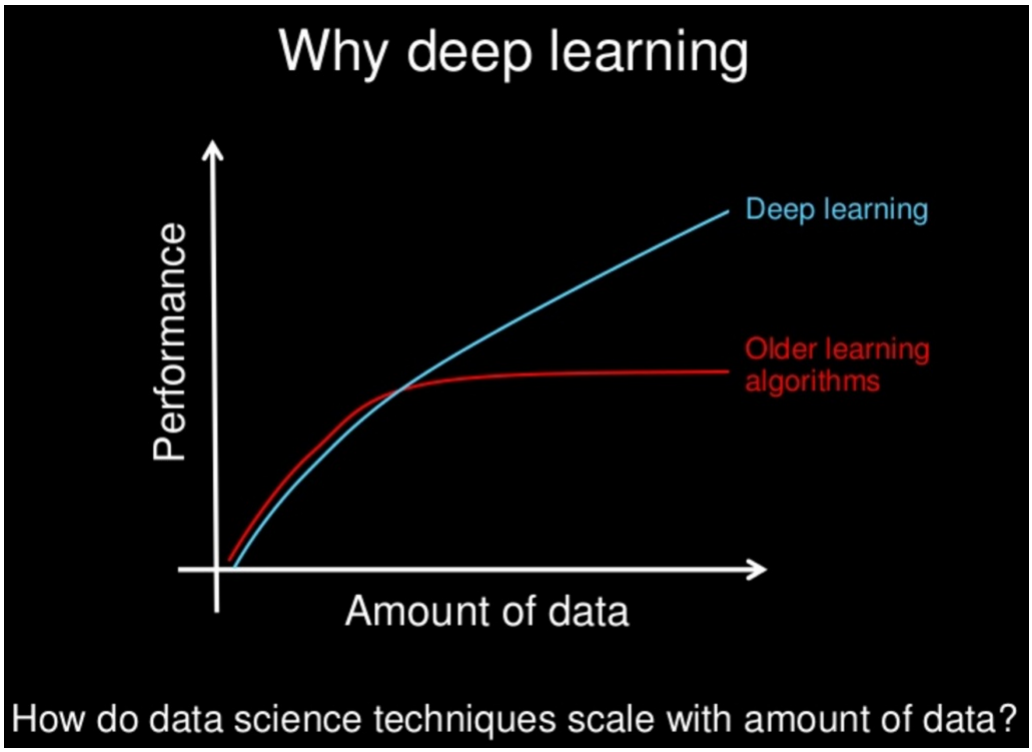


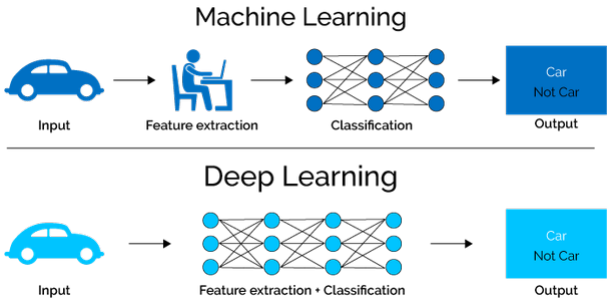
Deep Learning uses neural networks to solve the same tasks as machine learning

Machine Learning vs Deep Learning

Multiple ways to solve the same problem





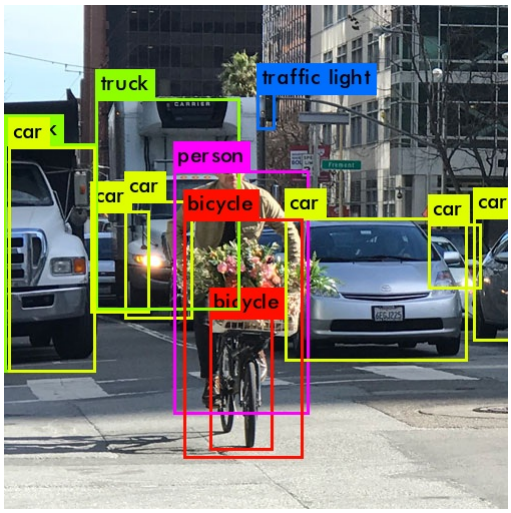


Applications of Deep Learning

https://www.youtube.com/watch?v=gLoI9hAX9dw

Dog vs cat classfier

Object Detection



Like mask detection

Image Segmentation

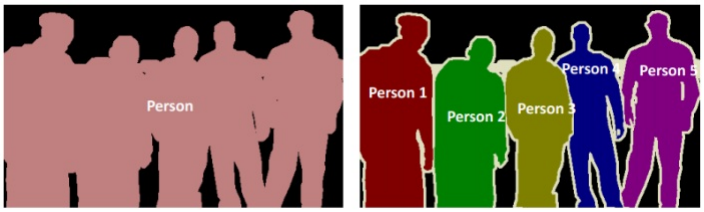


Image 1 Image 2

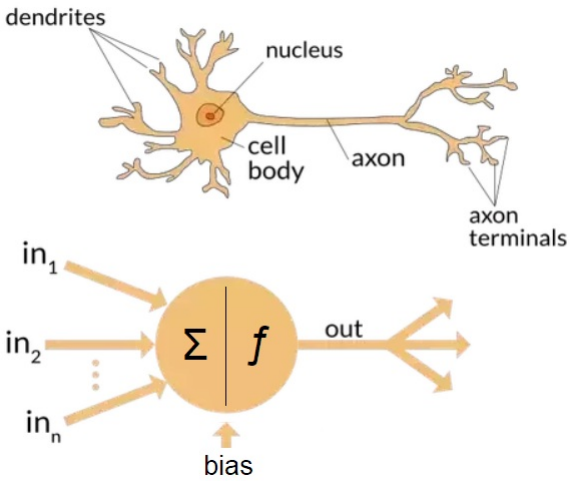
Face detection

Prisma like apps

Generative networks

Speech Recognition

Neural Network and biological intuitions



Basic components

Neurons/Nodes

Weights

What is an image ?

Image is nothing but a matrix

Black and white image is a 2d matrix

RGB image is a 3d matrix

[1 3 6

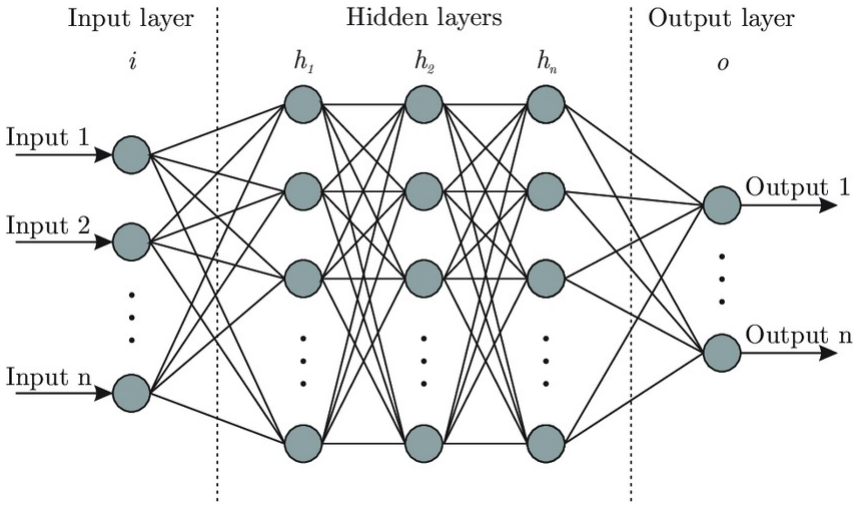
9 2 9

0 34 89] -> [1 3 6 9 2 9 0 34 89]

300x300 -> 90000

Higher value of the number means higher the activation

Artificial Neural Network



Hierarchy :-

1. Input layer -> Determined by size of input
2. Hidden layers -> Hyperparameter to be tuned
3. Output layer -> Defined by target