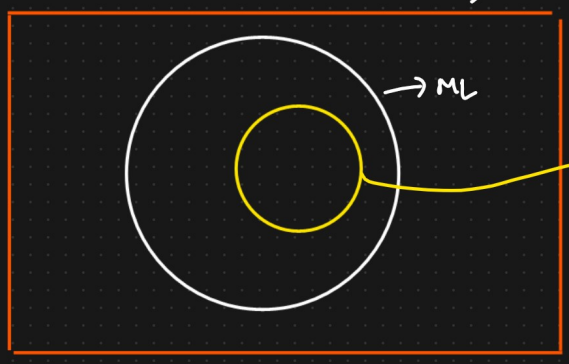
Deep Learning



Deep Learning

1. ANN → Artificial Neural N/W → Classification, Regression
2. CNN → Convolutional Neural N/W → I/P : Images, Video frames → RCNN, MASKED RCNN, Detectron, YOLO V5, V6, V7 (Computer Vision, Objection Detection)
3. RNN → Recurrent Neural N/W → NLP → NLP, Time Series

I/P: Text, Time Series

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{ Word Embedding, LSTM RNN, GRU RNN, Bidirectional LSTM RNN, Encoder Decoder, Transformers, BERT }

FRAMEWORK

TENSORFLOW

End to End Project

② Why Deep Learning Is Becoming popular?

2005 ⟶ Facebook, Youtube, Whatsapp, Linked, Twitter } ⇒ Social Media platform

⋮

2011-2012

⇓

DATA WAS GENERATED

Exponentially

Image, Text, Documents, Videos

↳ Big DATA ⟶ HADOOP → unstructured DATA

⇓

2011 ⇒ Cloudera, Hortonworks

Netflix → movie streaming platform

⇓

Recommendation System

⇓

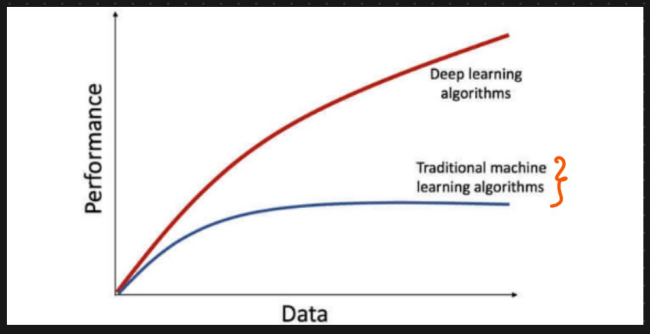
Increase Revenue

2011-2012 :

① Hardware Requirement ⟶ GPU's cost↓↓↓ → NVidia GPU Price↓↓↓

TRAIN MODELS

② Huge amount of data is getting generated → Deep Learning Models Perform well



③ Deep learning is been used in Many Domains

1. Medical
2. ECommerce
3. Retails
4. Marketing . . . . .

④ Frameworks Open source

Community size ↑↑

Tensorflow

⇓

Google

Pytorch

⇓

Facebook

⇓

More Research

③ Perceptron [Artificial Neuron or Neural Network Unit]

① Input layer ✓

② Hidden layer ✓

③ Weights ✓

④ Activation function ✓

[Single layered NN]

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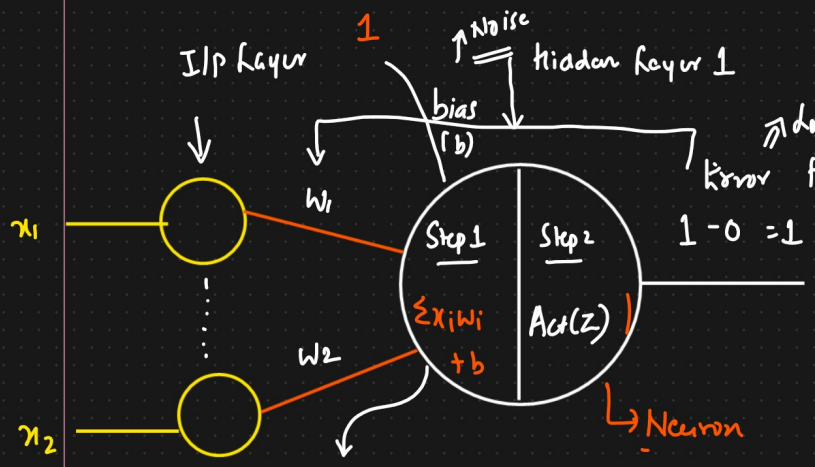
Binary classifier

DATASET

	x_1 Id	x_2 No. of study hours	o/p Pass/Fail
→	95	3	0
→	110	4	1
→	100	5	1



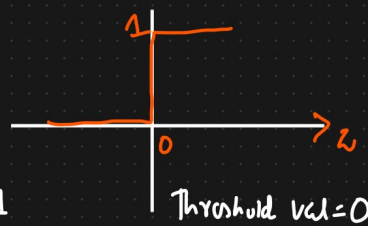
$$z = w_1 x_1 + w_2 x_2 + b$$

$$z = \sum_{i=1}^{n} x_i w_i + b$$

Activation function

Transform the output between 0 to 1, -1 to 1

Step Function

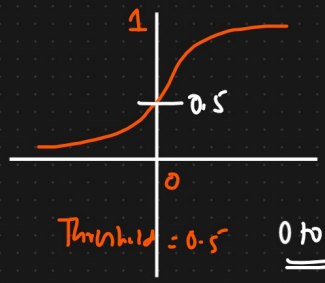


0 to 1

Threshold val = 0

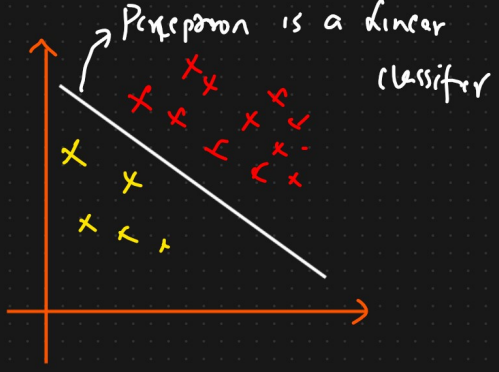
$$\begin{cases} 0 & z \le 0 \\ 1 & z > 0 \end{cases}$$

Sigmoid Function



Threshold = 0.5 0 to 1

$$\begin{cases} 1 & z > 0.5 \\ 0 & z \le 0.5 \end{cases}$$



Step 1

$$z = \sum_{i=1}^{n} w_i x_i + b$$

$$z = b + w_1 x_1 + w_2 x_2 + w_3 x_3 + \cdots + w_n x_n$$

$$y = mx + c$$

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 \; - - - + \beta_n x_n$$

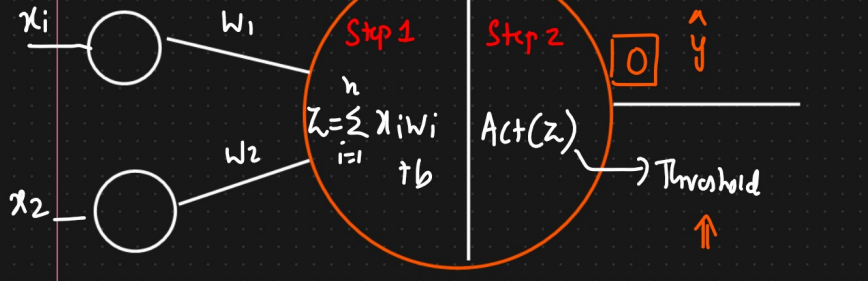
linear problem Statement

Perceptron Models

- Single Layer Perceptron Model
- Multi Layered Perceptron Model [ANN]

Single Layer Perceptron Model

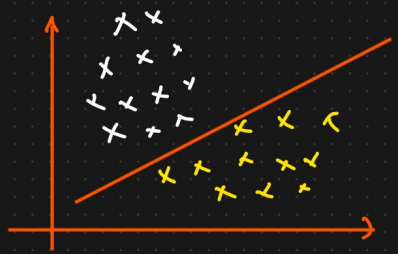
Feed Forward Neural NW



Multi Layered Perceptron Model

1. Forward Propogation
2. Backward "
3. Loss functions
4. Activation functions
5. Optimizers

linear Separable problem



Binary classification

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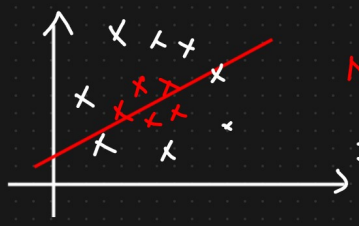
linearly separable



Non linear separable

⇒ Multi Layered NN