GDSC IIIT VADODARA

NEURAL NETWORKS

AN INTRODUCTION

HISTORY

1962

Rosenblatt, Perceptron!!

1974

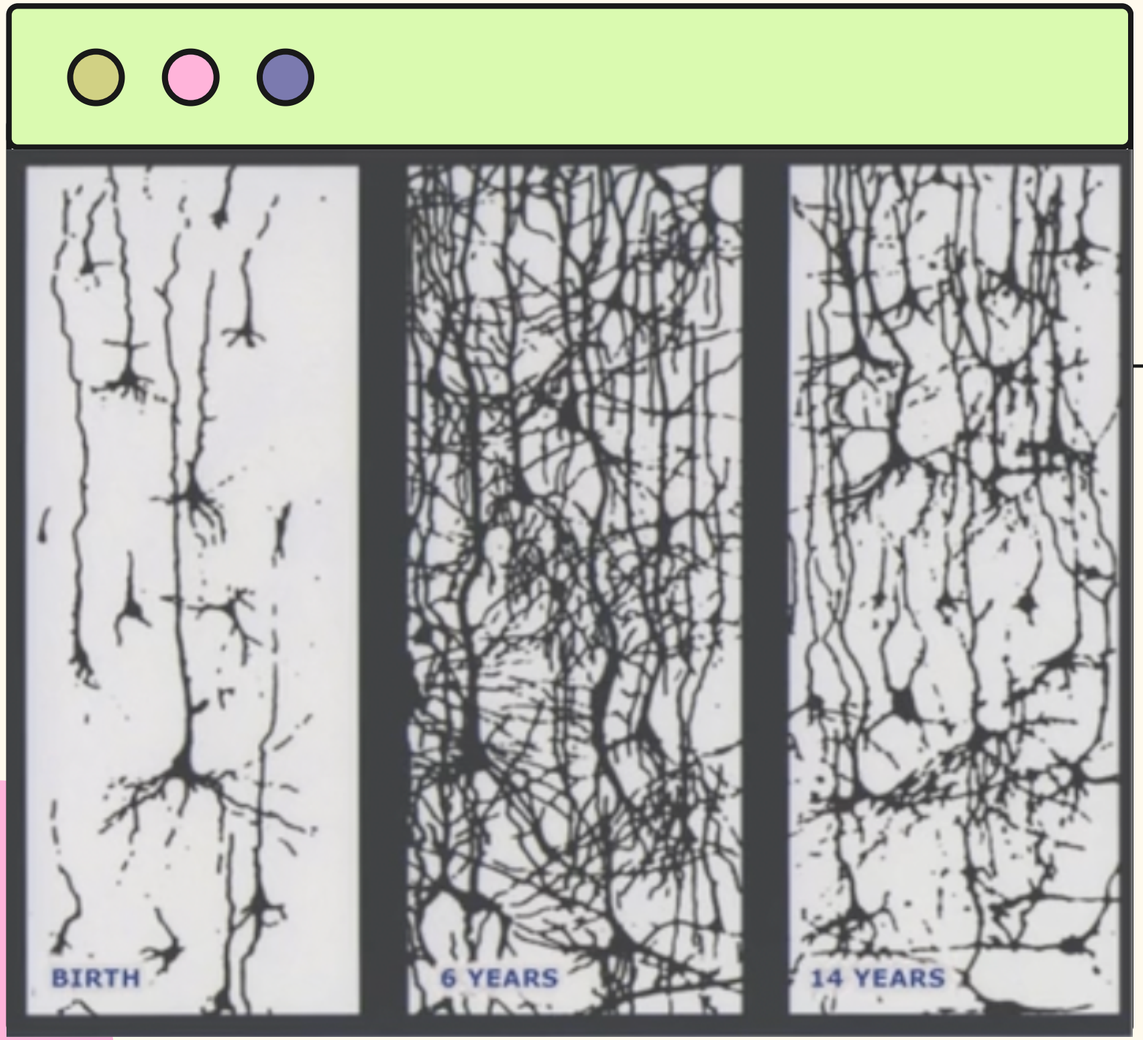
AI Winter :'(

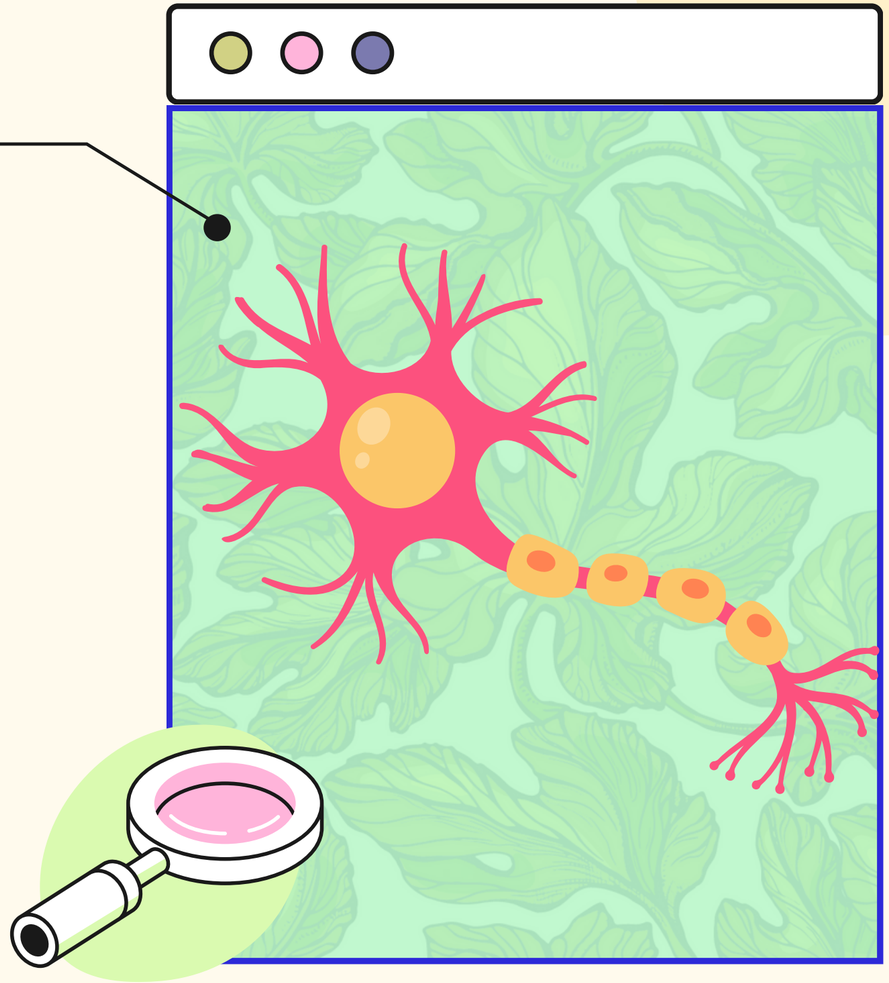
1986

Backpropagration

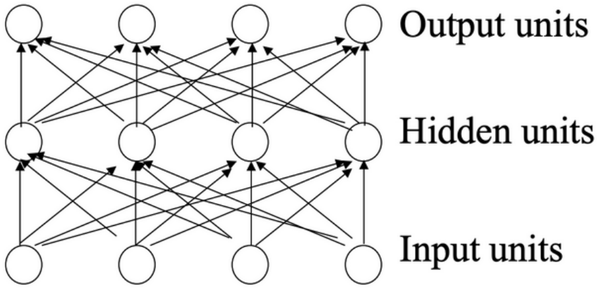
CONCLUSION

DL To the moon!!!


BIRTH
6 YEARS
14 YEARS



NEURAL NETWORKS

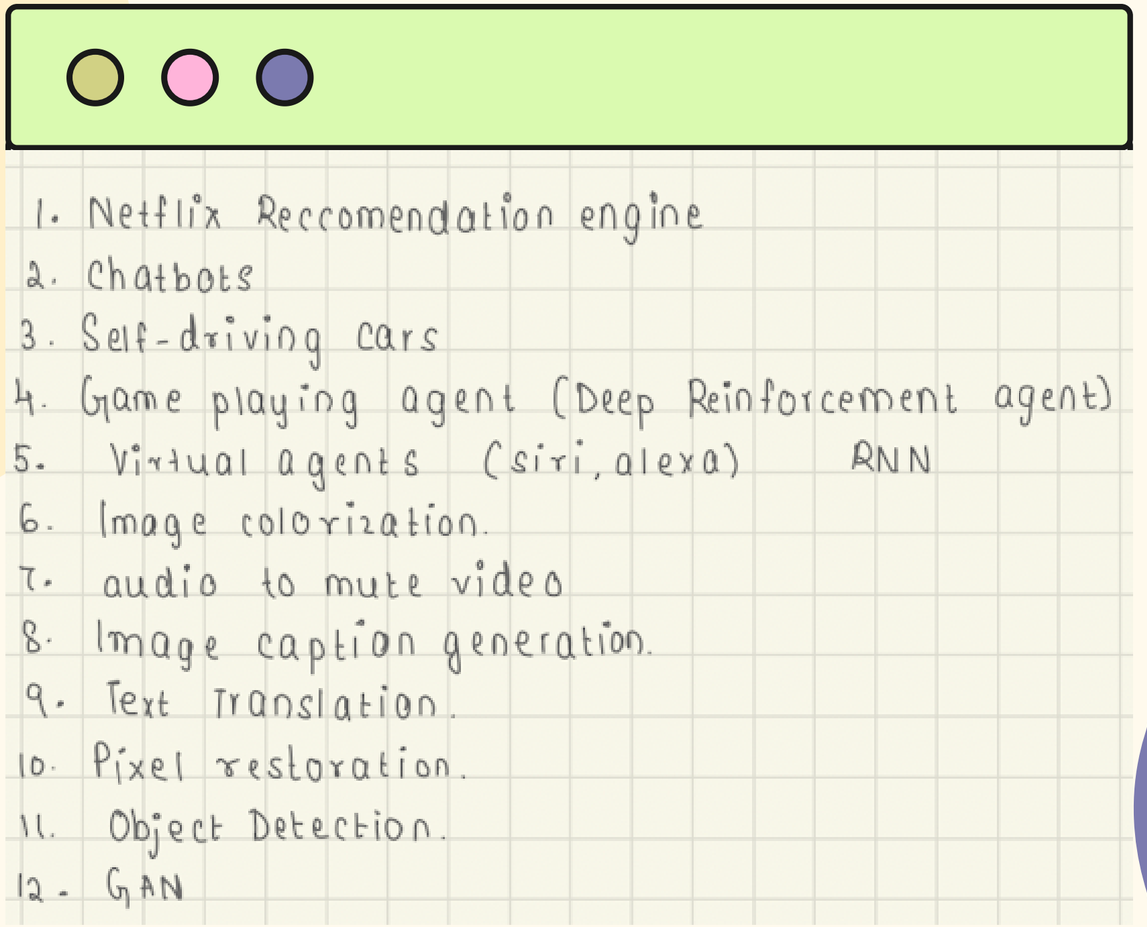


Layered feed-forward network

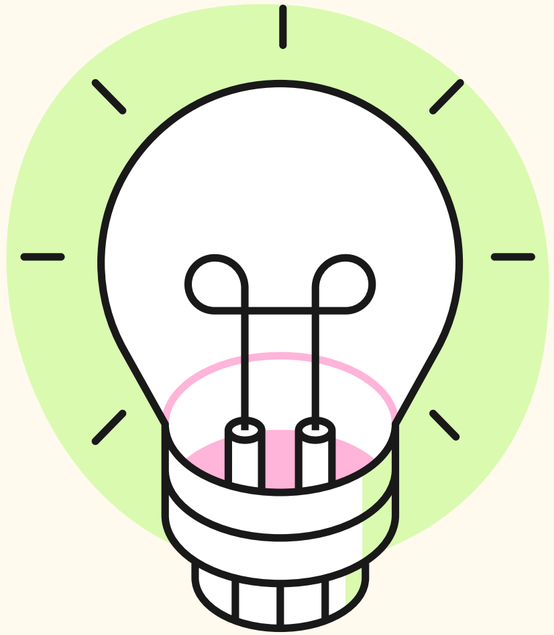
- Neural networks are made up of nodes or units, connected by links
- Each link has an associated weight and activation level
- Each node has an input function (typically summing over weighted inputs), an activation function, and an output

Deep learning is an attempt to draw similar conclusions as humans would, by continuously analysing the data by a logical structure called neural network

APPLICATIONS



1. Netflix Reccomendation engine
2. Chatbots
3. Self-driving cars
4. Game playing agent (Deep Reinforcement agent)
5. Virtual agents (siri, alexa) RNN
6. Image colorization.
7. audio to mute video
8. Image caption generation.
9. Text Translation.
10. Pixel restoration.
11. Object Detection.
12. GAN

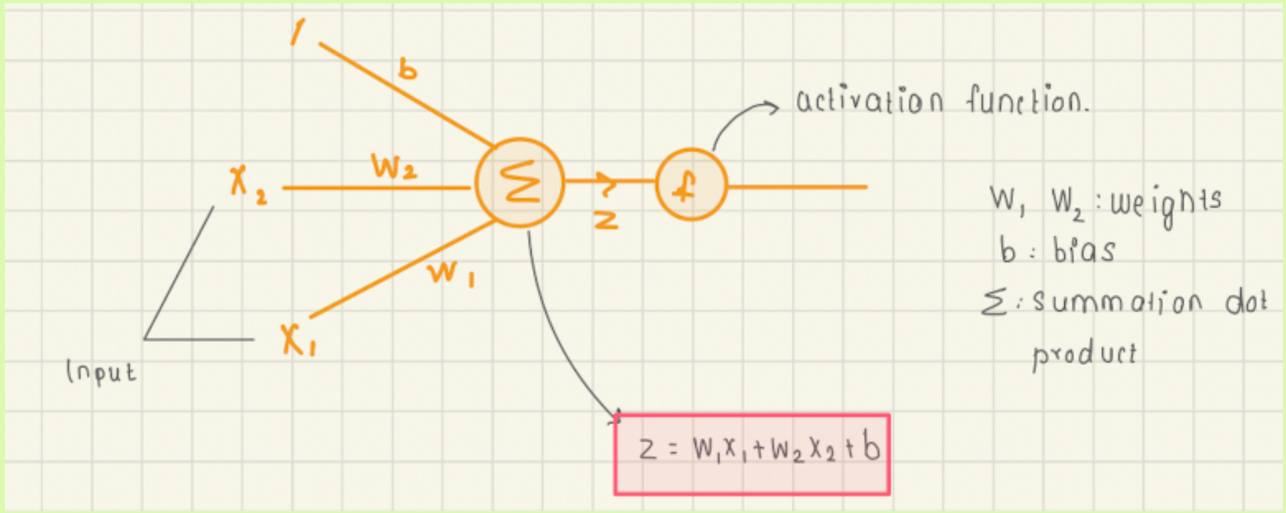


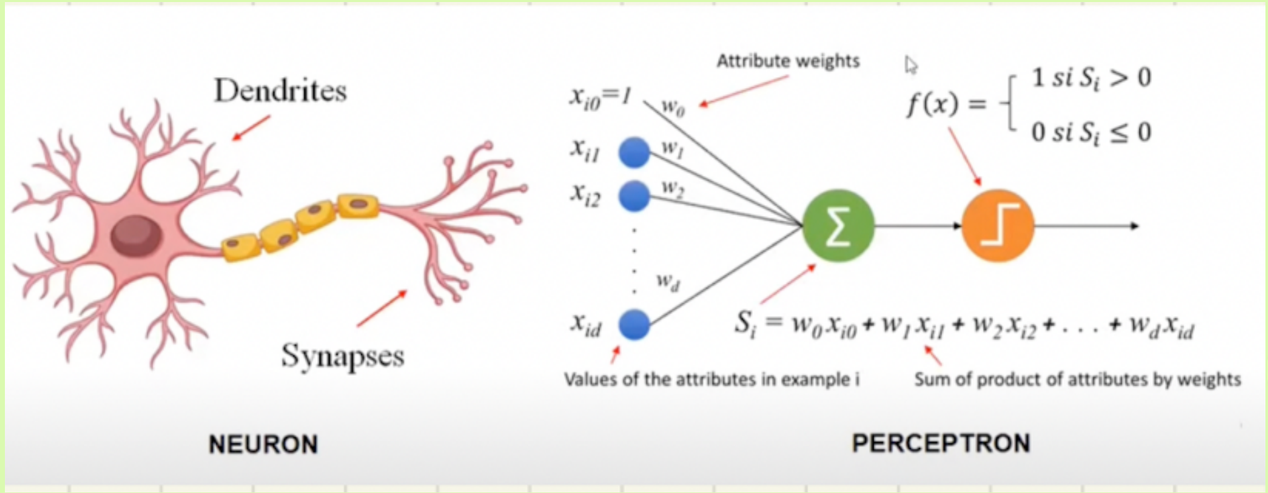
Famous Architectures: Transfer learning

Image classification: ReSNet
Text classification → BERT
Image segmentation: UNet
Image translation : Pix2Pix
Object Detection : YOLO
Speech generation : WaveNET

PERCEPTRON

1. SUPERVISED MACHINE LEARNING ALGORITHM
2. WEIGHTS DETERMINE THE STRENGTH OF CONNECTION
3. ACTIVATION FUNCTION





CAN ONLY CLASSIFY LINEAR SORTS OF DATA --> BINARY CLASSIFIER

Machine learning

1. Statistics
2. Data dependency less than DL
3. Hardware dependency : CPU (cheap hardware)
4. Training time low
5. Prediction time varies
6. Feature selection: manually
7. Interpretability: Yes.

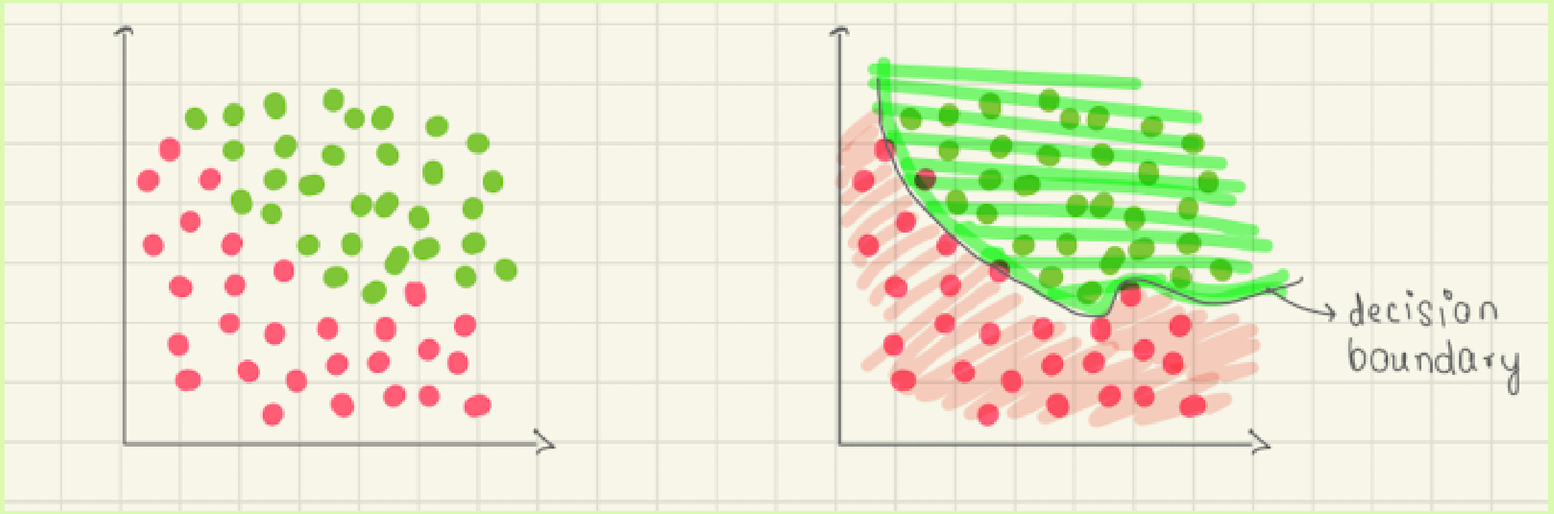
Deep learning

1. Neural Network
2. It is data hungry
3. GPU (matrix multiplication)
4. Training time high
5. Prediction time fast
6. feature extracted automatically
7. Interpretability: No (Black Box)

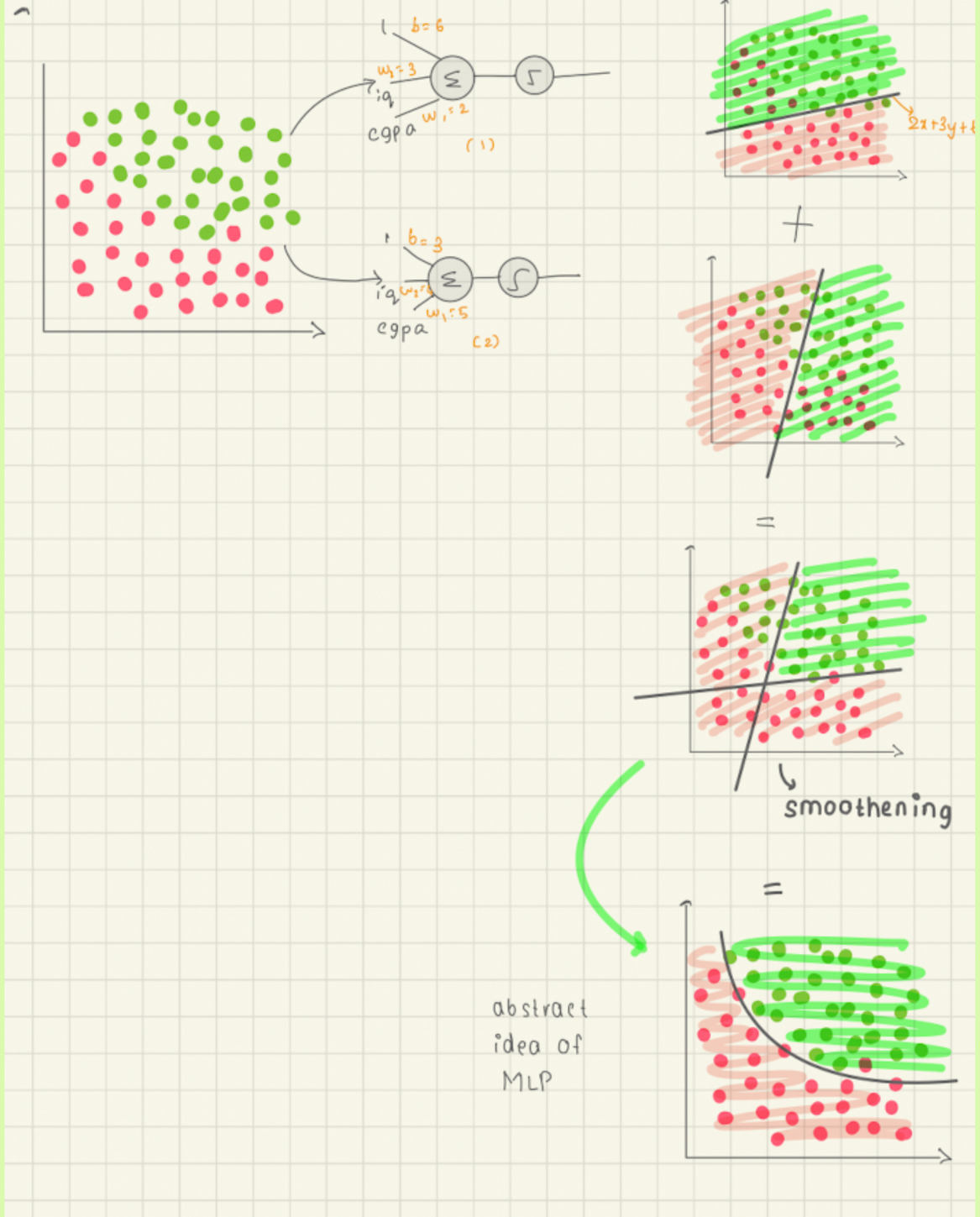
Loss function	Activation	Output
Hinge loss (classification)	Step	Perceptron → binary classifier -1, 1
log-loss (binary cross entropy) (classification)	sigmoid	logistic regression 0-1 → binary classfie
categorical cross entropy (classification)	Softmax	Softmax regression → multilevel classification output: probability
MSE (regression)	linear	linear regression output: number

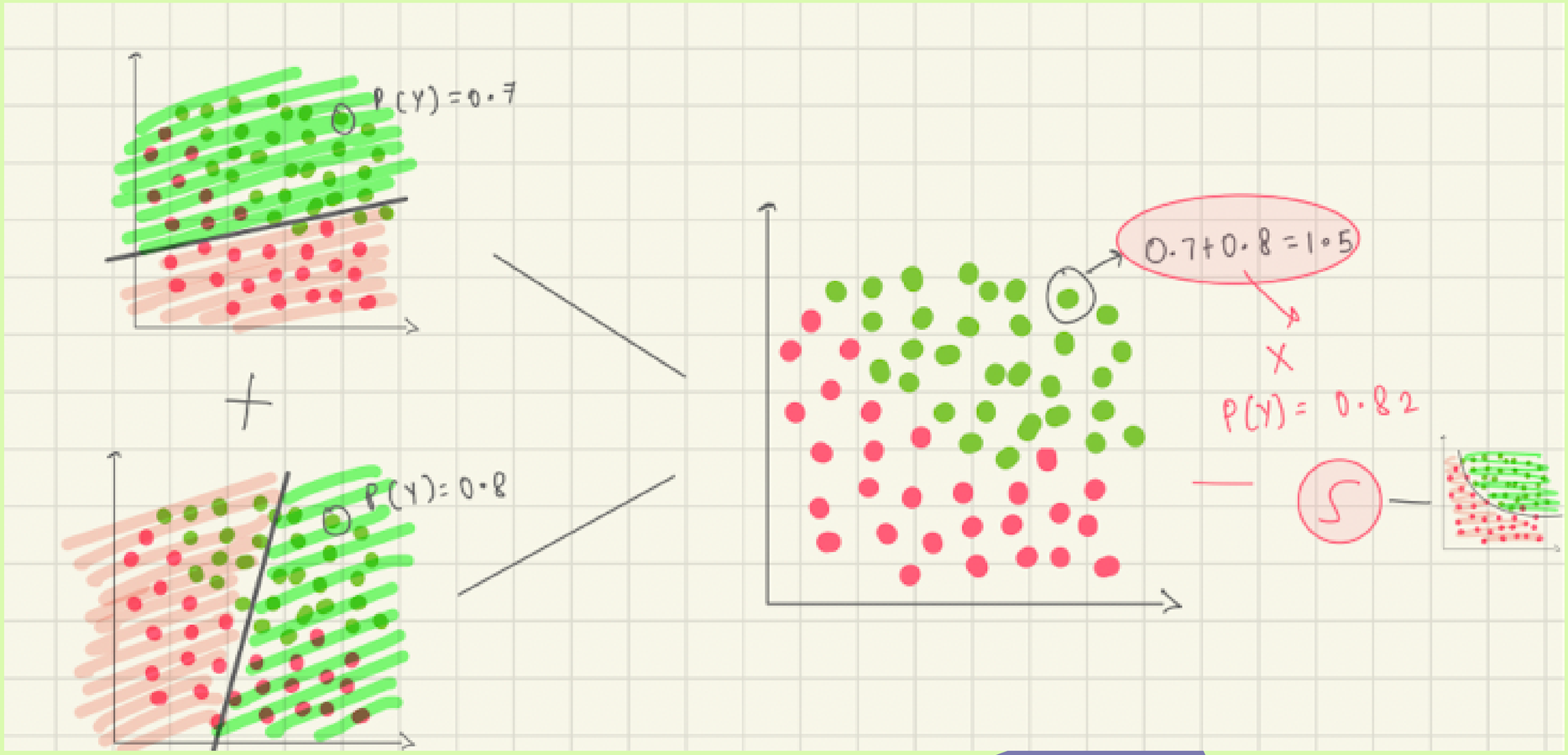
MLP

1 PERCEPTRON CANNOT SOLVE NON-LINEAR DECISIONS THAT IS WHY WE CAME UP WITH MLP



MLP INTUITON




P(Y) = 0.7
+
P(Y) = 0.8
0.7+0.8 = 1.5
X
P(Y) = 0.82
S

THANK YOU