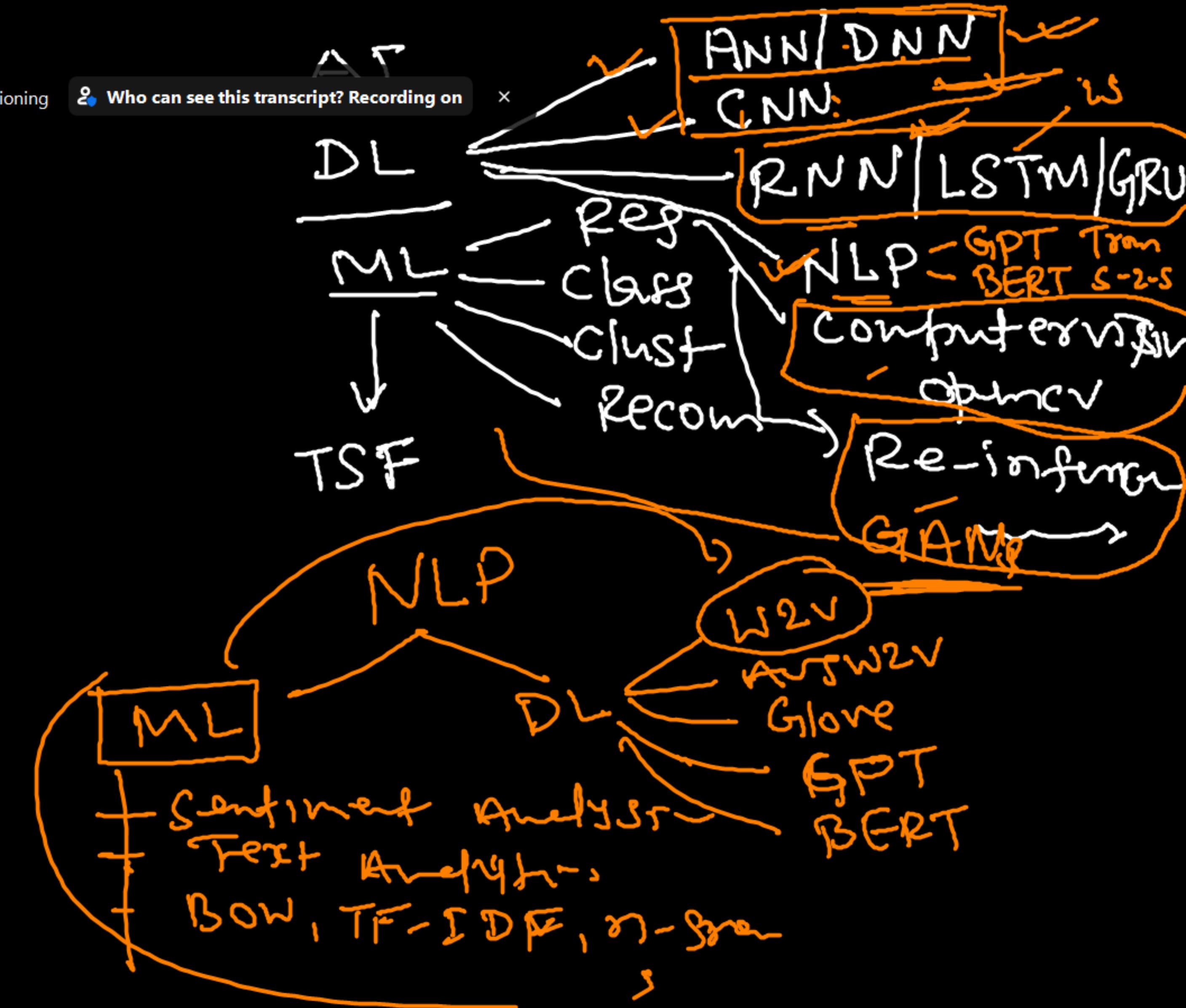
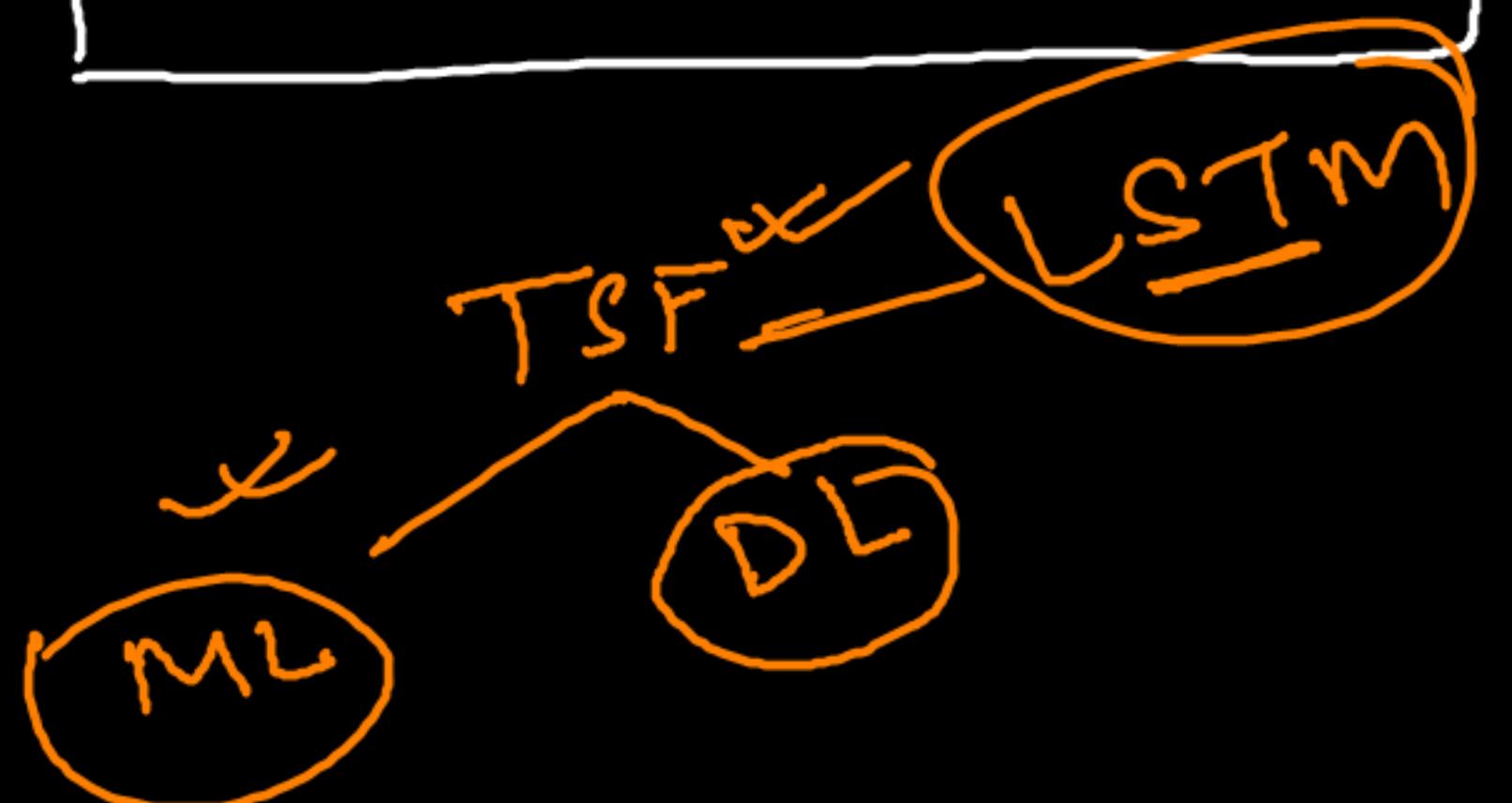


* Deep learning :-

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AI

Rule Based AI

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you tell the machine what
to do.

Input	Output
x	y
1	1
2	4
3	9
4	16
5	?
6	?

Machine Learning Based AI

Rule Based AI :- it's hard coded rules

if - else conditions

$$\underline{2+2 \div 2} = 2/3$$

$$\underline{3+3 \div 3} = 4$$

Square

$$y = f(x)$$

Operations :-



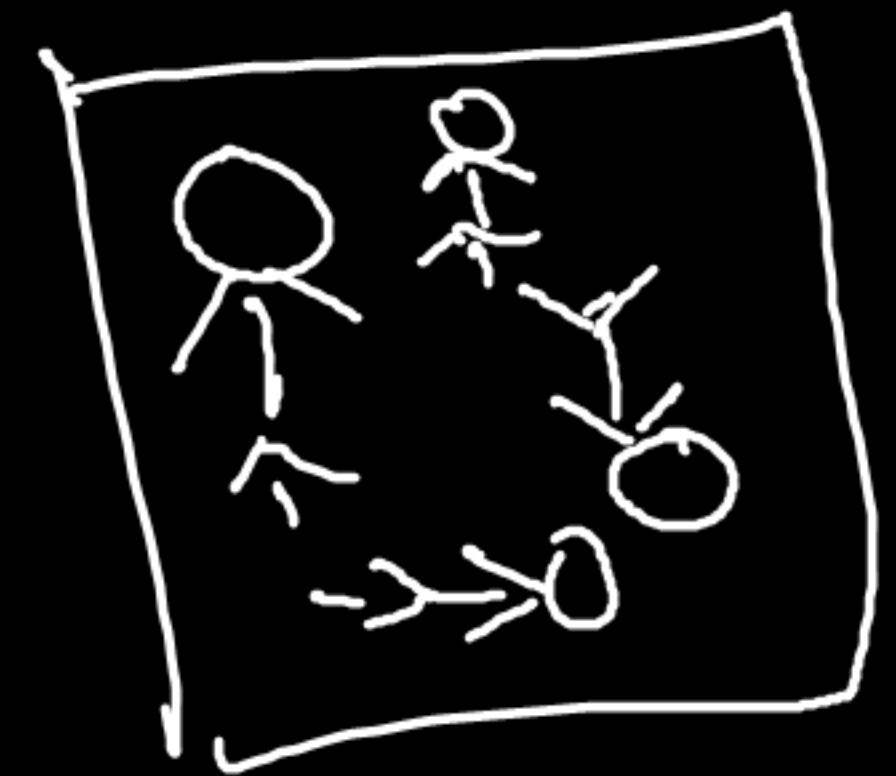
① Get the requirement

② Build the logic

③ convert logic into a program

ML Based AI :- ~~Rules~~ or we don't
Know the Patterns - we will use ML Based AI.

Translation variance



DL :- is nothing but Specialised of ML

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1957 - Rosenblatt - Perceptron

1960 - Alan Turing - Father of Computer

↳ inspired by "biology"

↳ human, cells, monkeys, ants - creatures

Language - NLP

1986 - Geoffrey Hinton - Father of modern Deep Learning

"Hype" USA ↳ Backpropagation → 2006

1990 - AI

Winter's

Year

ML - SVM
RF

XGB
(1995) find
dropped

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1990 - AI winters Year

→ computationally costly

→ Hardware DL — GPU | TPU
 ML — CPU

→ Software — tensorflow, keras, PyTorch etc —
Data was not available.

2012 - AI Golden Year

ImageNet

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$$Y = C + BX$$

↓ ↓
Int Slope
B, w/ weva

Google, MS, FB, Amazon, Baidu —

- Lots of data
- GPU/TPU - lots of computer Capabil.

→ New algorithm

→ voice assistance → Siri
→ Cortana

Since 2012

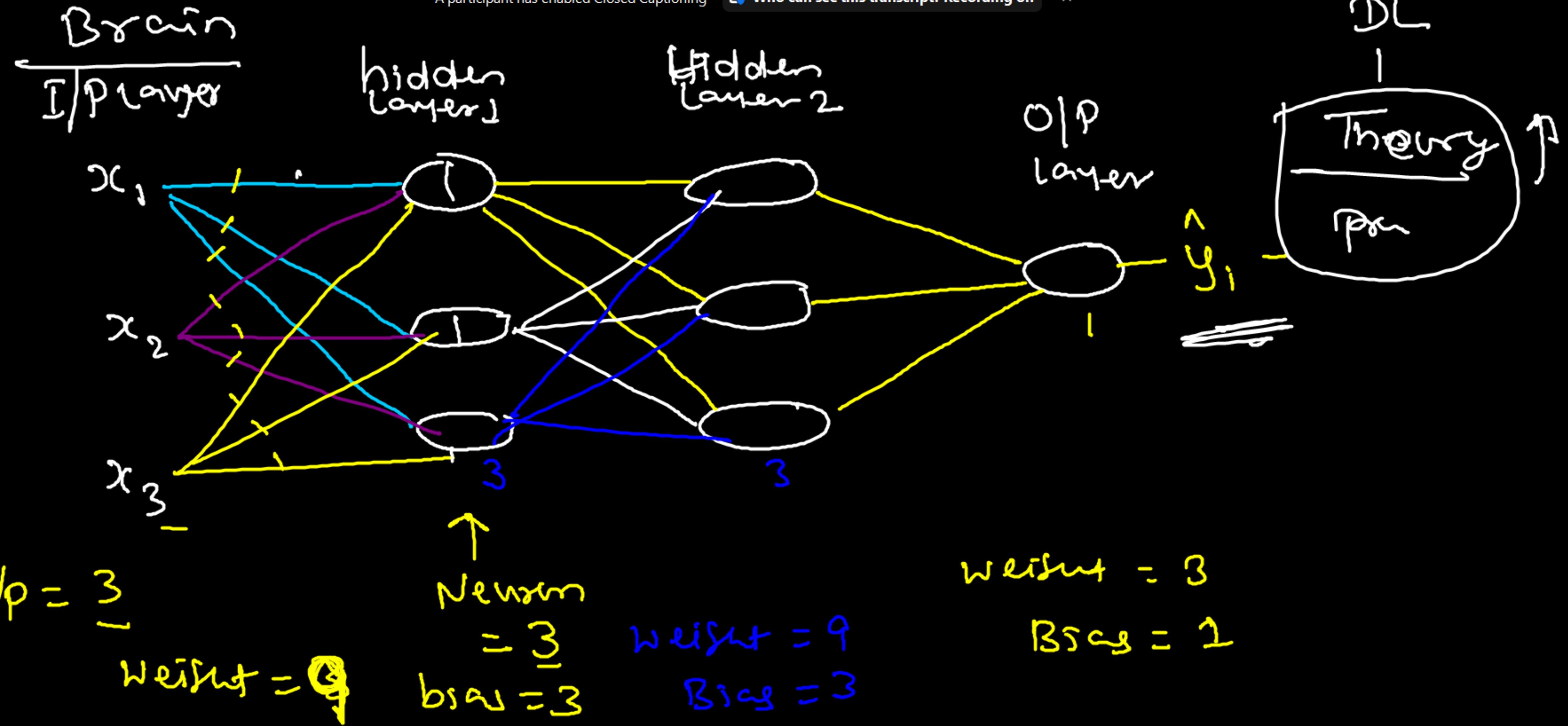
Self drive car
Skin-cancer-digi
Smart phone
Cameras

Alexa
Google ASS;
Bixby

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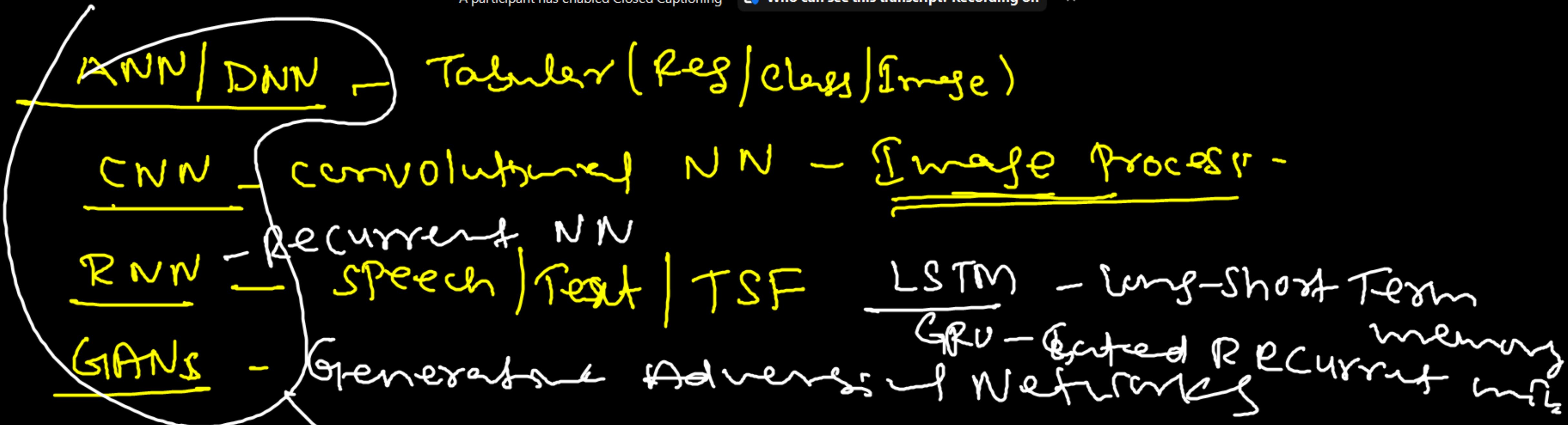
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Difference between ML and DL



Algorithm

ML - Reg → LR, LSVR, Reg, DT, RF, XGB

Deep Learning

DNN
CNN
RNN

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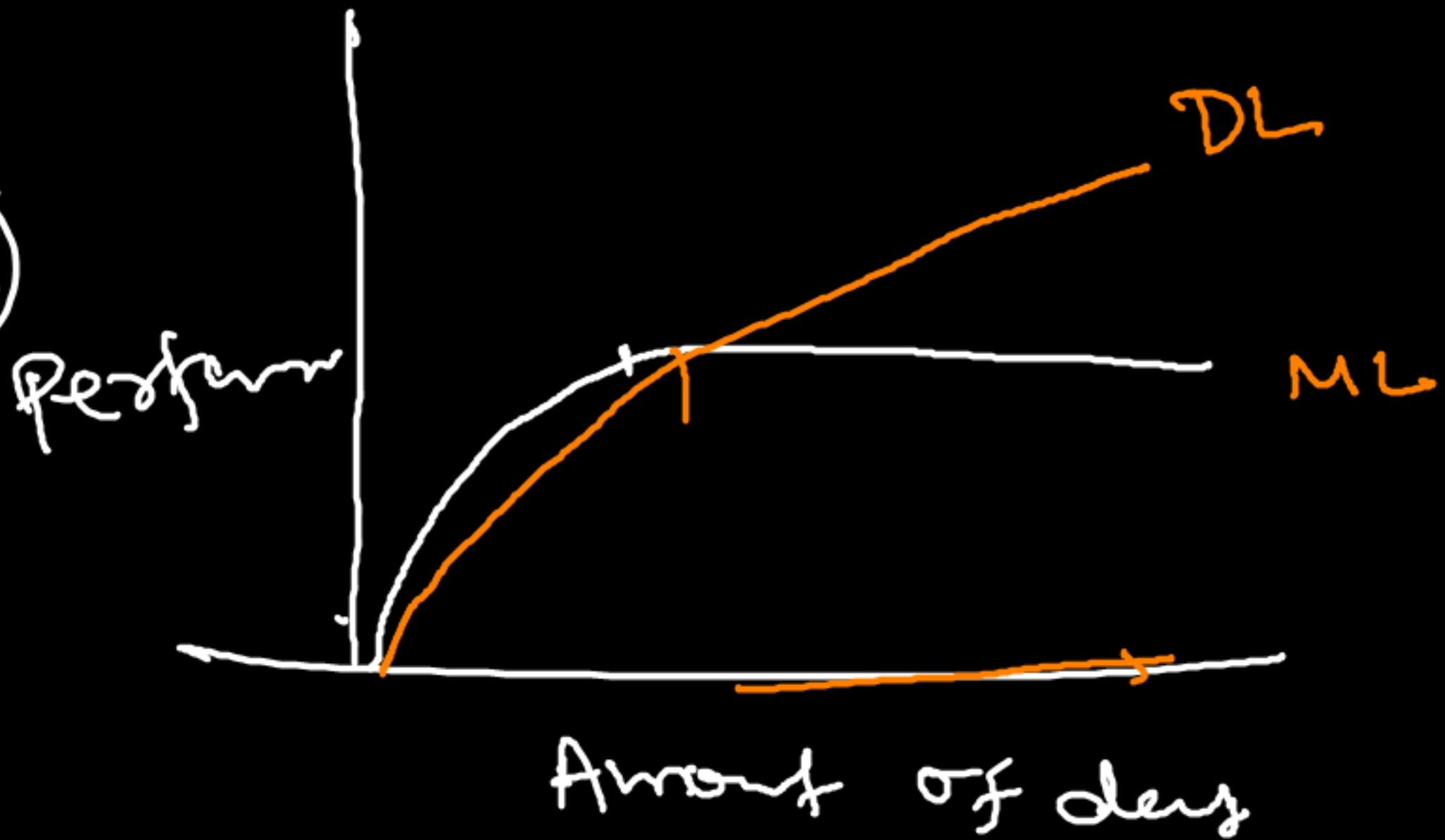
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② Date dependency

DL - data hungry

2015



ML - Manual work

DL - Automation

③ Hard ware dependency

ML - CPU

- Costly - DL - GPU

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④ Software Dependency

ML - SKlearn, numpy, Pandas, matplotlib, scikit-learn
Plotly etc - -

DL - Tensorflow, keras, PyTorch, Theano, NLTK, Spacy
Tensorboard and so on - -

⑤ Training

ML - Training Time - Less

DL - " " n - high

Test - less
Test - less

Feature Selection

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⑥

ML - come by one hypothesis test, etc

DL -



Black box

edge - CNN

⑦

Interpretability — ML - Full control ↑

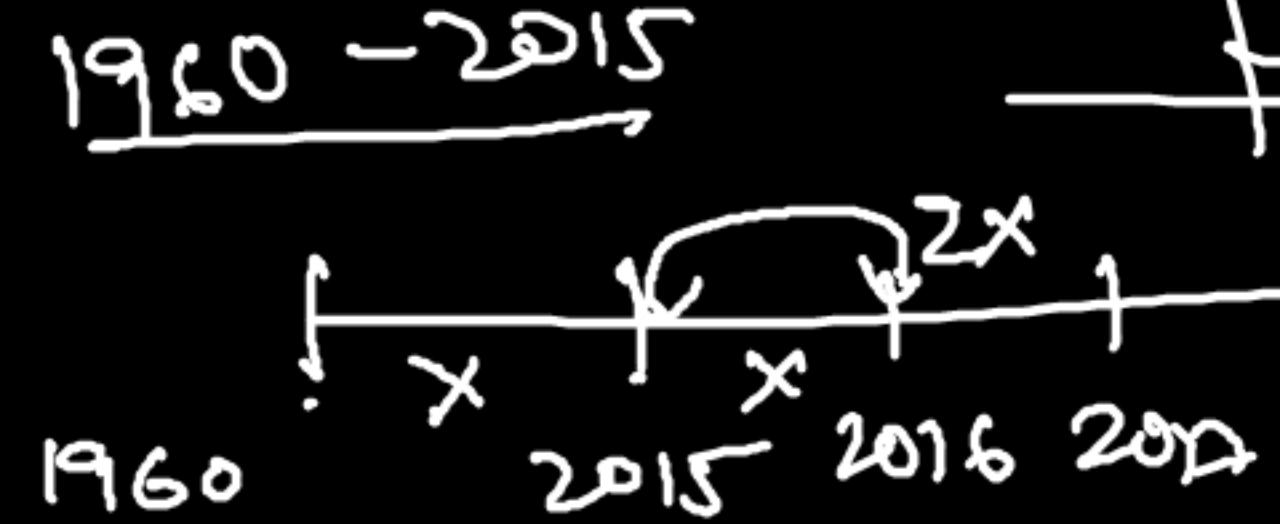
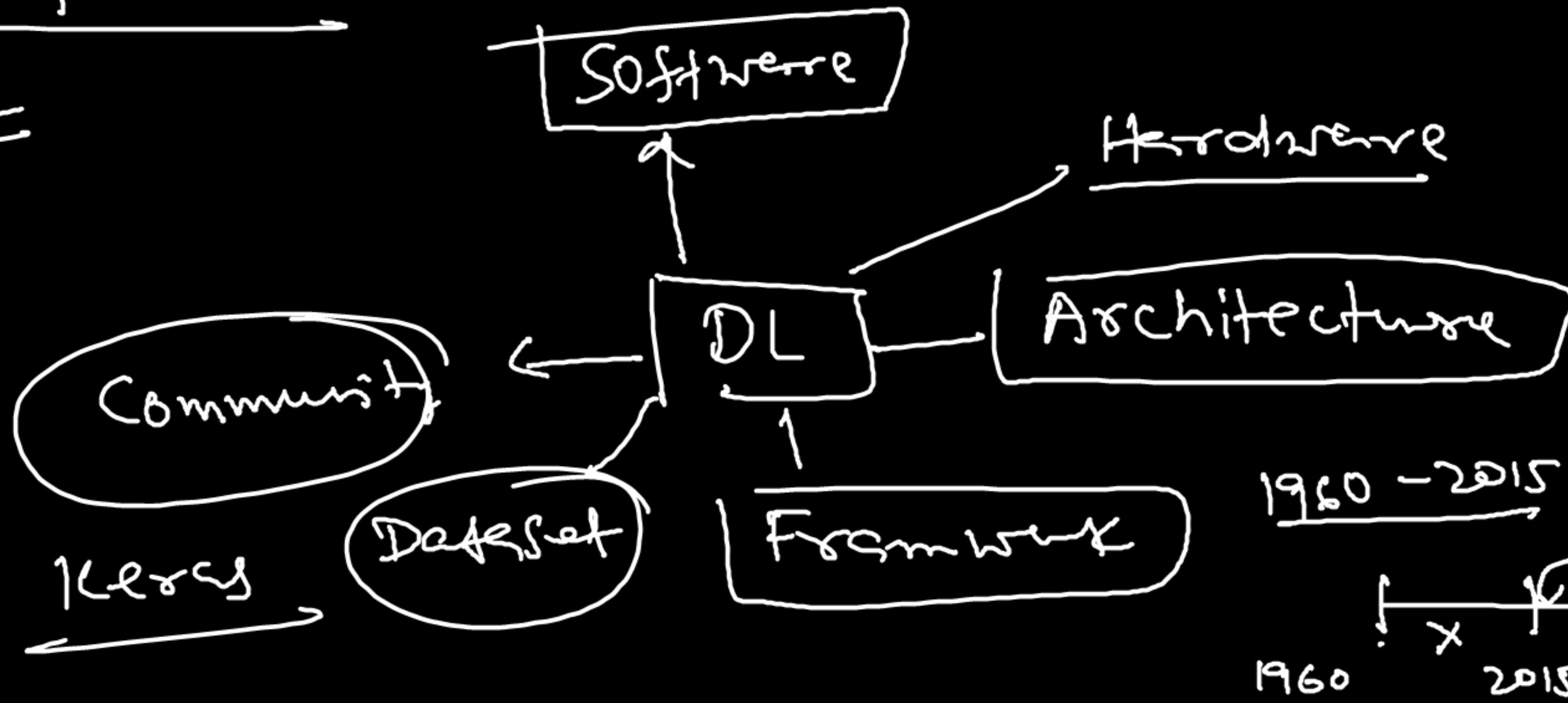
— DL - Black box

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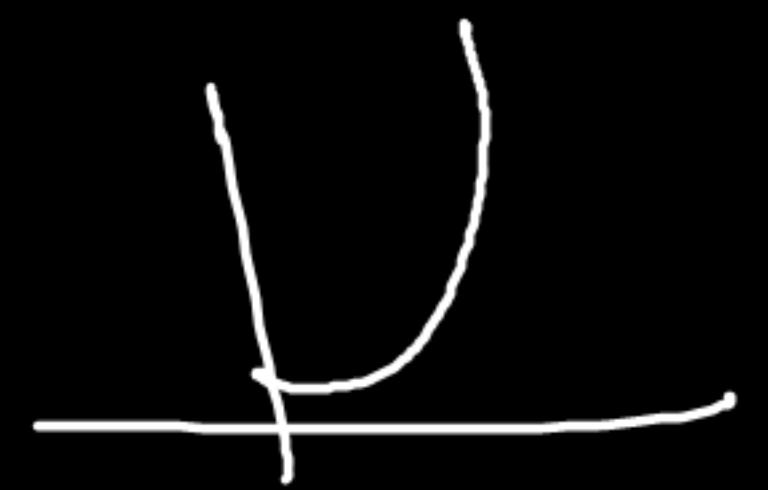
Why Now
2012



Andrew Ng - GPU - Google Colab - 12 GB - 2-35

NVIDIA

Internet
Prize - 2015



~~Dendrites~~

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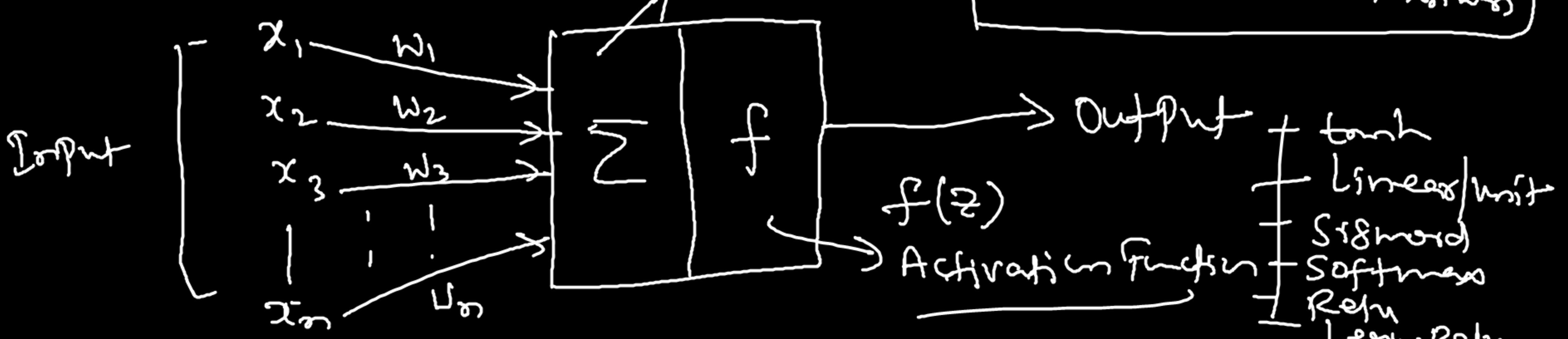
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Nucleus

Mem
Terminal

axon

AI



$$z = 0.8$$

$$f(z) = f(0.8) = 1$$

Sigmoid

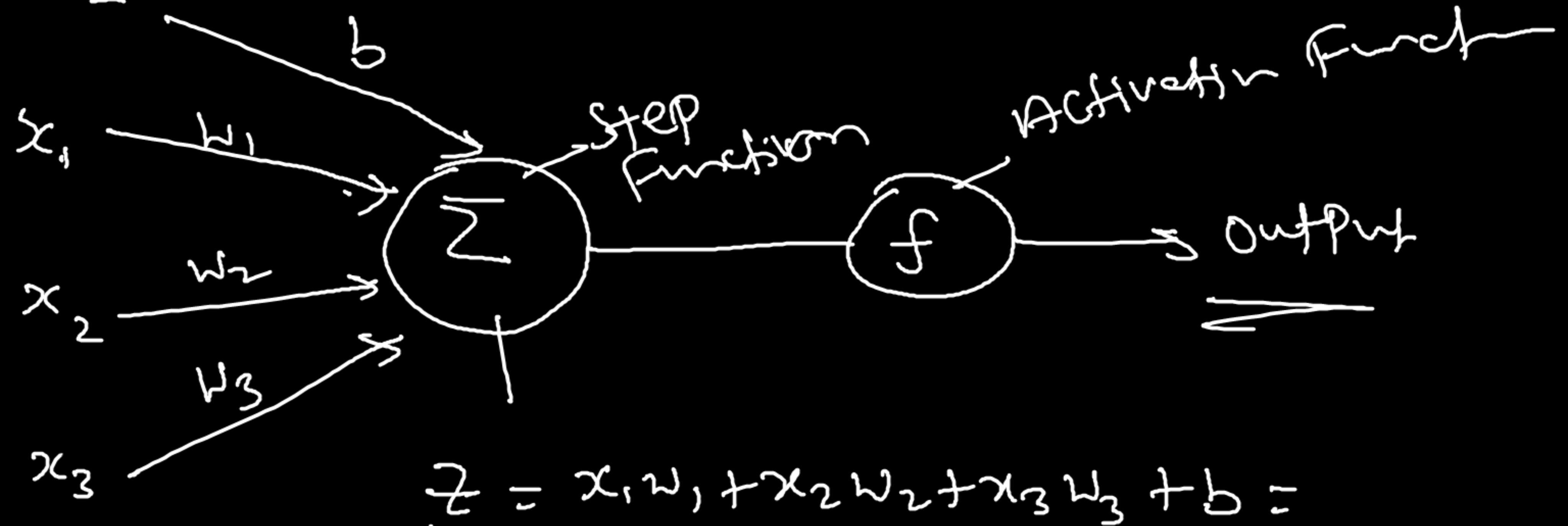
Perceptron model — Linear model

1

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x



Logistic - Sigmoid

$$0 \xrightarrow{\quad} 1 \xleftarrow{\quad}$$

Perceptron (only one neuron)

