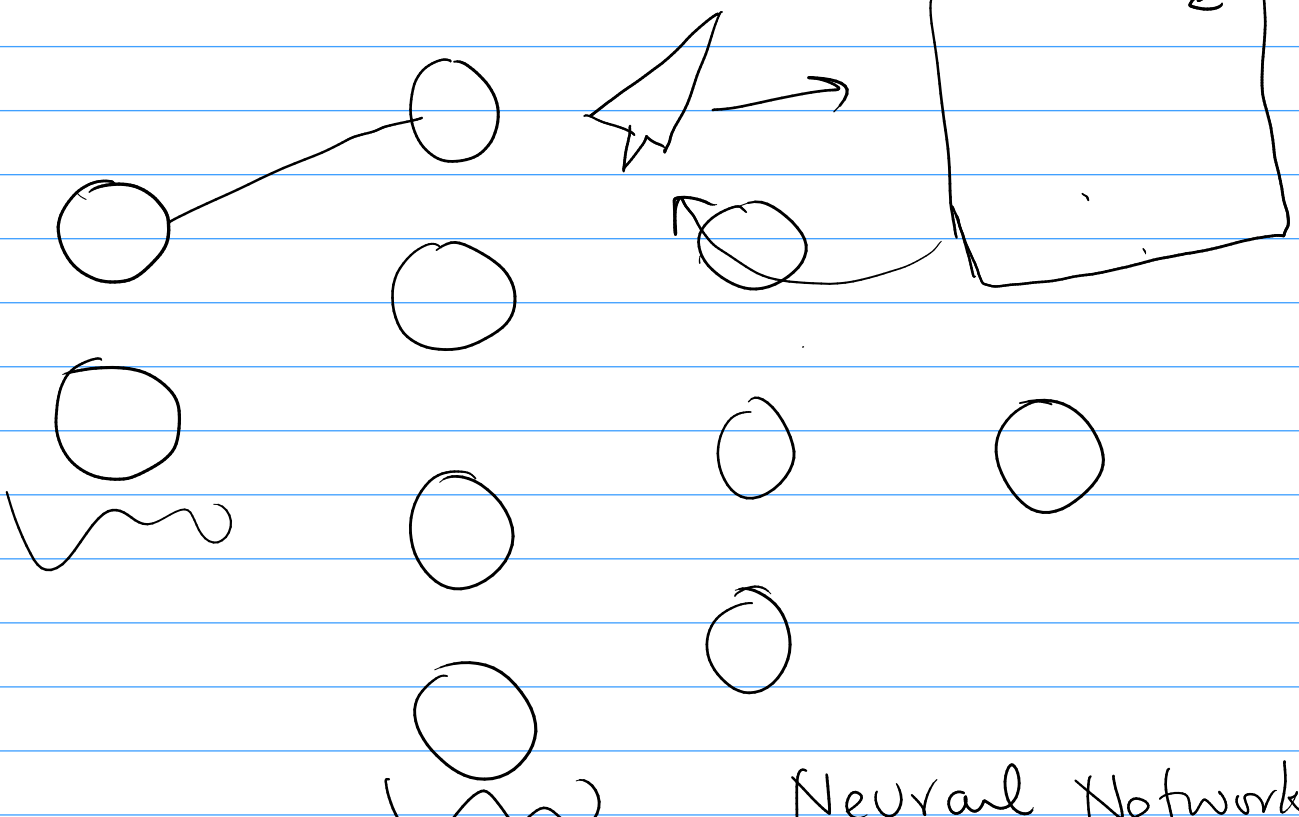
⇒ Introduction to Deep Learning :-

Machine Learning & Deep Learning.

Shallow Learning → KNN, SVM — } 1 or 2 times.



Neural Networks

1080 X 1920

h	w	Label
x	y	z

Structured Data.

⇒ SVM ⇒ Support Vector Machine

↳ failed in classifying pictures

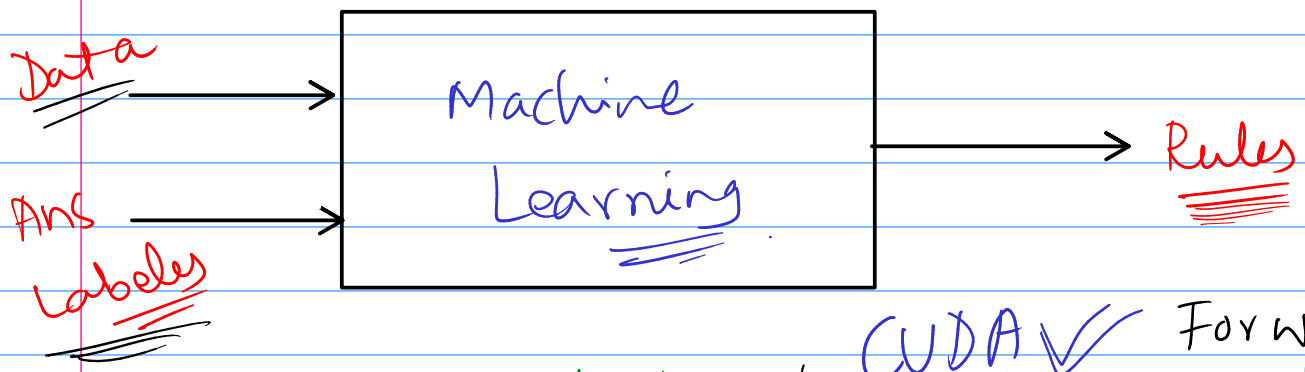
Kaggle.com → Datasets 2012

100, 26 images 74% LeCun

wrong classification.

2014

86% → 96% 100 → 96 ✓ 4 ✗



Neural Networks :

Hardware

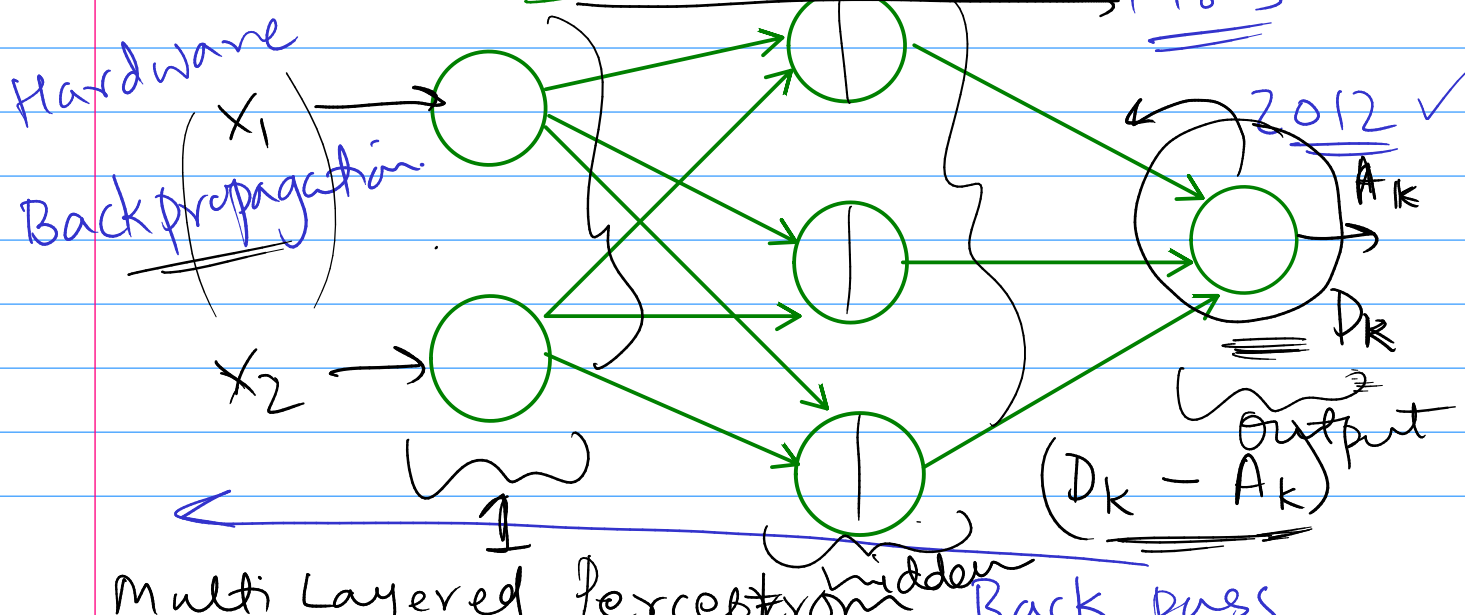
Backpropagation

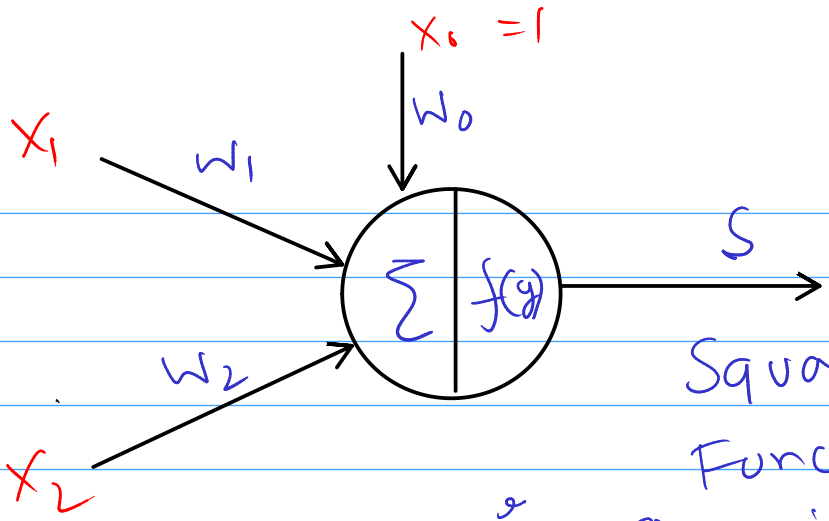
CUDA ✓

Forward pass

1980s

2012 ✓





Squashing Functions:

(i) Sigmoid
(ii) Linear
(iii) Tanh
(iv) Binary TLN
(v) Rectified Linear Unit

Perceptron: BTLN

$y > 0 \Rightarrow S = 1$

$y < 0 \Rightarrow S = 0$

Weight Update

$y < 0$ but $D_k = 1$

$W_{k+1} = W_k + \eta X_k$

$y > 0$ but $D_k = 0$

$W_{k+1} = W_k - \eta X_k$

$\eta \approx 1$

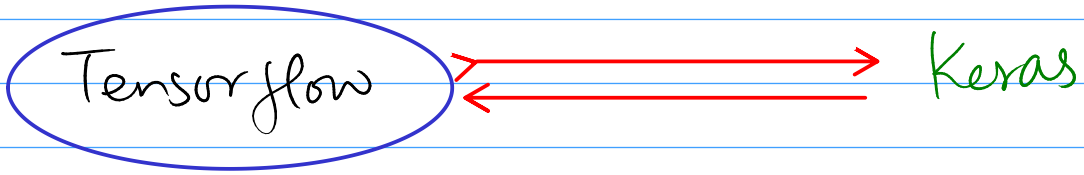
Classification problem.

AND $\Rightarrow$

$$W_{k+1} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

⇒ Tensorflow & keras:

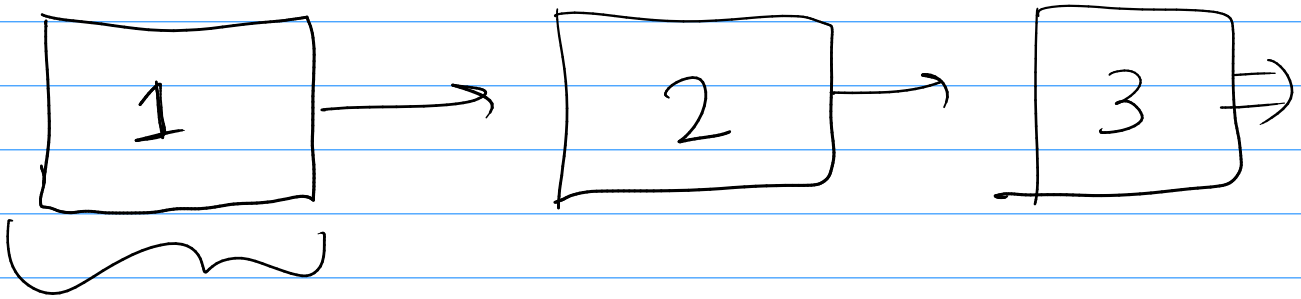


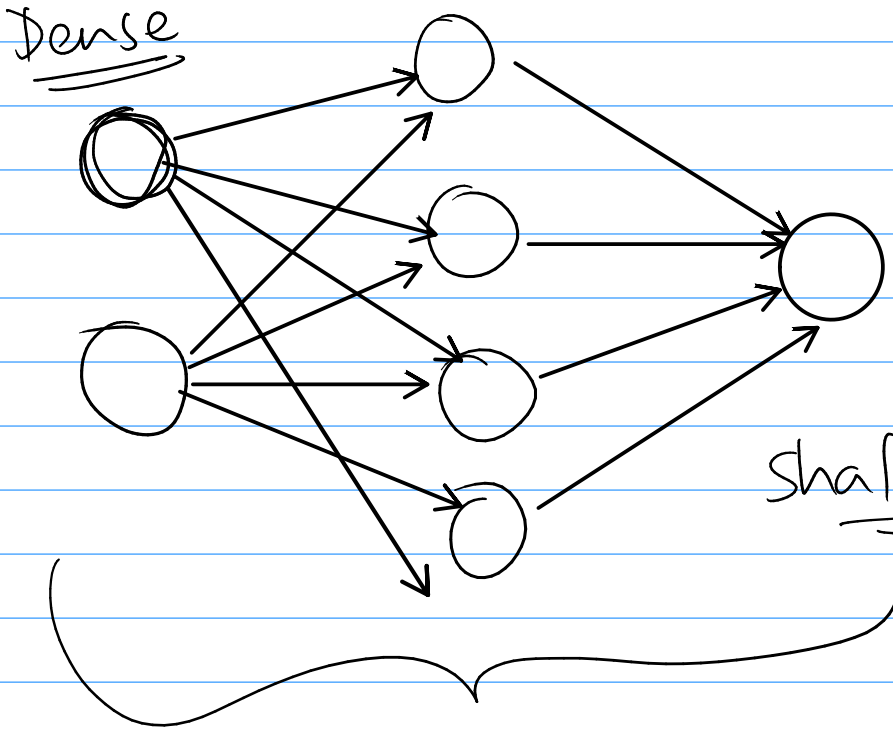
imported Tensorflow & keras.

models (Sequential)

compile model.

model.fit(_, _, _, _) ← train





Optimizer

Loss