Weights ⟶ | Input Layer | ✓

hidden layers

Weights ⟶ | Output Layer |

Weight Update ✓

(Optimiser)

Y_pred

Y_real

loss function

Loss Score

(i) Put the data in input layer.

$\downarrow$

— — — — — Calculations — — —

(ii) Y_pred —

(iii) loss function (_____)

$\hookrightarrow$ generates a loss score

(iv) Loss score is given to optimiser.

? Algo. used for updating weights.

Weights ↓ weights — Backward Pass.

g(x) ✓ ↓ weights.
f(x)

Forward Pass

Back propagation Algorithm ✓

$(D_k - y_{pred})$
$(y_{real} - y_{pred})$
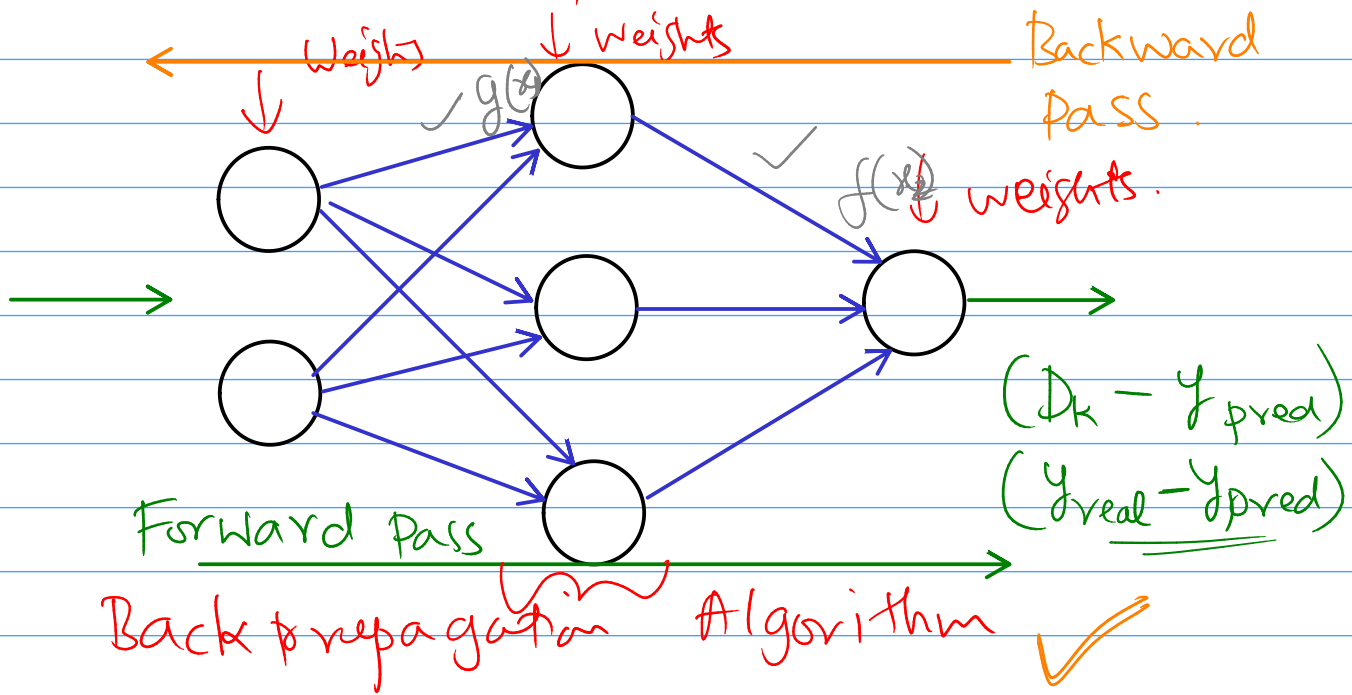
⇛ Gradient: ⇒ The direction of max. change.

$$= \sum \left(\frac{\partial}{\partial w_i^j} w_i^j \right) loss$$

$loss = f(w)$

loss

$-stq * gradient()$

$(w_0, w_1, w_2 \dots)$ local Minima

Global

loss (min)

$(w_0, w_1, w_2 \dots)$

$loss = f(x_2, g(x_1))$

loss (min)

Global Minima

⇛ Momentum: Concept from Physics

$\Rightarrow \quad f(n) , g(w) | Loss(W_1, W_2, W_3)$

Input Layer

Hidden layer

Output Layer:
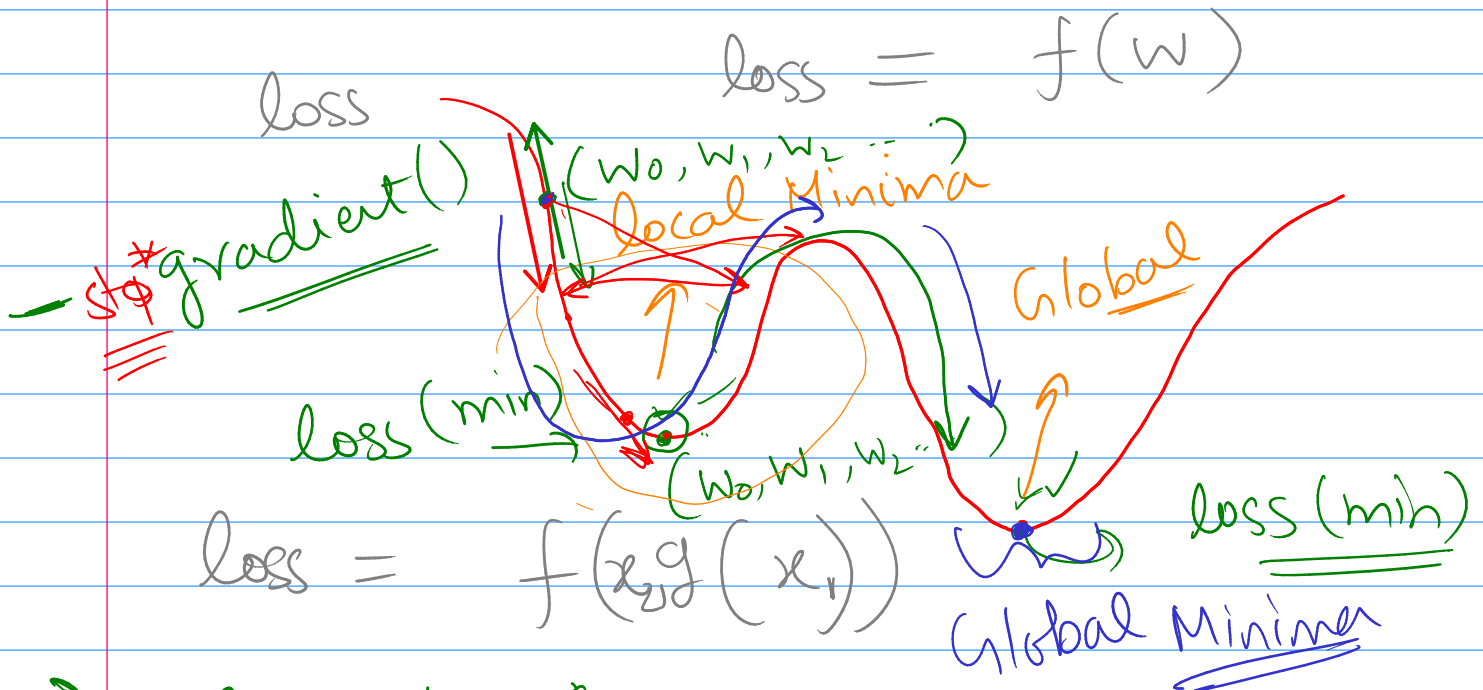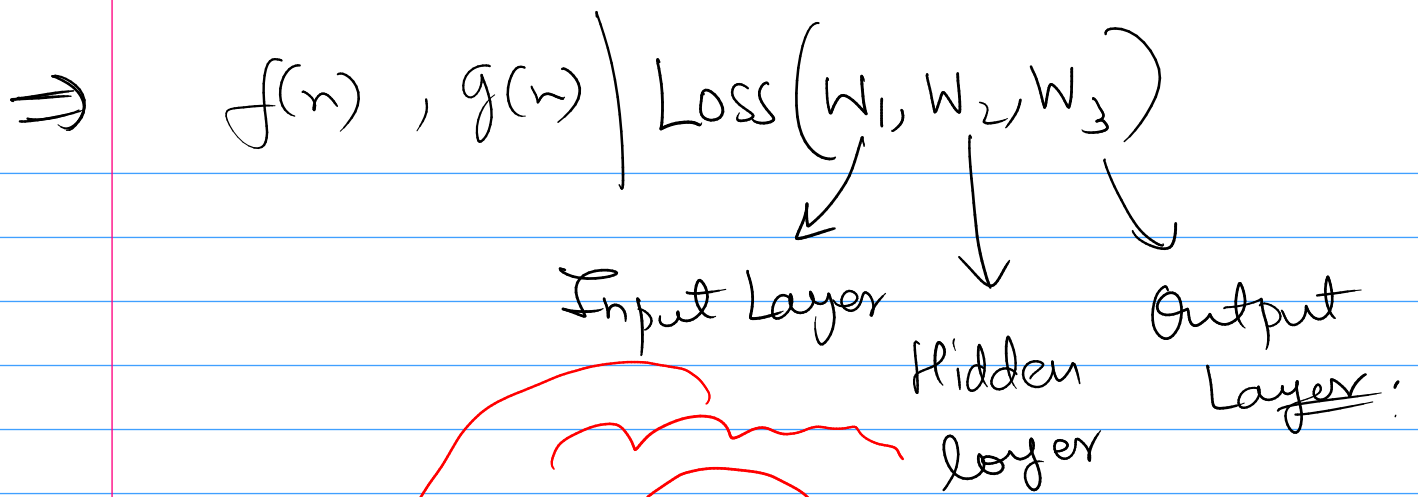
$Loss = f(W_3, g(W_2, h(W_1)))$

$\Rightarrow$ chain Rule :

$\Rightarrow \quad f(g(h(w)))$

$\dfrac{d(Loss)}{dw} = f'(g(h(w))) \cdot g'(h(w)) \cdot h'(w).$

chain Rule ~

$\dfrac{d}{dx}(e^{(x^2)}) = e^{x^2} \cdot 2x \cdot \left(\dfrac{dx}{dn}\right) = 2x\, e^{x^2}$

$\Rrightarrow$ (Stochastic) Gradient Decent :

$\hookrightarrow$ Random

model.fit (Data, y, epochs= __ , batch_size=)

$$\begin{bmatrix} [\_ \_ \_]? \\ \{ \_ \_ \_ \}? \\ \_ \_ \_ \_ \end{bmatrix}$$

batch-size = 128

Gradient . | Randomly

(Stochastic)

Probabilistic or Random

⇒ Losses :

Classification — 2 - class
                 loss = Binary-crossentropy

                 Many class.
                 Multi (Categorical-
                         crossentropy).

Regression =

⇒ Choosing the right parameters ?

AI ⟶ ↑ Human life satisfaction
        7-9 Billion .

⟶ Kill most of the humans

Thanos

2 PM   DHA submit
   1 PM

1. $y = x^2 - 2x + 1$ $\Rightarrow$ $\frac{dy}{dn} = 2x - 2 = 0$

$y_{min} = 0$ $\boxed{x = 1}$

2. $y = \sin(x)$ $\longrightarrow$ $\frac{d}{dn}(\sin(x)) = \cos(n) = 0$
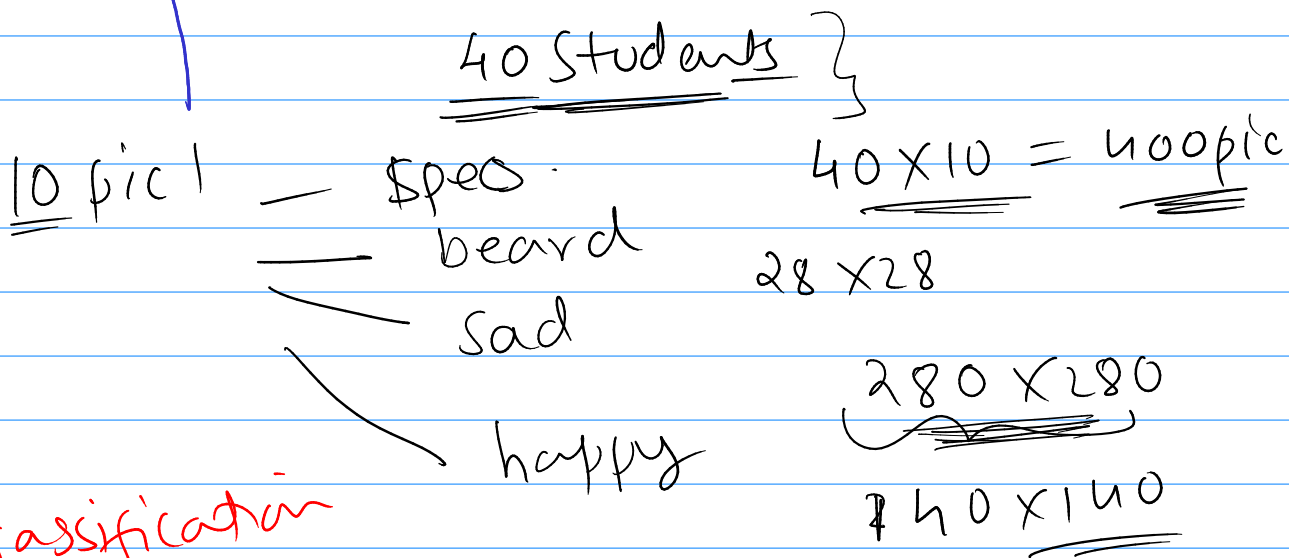
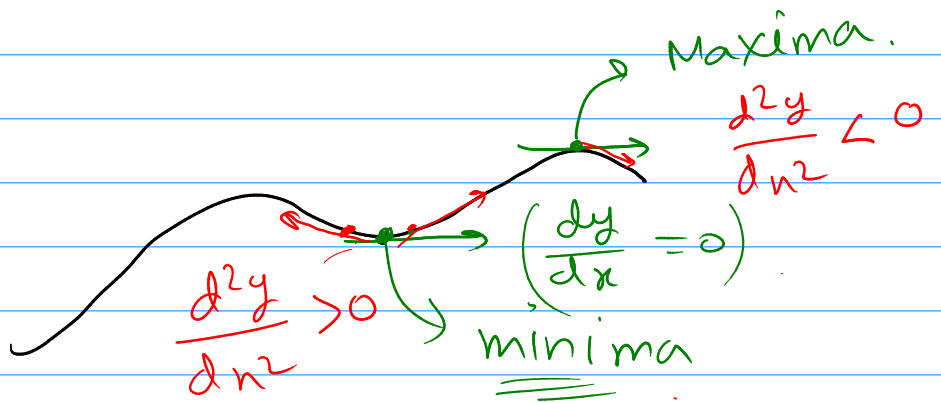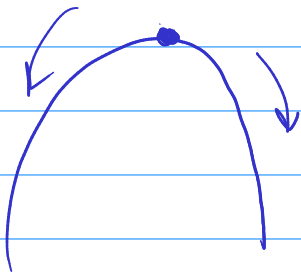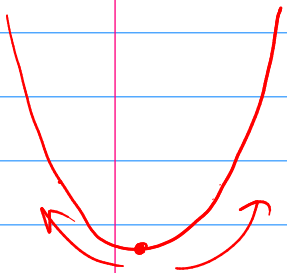$\Rightarrow$ $\cos(x) = 0$

$\hookrightarrow \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2} \cdots$

3. $y = xe^{-x}$ ✓

4. $y = x^3 + 3x^2 + 3x + 1$

$(2n+1)\frac{\pi}{2}$

5. $y = \cos(x)$

$\frac{d^2y}{dn^2} = -\sin(n)$

Maxima.

$\frac{d^2y}{dn^2} < 0$

$\frac{d^2y}{dn^2} > 0$

$\left(\frac{dy}{dx} = 0\right)$

minima

40 Students

$40 \times 10 = 400 \text{ pic}$

28×28

10 pic — Spec.
beard
sad

280×280

happy

740×140

$\Rightarrow$ Classification
Problem
$\hookrightarrow$ Multi class

$\nearrow$ Categorical —
= Cross entropy