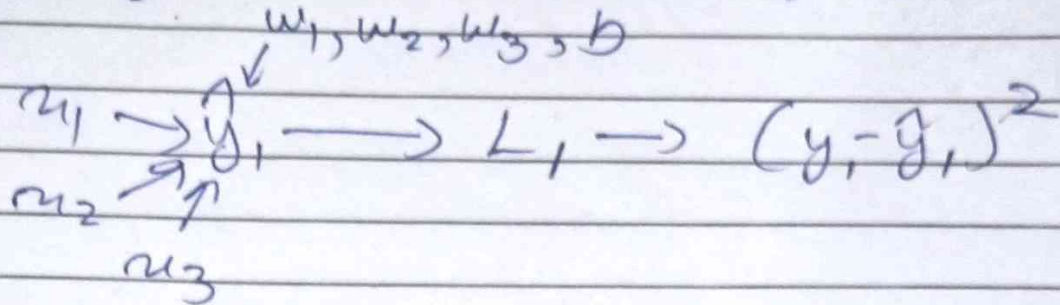


Stochastic G.D.

DATE

for ~~vector~~ Single record

$$\hat{y} = w_1 x_1 + w_2 x_2 + w_3 x_3 + b$$



$$\frac{\partial L_1}{\partial w_1} = \frac{\partial L_1}{\partial \hat{y}_1} \frac{\partial \hat{y}_1}{\partial w_1} = -2(y_1 - \hat{y}_1) \cdot x_1$$

$$\frac{\partial L_1}{\partial w_2} = \frac{\partial L_1}{\partial \hat{y}_1} \frac{\partial \hat{y}_1}{\partial w_2} = -2(y_1 - \hat{y}_1) \cdot x_2$$

$$\frac{\partial L_1}{\partial w_3} = \frac{\partial L_1}{\partial \hat{y}_1} \frac{\partial \hat{y}_1}{\partial w_3} = -2(y_1 - \hat{y}_1) \cdot x_3$$

$$\frac{\partial L_1}{\partial b} = \frac{\partial L_1}{\partial \hat{y}_1} \frac{\partial \hat{y}_1}{\partial b} = -2(y_1 - \hat{y}_1)$$

$\hookrightarrow 1$

$$\frac{\partial L}{\partial W} = -2(y_1 - \hat{y}_1) \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} \quad \frac{\partial L}{\partial b} = -2(y_1 - \hat{y}_1)$$

$W = \begin{bmatrix} w_1 \\ w_2 \\ w_3 \end{bmatrix}$

→ For Stochastic gradient calculate for each record and update weight & bias

$$w_i := w_{i-1} - \eta \frac{\partial L}{\partial w_i} \quad b := b_{i-1} - \eta \frac{\partial L}{\partial b}$$