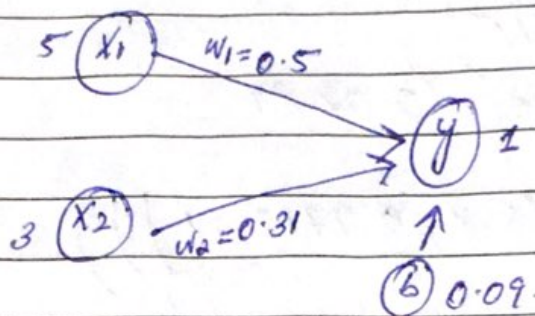Basil Ali Khan

20K-0477

Task #04

$$w_1 = 0.5 \qquad x_1 = 5 \qquad b = 0.09$$
$$w_2 = 0.31 \qquad x_2 = 3 \qquad y = 1.$$

Iteration #01:

$$y^\wedge = (5)(0.5) + (3)(0.31) + 0.09$$
$$= 3.5200$$

$$\sigma(y^\wedge) = \frac{1}{1+e^{-3.5}} = 0.9713$$

$$Loss = -\left(y \log(\sigma y^\wedge)) + (1-y) \log(\sigma y^\wedge)) \right)$$
$$= -\left(y \log(0.9713) + (1-1) \log(0.9713) \right)$$
$$= -\left((1)(-0.0292) \right)$$
$$= 0.292$$

$$w_1 = 0.5 - \left(0.01 \times (5 \times (0.9713 - 1)) \right)$$
$$w_1 = 0.5014$$
$$w_2 = 0.81 - \left(0.01 \times (3 \times (0.9713 - 1)) \right)$$
$$w_2 = 0.309$$
$$b = 0.09 - \left(0.01 \times (0.9713 - 1) \right)$$
$$b = 0.0903$$

Iteration #02 :

$$y^\wedge = 0.5014 \times 5 + 0.3109 \times 8 + 0.0903$$
$$y^\wedge = 3.5300$$
$$6(y^\wedge) = \frac{1}{1+e^{-3.58}} = 0.9715$$

$$Loss = - (y \log(8(y^\wedge)))$$
$$= - ((1) \log(0.9715))$$
$$= - (-0.0289) = 0.0289.$$

$$W_1 = 0.5014 - (0.01 \times (5 \times (0.9715 - 1)))$$
$$W_1 = 0.5029$$
$$W_2 = 0.3109 - (0.01 \times (8 \times (0.9715) - 1)))$$
$$W_2 = 0.3117$$
$$b = 0.0903 - (0.01 \times (0.9715 - 1))$$
$$b = 0.0906.$$

Iteration #03 :

$$y^\wedge = 0.5029 \times 5 + 0.3197 \times 8 + 0.0906.$$
$$y^\wedge = 3.5378$$
$$6(y^\wedge) = \frac{1}{1+e^{-3.5378}} = 0.9715$$

$$Loss = - (y \log(8(y^\wedge)))$$
$$= - ((1) \log(0.9718))$$
$$= - (-0.0287) = 0.0287.$$

$W_1 = 0.5029 - (0.01 \times (5 \times (0.9718 - 1)))$

$W_1 = 0.5043$

$W_2 = 0.3117 - (0.01 \times (8 \times (0.9718 - 1)))$

$W_2 = 0.3126$

$b = 0.0906 - (0.01 \times (0.9718 - 1))$

$b = 0.0909$

Iteration #04:

$y^1 = 0.5043 \times 5 + 0.3126 \times 8 + 0.0909$

$y^1 = 3.5502$

$\delta(y^1) = \dfrac{1}{1 + e^{-3.5502}} = 0.9721$

$Loss = - (y \log (\delta(y^1)))$

$= - ((1) \log (0.9721))$

$= - (-0.0283) = 0.0283$

$W_1 = 0.5043 - (0.01 \times (5 \times (0.9721 - 1)))$

$W_1 = 0.5057$

$W_2 = 0.3126 - (0.01 \times (3 \times (0.9721 - 1)))$

$W_2 = 0.3134$

$b = 0.0909 - (0.01 \times (0.9721 - 1))$

$b = 0.09121$

Iteration #05:

$y^1 = 0.5057 \times 5 + 0.3134 \times 8 + 0.09121$

$y^1 = 3.5598$

$$g(y^\wedge) = \frac{1}{1 + e^{-3.5598}} = 0.9723.$$

$$LOSS = -(y \log(y^\wedge))$$
$$= -((1) \log(0.9723))$$
$$= -(-0.0281) = 0.0281$$

$$W_1 = 0.5057 - (0.01 \times (5 \times (0.9723 - 1)))$$
$$W_1 = 0.5071$$
$$W_2 = 0.3134 - (0.01 \times (\overset{3}{0} \times (0.9723 - 1)))$$
$$W_2 = 0.3142.$$
$$b = 0.0911 - (0.01 \times (0.9723 - 1)))$$
$$b = 0.0914.$$

Results Matched!

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