

# ANN Assignment

17K41A0536.

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Ans!

ANN using adagrad optimizer.

Sigmoid activation function:

$$y = f(x) = \frac{1}{1 + e^{-(w \cdot x + b)}}$$

$$\Delta w^1 = (f(x) - y) * (f(x)) * (1 - f(x)) * x^1$$

$$\Delta w^2 = (f(x) - y) * f(x) * (1 - f(x)) * x^2 \dots$$

Adagrad!

$$v_t^w = v_{t-1}^w + (\Delta w_t)^2$$

$$w_{t+1} = w_t - \frac{\eta}{\sqrt{v_t^w + \epsilon}} * \Delta w_t$$

$$v_t^b = v_{t-1}^b + (\Delta b_t)^2$$

$$b_{t+1} = b_t - \frac{\eta}{\sqrt{v_t^b + \epsilon}} * \Delta b_t$$

Step!  
Note!

$$(x, y), \eta = 0.1, m=1, c=-1$$

$$\text{epoch} = 1 \quad G_m^r = G_e^r = 0, w=3.$$

20:  
Solution:

Step 1: Read dataset. Making required modifications in the dataset and splitting data into training & testing.

Step 2: Setting  $\eta = 0.1$ , epochs = 1,  $m = 1$ ,  $c = -1$ ,  $\lambda = 0.9$ ,  $V_m = 0$  and  $V_c = 0$ .

Step 3: Sigmoid function;  $f(x) = \frac{1}{1 + e^{-(wx \cdot b)}}$

Step 4: Initializing weights randomly, using random function.

Step 5: Then developing adagrad, algorithm<sup>optimizing</sup>.

Step 6: Constructing Artificial Neural network with one hidden layer.

Step 7: Developing algorithm for forward and backward propagation and also cross entropy.

Step 8: Calculating the accuracy.

Step 9: Calculating the result which are loads.