Group Homework Credit

Group K Task

*To be presented on April 3, 2024*

a) Assume the following subset of a neural network is given:

wA,B=0.2

ΔB=0.5

A B

Assume that B is an intermediate node of a neural network, the forward propagation activation values of nodes aA and aB are 0.5 and 0.8 and the current value of WA,B is 0.2; the associated error ΔB of node B that was computed by the back propagation algorithm is 0.4, the learning rate γ is assumed to be 0.5. First give the general weight update formula and then compute the new value of weight wA,B!

b) The step size in neural network learning depends—among other factors—on the gradient of the error function[[1]](#footnote-1); explain why this is important!

c) Take a look at the sub neural network consisting of nodes A, B, C, and D in the figure below; give a formula that computes the associated error ΔA for a node A. Assume the used activation function is g and its derivative is denoted by g’, and the activation of a node X is denoted by aX and the linear input of a node X is denoted by zX. First provide a general formula; then, replace general variables in the formula by their actual known values.

wA,B=0.2

ΔB=0.4

A B

wC**,A**=1 wD,A=0.5

C D

Remark: We will briefly discuss the above tasks in the April 1, 2024 lecture.

1. Also called loss or cost function in some textbooks. [↑](#footnote-ref-1)