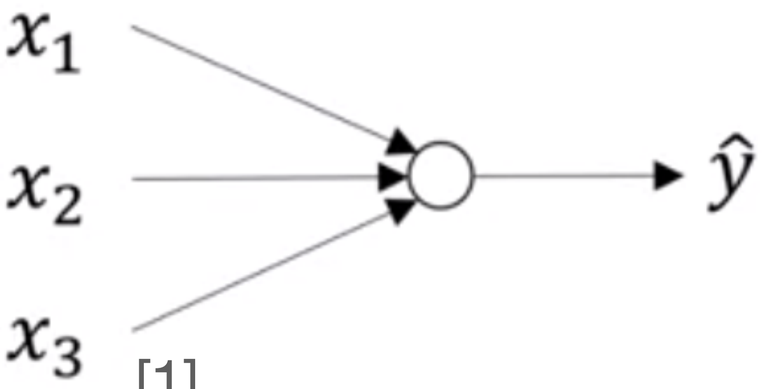
Neural Networks and Deep Learning

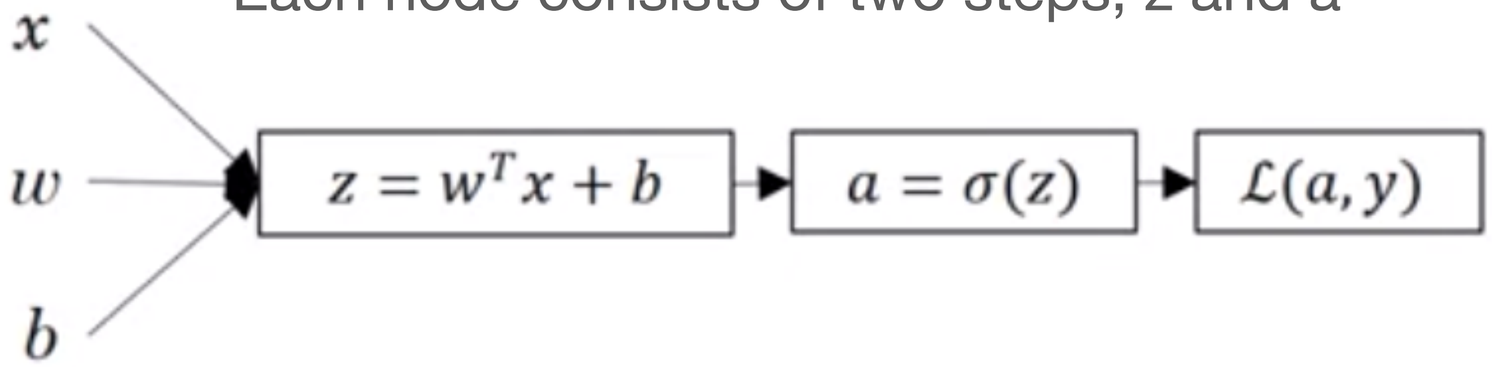
박달님 05.07.21

Neural Network Overview

Logistic Regression

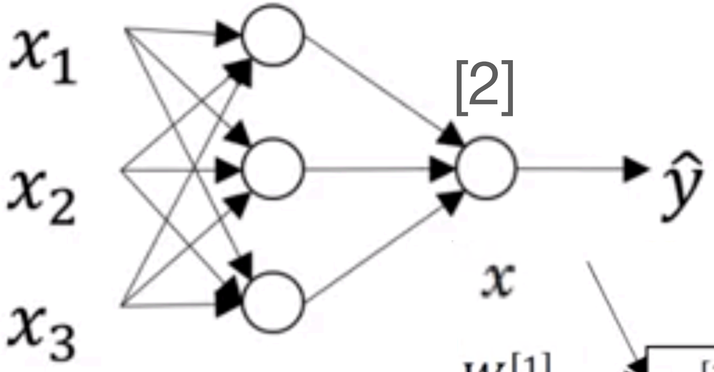


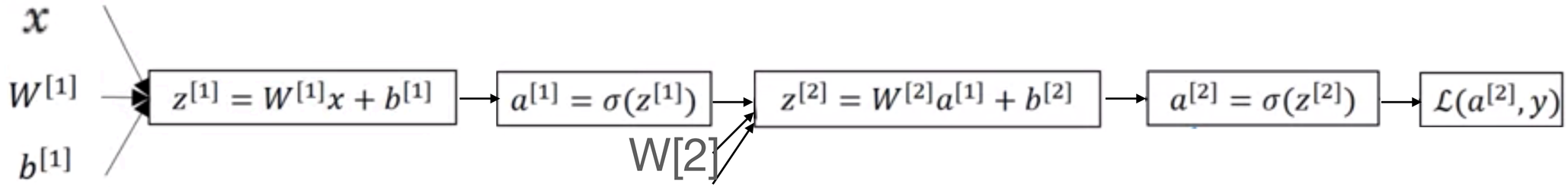
Each node consists of two steps, z and a



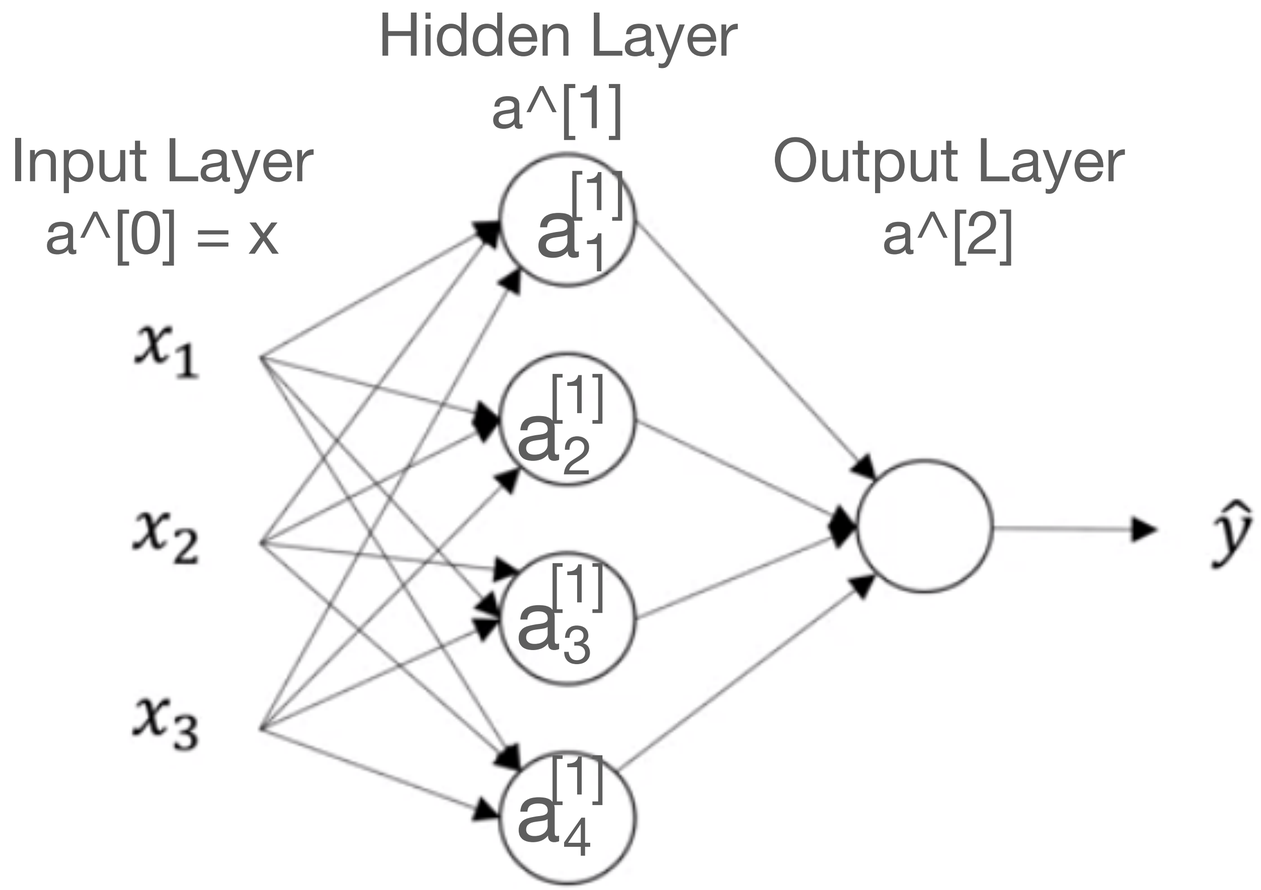
[1]

[2]

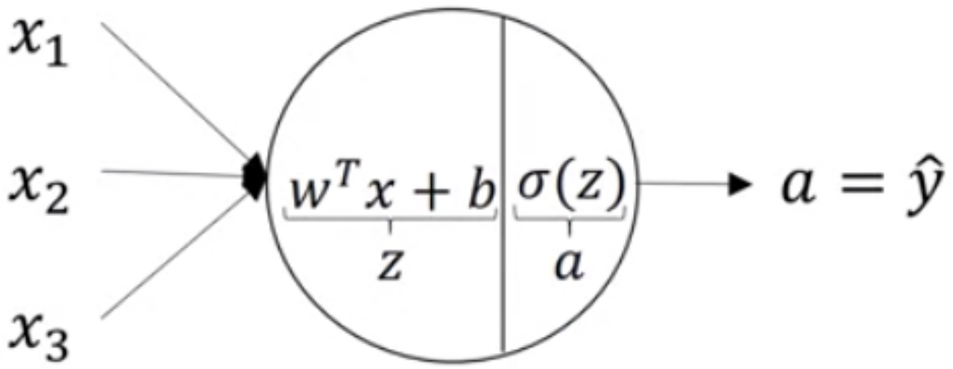




Neural Network Representation



Computing a Neural Network's Output



$$z = w^T x + b$$

$$a = \sigma(z)$$

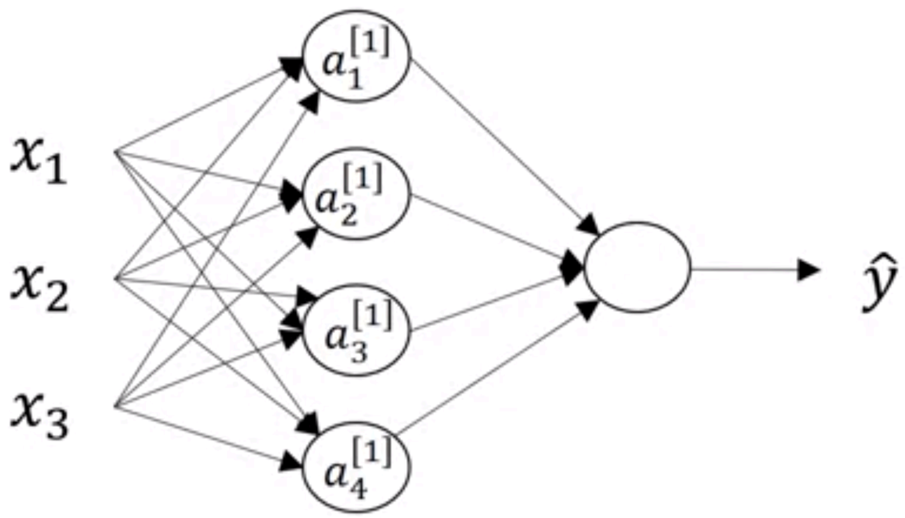
$$z^{[1]}_{2} = W^{[1]T}_{2} x + b^{[1]}_{2}$$

$$a^{[1]}_{2} = \sigma(z^{[1]}_{2})$$

1. Z의 값을 구함
2. Z의 시그모이드 함수로 activation function을 산출

신경망에서는 이 절차를 여러번 진행

Neural Network Representation



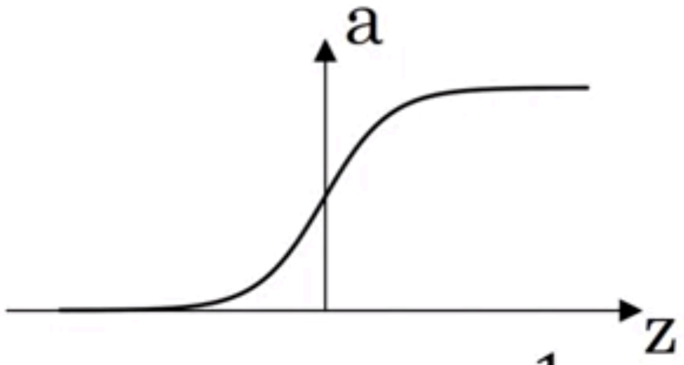
$$z_1^{[1]} = w_1^{[1]T} x + b_1^{[1]},\ a_1^{[1]} = \sigma(z_1^{[1]})$$

$$z_2^{[1]} = w_2^{[1]T} x + b_2^{[1]},\ a_2^{[1]} = \sigma(z_2^{[1]})$$

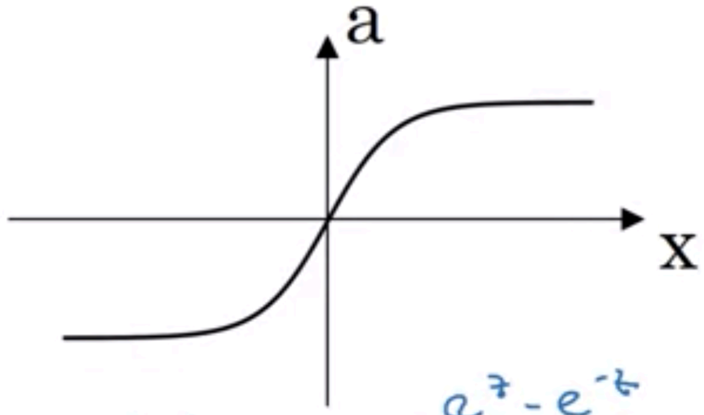
$$z_3^{[1]} = w_3^{[1]T} x + b_3^{[1]},\ a_3^{[1]} = \sigma(z_3^{[1]})$$

$$z_4^{[1]} = w_4^{[1]T} x + b_4^{[1]},\ a_4^{[1]} = \sigma(z_4^{[1]})$$

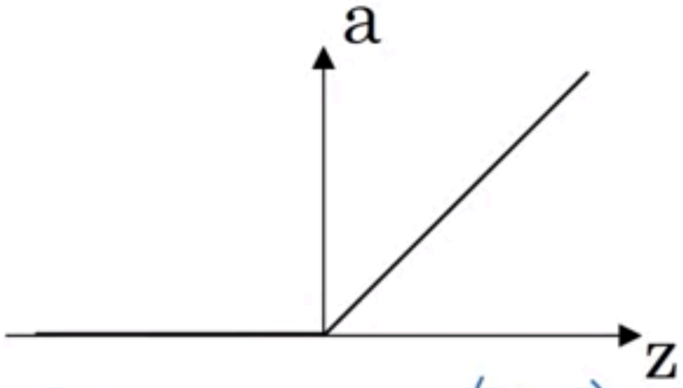
Activation Functions



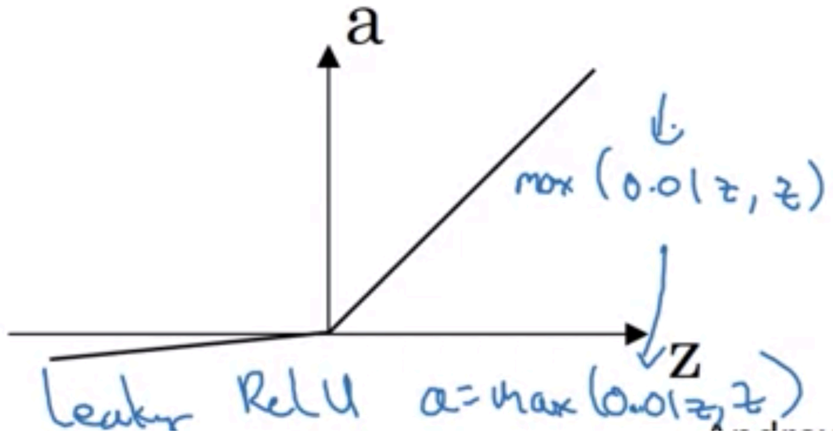
sigmoid: $a = \dfrac{1}{1+e^{-z}}$



tanh: $a = \dfrac{e^{z}-e^{-z}}{e^{z}+e^{z}}$



ReLU $a = \max(0, z)$



Leaky ReLU $a = \max(0.01z, z)$