

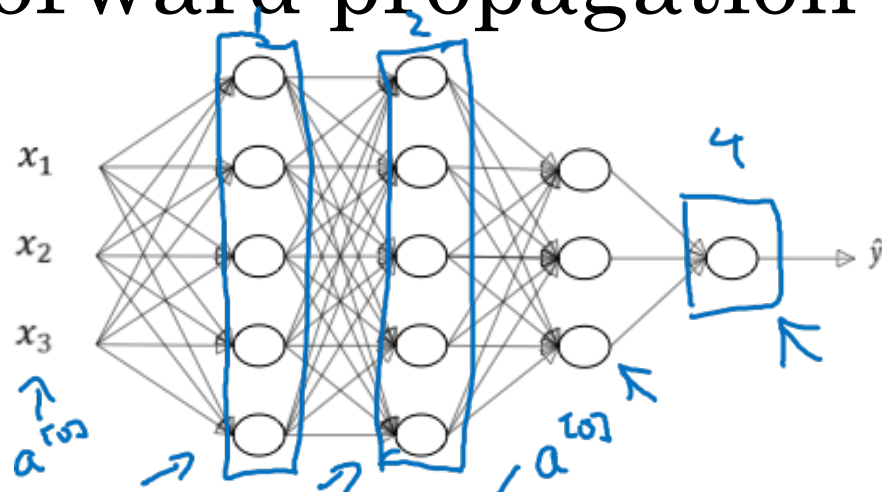


deeplearning.ai

Deep Neural Networks

Forward Propagation in a Deep Network

Forward propagation in a deep network



$$X : z^{[1]} = W^{[1]} a^{[0]} + b^{[1]}$$

$$a^{[1]} = g^{[1]}(z^{[1]})$$

$$z^{[2]} = W^{[2]} a^{[1]} + b^{[2]}$$

$$a^{[2]} = g^{[2]}(z^{[2]})$$

$$z^{[4]} = W^{[4]} a^{[3]} + b^{[4]}, a^{[4]} = g^{[4]}(z^{[4]}) = \hat{y}$$

$$\begin{aligned} z^{[l]} &= W^{[l]} A^{[l-1]} + b^{[l]} \\ A^{[l]} &= g^{[l]}(z^{[l]}) \end{aligned}$$

$A^{[0]} = X$

Vertical:

$$\begin{aligned} z^{[1]} &= W^{[1]} A^{[0]} + b^{[1]} \\ A^{[1]} &= g^{[1]}(z^{[1]}) \\ z^{[2]} &= W^{[2]} A^{[1]} + b^{[2]} \\ A^{[2]} &= g^{[2]}(z^{[2]}) \\ &\vdots \\ z^{[4]} &= W^{[4]} A^{[3]} + b^{[4]} \\ A^{[4]} &= g^{[4]}(z^{[4]}) = \hat{y} \end{aligned}$$

$\rightarrow X = A^{[0]}$
for $l=1 \dots 4$