No.

Date: / /

1 $a^{[l]} = \sigma(W^{[l]} a^{[l-1]} + b^{[l]}) \in \mathbb{R}^{n_l}$ for $l = 2, 3, \cdots, L$

$a^{[1]} = x \in \mathbb{R}^{n_1}$

$$\nabla a^{[L]}(x) = \frac{\partial a^{[L]}}{\partial x}$$

let $z^{[l]} = W^{[l]} a^{[l-1]} + b^{[l]}$

then
$$\frac{\partial a^{[L]}}{\partial x} = \frac{\partial a^{[L]}}{\partial z^{[L]}} \cdot \frac{\partial z^{[L]}}{\partial a^{[L-1]}} \cdots\cdots \frac{\partial z^{[2]}}{\partial a^{[1]}} \cdot \frac{\partial a^{[1]}}{\partial x}$$
$$= \mathrm{diag}(\sigma'(z^{[L]}))\, W^{[L]} \cdots \mathrm{diag}(\sigma'(z^{[2]}))\, W^{[2]}\, I.$$

Forward pass:

$a^{[1]} = x$

for $l = 2$ to L:

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

$a^{[l]} = \sigma(z^{[l]})$

Backward pass:

$J^{[1]} = I$

for $l = 2$ to L:

$J^{[l]} = \mathrm{diag}(\sigma'(z^{[l]}))\, W^{[l]} J^{[l-1]}$

return $\nabla a^{[L]} = J^{[L]}$