Densely Connected Neural Network (Backward Propagation)

$$a^{[2]} = \text{ReLU}(z^{[2]}) \longleftarrow z^{[2]} = \omega_2 a^{[1]} + b_2 \longleftarrow a^{[1]} = \text{ReLU}(z^{[1]}) \longleftarrow z^{[1]} = \omega_1 x + b_1 \longleftarrow x$$

$$\frac{\partial z^{[3]}}{\partial a^{[2]}} \longrightarrow \frac{\partial a^{[2]}}{\partial z^{[2]}} \longrightarrow \frac{\partial z^{[2]}}{\partial a^{[1]}} \longrightarrow \frac{\partial a^{[1]}}{\partial z^{[1]}} \longrightarrow \frac{\partial \text{Loss}}{\partial z^{[1]}}$$

$$z^{[3]} = \omega_3 a^{[2]} + b_3 \longrightarrow a^{[3]} = \text{ReLU}(z^{[3]}) \longrightarrow z^{[4]} = \omega_4 a^{[3]} + b_4 \longrightarrow \hat{y} = \sigma(z) \longrightarrow \text{Loss}$$

$$\text{Loss} = -\frac{1}{m}\sum_{1}^{m} y\log(\hat{y}) + (1-y)\log(1-\hat{y})$$

$$\frac{\partial a^{[3]}}{\partial z^{[3]}} \longleftarrow \frac{\partial z^{[4]}}{\partial a^{[3]}} \longleftarrow \frac{\partial \hat{y}}{\partial z^{[4]}} \longleftarrow \frac{\partial L}{\partial \hat{y}} \longleftarrow \text{Loss}$$