Joe
Kuhalla

$$\sum y^{(i)} \frac{\partial}{\partial \theta_j} h(x^{(i)}) + (1-y^{(i)}) \cdot \frac{1}{1-h_\theta(x^{(i)})} \frac{\partial}{\partial \theta_j} \cdot h_\theta(x^{(i)})$$

$$h_\theta(x) = g(\theta^T x) \quad \frac{\partial}{\partial \theta_j} h_\theta(x) = g'(z) \frac{\partial z}{\partial \theta_j}$$

$$(1) = \sum y^{(i)} g'(z^{(i)}) \frac{\partial z}{\partial \theta_j} + (1-y^{(i)}) \cdot \frac{1}{1-g(\theta^T x)} \cdot g'(z^{(i)}) \frac{\partial z}{\partial \theta_j}$$

Need to maximize so solve for θ

$$0 = \sum y^{(i)} g'(z^{(i)}) \frac{\partial z}{\partial \theta_j} + (1-y^{(i)}) \cdot \frac{1}{1-g(\theta^T x)} \cdot g'(z^{(i)}) \frac{\partial z}{\partial \theta_j}$$

$$\Rightarrow \theta_j := \theta_j + \alpha \frac{\partial}{\partial \theta_j} \ell(\theta) = \theta_j + \alpha (y^{(i)} - h(x^{(i)}) x_j^{(i)})$$