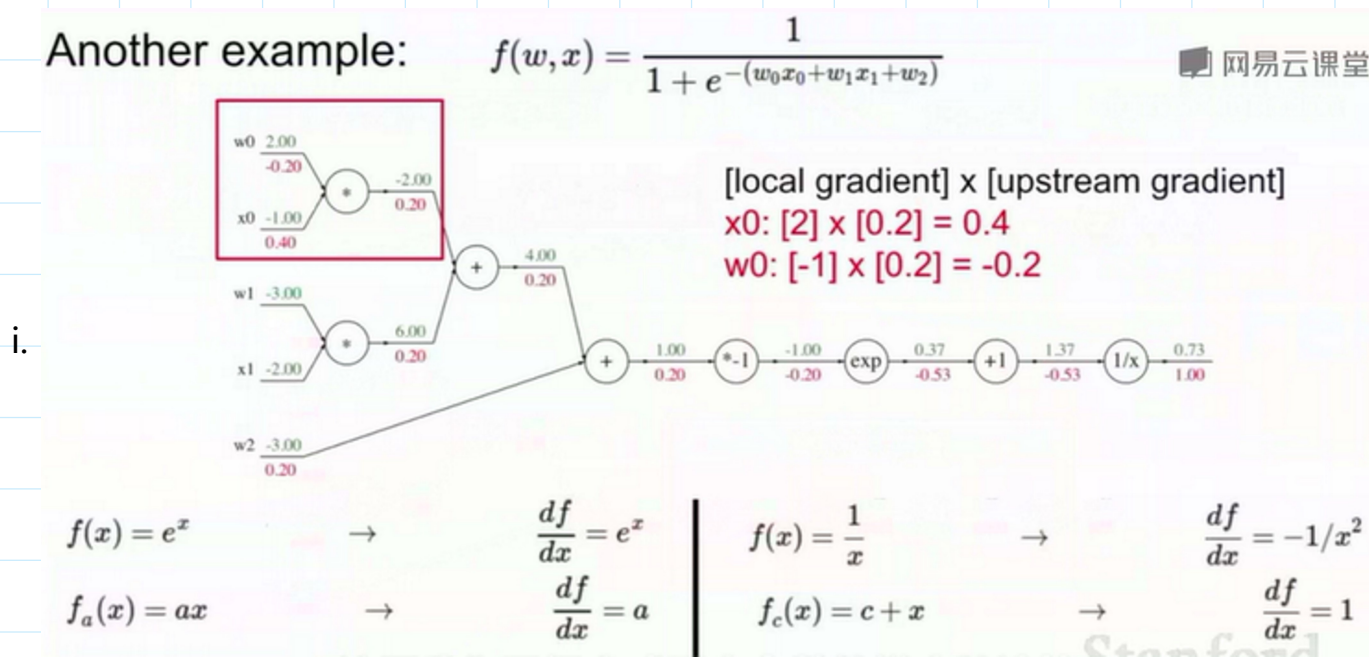


L4 反向传播和神经网络

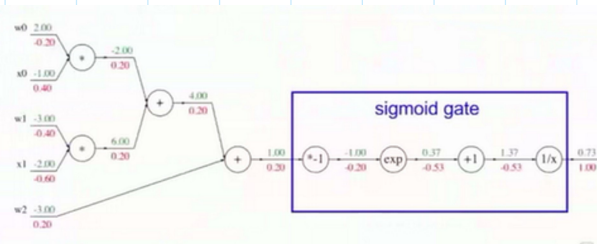
2020年3月29日 15:50

1. 反向传播

a. 计算图

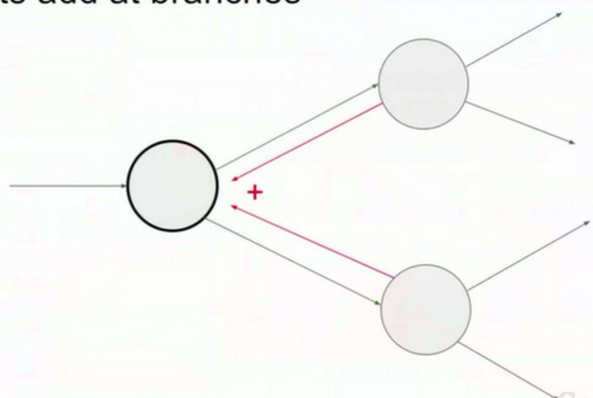


ii. 可以将多个计算节点整合为一个e.g.:



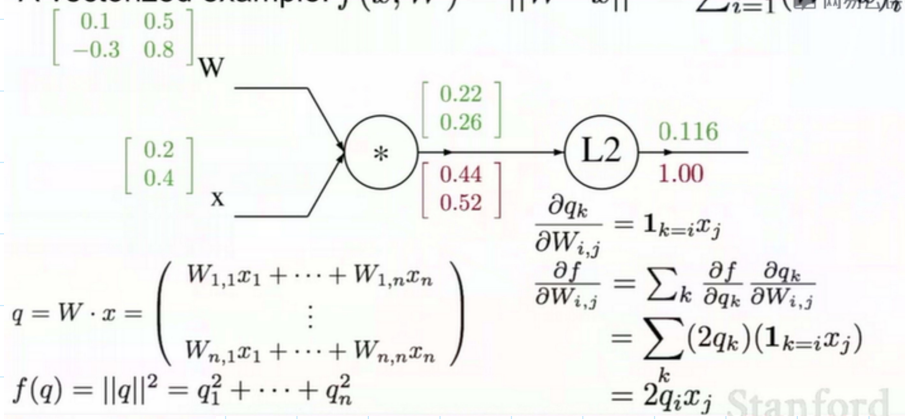
iii. 梯度回流

Gradients add at branches



iv. 向量梯度

A vectorized example: $f(x, W) = \|W \cdot x\|^2 = \sum_{i=1}^n (W_{i,1}x_1 + \dots + W_{i,n}x_n)^2$



$$\frac{\partial q_k}{\partial x_i} = W_{k,i}$$

$$\frac{\partial f}{\partial x_i} = \sum_k \frac{\partial f}{\partial q_k} \frac{\partial q_k}{\partial x_i} = \sum_k 2q_k W_{k,i}$$

其中 $\mathbf{1}_{k=i}$ 为指示函数

- b. 完整性检查：梯度向量应和变量大小相同
(同型矩阵)