Brief Article

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1 Feed Foward

Activation function

$$\phi(\mathbf{w}^T\mathbf{a}) = \frac{1}{1+\exp(-\mathbf{w}^T\mathbf{a})} \tag{1}$$

Feed Foward

$$s_j^{(1)} = \sum_i x_i w_{i\to j}^{(in\to 1)} \tag{2}$$

$$s_j^{(2)} = \sum_i f^{(1)}(s_i^{(1)}) w_{i\to j}^{(1\to 2)} s_j^{(2)} = \sum_i z_i^{(1)} w_{i\to j}^{(1\to 2)} \tag{3}$$

$$\begin{aligned} S^{(1)} &= XW^{(in\to 1)} \\ Z^{(1)} &= f_1(S^{(1)}) \\ S^{(2)} &= Z^{(1)}W^{(1\to 2)} \\ Z^{(2)} &= f_2(S^{(2)}) \\ \hat{y} &= f_{out}\left(Z^{(2)}W^{(2\to out)}\right) \end{aligned} \tag{4}$$

2 Back Propigation

$$\delta_j = f_j'(s_j) \sum_{k\in \text{outs}(j)} \delta_k w_{j\to k} \tag{5}$$

$$\begin{aligned} D^{(1)} &= F'^{(1)} \odot D^{(2)}W^{(1\to 2)} \\ D_{ij}^{(1)} &= F_{ij}'^{(1)} \sum_{k=1}^{b} D_{ik}^{(2)} W_{kj}^{(1\to 2)} \\ &= f_{ij}'^{(1)}(s_{ij}^{(1)}) \sum_{k\in \text{outs}(j)} \delta_{ik}^{(2)} w_{j\to k}^{(1\to 2)} \end{aligned} \tag{6}$$

2.1 A subsection

More text.