PROSEMINAR: DATA MINING

Neuronale Netze: Grundlagen

Lukas Krenz

12. Juni 2015

Technische Universität München

WAS SIND NEURONALE NETZE?

blablablablabla

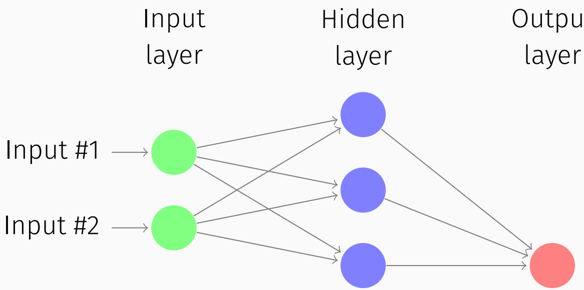
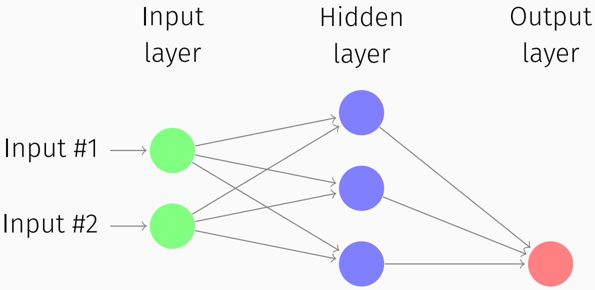


Abbildung 1: Ein 2-schichtiges MLP.

$$\sigma_1(x) = \frac{1}{1 + e^{-x}} \tag{1}$$

$$\sigma_2(x) = \tanh(x) = \frac{1 - e^{-2x}}{1 + e^{-2x}} \tag{2}$$

$$\sigma_3(x) = \max(0, x) \tag{3}$$



$$\mathrm{net}_j = \sum_i w_{ji} y_i = w_j^t x \tag{4}$$

$$y_j = \sigma(\mathrm{net}_j) \tag{5}$$

$$E = \sum_{k=1}^{K} \sum_{i=1}^{N} \left(y_i^k - t_i^k \right)^2 \tag{6}$$

$$= \sum_{n} E_n(y_1, \ldots, y_c) \tag{7}$$

$$\frac{\partial E^n}{\partial w_{ij}} = \frac{\partial E^n}{\partial net_j} \frac{\partial net_j}{\partial w_{ji}} \tag{8}$$

$$\frac{\partial net_j}{\partial w_{ji}} = y_i \quad \text{und} \tag{9}$$

$$\frac{\partial E^n}{\partial net_j} = \delta_j, \tag{10}$$

$$\frac{\partial E^n}{\partial w_{i,j}} = z_i * \delta_j. \tag{11}$$

$$\delta_j = \begin{cases} \sigma'(net_j)(y_j - \hat{y}_j) & \text{wenn j Ausgabeneuron ist} \\ \sigma'(net_j) \sum_k w_{kj} \delta_k & \text{wenn j verdecktes Neuron ist} \end{cases} \tag{12}$$

$$x_{n+1} = x_n - \eta \nabla F(x_n), \tag{13}$$

$$\Delta_w^t = -\eta \nabla_w E(w), \tag{14}$$

AUSBLICK

blablablablabla