

Neural Networks Cheatsheet

Maxim Lakin

1 Overview

1.1 Perceptron

Sigmoid activation output:

$$o_i = \frac{1}{1 + e^{-\sum_j w_{i,j} x_j + b_i}}$$

1.2 Backpropagation

Squared error:

$$E = \frac{1}{2} \sum_i (t_i - o_i)^2$$

Backpropagation:

$$\frac{\partial E}{\partial w_i} = \frac{\partial E}{\partial o_{l1}} \times \frac{\partial o_{l1}}{\partial o_{l2}} \times \dots \times \frac{\partial o_{li}}{\partial w_i}$$

Weights update:

$$w' = w - \eta \frac{\partial E}{\partial w}$$