Machine Learning Worksheet 8

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Problem 1

$$\nabla E(w) = \begin{pmatrix} \frac{\partial E(w)}{\partial w_1} \\ \vdots \\ \frac{\partial E(w)}{\partial w_d} \end{pmatrix}$$

with

$$\frac{\partial E(w)}{\partial w_i} = \frac{1}{m} \sum_{i=1}^{m} f'(z_i - wx_i)x_i + \gamma w_i$$

$$f'(x) = \begin{cases} x & |x| < 1 \\ sgn(x) & otherwise \end{cases}$$

Problem 2

To minimize the error or loss we have to find better values for the weights w. This is normaly not a convex problem so we have to use an incremental approach like steepest decent to propagate changes back through the network and adjusting the weights.

$$w_{i+1} = w_i - \alpha \nabla E(w) \tag{1}$$

α is the learing rate.