Formulas

Backpropagation output layer

$W23* = W23 - \eta\delta . A3$

$\delta = (y - Y)*y*(1-y)$

Backpropagation hidden layer

$Wn* = Wn - \eta(Et/Wn)$

Forward pass

1- $Z1 = (In1x\ W11)$
2- $A1 = f\ (Z1)$
3- $Z4 = (A1x\ W21)$
4- $y = f\ (Z4)$
5- $Etotal$ = sum(1/2 $(target - output)$^2)

Exercise

Forward pass

Z1 = I1*W11 + I2*W14 = -2.7788

Z2 = I1*W12 + I2*W15 = -1.241

Z3 = I1*W13 + I2*W16 = 1.3835

$Sigmoid$ = 1/(1 + e^$-Z1$)

A1 = 0.0585

A2 = 0.2243

A3 = 0.7996

Z4 = A1*W21 + A22*W22 + A3*W23 = 1.6238

y = 0.8353

E = 0.0036

Backpropagation

$\delta = 0.011735$

$w21* = w21 - 0.5* \delta*A1 = 0.1097$

$w22* = w22 - 0.5* \delta*A2 = 2.2187$

$w23* = w23 - 0.5* \delta*A3 = 1.3953$

$w11* = w11 - 0.5(E/w11) = -3.5995$

$w12^* = w12 - 0.5(E/w12) = 1.4988$

$w13^* = w13 - 0.5(E/w13) = 0.9882$

$w14^* = w14 - 0.5(E/w14) = -1.2285$

$w15^* = w15 - 0.5(E/w15) = -3.5995$

$w16^* = w16 - 0.5(E/w16) = 1.3987$

Forward pass

Z1 = I1*W11 + I2*W14 = -2.7777

Z2 = I1*W12 + I2*W15 = -1.2414

Z3 = I1*W13 + I2*W16 = 1.3817

$Sigmoid$ = 1/(1 + e^−$Z1$)

A1 = 0.0585

A2 = 0.2242

A3 = 0.7993

Z4 = A1*W21 + A22*W22 + A3*W23 = 1.6191

y = 0.8347

E = 0.003587