

Foundations of Artificial Intelligence

Exercise Sheet 11

Riccardo Salvalaggio

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1 Multi Layer Perceptron

1.1 a)

$$\text{inh1} = i1*w1 + i2*w2 + b1 = 1*0.5 + 2*0.25 + 0.4 = 1.4$$
$$\text{outh1} = 1/(1+e^{-1.4}) = 0.8022$$

$$\text{inh2} = i1*w4 + i2*w3 + b1 = 1*1 + 2*1.5 + 0.4 = 4.4$$
$$\text{outh2} = 1/(1+e^{-4.4}) = 0.9878$$

$$o1 = \text{outh1}*w5 + \text{outh2}*w6 + b2 = 2.8963$$
$$\text{outo1} = 1/(1+e^{-2.8963}) = 0.9477$$

$$o2 = \text{outh1}*w8 + \text{outh2}*w7 + b2 = 1.97278$$
$$\text{outo2} = 1/(1+e^{-1.97278}) = 0.87791$$

1.2 b)

$$\text{MSE} = 1/2 * ((o1 - \text{outo1})^2 + (o2 - \text{outo2})^2)$$
$$\text{MSE} = 1/2 * ((2.0 - 0.9477)^2 + (4.0 - 0.87791)^2)$$
$$\text{MSE} = 5.4273$$

2 2 (Convolutional Neural Network)