Foundations of Artificial Intelligence

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Summer Term 2021

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Exercise Sheet 11

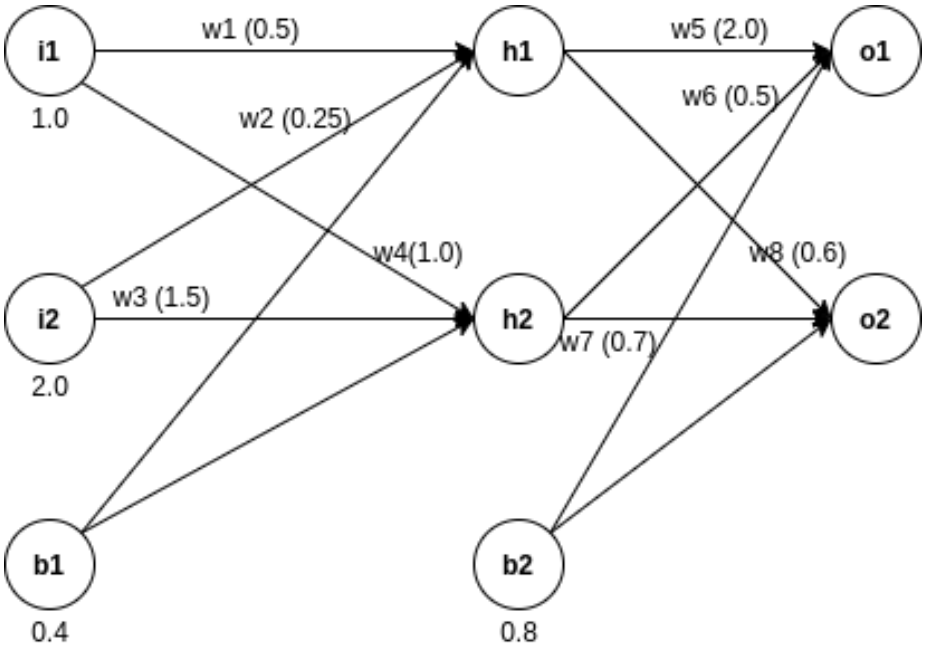
Due: Friday, July 16, 2021

Exercise 11.1 (Multi Layer Perceptron)

Given below is a structure of a multilayer perceptron with 2 inputs (i1 and i2), 2 hidden layers (h1 and h2), biases(b1 and b2) and one output layer(o). Each hidden and output layer output is activated using logistic sigmoid activation function:. :

a) Perform one forward pass with the values of parameters depicted with every variable in the network and calculate the outputs(o1,o2).

b) Calculate the mean square error given value of outputs (o1,o2) as (2.0,4.0).



Exercise 11.2 (Convolutional Neural Network)

Given below is a sequence of operations in a small convolutional neural network(CNN) which takes input of shape (48 x 48 x 3). Calculate the output size and number of trainable paramters after each layer of the network.

conv1 and conv2 are the convolutional layers with given filter size f , stride s and output feature size o.

layer	**shape**	**parameters**
Input	(48,48,3)	0
conv1(f=3,s=1,o=8)		
conv2(f=5,s=1,o=16)		

Note: The exercise sheets may be worked on in groups of up to three students.