UNIVERSITY OF LINCOLN

CMP9137M Advanced Machine Learning
Workshop 1: Feedforward Neural Networks

https://attendance.lincoln.ac.uk

Access Code:

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Practice: workshop 1

The aim of this workshop is to gain practical experience with Feedforward Neural Networks. To achieve that, the following tasks are recommended:

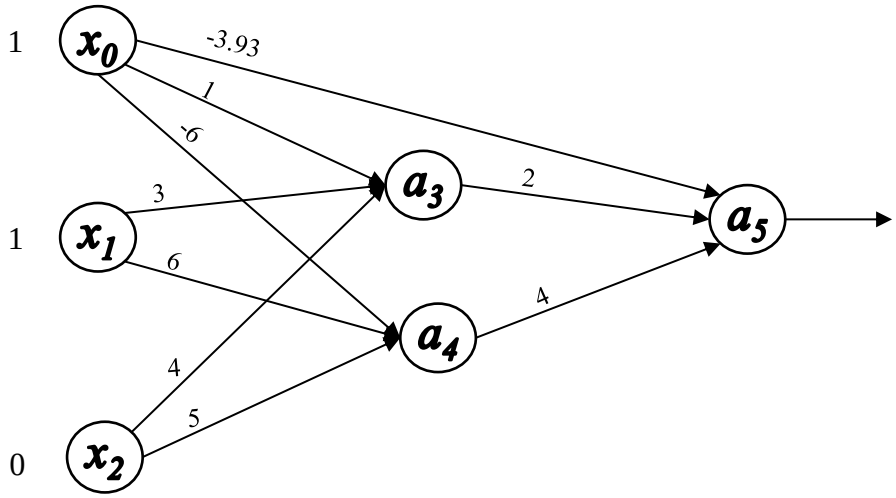
Tasks:

1. Using the Backpropagation example discussed during the lecture and extend it to the MLP to generate the 1st and 2nd passes of the Forward and Backward procedures.

2. Homework: write your own program of the Backpropagation procedure above and train your neural net until convergence

3. Run the MLP_with_MNIST.ipynb program, available under the workshop materials of week 1 in Blackboard, and try diffident amounts of hidden nodes and hidden layers.

Practice: workshop



Input patterns: $x_1 = 1$, $x_2 = 0$

Bias input: $x_0 = 1$

Weights: $w_{13} = 3$, $w_{14} = 6$, $w_{03} = 1$, $w_{04} = -6$, $w_{23} = 4$, $w_{24} = 5$, $w_{05} = -3.93$, $w_{35} = 2$, $w_{45} = 4$

Unit output:

$$y_j = f(a_j) = \frac{1}{1+e^{-a_j}}$$

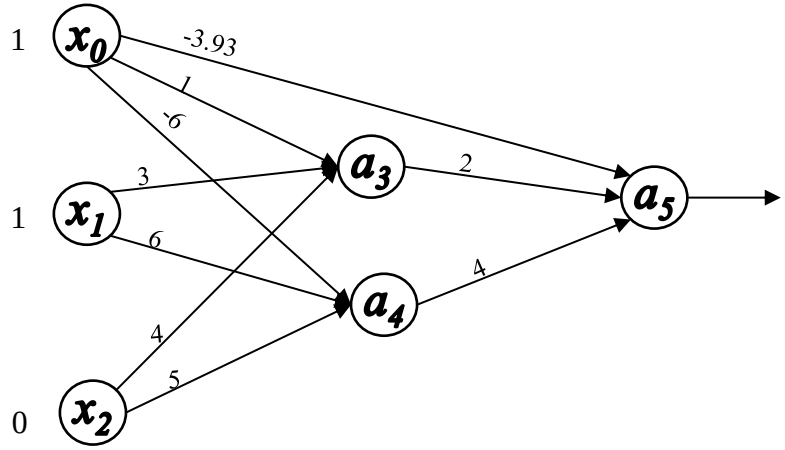
Combined input:

$$a_j = \sum_i w_{ij} \cdot x_i$$

Target output: $y_{target} = 1$

[1] use a learning rate of 0.1

Practice: workshop



Backward Passes:

Weight	Initial Value	Backward Pass 1	Backward Pass 2
w_{45}	4		
w_{35}	2		
w_{05}	-3.93		
w_{03}	1		
w_{04}	-6		
w_{13}	3		
w_{14}	6		
w_{23}	4		
w_{24}	5		

- Forward Passes:
- I error in pass 1=
- I error in pass 2=