*6CCS3ML1 (Machine Learning)*

# *Tutorial 06*

(Version 1.2)

1. Consider the following set of training data:

| $x_1$ | $x_2$ | desired output |
|---|---|---|
| 1 | 2 | 1 |
| 3 | 1 | 0 |
| 1 | 1 | 1 |
| 2 | 0 | 0 |

   Compute the results of using the error-correction method on these examples.

   Your perceptron should have initial weights $w_1 = 1$ and $w_2 = 2$, and should use the step function:

$$g(s) = \begin{cases} 1, & \text{if } s \geq 0 \\ 0, & \text{otherwise} \end{cases}$$

   Use a learning rate of $0.5$ and train for one epoch.

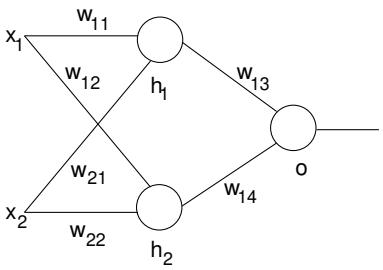
2. Train the same perceptron for one epoch using the delta rule and stochastic gradient descent.

3. Train the same perceptron for one epoch using the generalised delta rule and stochastic gradient descent.

   For this you will need to use the sigmoid transfer function:

$$g(s) = \frac{1}{(1 + e^{-s})}$$

4. Now consider the neural network:




   Using the same examples as before, train the neural network for one epoch.

   Set all the weights to 1 initially and use a learning rate of 0.5.

## Version list

- Version 1.0, January 30th 2020.
- Version 1.1, February 4th 2021.
- Version 1.2, February 25th 2021.
  - Fixed function in Question 1 (g(s) instead of g(x)).