

COMP3411 Tutorial - Week 5

Neural Nets and Computer Vision

2023

Question 1

- a) Construct by hand a Perceptron which correctly classifies the following data; use your knowledge of plane geometry to choose appropriate values for the weights w_0 , w_1 and w_2 .

Training Example	x_1	x_2	Class
a.	0	1	-1
b.	2	0	-1
c.	1	1	+1

- b) Demonstrate the Perceptron Learning Algorithm on the above data, using a learning rate of 1.0 and initial weight values of

$$w_0 = -2.5$$

$$w_1 = 0$$

$$w_2 = -1$$

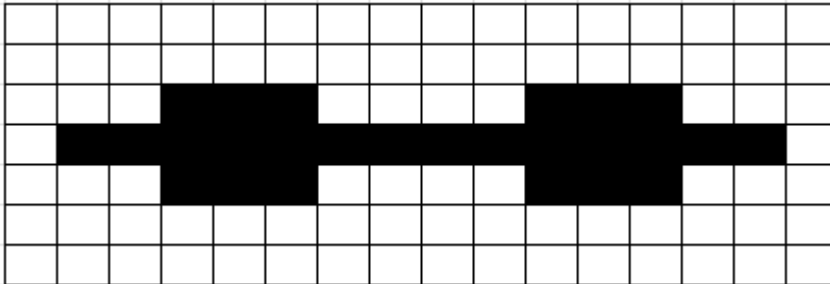
Question 2

Explain how each of the following could be constructed:

1. Perceptron to compute the OR function of m inputs.
2. Perceptron to compute the AND function of n inputs
3. 2-Layer Neural Network to compute any (given) logical expression, assuming it is written in Conjunctive Normal Form.

Question 3

Consider the binary image with dimension 7x16 shown below:



Use the averaging method with a threshold $\epsilon = 3$ and a 3x3 sliding windows. Show the resulting image.