

24-787: Machine Learning and Artificial Intelligence for Engineers

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Homework 7

Due: Mar 16, 2024

Concept Questions:

Problem 1

$$x = [1, -6, 10, 8, -2, 3] ; \quad w = [7, -2, -4, 5, 2, -6]$$

$$a = (1 \cdot 7) + (-6 \cdot -2) + (10 \cdot -4) + (8 \cdot 5) + (-2 \cdot 2) + (3 \cdot -6)$$

$$a = 7 + 12 - 40 + 40 - 4 - 18 \rightarrow a = -3$$

$$y = f(a) = \frac{1}{1 + e^{-a}} = \frac{1}{1 + e^3} \cong 0.0474 \#$$

Problem 2

$$W_3 = \begin{bmatrix} 10 & -3 \\ 16 & 9 \\ 12 & -7 \end{bmatrix}$$

Problem 3

The softmax activation function is used in the output layer for multi-class classification problems to produce a probability distribution over multiple classes.

Problem 4

All of the above.