

Homework 0

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1 Python Requirements

See versions.py and pythonVersionProof.png.

2 GitHub Requirements

Git Hub username: brian-henderson

Repository link: <https://github.com/brian-henderson/DeepLearning-w-TensorFlow>

See GitHubCollaboratorProof.png for adding collaborator proof.

3 Kaggle Requirements

Kaggle username: brianhenderson

See kaggleAccountProof.png for proof.

4 Problems

4.1

Find the value of x that maximizes $g(x)$

$$g(x) = -3x^2 + 24x = 30$$

$$-6x + 24 = 0$$

$$24 = 6x$$

$$x = 4$$

4.2

Consider the following function, find the partial derivatives of $f(x)$ with respect to x_0x_1

$$f(x) = -3x_0^3 - 2x_0x_1^2 + 4x_1 - 8$$

First step is to apply the sum/difference rule.

$$= \frac{du}{dt}(3x_0^3) - \frac{du}{dt}(2x_0x_1^2) + \frac{du}{dt}(4x_1) - \frac{du}{dt}(8)$$

Then, simplify. In order to simplify, take the derivative for each number, take the constant out, if needed ($\frac{du}{dt}(3x_0^3)$ and $\frac{du}{dt}(2x_0x_1^2)$) apply the Power Rule to simplify even further. Simplified Result:

$$= 9x^2 - 4x_0x$$

4.3

(a) It is not possible to multiply the two matrices because the number of columns in matrix A is not equal to the number of rows in matrix B.

(b) See problem3.py for python code. The first step is finding the transpose of matrix A:

$$\begin{bmatrix} 1 & 2 \\ 4 & 1 \\ -3 & 3 \end{bmatrix}$$

Second step is multiplying the matrices together, which we can do now since the number of columns in A match the number of rows in B.

$$\begin{bmatrix} -2 & -2 & 13 \\ -8 & 1 & 16 \\ 6 & -3 & -3 \end{bmatrix}$$

Calculating the rank involves transforming the matrix to its row echolon form and counting the number of non-zero rows. This matrix has a rank of 2.

(c) Undergraduate student.

4.4

Suppose that random variable $X \sim N(2,3)$. What is the expected value of X ?

$$P(x = 2) = 1/2$$

$$P(x = 3) = 1/2$$

$$E(x) = (2 * (1/2)) + (3 * (1/2))$$

$$E(x) = 2.5$$