Fall 2020: CSCI 4/5588 Written Homework # 1

DUE: Monday, Nov/02/2020 (Submit softcopy by 2 PM via Moodle).

Instructions

- All work must be your own. You are NOT to work in a team on this assignment.
- Format: Except for drawing, for the **typed** answer, you will get **10 bonus** points.
- Submit as a single compressed file (via Moodle) containing an MS-word or a PDF
- The top/cover page should have the title, "Fall 2020: CSCI 4/5588 Written Homework # 1" and "Name: _____ and ID:_____
- Save (all) the file name(s) as HW1_<Your_name>
- Total Marks: **100** + Bonus (**10**) = **110.**

Description: The assignment has the following two parts:

PART (A) [points: 20]

Task #1: Draw the graphs of a sigmoid function $f_{sig}(x) = \frac{1}{1+e^{-x}}$ and a hyperbolic tangent function $f_{\tanh}(x) = \frac{e^{x}-e^{-x}}{e^{x}+e^{-x}}$, overlapping each other, with an *x*-axis ranging from -6 to +6. Describe the differences between them.

PART (B) [points: 80]

Task #2: In chapter 04 (ANN) from pages 10 to 13, we have derived equations from (*i*) to (*vi*) for **backpropagation** where we assumed our activation function was a *sigmoid function*. Now, in this assignment, similarly, workout the ***detailed derivation*** and show the new form of the equations: (*i*) to (*vi*) (if any) when the activation function is assumed to be a hyperbolic tangent function, that is: $\tanh(x) = \frac{e^{x}-e^{-x}}{e^{x}+e^{-x}}$, where *x* is a variable.

Note again, your **detailed** answer is expected.

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