







ECE 5831 - Lecture 04 - 9/26/2022



Assignment 4



ECE-5831-001 / ECE-5831-002 (202310) > Mediasite Channel





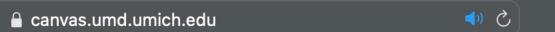






Activation	Functions
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Activation function	Equation	Example	1D Graph
Unit step (Heaviside)	$\phi(z) = \begin{cases} 0, & z < 0, \\ 0.5, & z = 0, \\ 1, & z > 0, \end{cases}$	Perceptron variant	
Sign (Signum)	$\phi(z) = \begin{cases} -1, & z < 0, \\ 0, & z = 0, \\ 1, & z > 0, \end{cases}$	Perceptron variant	
Linear	$\phi(z) = z$	Adaline, linear regression	
Piece-wise linear	$\phi(z) = \begin{cases} 1, & z \ge \frac{1}{2}, \\ z + \frac{1}{2}, & -\frac{1}{2} < z < \frac{1}{2}, \\ 0, & z \le -\frac{1}{2}, \end{cases}$	Support vector machine	
Logistic (sigmoid)	$\phi(z) = \frac{1}{1 + e^{-z}}$	Logistic regression, Multi-layer NN	-
Hyperbolic tangent	$\phi(z) = \frac{e^z - e^{-z}}{e^z + e^{-z}}$	Multi-layer Neural Networks	
Rectifier, ReLU (Rectified Linear Unit)	$\phi(z) = \max(0,z)$	Multi-layer Neural Networks	
Rectifier, softplus		Multi-layer	1/



















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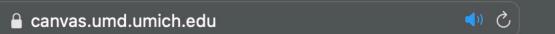


Activation Functions	Acti	vati	on	Fur	ncti	ons
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Rectifier, softplus Copyright © Sebastian Raschka 2016 (http://sebastianraschka.com)	$\phi(z) = \ln(1 + e^z)$	Multi-layer Neural Networks	















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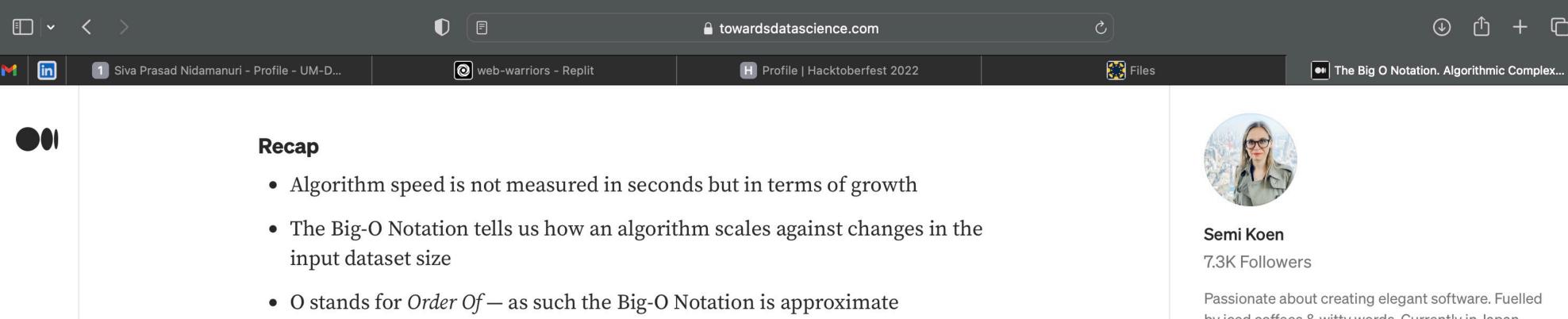
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Activation Functions

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Rectifier, softplus Copyright © Sebastian Raschka 2016 (http://sebastianraschka.com)	$\phi(z) = \ln(1 + e^z)$	Multi-layer Neural Networks	









Further Resources

• If you would like to dig deeper into the Maths behind Big-O, take a look at this free Coursera course from Stanford University.

• Algorithm running times grow at different rates:

- The Big-O Cheat Sheet
- My Cheat Sheet:

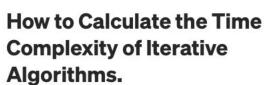
by iced coffees & witty words. Currently in Japan. Opinions are my own; often flawed





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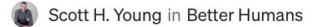


Knowable

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3 Common Bug Sources and How to Avoid Them

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