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Research Assessment #9

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Subject: An introduction to implementation of neural networks programmatically

MLA citation(s):

Shiffman, Daniel. "Chapter 10: Neural Networks." *The Nature of Code*, Daniel Shiffman, 2012, <https://natureofcode.com/book/chapter-10-neural-networks/>.

Assessment:

In the past week, I have been trying to move into the implementation of machine learning as I now have a general idea of the different machine learning algorithms and their functions. I was specifically interested in creating neural networks that could facilitate computer vision and natural language processing. Thus, I focused on the programming that could create neural networks and learned about some of the general implementations of several algorithms. I found a book, "Nature of Code", and was particularly interested in chapter 10, "Neural Networks." This article helped me learn about the most basic neural network algorithm and I was able to gain exposure to how some of the programming implementations of a neural network could look like.

After reading the article and understanding the information about program implementation of neural networks and particularly taking a deep dive on the basic algorithm of neural networks encompassing a single neuron also known as the perceptron. I was able to gain knowledge about each of the steps on the programmatic implementation for a perceptron: Obtain

each input and multiply it by its weight, get the sum of all weighted inputs, add a bias for special inputs, compute the output through an activation function, measure the error from the real value and predicted value, change the weights accordingly, and repeat till error is minimized (Shiffman pp. 7-12). Furthermore, I was able to make connections among each of these topics as I was able to view the actual program implementations in Python that enabled the model to make successful predictions. With this knowledge of the specific lines of code that could create a simple neural network model, I was able to take a deep dive on creating a single neuron and have obtained a practical example that can help me create my own model. I still wonder what are the other neural network algorithms and how they function to understand programmatic implementation for computer vision and natural language processing in the future.

This also connects with my current knowledge of neural networks as I already know the basics and terms of neural networks such as activation functions, nodes, and how input and output of a neuron works. I was also able to connect what I learned today to my existing programming knowledge of functions and variables and thus was easily able to understand how the implementation worked. Furthermore, now that I have gained insight on the most basic neural network algorithm, the perceptron which consists of a single neuron, I have a plan to study more programmatic implementations and tutorials over various neural network algorithms that are more complex and helpful for topics such as computer vision and natural language processing (NLP).

I continue to strive to learn to explore the field of natural language processing and computer vision as this has helped me finally start the learning process for implementation of neural networks and start the development of a model that could create computer vision or natural language processing technology for my original work. I will continue to learn about the

practical implementations of neural networks. This will allow me to achieve my goal of successfully implementing machine learning, more specifically deep learning and computer vision/natural language processing into real life applications in the future.