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Research Assessment #10

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Subject: Convolutional Neural Networks

MLA citation(s):

Mandal, Manav. "CNN for Deep Learning: Convolutional Neural Networks." *Analytics Vidhya*, Analytics Vidhya, 1 May 2021, www.analyticsvidhya.com/blog/2021/05/convolutional-neural-networks-cnn/.

Assessment:

In the past week, I have started the implementation of machine learning as I now have learned most of the theory behind some of the most popular and useful algorithms such as linear regression, logistic regression, and neural networks. I was specifically interested in creating neural networks that could facilitate computer vision and natural language processing. Thus, I focused on the programming and specific neural network algorithms that could facilitate natural language processing and computer vision. I found an article, "CNN for Deep Learning: Convolutional Neural Networks.", which went over convolutional neural networks and the theory behind them and their functions in computer vision. This article helped me learn about convolutional neural networks and what they exactly do to make computer vision possible. I also now want to explore more algorithms and start programming them as a part of my original work and final product.

After reading the article and understanding the information about convolutional neural networks and particularly took a deep dive on the steps convolutional neural networks use to facilitate computer vision. I was able to gain knowledge about theory of convolutional neural networks: The first layer in the neural network scans for basic structures such as horizontal and diagonal edges, then, the second layer analyzes corners and combinational features, afterwards, the third layer identifies different objects as it keeps on adding complexity, and lastly, after the final activation layer, the classification outputs a probability that can signify a particular “class” (object, thing, or person) (Mandal pp. 4-5). Furthermore, I was able to make connections among each of these topics as I had background knowledge on convolutional neural networks and how they use each pixel and narrow them down into smaller, easily classifiable data. I also learned about the concept of pooling, specifically max pooling and average pooling, where max pooling draws on the specific RGB (Red, Green, Blue) values of sets of pixels and transforms them into one pixel by using the maximum number in those sets, while average pooling takes in the average RGB values of sets of pixels (Mandal 6). Moreover, pooling is the actual process that narrows the entire image into smaller, classifiable data. With this knowledge of convolutional neural networks, I hope to start the program implementation for convolutional networks and create computer vision projects for my original work and final product. I still wonder what the other neural network algorithms are and how they function to better understand programmatic implementation for computer vision and natural language processing in the future.

I continue to strive to explore the other types of neural network algorithms that facilitate natural language processing and computer vision as this has helped me finally more about the theory of neural networks and will strongly aide me as I do implementation of machine learning models 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.