

2a. The computational innovation I chose to be represented in my artifact is Machine Learning(ML). Machine Learning is a way of programming to give a computer the ability to learn something without directly being programmed to do that thing. The artifact begins with showing an illustration and a diagram that show how a deep neural network trains on a specific dataset for input and compares its predictions to its test set. The diagram contains the different layers of input, processing, and output. The bottom portion shows the statistics of Machine Learning's use and several different applications that Machine Learning is used for.

2b. I used a Google-Drive program called Google-draw to create my artifact. I started by splitting it into different regions to work with, one for illustrations on how it works, one for statistics on the use, and one for a list of a few different applications. I then found images on the internet that fit what I wanted to have as the diagrams, to show how it works. I then added text to label the diagrams and to list the applications. I then located graphs that demonstrate the use of Machine Learning in different areas and an example of a learning curve.

2c. One beneficial effect of Machine Learning is that it can be used in a variety of fields, from self-driving cars to facial recognition. Many areas could be simplified by using Machine Learning. Image classification for example, instead of sorting images by hand you could write a machine learning program to do it for you based on the content within each image. Another example is genetic algorithms. Genetic algorithms can be used for many things like, Audio watermark insertion, RNA structure prediction, multidimensional sphere stacking, etcetera. Another great use of Machine Learning is One harmful effect is that it learns from datasets and if the dataset that it's learning from contains biases or errors it will learn those biases and have them(and possibly even magnify them) in the output. This could allow for programs to replicate errors and biases on a larger scale.

2d. The kind of data Machine Learning uses is a wide variety for input and output, from images to text, to audio. Such as image classification, text analysis, audio reproduction. A neural network is modeled off of how we think the brain processes information. To train it takes a number of inputs and puts the values through connections between nodes that each have a weight, at the and it puts it all together as the output. It the compares the output to the input and if something doesn't match it adjusts the weights of some connections and tries again until it gets it right. After training off of a dataset it can then use what it has learned and apply it to a new input and learn from that if it makes any mistakes. It may need the data to be adjusted like breaking an image down into a flat "2d image", or transferring it from one type to another.

2e.

1. "Artificial Intelligence: The Effects of Machine Learning." Artificial Intelligence: The Effects of Machine Learning | Protiviti - United States. N.p., n.d. Web. 1 Dec. 2017. <<https://www.protiviti.com/US-en/insights/effects-machine-learning>>.
2. "List of Genetic Algorithm Applications." Wikipedia. Wikimedia Foundation, 25 Oct. 2017. Web. 01 Dec. 2017. <[https://en.wikipedia.org/wiki/List\\_of\\_genetic\\_algorithm\\_applications](https://en.wikipedia.org/wiki/List_of_genetic_algorithm_applications)>.

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