SmallSEOTools

PLAGIARISM SCAN REPORT

Words	424	Date	April 22,2021
Characters	3023	Excluded URL	

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2.4 SCENARIO IN WHICHMULTI-CORE, EMBEDDED AND DISTRIBUTED COMPUTING USED

A deep learning algorithm is a software construct that has certain steps that may be hardware intensive. Generative Adversarial Networks require huge amount of computing prowess to complete multiple passes of forward and backward propagation in order to train themselves. A network may consist of millions and billions of parameters which are associated with hundreds of thousands of graph nodes. To actually be able to train a network with more than a billion parameters, we need appropriately large amount of memory. Furthermore, the operations of forward and backward propagation are mathematical operations that adjust the parameters based on the gradient of the cost function to minimize the cost. This calculation, although heavy, is independent of each node and can be performed in a parallel framework. NVIDIA CuDA enabled GPUs have a CuDNN (CuDA Deep Neural Network) library that hooks the training algorithm onto the GPU memory for processing, deploying thousands and hundreds of thousand parallel threads to perform independent calculations of optimizing gradients. Such an infrastructure is expensive and requires a dedicated set up for running deep learning algorithms. For normal use cases, one can run into the problems of memory overflows while allocating tensors in the process of creation of graphs. In such cases, it is costly to buy more GPUs. One can make use of cloud services provided by Google Colab, AWS, Azure and more. These services can host runtimes that will allow users to run their deep learning algorithms over their hardware which will ensure fast and efficient training.

2.5 OUTCOME

• An efficient mathematical model to be created which will describe mappings required to colorize and super-resolve low resolution grayscale images
• A brief albeit descriptive study of different approaches towards image colorization and super-resolution
• Study presenting the benefits of certain GAN architectures and their edge over other kinds of neural networks in image colorization and super-resolution

2.6 APPLICATIONS

• Currently, given the number of the raw and unprocessed images in Hubble Legacy Archives, much of the images are not workable for scientific evaluation. The main application of building a GAN and automating the upscaling and colorization of these images is to help in visual classification for astronomers. Through a high resolution and colourized image, astronomical objects which would’ve been imperceptible to the human eye could be now visible for visual inspection. While upscaling is expected to address the poor quality of the original images, colourization will help distinguish astronomical objects and activites from the noise generated by various factors.