American International University-Bangladesh (AIUB)
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CVPR Mid Project Report

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Abstract: Convolutionary Neural Network (CNN) is a neural network with one or more evolutionary layers used primarily for image processing, classification, partitioning, and other auto-linked data. In this project, I applied CNN Architecture to classify MNIST handwritten datasets. I used 3 types of optimizers ADAM, SGD, RMSProp to test different accuracy levels. Convolutionary Neural Network (CNN) is a neural network with one or more evolutionary layers used primarily for image processing, classification, partitioning, and other auto-linked data. In this project, I applied CNN Architecture to classify MNIST handwritten datasets. I used 3 types of optimizers ADAM, SGD, RMSProp to test different accuracy levels.

Introduction:

Optimizers are strategies or methods that adapt to the characteristics of your neural network, such as weight and learning rate, to reduce damage.

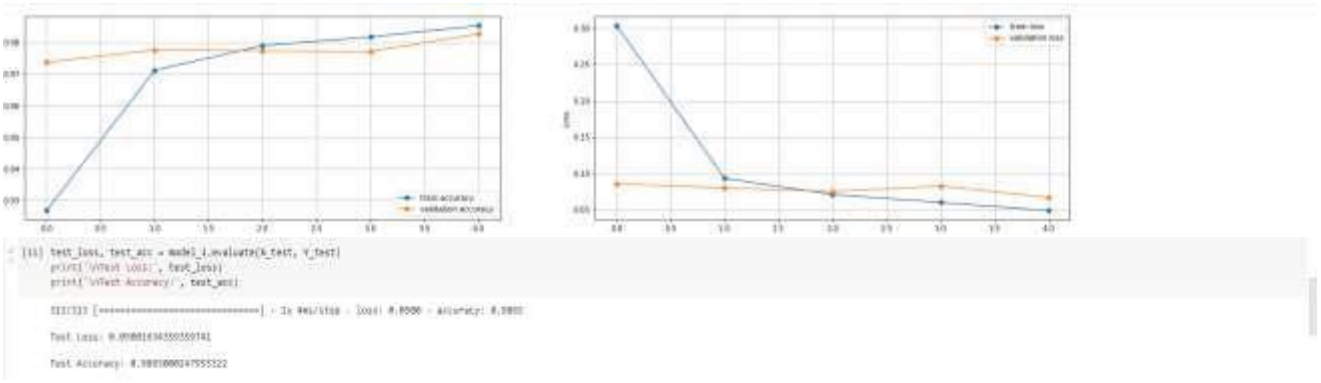
Adam is an optimization technique that can be used to update network weights repetitively based on training data instead of the traditional stochastic gradient descent method. Adam is a popular deep learning method because it gives good results quickly.

SGD is a method of finding the optimal polishing properties for an objective function. However, ADAM is significantly faster than SGD.

In neural network training, RMSprop is a gradient-based optimization strategy. This normalization equalizes the size of the step, reducing it for higher gradient to prevent explosion and increasing it for smaller gradient to avoid disappearing.

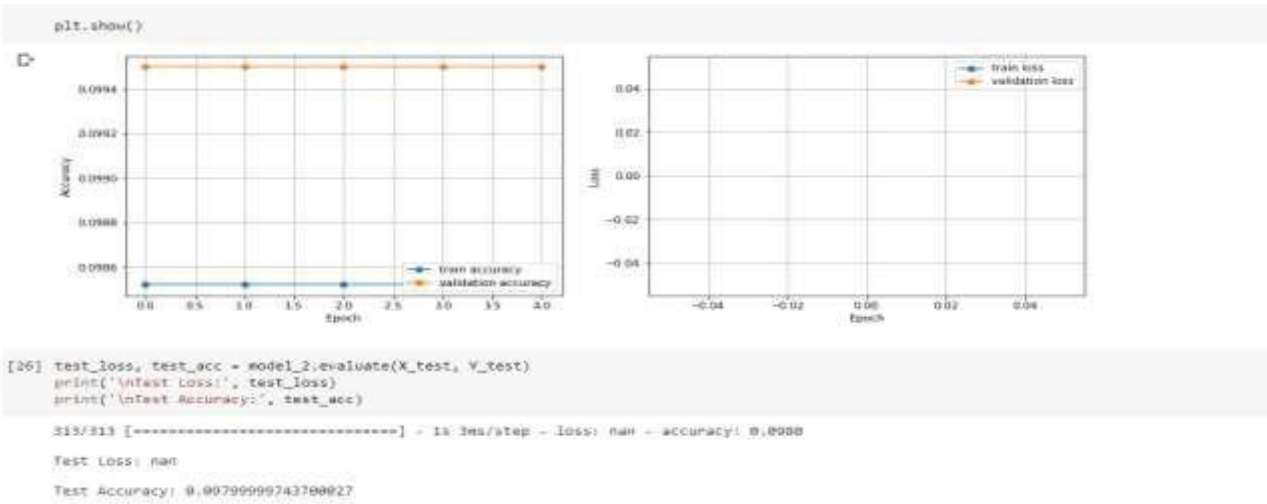
Result:

For ADAM, I have got test accuracy of 98.65% and loss 5%



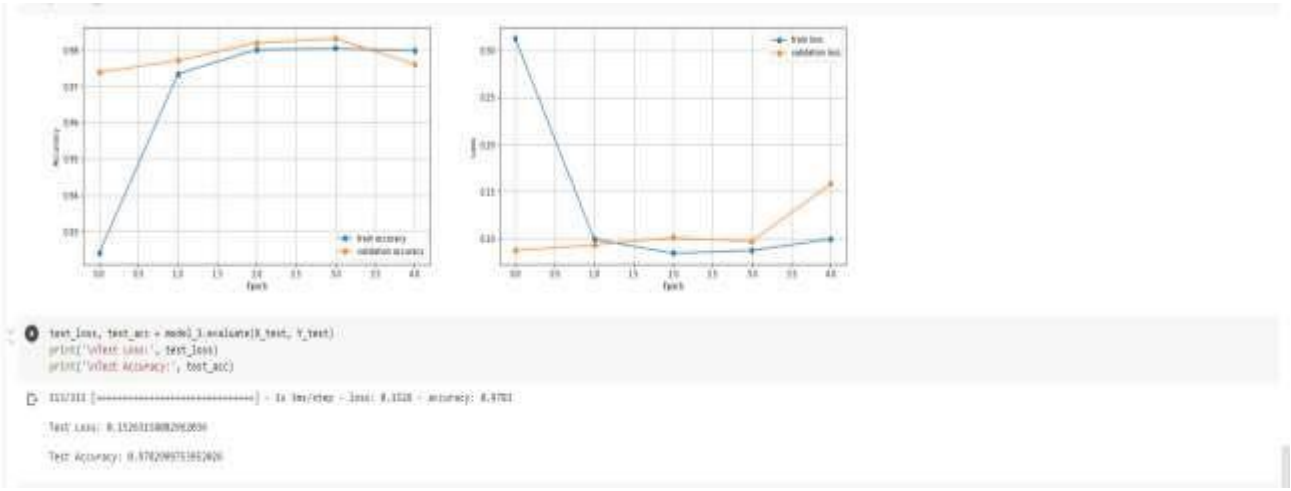
#SDG

For SDG, I have got test accuracy of 97% and loss 0%



RMSprop

For RMSprop, I have got test accuracy of 97.82% and loss 15.26%



Conclusion: I have employed three types of optimizers in this mid-project report: ADAM, SGD, and RMSProp. I discovered an inconsistency in their accuracy. SGD and RMSProp are much slower and less effective than ADAM. Adam Optimizer surpasses the previous optimizer by a wide margin. The accuracy of my ADAM Optimizer is 98.65 percent. The second best optimizer is RMSProp, which is also good and has an accuracy rate of 97.82 percent. The latter is SGD, with an accuracy of 97 percent, slightly lower than ADAM and RMSProp. So, in my experience, Adam Optimizer is the fastest and most accurate optimizer.