IT416: TOPICS IN DEEP LEARNING

Assignment 9 : Experimental study on generative adversarial networks

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1 LEARNING OUTCOME

At the end of this assignment you will learn to implement the generative adversarial network and its working

2 PROBLEM DESCRIPTION

Implement GAN to create fake handwritten images which resembles MNIST dataset

3 IMPLEMENTATION

3.1 Task 1

- Implement a generator network which would map a vector of dimension 100 to images of 28X28
- Implement discriminator network which takes images of 28X28 and checks whether it is from the real distribution or fake
- Design GAN which chains both the above networks.
- Train your GAN on MNIST data with the objective of generating fake MNIST samples
- Comment on the loss and accuracy produced by both Generators and Discriminators
- Sample 30 training images from your GAN at three points during training process: At the start, halfway point and after the completion. Comment.

3.2 Task 2

- Sample two images from GAN of **different classes**. Interpolate between two digits in the latent space. Use 8 steps, so there will be 10 images (including the two selected before). Display the results.

3.3 Task 3

- Now generate a good amount of fake samples from your GAN and add this to the Data required for training any neural network for MNIST classification. Evaluate on the testing data.

- See if you get any improvement as compared to neural network performance on previous available MNIST dataset.

3.4 Points to note

- In all the cases, observe the classification accuracies, loss variation and try to justify.

- Use Keras and Tensorflow for this assignment.

4 SUBMISSION

- You have to submit your assignment in Google Colab notebook (.ipynb file) with proper comments and explanation of your approach.

- Your filename should be named as **LabAssignment9_StudentId** . If your id is 202011001 then filename will be **LabAssignment9_202011001.ipynb**

- The submission deadline for this assignment is **11th December 2020 11:59 pm**