

DL Assignment - 3

Team - 15

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Variational Auto Encoder + Adversarial Learning

- Generate images from the given dataset by learning the disentangled representations and underlying representations.
- Dataset used: MNIST which contains 60,000 training images.
- The auto-encoder has been trained to learn the representations.

Architecture of the model:

Encoder: 3 convolutional layers with a filter size of 5 combined with Batch normalisation, ReLU activation.

Decoder: 3 transpose convolutional layers with a filter size of 5 combined with Batch normalisation, ReLU activation

The above architecture for the encoder, decoder is mentioned in the paper.

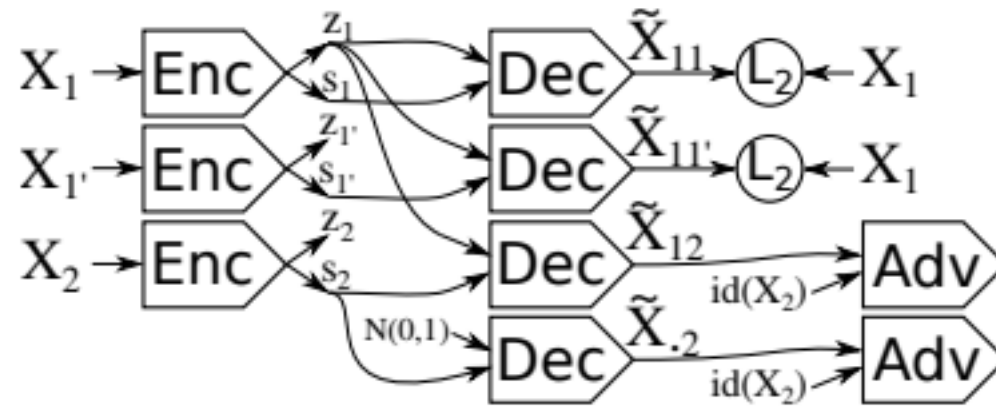
To extract the mean, variance for specified latent factors the batch input is passed through the encoder.

To sample the specified factors of latent space, we use reparameterisation trick.

The unspecified latent factor is also obtained from the encoder

The decoder generates an image based on the specified latent factor, unspecified latent factor.

The training architecture is as shown below:



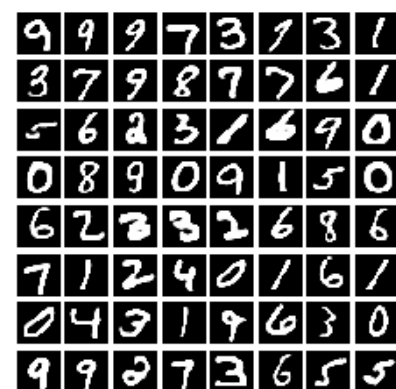
The network is trained by back propagating the loss. L2 loss, adversarial loss are calculated.

The results can be as seen below:

Original grid



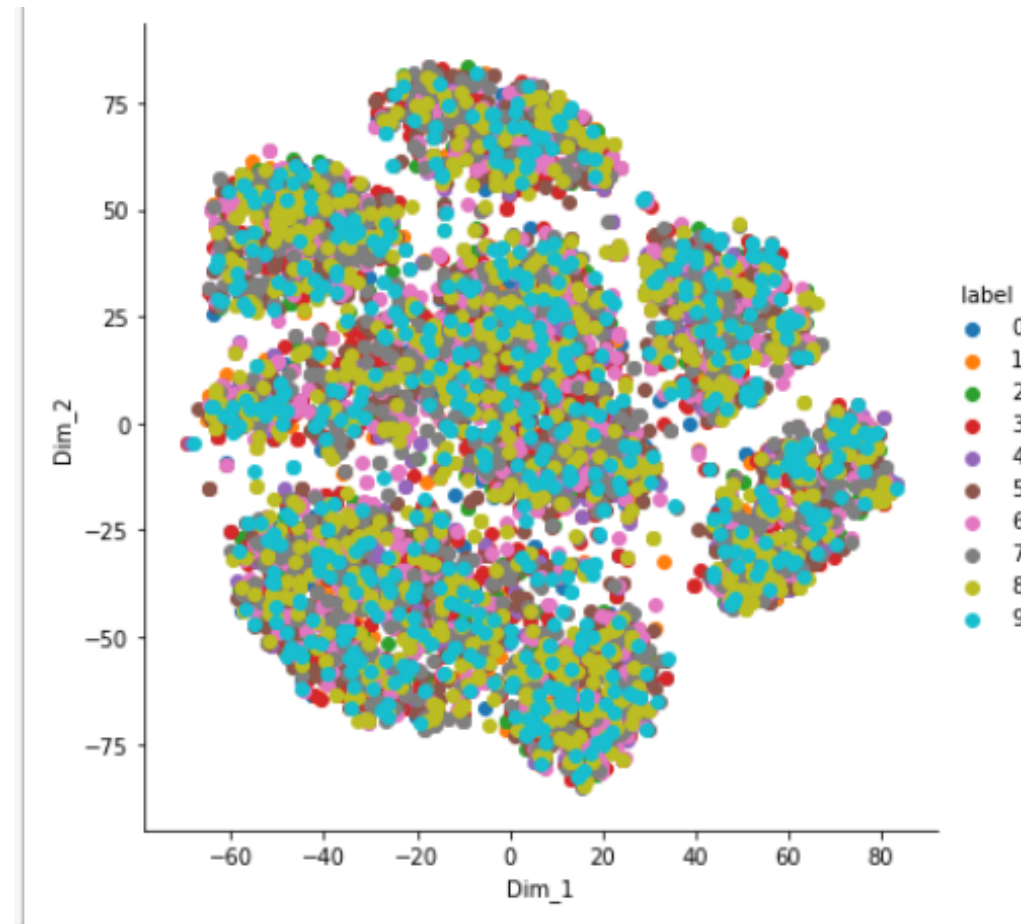
Generated Grid



Varying style factors shown with respect to a single image, we can see that the images are altered with respect to the style factors.



t-SNE plots of specified factor space color coded by labels



Adversarial loss plot

