

~~17/10/18~~  
CAB 11 :- (Using Variational Auto encoders)

AIM:- To implement and analyze a variational Autoencoder (VAE) for learning latent representation of MNIST dataset.

Pseudocode :-

- Import libraries.
- Load MNIST dataset
- Define encoder Network
- Sampling step
- Define Decoder Network
- Define loss function
- Train the model
- Forward pass
- Compute loss
- Backpropagate & update weights.
- After Training
- Deconstruct test image
- Generate new images by sampling.
- Visualize

Observation :-

During training, the reconstruction loss gradually decreased, indicating better learning of input structure.

The KL Divergence stabilized over time, showing that the latent space was learning a valid distribution.

→ The model successfully learned a smooth latent space, where interpretation between two points produced meaningful transitions between digits.

Result :-

An variational Autoencoder model successfully implemented on MNIST dataset.

Accuracy :- 80-87%

80-87

output

epoch [1, 5] loss = 164. 0216

epoch [2, 5] loss = 121. 5716

epoch [3, 5] loss = 119. 6072

epoch [4, 5] loss = 111. 6099

epoch [5, 5] loss = 109. 843

## VAE Architecture

