

17/10/25

LAB 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 interpolation between two points produced meaningful transitions between digits.

Result:

An variational Autoencoder model successfully implemented on MNIST dataset.

Accuracy :- 80-04%

eg:



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

