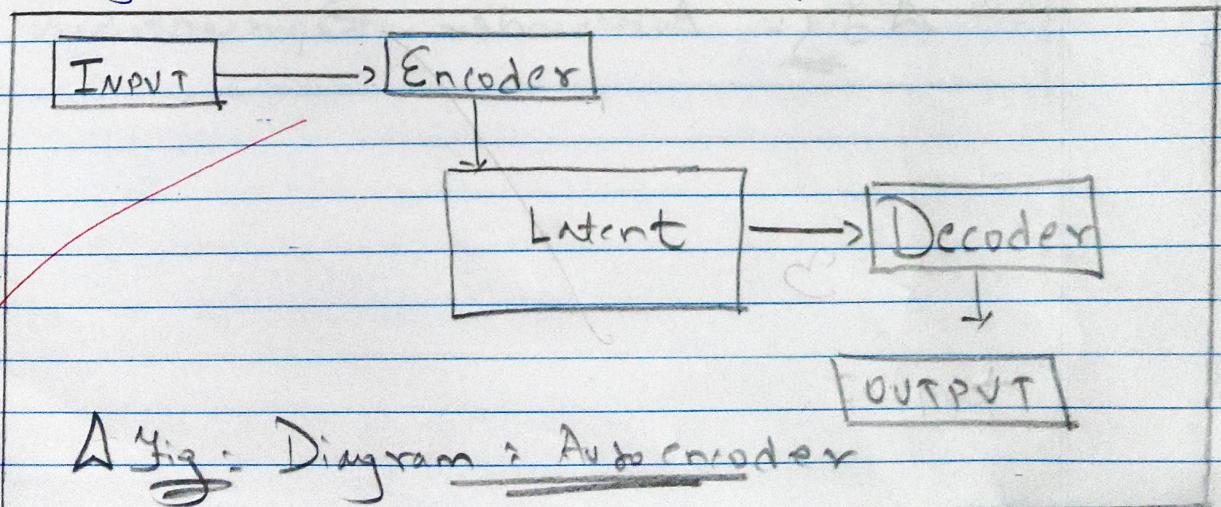


- ① Explain the working of an Autoencoder with neat diagram.
- ② What is reparameterization trick, why is essential in VAE, prove mathematically how it enables back propagation through stochastic variables.
- ③ What is role of KL divergence in VAE, & write down limitations of VAE.

Answers

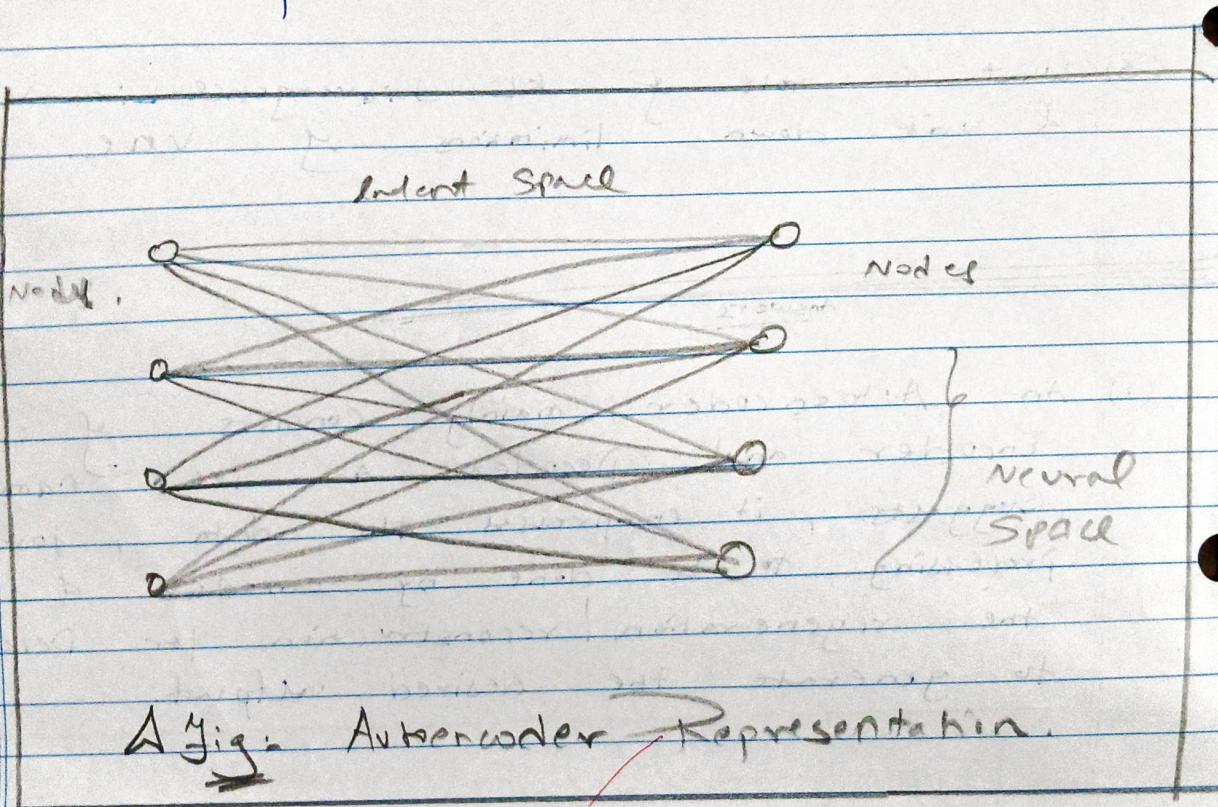
- ① An Autoencoder mainly consists of Encoder and Decoder. As its name suggests, it compresses the data, for processing to be done by encoder & the regeneration / reconstruction for Decoder to generate the desired output.



Autoencoder Consists of :

Encoder : for encoding, i.e., compressing the given input for further processing.

Decoder : decoding, i.e., reconstructing the processed data from encoder & generating the output.



A Yogi Autoencoder Representation.

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(2) Reparameterization : It is very essential in Variational Autoencoder

It is responsible for enabling back propagation through SGD, i.e., Stochastic Gradients, which in turn are nothing but, stochastic variables.

(3) KL divergence.

1. Learned latent distribution is close to prior distribution.
2. How probability distribution differed from another is ensured by KL divergence.
- 3) A VAE : Variational Autoencoder tries to learn latent distribution that approximate to be true.

loss function (ELBO - Evidence Lower Bound).

Here, KL divergence ensures smooth, continuous and structured space.

Limitations:

1. Output is Blurry :

In vae, sometimes due, output is not clear.

2. Over Regularization

In vae, input is not clearly interpreted

3. which leads to posterior collapse, which we simply call over regularization.

3. Choice of Prior.

MD