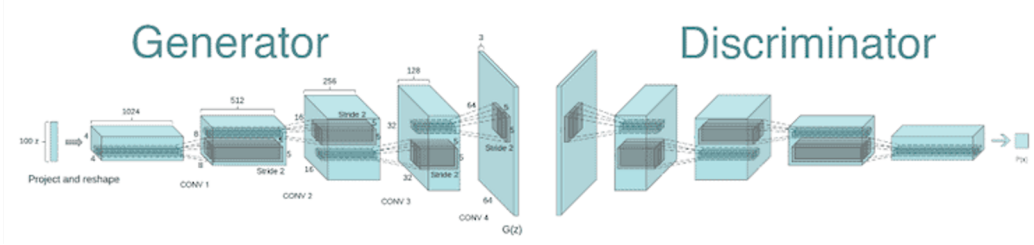
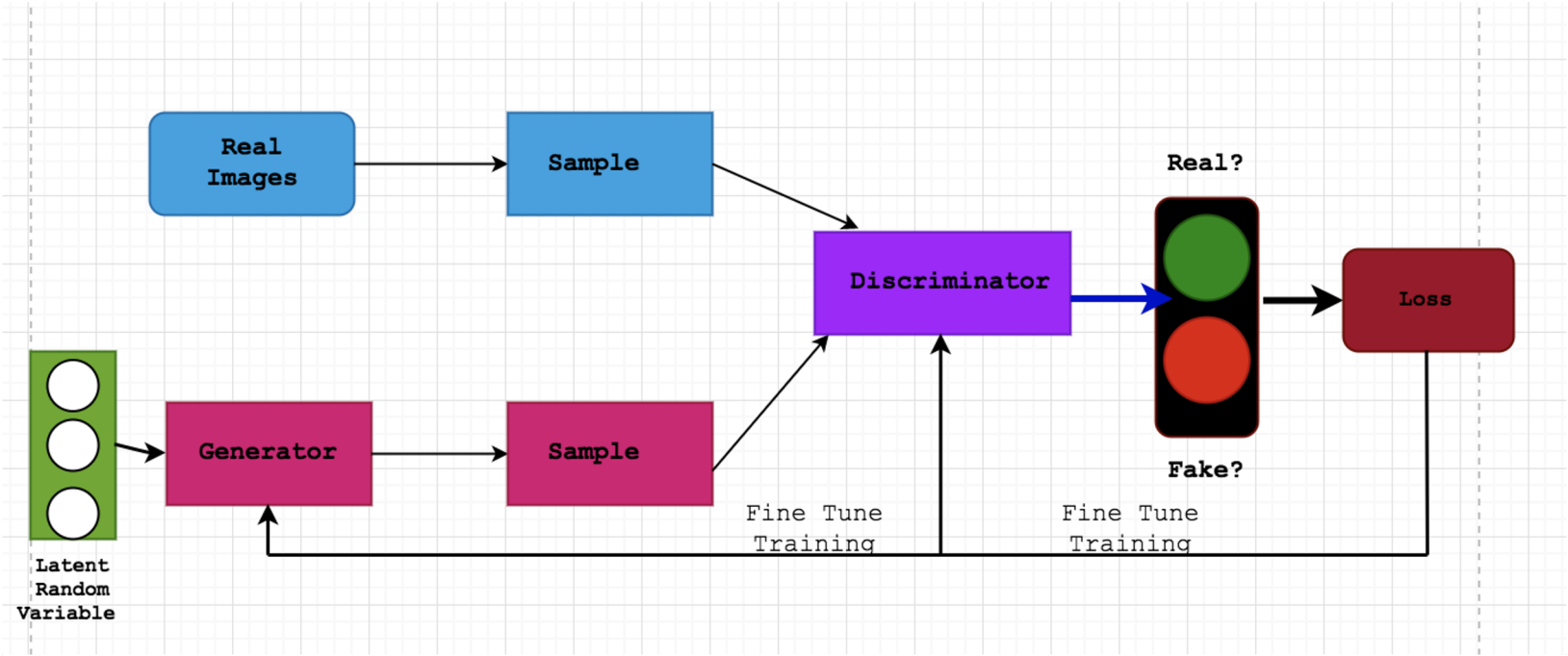
Seminar 6: Generative



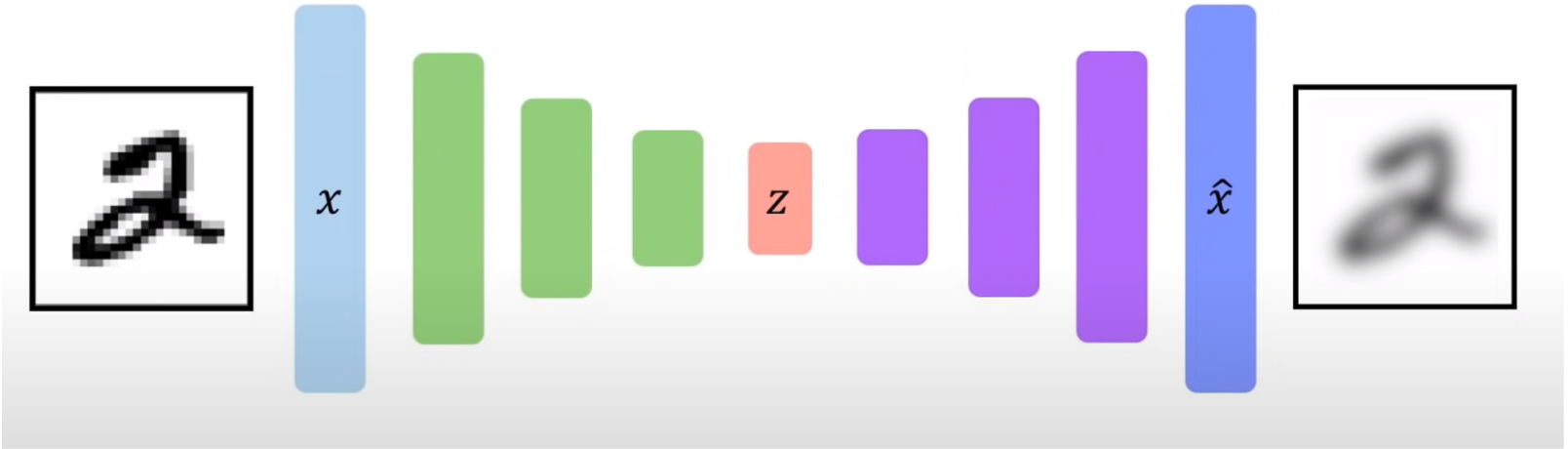
generative adversial net



GANS problems

Difficulties in GAN training
1.Non-convergence,
2.Mode-collapse,
3.Vanishing gradients
4. High sensitivity to the hyperparameter selections.

Autoencoder



https://www.youtube.com/watch?v=rZufA635dq4

Variational Autoencoder

$$D\left(p_\phi(z|x) \parallel p(z)\right)$$

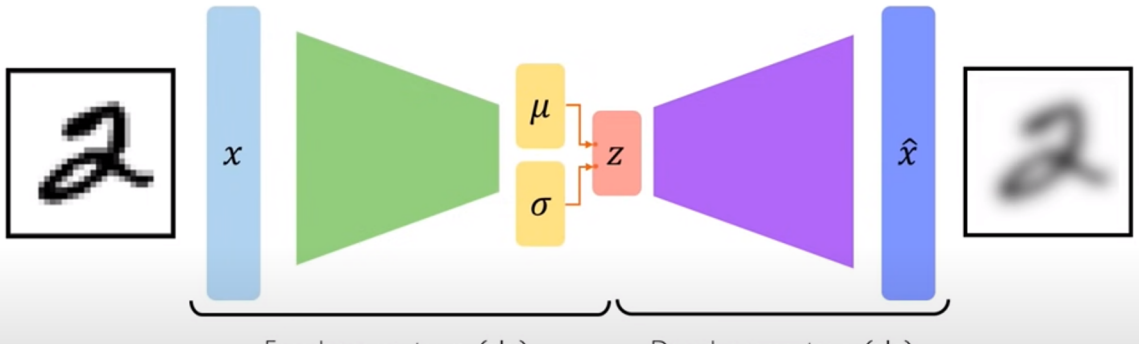
$$= -\frac{1}{2}\sum_{j=0}^{k-1}\left(\sigma_j + \mu_j^2 - 1 - \log \sigma_j\right)$$

KL-divergence between the two distributions

Common choice of prior:

$$p(z) = \mathcal{N}(\mu = 0, \sigma^2 = 1)$$

VAE optimization



$$\mathcal{L}(\phi, \theta) = \text{(reconstruction loss)} + \text{(regularization term)}$$

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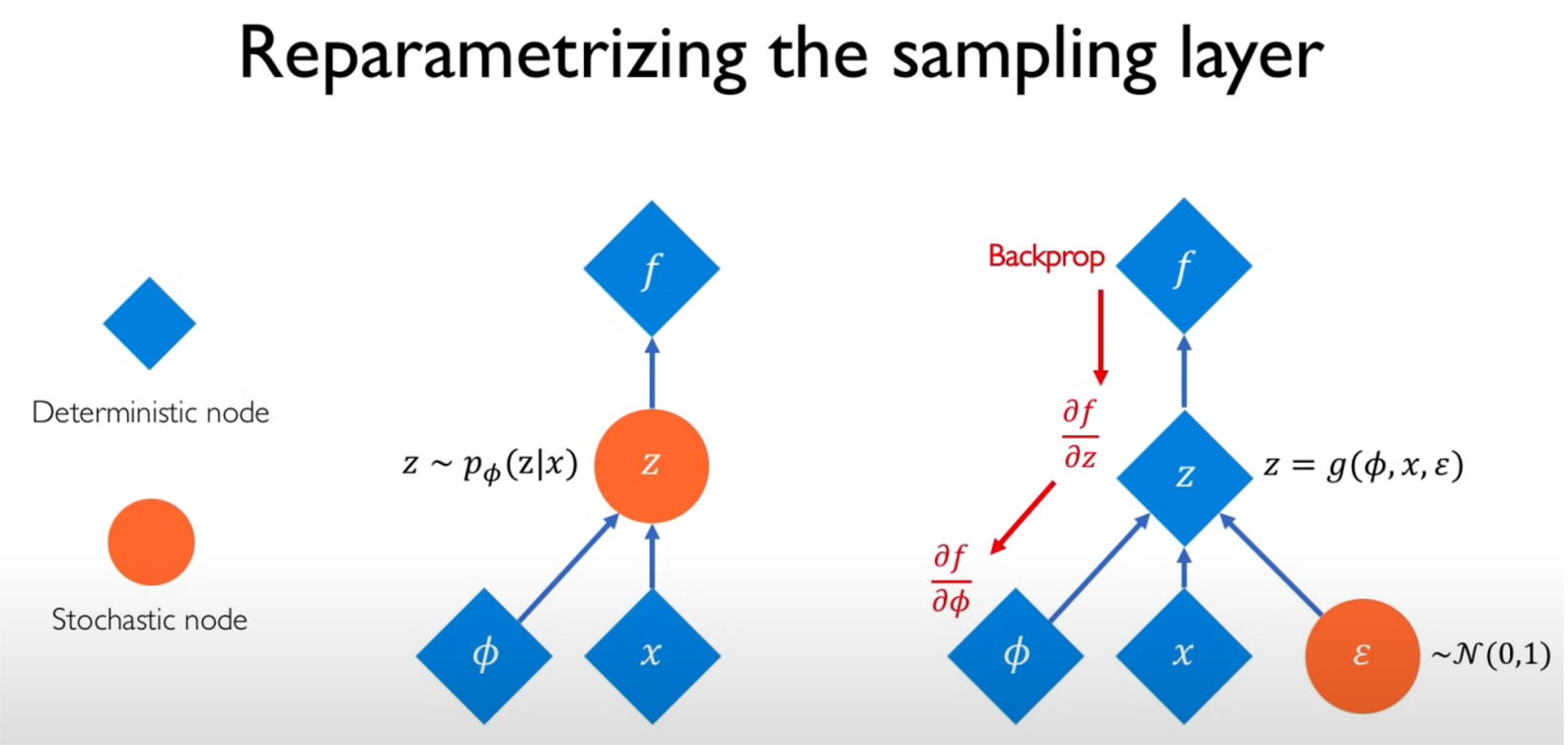
Variational Autoencoder (backprop)



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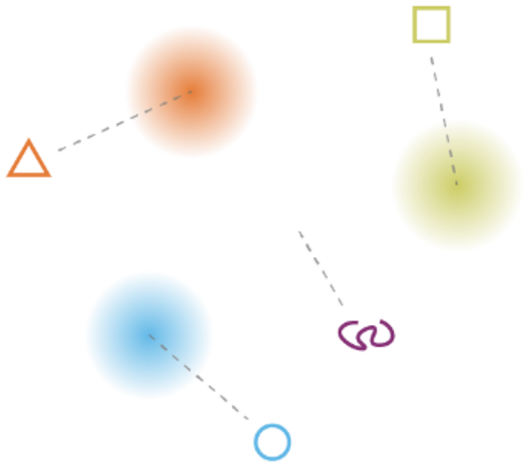
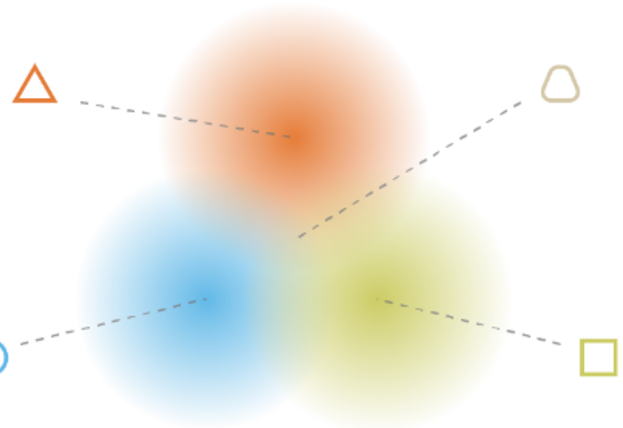
Variational Autoencoder (backprop)



what can happen without regularisation



what we want to obtain with regularisation