GANs

AutoEncoders

- Compression, noise removal
- Z space, Latent Space
- Not continuous

Input layer   Hidden layer   Output layer

"bottleneck"

x_1 x_2 x_3 x_4 x_5 x_6

a_1 a_2 a_3

$\hat{x}_1$ $\hat{x}_2$ $\hat{x}_3$ $\hat{x}_4$ $\hat{x}_5$ $\hat{x}_6$
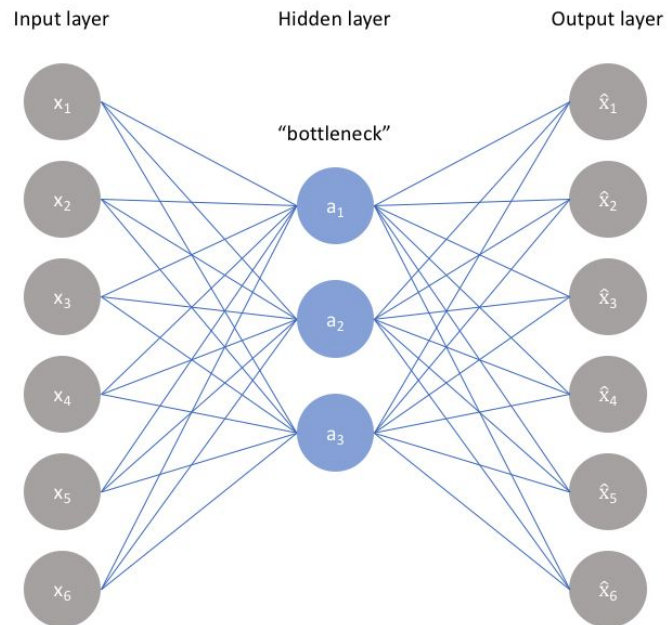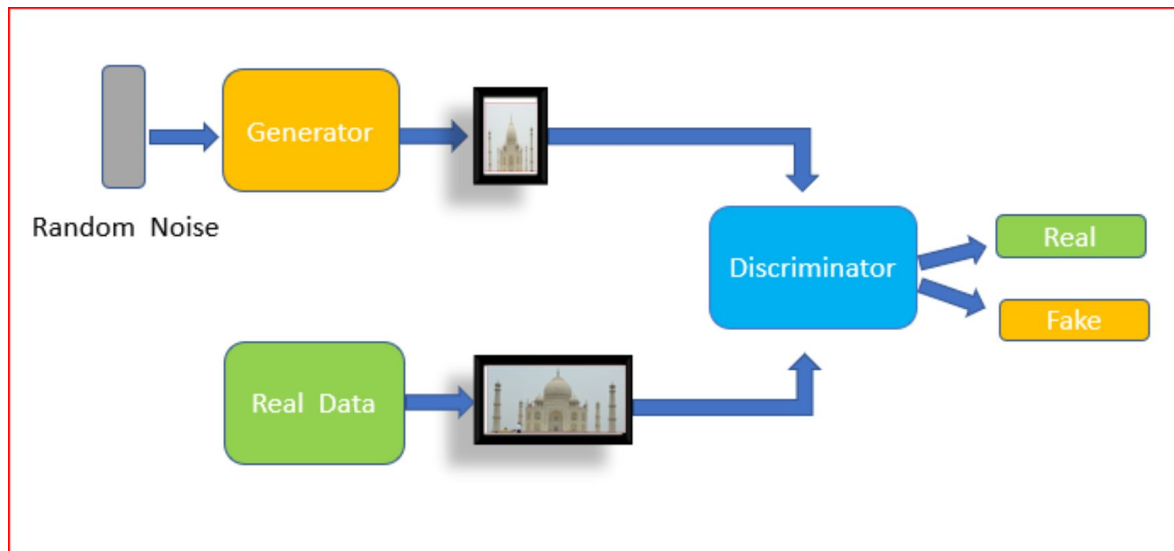
Variational Auto Encoders

- Continuous Z Space
- AE Cost function + KL Divergence
- No obvious way to measure error

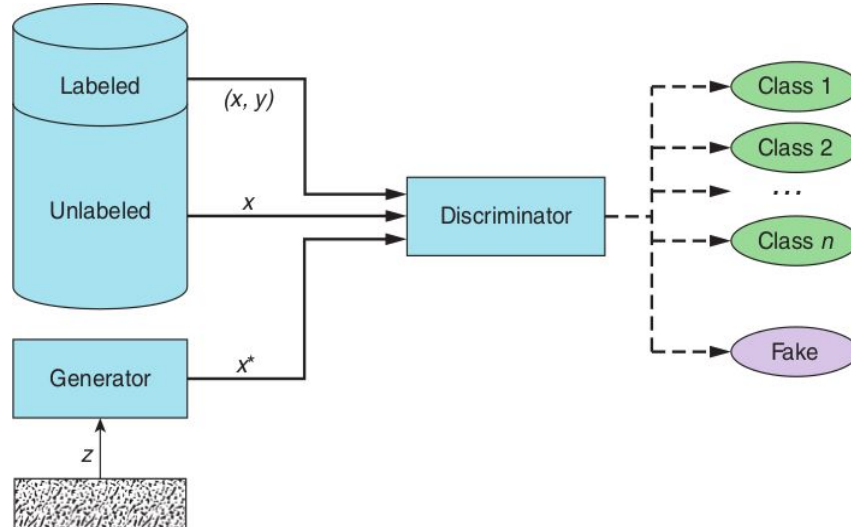$$D(p||q) = \sum_{x \in X} p(x) \log \frac{p(x)}{q(x)}.$$
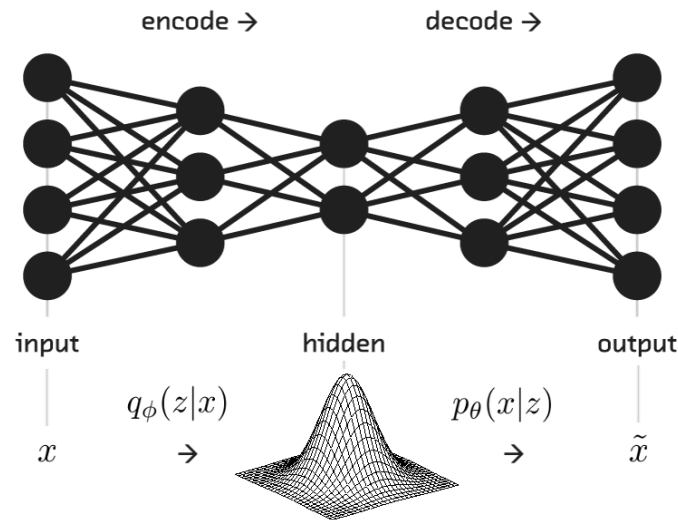
GANs

- Discriminator (Critic) determines error
- Generator can be used to create new data (medical imaging)

Semi Supervised GAN

Can be used with partially labeled data (Kannada/MNIST)

(different distribution btwn train/test/val data, used only 4k labeled images of 40k, 81% accuracy)

Code

- RL GANs   —- World Models https://worldmodels.github.io/
- Really Awesome GAN resources
  https://github.com/nightrome/really-awesome-gan
- Keras GANs https://github.com/eriklindernoren/Keras-GAN
- Numpy GAN https://github.com/shinseung428/gan_numpy

Kannada code

https://github.com/timestocome/Kaggle/tree/master/SemiSupervised%20GAN%20Kannada%20MNIST

Resources

Paper

- Generative Adversarial Nets
- https://papers.nips.cc/paper/5423-generative-adversarial-nets.pdf

Books

- Generative Deep Learning: Teaching Machines to Paint, Write, Compose, and Play (O'Reilly)
- GANs in Action (Manning)