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| Models | Characteristics | Topics |
| VAE | Consists of an encoder, a decoder, and a loss function; approximate inference in a latent Gaussian model where the approximate posterior and model likelihood are parametrized by neural nets; models latent variables and data directly; Semi-supervised and supervised | Image generation, synthetic text and music, Google’s Magenta sketchrnn |
| Conditional VAE | Like VAE, but models latent variables and data conditioned to some random variables | Like VAE, but can be applied to generate data with specific attributes |
| GAN | Contains two sub-models: the generator model to generate new examples and the discriminator model to classify examples as either real or fake | Generate data; generate cartoon characters and background images; Fashion industry can use it to input pose to transform it into other poses; generate high resolution images from low resolution images |
| Conditional GAN | Like GAN, but involves the conditional generation of images by a generator model | Like GAN, but can be applied to generate examples from a domain of a given type |
| VAE-GAN | Looks like a VAE, but decoder is replaced with generator of GAN and loss function is calculated using discriminator; high quality compared to VAE and more diverse compared to GAN | Image generation |
| Self-Attention GAN | Like GAN, but details can be generated using cues from all feature locations; high quality compared to VAE and more diverse compared to GAN | Image generation |