Deep Learning: Lab 8

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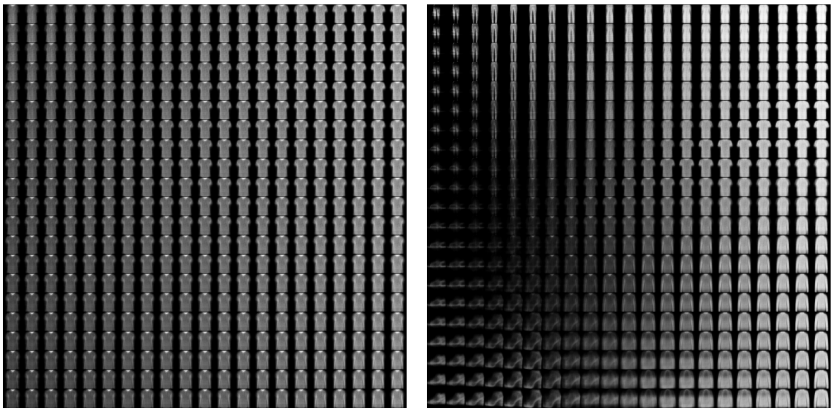
1 Exploring the latent space of a VAE

1.1 Systematically sample a VAE

The latent space of the VAE was sampled as directed, with values ranging between $\pm 4\sigma$, and the results can be seen in Figure 1(a). However, each of these showed the same item of clothing, so the sampling range was also increased to $\pm 20\sigma$, resulting in Figure 1(b).



(a) (b)

Figure 1: Samples taken from latent space ranging between (a) $\pm 4\sigma$ (as directed) (b) $\pm 20\sigma$

2 Exploring the code space of a standard auto-encoder

2.1 Systematically sample an autoencoder

The autoencoder from part 1 was altered to have a 2-d latent space. Samples from this can be seen in Figure 2.

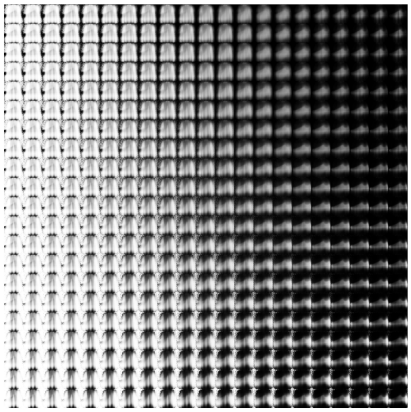


Figure 2: Samples from autoencoder

2.2 Compare the latent spaces of the VAE and autoencoder

In Figure 1(a), each item of clothing is the same (a t-shirt), whereas in Figure 2, they vary between items, with most items being indiscernible. This may be because we sample from a Gaussian distribution for the VAE, so each sample remained similar to the original. This is because the VAE was trained to fit this distribution. By contrast, samples from the autoencoder's latent space were equally spaced apart in each dimension, so samples varied between different clothing items. The autoencoder was not trained to fit any distributions to its latent space.