

What is the influence of each component of VAE's loss term on the latent space? How will the latent space change if you zero out the KL-divergence term? What about the reconstruction term? Use the terms: smooth, clustering, uniform, regularization. How will the generation from the model change depending on the loss term?

The Variational Autoencoder (VAE) loss term consists of two components: the reconstruction term and the KL-divergence term.

The reconstruction term measures the difference between the input data and the decoded output, and it aims to ensure that the decoded output is similar to the input data. If this term is zeroed out, the decoded output would be less similar to the input data and the generation from the model would be of lower quality.

The KL-divergence term measures the difference between the learned latent space distribution and the prior distribution, which is usually assumed to be a standard normal distribution. This term acts as a regularization term, which helps to ensure that the learned latent space is smooth, uniform, and has a clustering property. If this term is zeroed out, the latent space would be less smooth and less regularized, and the generation from the model would be less controlled and less interpretable.

In summary, the reconstruction term aims to produce similar outputs as inputs and the KL-divergence term aims to create a smooth, clustering, and uniform latent space. Zeroing out the KL-divergence term would lead to less regularized and less interpretable generation from the model.