HSE ML Project Proposal

Author: Tam Yu Fung

Proposal 1   Explore hierarchical VAE techniques, such as stacking VAEs on top of each other in Semi-Supervised Learning with Deep Generative Models https://arxiv.org/abs/1406.5298, and ladder VAE as proposed in https://arxiv.org/abs/1602.02282v3

Proposal 2   Explore normalizing flows in variational inference, such as Improved Variational Inference with Inverse Autoregressive Flow https://arxiv.org/abs/1606.04934

Proposal 3   Using the approach in the paper Unbalanced GANs: Pre-training the Generator of Generative Adversarial Network using Variational Autoencoder https://arxiv.org/abs/2002.02112, explore using VAE as a pretrained generator for GAN to generate anime faces.

Proposal 4   In the paper Towards Visually Explaining Variational Autoencoders https://arxiv.org/abs/1911.07389, visual attention from learned latent space are generated and used to localize anomalies in images. Using the Radiological Society of North America (RSNA) Pneumonia Detection Challenge dataset https://www.kaggle.com/c/rsna-pneumonia-detection-challenge/data, we try to locate lung opacities on chest radiographs using anomaly attention localization maps.