



The Hong Kong University of Science & Technology

Department of Mathematics

PhD Student Seminar

Denoising problems in cryo-em images

by

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Abstract

The cryo-electron microscopy (cryo-EM) becomes popular for macromolecular structure determination. But the 2D images which cryo-electron microscopy (cryo-EM) machine produce are in very high noise. Thus it is important to remove noise to continue further research. In this paper we address image denoising problem in cryo-EM in generative adversarial networks(GAN) method. We introduce different types of GAN to denoise cryo-em image such as JS-GAN, Wasserstein GAN and boosting GAN in low SNR simulation data. Through testing mean square error(MSE), peak signal to noise ratio(PSNR) and the clustering accuracy, we find GAN can grasp some clear features of images even the noise is very high and perform better than traditional denoising methods. In addition, our methods have robustness(training data mixes lower than 0.2 range of the noisy image will not change our result) Our other work is denoise the experimental images based on \cite{su2018generative}'s structure. We modify the loss and part of the structure of the network to improve result because it alleviates the influence of deconvolution.

Date: Wednesday, 21 August 2019

Time: 3:00 p.m. - 4:00 p.m.

**Venue: Room 3472, Academic Building
(near Lifts 25-26), HKUST**

All are welcome!