Statistics Seminar

Department of Mathematical Sciences

DATE:	Thursday, Nov. 11, 2021
TIME:	1:15pm – 2:15pm
LOCATION:	Zoom meeting
SPEAKER:	Jingze Liu, Binghamton University
TITLE:	Some Theoretical Properties of GANs

Abstract

Generative Adversarial Networks (GANs) are a class of generative algorithms that have been shown to produce state-of-the art samples, especially in the domain of image creation. The fundamental principle of GANs is to approximate the unknown distribution of a given data set by optimizing an objective function through an adversarial game between a family of generators and a family of discriminators. In this paper, we offer a better theoretical understanding of GANs by analyzing some of their mathematical and statistical properties. We study the deep connection between the adversarial principle underlying GANs and the Jensen-Shannon divergence, together with some optimality characteristics of the problem. An analysis of the role of the discriminator family via approximation arguments is also provided.In addition, taking a statistical point of view, we study the large sample properties of the estimated distribution and prove in particular a central limit theorem. Some of our results are illustrated with simulated examples.