Department of Decision Sciences

Università Commerciale Luigi Bocconi

Statistics Seminars

Minimum distance estimators and inverse bounds for latent probability measures

Long Nguyen
University of Michigan

Thursday, 23rd March 2023
12:00 pm Room 3-E4-SR03 Via Roentgen 1 Milano

Abstract

A talk about a general framework for estimating the mixing measure arising in finite mixture models, which we term minimum Φ-distance estimators.
We establish a general theory for the general minimum Φ-distance estimator, which involves obtaining sharp probability bounds on the estimation error, under optimal transport distance metrics, of the mixing measure in terms of the suprema of the associated empirical processes for a suitably chosen function class Φ.
The theory makes clear the dual roles played by the function class Φ --- large enough to induce necessary strong identifiability conditions and small enough to guarantee optimal rates for parameter estimation for the multivariate parameter and multivariate data settings.
Our framework includes many existing estimation methods as special cases but also results in new ones. For instance, it includes the minimum Kolmogorov-Smirnov distance estimator as a special case but extends to the multivariate setting. It includes the method of moments as well, while extending existing results for Gaussian mixtures to a much larger family of probability kernels. Moreover, the minimum Φ-distance estimation framework leads to new methods applicable to complex (e.g., non-Euclidean) observation domains.
In particular, we study a novel minimum distance estimator based on the maximum mean discrepancy (MMD), a particular Φ-distance that arises in a different context (of learning with reproducing kernel Hilbert spaces).

This work is joint with Yun Wei and Sayan Mukherjee.

Department of Decision Sciences
Via Röntgen 1 – 20136 Milano

Tel. 02 5836.5632
Fax 02 5836.5630