Séminaire de Probabilités et Statistique

Mardi 01 Décembre à 14h00
Laboratoire Dieudonné
Salle de conférence - LJAD

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Simulator Calibration under Covariate Shift with Kernels

Computer simulation has been widely used in many fields of science and engineering. The power of computer simulation is extrapolation, by which one can make predictions about the quantities of interest, for a given hypothetical condition of the target system. A major task regarding simulation is calibration, i.e., the adjustment of parameters of the simulation model to observed data, which is needed to make simulator-based predictions reliable. By definition of extrapolation, predictions are often required in a region where observed data are scarce: this is the situation known as covariate shift in the literature. Our contribution is to propose a novel approach to simulator calibration focusing on the setting of covariate shift. This approach is based on Bayesian inference with kernel mean embedding of distributions, and on the use of an importance-weighted reproducing kernel for covariate shift adaptation. We provide a theoretical analysis for the proposed method, as well as empirical investigations suggesting its effectiveness in practice. The experiments include calibration of a widely used simulator for industrial manufacturing processes, where we also demonstrate how the proposed method may be useful for sensitivity analysis of model parameters.