A WASSERSTEIN INDEX OF DEPENDENCE FOR BAYESIAN NONPARAMETRIC MODELING

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Optimal transport (OT) methods and Wasserstein distances are flourishing in many scientific fields as an effective means for comparing and connecting different random structures. In this talk we describe the first use of an OT distance between Lévy measures with infinite mass to solve a statistical problem. Complex phenomena often yield data from different but related sources, which are ideally suited to Bayesian modeling because of its inherent borrowing of information. In a nonparametric setting, this is regulated by the dependence between random measures: we derive a general Wasserstein index for a principled quantification of the dependence gaining insight into the models' deep structure. It also allows for an informed prior elicitation and provides a fair ground for model comparison. Our analysis unravels many key properties of the OT distance between Lévy measures, whose interest goes beyond Bayesian statistics, spanning to the theory of partial differential equations and of Lévy processes.
This is a joint work with Hugo Lavenant, Antonio Lijoi and Igor Prünster.

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