Seminar/Talk

Continuum limit of posteriors in graph-Bayesian inverse

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Host: Jan Maas

We consider the problem of recovering a function input of a differential equation formulated on an unknown domain M. We assume to have access to a discrete domain $M_n=\{x_1, \dots, x_n\} \subset M$, and to noisy measurements of the output solution at $p\le n$ of those points. We introduce a graph-based Bayesian inverse problem, and show that the graph-posterior measures over functions in M_n converge, in the large n limit, to a posterior over functions in M that solves a Bayesian inverse problem with known domain. The proofs rely on the variational formulation of the Bayesian update, and on a new topology for the study of convergence of measures over functions on point clouds to a measure over functions on the continuum. Our framework, techniques, and results may serve to lay the foundations of robust uncertainty quantification of graph-based tasks in machine learning. The ideas are presented in the concrete setting of recovering the initial condition of the heat equation on an unknown manifold. This is joint work with Daniel Sanz-Alonso

Tuesday, June 27, 2017 04:00pm - 06:00pm
Big Seminar room Ground floor / Office Bldg West (I21.EG.101)

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