SEMINARIO DEL DEPARTAMENTO DE PROBABILIDAD Y ESTADÍSTICA

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AMENTO DE PROBABILIDAD Y ESTADÍSTICA-IIMAS-UNAM



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"AMARGINAL SAMPLER FOR o-STABLE POISSON-KINGMAN MIXTURE MODELS"

Infinite mixture models reposed on random probability measures like the Dirichlet process allow for flexible modelling of densities and for clustering applications where the number of clusters is not fixed a priori. Indeed, we can formulate the problem as a hierarchical model where the top level is a discrete random probability measure. In recent years, there has been a growing interest in using different random probability measures, beyond the classical Dirichlet process, for extending modelling flexibility. Some examples include Pitman-Yor processes, normalised generalised Gamma processes, and normalized random measures. Our understanding of these models has grown significantly over the last decade: there is an increasing realisation that while these models are nonparametric in nature and allow an arbitrary number of components to be used, they do impose significant prior assumptions regarding the clustering structure. In this talk we will present a wide class of random probability measures, called σ -Stable Poisson-Kingman processes, and discuss its use for Bayesian nonparametric mixture modelling. This class of processes encompasses most known random probability measures proposed in the literature so far and we argue that it forms a natural class to study. We will review certain characterisations which lead us to propose a tractable and exact posterior inference algorithm for the whole class. Specifically, we are able to derive a marginal sampler in an augmented space that has a fixed number of auxiliary variables per iteration. We illustrate the algorithm performance with a multidimensional experiment.



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