Reinforced random processes in continuous time

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Abstract

We introduce a stochastic process based on non-homogeneous Poisson processes and urn processes which can be reinforced to produce a mixture of semi-Markov processes. By working with the notion of exchangeable blocks within the process, we present a Bayesian nonparametric framework for handling data which arises in the form of a semi-Markov process. That is, if units provide information as a semi-Markov process and units are regarded as being exchangeable then we show how to construct the sequence of predictive distributions without explicit reference to the de Finetti measure, or prior.

Keywords: Reinforced urn processes; Non-homogeneous Poisson processes; Mixture of semi-Markov processes; Bayesian nonparametrics.