
Learning Multiple Behaviors from Unlabeled Demonstrations in a Latent Controller Space

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Abstract

In this paper we introduce a method to learn multiple behaviors in the form of motor primitives from an unlabeled dataset. One of the difficulties of this problem is that in the measurement space, behaviors can be very mixed, despite existing a latent representation where they can be easily separated. We propose a mixture model based on a *Dirichlet Process* (DP) to simultaneously cluster the observed time-series and recover a sparse representation of the behaviors using a Laplacian prior as the base measure of the DP. We show that for linear models, e.g potential functions generated by linear combinations of a large number of features, it is possible to compute analytically the marginal of the observations and derive an efficient sampler. The method is evaluated using robot behaviors and real data from human motion and compared to other techniques.

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