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Neural Empirical Bayes: Source Distribution Estimation and its Applications to Simulation-Based Inference

Monday 12 July 2021 15:00 (15 minutes)

We examine the problem of unfolding in particle physics, or de-corrupting observed distributions to estimate underlying truth distributions, through the lens of Empirical Bayes and deep generative modeling. The resulting method, Neural Empirical Bayes (NEB), can unfold continuous multi-dimensional distributions, in contrast to traditional approaches that treat unfolding as a discrete linear inverse problem. We exclusively apply our method in the absence of a tractable likelihood function, as is typical in scientific domains relying on computer simulations. Moreover, combining NEB with suitable sampling methods allows posterior inference for individual samples, thus enabling the possibility of reconstruction with uncertainty estimation.

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