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Abstract

Hellinger Entropy Concept: Multidisciplinary Applications †

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The use of a metric to assess distance between probability densities is an important practical problem used in artificial intelligence or recommendation systems. The generalized α-formalisms introduced by Rényi and Tsallis are the basis of well-known entropies and divergence models. A particular α-divergence that, was presented in a previous work from the co-authors. This particular α-divergence, in our perspective, was already essentially defined by Hellinger. The concept of Hellinger entropy makes it possible, through a maximum-entropy syllogism, to state a bound for the Hellinger metric. The square root divergence is a metric, and its nonparametric estimator has information-theoretic bounds, that can be directly computed from the data. Information-theoretic bounds for Hellinger distance are developed in this work. The asymptotic behavior allows to use this metric, in a competitive scenario with three or more densities, like clustering. The bound can be directly computed from the data making this method suitable for streaming data.