HSIC, A Measure of Independence?*

Zoltán Szabó†

Abstract

Hilbert-Schmidt independence criterion (HSIC, also called distance covariance) is among the most popular and efficient techniques in machine learning and statistics to measure the dependence of random variables. Thanks to its kernel-based foundations, HSIC is applicable on a variety of domains including documents, images, trees, graphs, time series, dynamical systems, sets or permutations. Despite its tremendous practical success, quite little is known about when HSIC characterizes independence. I am going to provide a complete answer to this question, with conditions which are often easy to verify in practice.

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*Laboratory for Information and Inference Systems (LIONS), EPFL, Lausanne, Switzerland, 28 February 2018; abstract.

†Joint work with Bharath K. Sriperumbudur (Department of Statistics, Pennsylvania State University)