Cousido-Rocha, Marta; de Uña-Álvarez, Jacobo; Hart, Jeffrey D.

Testing equality of a large number of densities under mixing conditions. (English)

Zbl 1439.62110
Test 28, No. 4, 1203-1228 (2019).

Summary: In certain settings, such as microarray data, the sampling information is formed by a large number of possibly dependent small data sets. In special applications, for example in order to perform clustering, the researcher aims to verify whether all data sets have a common distribution. For this reason we propose a formal test for the null hypothesis that all data sets come from a single distribution. The asymptotic setting is that in which the number of small data sets goes to infinity, while the sample size remains fixed. The asymptotic null distribution of the proposed test is derived under mixing conditions on the sequence of small data sets, and the power properties of our test under two reasonable fixed alternatives are investigated. A simulation study is conducted, showing that the test respects the nominal level, and that it has a power which tends to 1 when the number of data sets tends to infinity. An illustration involving microarray data is provided.

MSC:
62G10 Nonparametric hypothesis testing
62G07 Density estimation
62G30 Order statistics; empirical distribution functions

Keywords:
dependent data; kernel density estimation; \(k\)-sample problem; smooth tests; \(U\)-statistics

Software:
CRAN; Equalden.HD

Full Text: DOI

References: