Test of Independence via Categorically Weighted Distance Correlation

Wei Zhong

Xiamen University
E-mail: wzhong@xmu.edu.cn

Abstract: It is of particular importance to understand the relationship among random variables in statistical inference. In this paper, motivated by the classification problems, we place focus on a test of independence between a categorical random variable and a random vector. A new Categorically Weighted Distance Correlation (CWDC) is developed to measure the dependence between a categorical random variable and a random vector. Asymptotical distributions and associated theoretical properties of the new CWDC-based test of independence are studied. The test is robust to distribution assumptions and outliers. Monte Carlo simulations demonstrate its excellent finite-sample performance.