

ACMS Statistics Seminar



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154 Hurley Hall
3:30 PM – 4:30 PM

Data Driven Robust Change Detection Using Wasserstein Ambiguity Sets

The problem of quickest detection of a change in the distribution of a sequence of independent observations is considered. It is assumed that the pre-change distribution is known (accurately estimated), while the only information about the post-change distribution is through a (small) set of labeled data. This post-change data is used in a data-driven minimax robust framework, where an uncertainty set for the post-change distribution is constructed using the Wasserstein distance from the empirical distribution of the data. The robust change detection problem is studied in an asymptotic setting where the meantime to the false alarm goes to infinity. A cumulative sum (CuSum) test based on the least favorable distribution, which is referred to as the distributionally robust (DR) CuSum test, is then shown to be asymptotically robust. The results are further extended to the case where the uncertainty set is constructed adaptively. The proposed method is applied to a real-world human activity detection scenario, and validation results are presented.

The Department of Applied and Computational
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