

Functional Outlier Detection based on the Minimum Regularized Covariance Trace Estimator

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Outlier detection is a big part of functional data analysis as it is crucial to identify atypical observations (curves) to prevent bias in subsequent analysis. This paper proposes a new method for finding irregular functional data, the *Minimum Regularized Covariance Trace Estimator* (MRCT). The algorithm searches for a subset, of the pre-determined size h , of the data for which the standardization results in the covariance with minimal trace. This framework includes inverting the singular covariance operator by the Tikhonov regularization [1]. The proposed iterative algorithm consists of concentration steps in which the dissimilarity is based on a functional Mahalanobis distance defined on the reproducing kernel Hilbert space [2]. Furthermore, the selection of the Tikhonov regularization parameter is automated. The method converges fast in practice and performs favorably compared to other functional outlier detection methods.

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