

Regularized Mahalanobis distance for high-dimensional data

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Abstract

Estimating inverse covariance matrix (precision matrix) is an essential part of many statistical methods. This paper proposes a regularized estimator for the inverse covariance matrix. Modified Cholesky decomposition (MCD) is utilized to construct positive definite estimators. Instead of directly regularizing the inverse covariance matrix itself, we impose regularization on the Cholesky factor. The estimated inverse covariance matrix is used to build Mahalanobis distance (MD). The proposed method is evaluated by detecting outliers through simulations.

Keywords

Modified Cholesky decomposition, Mahalanobis distance, Shrinkage, Robust analysis.