

SEMINARIO

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Robust Explainable Multivariate and Matrix-variate Data Analysis

Abstract: This presentation introduces robust covariance estimation and outlier detection methods in the multivariate and matrix-variate setting. We propose a novel outlier interpretability approach that combines Mahalanobis distances with Shapley values, thereby reducing computational complexity while maintaining key properties. Additionally, we introduce the Matrix Minimum Covariance Determinant (MMCD) estimators for robust location and covariance, demonstrating their consistency, affine equivariance, and efficiency improvements. We extend the MMCD estimators to a setting with multiple groups by relying on the robust trimmed clustering approach. While the MMCD estimators only distinguish between regular observations and outliers by trimming a proportion of the observations, the trimmed clustering approach assigns each observation to one of the clusters or marks them as outliers. Overall, our framework provides interpretable and robust analysis tools for complex data structures, supported by simulations and real-world examples.

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