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Cellwise outliers

Cellwise outliers, introduced by Alqallaf et al. (2009), represent a shift from the traditional rowwise approach in robust statistics by focusing on individual anomalous data cells rather than entire observations. This paradigm offers significant advantages, such as pinpointing which variables cause outlying behavior and preserving more usable data, particularly in high-dimensional settings where discarding full rows can lead to substantial information loss. However, the cellwise approach introduces new challenges, including complications from data transformations, difficulty in detecting non-marginal outliers due to hidden dependencies, and the exponential growth of possible outlier patterns with dimensionality. These issues complicate tasks like covariance estimation, regression, and PCA, demanding new statistical methods. While promising methods like the cellwise MCD estimator have emerged, many existing approaches lack strong theoretical foundations and are often tested in limited scenarios. Continued innovation is essential to fully address the complexities of cellwise contamination and to build robust tools that perform reliably in diverse, real-world data scenarios.

Special/ Invited session

Session for recipient of the Young Statistician Award

Classification

Mainly methodology

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Primary author: RAYMAEKERS, Jakob (University of Antwerp)

Presenter: RAYMAEKERS, Jakob (University of Antwerp)

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