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New insights about robust kernel PCA

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Kernel Principal Component Analysis (KPCA) extends linear PCA from a Euclidean space to data provided in the form of a kernel matrix. Several authors have studied its sensitivity to outlying cases and have proposed robust alternatives, as well as outlier detection diagnostics. We investigate the behavior of kernel ROBPCA, which relies on the Stahel-Donoho outlyingness in feature space (Debruyne and Verdonck, 2010). It turns out that one needs an appropriate selection of directions in which to compute the outlyingness. The outlier map of linear PCA also needs to be adapted to the kernel setting. Our study involves simulated and real data sets, such as the MNIST fashion data.

Type of presentation

Talk

Classification

Mainly methodology

Keywords

robust statistics, kernel pca, outlier detection

Primary authors: DAGIDIR, Can Hakan (KU Leuven); HUBERT, Mia (KU Leuven); Prof. ROUSSEEUW, Peter (KU Leuven)

Presenter: DAGIDIR, Can Hakan (KU Leuven)

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