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Maximum Correntropy Criterion Partial Least Squares

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Abstract

Partial least squares(PLS) has been extensively used to solve problems such as infrared quantitative analysis, economic data analysis, object tracking. PLS finds a linear regression model by projecting the predicted variables and the response to a new space. A major drawback of existing PLS methods is that regression coefficient will be affected by outliers. Thus, partial least squares experience significant performance degradation when gross outliers are presented. The problem of robust partial least squares has been relatively unexplored in Chemometrics and other related fields. In this paper, a new maximum correntropy based partial least squares is proposed to build robust model. We then proposed a solution algorithm for proposed model. Moreover, we also conducted convergence analysis to mathematically support the proposed model. Extensive experiments are conducted with four public data sets and experimental results demonstrate that our proposed regression method can lead to better accuracy to existing methods.

Keywords: maximum correntropy; robustness; partial least squares; regression

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