

STATISTICAL ANALYSIS AND DATA MINING

Research Article

Modeling local nonlinear correlations using subspace principal curves

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Abstract

While analyzing some of the complex real - world datasets, it is vital to identify local correlations in the subspaces. Some of the critical limitations of the subspace clustering techniques in identifying order revealing subspace correlation patterns motivate the need for more advanced subspace techniques. We formalize the problem of identifying local nonlinear correlations in high - dimensional data and build subspace models to capture such correlations. In this paper, we propose a new method for computing subspace principal curve models which can effectively capture these local patterns in the data. We demonstrate the results of the proposed method using several real - world datasets and highlight the advantages of our model compared to the other state - of - the - art techniques proposed in the literature. We also show the improved performance of the proposed algorithm in related problems such as missing data imputation and regression analysis compared to some of the state - of - the - art methods. © 2010 Wiley Periodicals, Inc. Statistical Analysis and Data Mining 3: 332 - 349, 2010

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