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地　点：电院群楼2-530会议室

Improved Robust Tensor Principal Component Analysis via Low Rank Core Matrix

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Abstract:

Robust principal component analysis (RPCA) has been widely used for many data analysis problems in matrix data. Robust tensor principal component analysis (RTPCA) aims to extract the low rank and sparse components of multi-dimensional data, which is a generation of RPCA. The current RTPCA methods are directly based on tensor singular value decomposition (t-SVD), which is a new tensor decomposition method similar to singular value decomposition (SVD) in matrices. These methods focus on utilizing different sparse constraints for real applications and make less analysis for tensor nuclear norm (TNN) defined in t-SVD. However, we find low rank structure still exists in the core tensor and existing methods cannot fully extract the low rank structure of tensor data. To further exploit the low rank structures in multi-way data, we extract low rank component for the core matrix whose entries are from the diagonal elements of the core tensor. Based on this idea, we have defined a new tensor nuclear norm that extends TNN with core matrix and propose a creative algorithm to deal with RTPCA problems. The results of numerical experiments show that the proposed method outperforms state-of-the-art methods in terms of both accuracy and computational complexity.

Biography:

刘翼鹏分别于 2006 年和 2011 年获得电子科技大学工学学士和工学博士学位。先后在西南电子技术研究所、清华大学（北京）、华为技术成都研究所、比利时鲁汶大学、清华大学（台湾）访问和工作；2014 年至今，任电子科技大学信息与通信工程学院特聘副教授，并同时受聘于机器人研究中心和信息医学研究中心。主要从事人工智能、图像处理、数学优化、医学工程交叉学科领域研究工作。曾主持/主研欧盟研究理事会高级项目、比利时佛兰德科学基金、中国国家自然科学基金。他目前是 IEEE 高级会员，信号处理协会技术委员会附属委员；中国计算机学会多媒体技术专委会委员。在包括 IEEE TMI, IEEE JSTSP, IEEE TSP, IEEE TMM 在内的重要国际期刊和会议发表论文 50 余篇。