Accepted Manuscript

Fast Optimization Algorithm on Riemannian Manifolds and Its Application in Low-Rank Learning

Haoran Chen, Yanfeng Sun, Junbin Gao, Yongli Hu, Baocai Yin

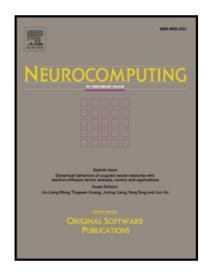
PII: \$0925-2312(18)30204-2

DOI: 10.1016/j.neucom.2018.02.058

Reference: NEUCOM 19348

To appear in: Neurocomputing

Received date: 12 January 2017
Revised date: 18 November 2017
Accepted date: 11 February 2018



Please cite this article as: Haoran Chen, Yanfeng Sun, Junbin Gao, Yongli Hu, Baocai Yin, Fast Optimization Algorithm on Riemannian Manifolds and Its Application in Low-Rank Learning, *Neurocomputing* (2018), doi: 10.1016/j.neucom.2018.02.058

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Fast Optimization Algorithm on Riemannian Manifolds and Its Application in Low-Rank Learning

Haoran Chen¹, Yanfeng Sun¹, Junbin Gao², Yongli Hu¹, and Baocai Yin³

Abstract

The paper proposes a first-order fast optimization algorithm on Riemannian manifolds (FOA) to address the problem of speeding up optimization algorithms for a class of composite functions on Riemannian manifolds. The theoretical analysis for FOA shows that the algorithm achieves the optimal rate of convergence for function values sequence. The experiments on the matrix completion task show that FOA has better performance than other existing first-order optimization methods on Riemannian manifolds. A subspace pursuit method (SP-RPRG(ALM)) based on FOA is also proposed to solve the low-rank representation model with the augmented Lagrange method (ALM) on the low-rank matrix variety. Experimental results on synthetic data and public databases are presented to demonstrate that both FOA and SP-RPRG (ALM) can achieve superior performance in terms of faster convergence and higher accuracy. We have made the experimental code public at https://github.com/Haoran2014.

Keywords: Fast optimization algorithm, Riemannian manifolds, Low-rank matrix variety, Low-rank representation, Subspace pursuit, Augmented Lagrange method, Clustering

¹Beijing Advanced Innovation Center for Future Internet Technology, Faculty of Information Technology, Beijing University of Technology, Beijing 100124, China. E-mail: hr.chen@emails.bjut.edu.cn, {yfsun, huyongli}@bjut.edu.cn

²The Discipline of Business Analytics, The University of Sydney Business School, The University of Sydney, NSW 2006, Australia. E-mail: junbin.gao@sydney.edu.au

³Faculty of Electronic Information and Electrical Engineering, Dalian University of Technology, Dalian 116024, China. E-mail: ybc@dlut.edu.cn

دريافت فورى ب متن كامل مقاله

ISIArticles مرجع مقالات تخصصی ایران

- ✔ امكان دانلود نسخه تمام متن مقالات انگليسي
 - ✓ امكان دانلود نسخه ترجمه شده مقالات
 - ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
 - ✓ امكان دانلود رايگان ۲ صفحه اول هر مقاله
 - ✔ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
 - ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات