

# Jun Liu

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## CONTACT INFORMATION

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## RESEARCH INTERESTS

• Large-Scale Sparse Learning • Feature Extraction • Face Recognition

Recently, I focused on the efficient optimization in large-scale sparse learning, based on  $\ell_1$ -norm and its variants. I am the principal developer for the SLEP (Sparse Learning with Efficient Projections) package, which provides efficient solvers for quite a few sparse learning models including Lasso, group Lasso, fused Lasso, tree structured group Lasso, overlapping group Lasso, sparse inverse covariance estimation, nuclear norm regularization, and so on.

## EDUCATION

Nanjing University of Aeronautics and Astronautics Nanjing, P. R. China

Ph.D., Computer Science 2002.9-2007.11

• Dissertation Topic: “Research on Subspace Representation of Face Images”

• Advisor: Prof. Songcan Chen

Nantong University Nantong, P. R. China

Bachelor, Computer Science 1998.9-2002.7

## PROFESSIONAL APPOINTMENTS

*Lecture* 2007.11-2009.6

The computer science department of Nanjing University of Aeronautics and Astronautics

*Associate Professor* 2009.6-2010.5

The computer science department of Nanjing University of Aeronautics and Astronautics

*Postdoc* 2008.2-2010.11

The Biodesign Institute and the Computer Science and Engineering, Arizona State University

*Research Scientist* 2010.12-2011.2

The Biodesign Institute and the Computer Science and Engineering, Arizona State University

*Research Scientist* 2011.2-present

Siemens Corporate Research

## HONORS AND AWARDS

“Three Goodness” Graduate Student of Nanjing University of Aeronautics and Astronauts 2005

China Aviation Supplies Import & Export Group Corporation (CASC) Prize 2006

The 13th International Conference on Neural Information Processing (ICONIP) Travel Award 2006

The 21st International Joint Conference on Artificial Intelligence (IJCAI) Travel Award 2009

The 23rd Annual Conference on Neural Information Processing Systems (NIPS) Travel Award 2009

The 25th Conference on Uncertainty in Artificial Intelligence (UAI) Travel Award 2009

Excellent Ph.D. Thesis of Jiansu Province, P. R. China 2009

The 24th Annual Conference on Neural Information Processing Systems (NIPS) Travel Award 2010

- [1] J. Liu and J. Ye. “Moreau-Yosida Regularization for Grouped Tree Structure Learning”, *Advances in Neural Information Processing Systems* (NIPS) 2010.
- [2] J. Liu, L. Yuan, and J. Ye. “An Efficient Algorithm for a Class of Fused Lasso Problems”, *ACM SIGKDD Conference on Knowledge Discovery and Data Mining* (KDD) 2010.
- [3] H. Liu, J. Zhang, X. Jiang, and J. Liu, The Group Dantzig Selector, *International Conference on Artificial Intelligence and Statistics* (AI & Statistics) 2010.
- [4] X. Tan, Y. Li, J. Liu, and L. Jiang, Face Liveness Detection from A Single Image with Sparse Low Rank Bilinear Discriminative Model, *European Conference on Computer Vision* (ECCV) 2010.
- [5] J. Liu, S. Ji, and J. Ye, Multi-Task Feature Learning Via Efficient  $\ell_{2,1}$ -Norm Minimization, *Uncertainty in Artificial Intelligence* (UAI) 2009.
- [6] J. Liu, J. Chen, and J. Ye, Large-Scale Sparse Logistic Regression, *ACM SIGKDD Conference on Knowledge Discovery and Data Mining* (KDD) 2009.
- [7] J. Liu and J. Ye, Efficient Euclidean Projections in Linear Time, *International Conference on Machine Learning* (ICML) 2009.
- [8] J. Liu, J. Chen, S. C. Chen, and J. Ye, Learning the Optimal Neighborhood Kernel for Classification, *International Joint Conference on Artificial Intelligence* (IJCAI) 2009.
- [9] J. Chen, L. Tan, J. Liu, and J. Ye, A Convex Formulation for Learning Shared Structures from Multiple Tasks, *International Conference on Machine Learning* (ICML) 2009.
- [10] L. Sun, J. Liu, J. Chen, and J. Ye. Efficient Recovery of Jointly Sparse Vectors, *Annual Conference on Neural Information Processing Systems* (NIPS) 2009.
- [11] S. Huang, J. Li, L. Sun, J. Liu, T. Wu, K. Chen, A. Fleisher, E. Reiman, and J. Ye. Learning Brain Connectivity of Alzheimer’s Disease from Neuroimaging Data, *Conference on Neural Information Processing Systems* (NIPS) 2009.
- [12] L. Sun, R. Patel, J. Liu, K. Chen, T. Wu, J. Li, E. Reiman, and J. Ye, Mining Brain Region Connectivity for Alzheimer’s Disease Study via Sparse Inverse Covariance Estimation, *ACM SIGKDD Conference on Knowledge Discovery and Data Mining* (KDD) 2009
- [13] J. Liu, S. C. Chen, Z. H. Zhou, and X. Tan. “Single Image Subspace for Face Recognition.” *IEEE International Workshop on Analysis and Modeling of Faces and Gestures* (AMFG, In conjunction with ICCV) 2007.
- [14] X. Tan, S. C. Chen, Z. H. Zhou and J. Liu. “Learning Non-Metric Partial Similarity Based on Maximal Margin Criterion.” *IEEE Computer Society Conference on Computer Vision and Pattern Recognition* (CVPR) 2006.
- [15] X. Tan, J. Liu and S. C. Chen. “Recognition From a Single Sample Per Person With Multiple SOM Fusion.” *International Symposium on Neural Networks* (ISNN) 2006.
- [16] J. Liu and S. C. Chen. “Resampling LDA/QR and PCA+LDA for Face Recognition.” *Australian Joint Conference on Artificial Intelligence* (AJCAI) 2005.

[17] X. Tan, J. Liu and S. C. Chen. “Weighted SOM-Face: Selecting Local Features for Recognition From Individual Face Image.” *Intelligent Data Engineering and Automated Learning (IDEAL)* 2005.

[18] D. Zhang, S. C. Chen and J. Liu. “Representing Image Matrices: Eigenimages Versus Eigenvectors.” *International Symposium on Neural Networks (ISNN)* 2005.

[19] J. Liu, S. C. Chen and Z. H. Zhou. “Progressive Principal Component Analysis.” *International Symposium on Neural Networks (ISNN)* 2004.

*Journal*

[1] J. Liu, S. C. Chen, Z. H. Zhou and X. Tan. “Generalized Low Rank Approximations of Matrices Revisited.” *IEEE Transactions on Neural Networks*, 21, no. 4 (2010): 621-632.

[2] Y. L. Zhu, J. Liu, S. C. Chen, Semi-Random Subspace Method for Face Recognition. *Image & Vision Computing*, 27, no. 9 (2009): 1358-1370.

[3] X. Tan, S. C. Chen, Z. H. Zhou, and J. Liu, Face Recognition under Occlusions and Variant Expressions with Partial Similarity, *IEEE Transactions on Information Forensics & Security*, 4, no. 2 (2009): 217-230.

[4] J. Liu, S. C. Chen and X. Tan. “Fractional order Singular Value Decomposition Representation for Face Recognition.” *Pattern Recognition* 41, no. 1 (2008): 378-395.

[5] J. Liu, S. C. Chen and X. Tan. “A Study on Three Linear Discriminant Analysis Based Methods in Small Sample Size Problem.” *Pattern Recognition*, 41, no. 1 (2008): 102-116.

[6] Z. Wang, S. C. Chen, J. Liu, and D. Zhang. “Pattern Representation in Feature Extraction and Classification- Matrix Versus Vector.” *IEEE Transactions on Neural Networks*, 19, no. 5, (2008): 758-769.

[7] J. Liu, S. C. Chen, X. Tan and D. Zhang. “Comments on “Efficient and Robust Feature Extraction by Maximum Margin Criterion”.” *IEEE Transactions on Neural Networks*, 18, no. 6 (2007): 1862-1864.

[8] J. Liu, S. C. Chen, X. Tan and D. Zhang. “Efficient Pseudo-Inverse Linear Discriminant Analysis and Its Nonlinear Form for Face Recognition.” *International Journal of Pattern Recognition and Artificial Intelligence*, 21, no. 8 (2007): 1265-1278.

[9] J. Liu and S. C. Chen. “Discriminant Common Vectors versus Neighbourhood Components Analysis and Laplacianfaces: A Comparative Study in Small Sample Size Problem.” *Image and Vision Computing* 24, no. 3 (2006): 249-262.

[10] J. Liu and S. C. Chen. “Non-Iterative Generalized Low Rank Approximation of Matrices.” *Pattern Recognition Letters* 27, no. 9 (2006): 1002-1008.

[11] X. Tan, J. Liu and S. C. Chen. “Sub-Intrapersonal Space Analysis for Face Recognition.” *Neurocomputing* 69, no. 13-15 (2006): 1796-801.

[12] S. C. Chen, J. Liu and Z. H. Zhou. “Making FLDA Applicable to Face Recognition With One Sample Per Person.” *Pattern Recognition* 37, no. 7 (2004): 1553-1555.

*Preprint*

- [1] [J. Liu](#) and J. Ye. “Efficient  $\ell_1/\ell_q$ -norm Regularization”, *arXiv:1009.4766v1*, 2010.
- [2] [J. Liu](#) and J. Ye. “Fast Overlapping Group Lasso”, *arXiv:1009.0306v1*, 2010.

PROFESSIONAL  
ACTIVITIES

*Tutorial*

- J. Liu, S. Ji, and J. Ye. “Mining Sparse Representations: Formulations, Algorithms, and Applications.” SIAM Conference on Data Mining (SDM), Columbus, Ohi, USA, 2010.

*Journal Reviewers*

- Computational Statistics and Data Analysis
- Frontiers of Computer Science in China
- IEEE Transactions on Image Processing
- IEEE Transactions on Circuits and Systems for Video Technology
- IEEE Transactions on Knowledge and Data Engineering
- IEEE Transactions on Neural Networks
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- IEEE Transactions on Systems, Man, and Cybernetics, Part B
- Image and Vision Computing
- Information Science
- International Journal of Pattern Recognition and Artificial Intelligence
- International Journal of Software and Informatics
- Journal of Software and Informatics
- Journal of Computer Science and Technology
- Neurocomputing
- Pattern Analysis & Applications
- Pattern Recognition Letters
- SCIENCE CHINA Information Sciences
- Signal Processing

*Conference Reviewers or Program Committee Members*

- International Conference on Machine Learning 2010, 2011
- ACM SIGKDD Conference on Knowledge Discovery and Data Mining 2011
- International Conference on Data Mining, 2011
- European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD) 2010
- International Conference on Machine Learning and Applications 2007, 2008, 2009, 2010, 2011
- International Symposium on Neural Networks 2007
- ACM SIGKDD Conference on Knowledge Discovery and Data Mining 2010 (External Reviewer)
- European Conference on Computer Vision 2010 (External Reviewer)

MAIN SOFTWARES  
DEVELOPED

I have developed the SLEP package, which provides functions for quite a few sparse learning models:

- $\ell_1$ -norm Regularized / Constrained Optimization
- $\ell_1/\ell_q$ -norm Regularized Optimization
- Fused Lasso
- Tree Structured Group Lasso

- Overlapping Group Lasso
- Sparse Inverse Covariance Estimation
- Trace Norm Regularized Optimization

The SLEP package is available at <http://www.public.asu.edu/~jye02/Software/SLEP/>.

Currently, the SLEP package is implemented in Matlab, with the associated Euclidean projections in C. The C version is under testing.

#### SUMMARY

- Skilled experience in creative research.
- Solid mathematical and statistical knowledge foundation.
- Strong programming ability. Master C, C++, Matlab.
- Competent communication skill.
- Skilled scientific writing.