Yaoliang Yu (CMU) February 29, 2016

CONTACT INFORMATION

Machine Learning Department
Carnegie Mellon University
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RESEARCH INTERESTS

My research revolves around machine learning, statistics and optimization, and my goal is to advance big data analytics using computational and statistical tools. My work spans a wide range of topics such as robust regression and classification, representation learning, kernel methods, collaborative filtering, topic models, convex and nonconvex optimization, distributed system, clustering, and metric learning. I am dedicated to applying statistical machine learning methodologies to healthcare, genetics, computer vision, and multimedia domains.

WORK EXPERIENCE

Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA, USA

- 08/2015 - present, **Research Scientist**, Center for Machine Learning and Health
- 03/2015 - 07/2015, *Project Scientist*
- 02/2014 - 02/2015, *Postdoctoral Fellow*

Supervisor: Eric P. Xing

EDUCATION

09/2008 - 11/2013, **PhD** (Statistical Machine Learning Program), Computing Science, University of Alberta, Canada

Supervisors: Dale Schuurmans and Csaba Szepesvári

Thesis: Fast Gradient Algorithms for Structured Sparsity

PhD Dissertation Award from the Canadian Artificial Intelligence Association, 2015

PhD Outstanding Thesis Award Winner, University of Alberta, 2014

09/2005 - 06/2008, MSc, Electronic Engineering, Fudan University, Shanghai, China

Supervisor: Liming Zhang

Thesis: Locality-based Dimensionality Reduction Methods and Their Application in Face Recognition

09/2002 - 06/2005, BSc, Electronic Engineering, Fudan University, Shanghai, China

PUBLICATIONS

[1] M. Law, **Y. Yu**, M. Cord, and E. Xing. "Closed-Form Training of Mahalanobis Metric for Supervised Clustering." In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*. 2016.

[2] X. Chang, **Yao-Liang Yu**, Y. Yang, and E. Xing. "Not Equally Reliable: Semantic Event Search using Differentiated Concept Classifiers." In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*. 2016.

[3] H. Cheng, **Y. Yu**, X. Zhang, E. Xing, and D. Schuurmans. "Scalable and Sound Low-Rank Tensor Learning." In: *International Conference on Artificial Intelligence and Statistics (AISTATS)*. 2016.

[4] Y. Zhou, **Y. Yu**, W. Dai, Y. Liang, and E. Xing. "On Convergence of Model Parallel Proximal Gradient Algorithm for Stale Synchronous Parallel System." In: *International Conference on Artificial Intelligence and Statistics (AISTATS)*. 2016.

[5] E. Xing, Q. Ho, W. Dai, J. Kim, J. Wei, S. Lee, X. Zheng, P. Xie, A. Kumar, and **Y. Yu**. "Petuum: A New Platform for Distributed Machine Learning on Big Data." In: *IEEE Transactions on Big Data* 1.2 (2015), pp. 49–67. (Preliminary version appeared in KDD, 2015).

[6] X. Chang, **Yao-Liang Yu**, Y. Yang, and A. Hauptmann. "Searching Persuasively: Joint Event Detection and Evidence Recounting with Limited Supervision." In: *ACM Conference on Multimedia (MM)*. 2015.

[7] X. Zheng, **Yao-Liang Yu**, and E. Xing. "Linear Time Samplers for Supervised Topic Models using Compositional Proposals." In: *ACM Conference on Knowledge Discovery and Data Mining (KDD)*. 2015.

[8] X. Chang, Y. Yang, A. Hauptmann, E. Xing, and **Yao-Liang Yu**. "Semantic Concept Discovery for Large-Scale Zero-Shot Event Detection." In: *International Joint Conference on Artificial Intelligence (IJCAI)*. 2015.

[9] **Yao-Liang Yu**, X. Zheng, M. Marchetti-Bowick, and E. Xing. "Minimizing Nonconvex Non-Separable Functions." In: *International Conference on Artificial Intelligence and Statistics (AISTATS)*. 2015.

[10] A. Yu, W. Ma, **Y. Yu**, J. Carbonell, and S. Sra. "Efficient Structured Matrix Rank Minimization." In: *Advances in Neural Information Processing Systems (NIPS)*. 2014.

[11] **Yao-Liang Yu**. "Better Approximation and Faster Algorithm Using the Proximal Average." In: *Advances in Neural Information Processing Systems (NIPS)*. 2013.

[12] **Yao-Liang Yu**. "On Decomposing the Proximal Map." In: *Advances in Neural Information Processing Systems (NIPS)*. 2013. (**Oral presentation, 20/1420**).

[13] X. Zhang, **Y. Yu**, and D. Schuurmans. "Polar Operators for Structured Sparse Estimation." In: *Advances in Neural Information Processing Systems (NIPS)*. 2013.

[14] **Yao-Liang Yu**, H. Cheng, D. Schuurmans, and C. Szepesvári. "Characterizing the Representer Theorem." In: *International Conference on Machine Learning (ICML)*. 2013.

[15] X. Zhang, **Y. Yu**, and D. Schuurmans. "Accelerated Training for Matrix-Norm Regularization: A Boosting Approach." In: *Advances in Neural Information Processing Systems (NIPS)*. 2012.

[16] M. White, **Y. Yu**, X. Zhang, and D. Schuurmans. "Convex Multi-view Subspace Learning." In: *Advances in Neural Information Processing Systems (NIPS)*. 2012.

[17] **Y. Yu**, Ö. Aslan, and D. Schuurmans. "A Polynomial-time Form of Robust Regression." In: *Advances in Neural Information Processing Systems (NIPS)*. 2012.

[18] **Y. Yu**, J. Neufeld, R. Kiros, X. Zhang, and D. Schuurmans. "Regularizers versus Losses for Nonlinear Dimensionality Reduction." In: *International Conference on Machine Learning (ICML)*. 2012.

[19] **Yao-Liang Yu** and C. Szepesvári. "Analysis of Kernel Mean Matching under Covariate Shift." In: *International Conference on Machine Learning (ICML)*. 2012.

[20] **Yao-Liang Yu** and D. Schuurmans. "Rank/Norm Regularization with Closed-Form Solutions: Application to Subspace Clustering." In: *Conference on Uncertainty in Artificial Intelligence (UAI)*. 2011.

[21] X. Zhang, **Y. Yu**, M. White, R. Huang, and D. Schuurmans. "Convex Sparse Coding, Subspace Learning, and Semi-Supervised Extensions." In: *Association for the Advancement of Artificial Intelligence (AAAI)*. 2011.

[22] **Yao-Liang Yu**, J. Jiang, and L. Zhang. "Distance Metric Learning by Minimal Distance Maximization." In: *Pattern Recognition* 44 (2011), pp. 639–649.

[23] **Y. Yu**, M. Yang, L. Xu, M. White, and D. Schuurmans. "Relaxed Clipping: A Global Training Method for Robust Regression and Classification." In: *Advances in Neural Information Processing Systems (NIPS)*. 2010.

[24] **Yao-Liang Yu**, Y. Li, D. Schuurmans, and C. Szepesvári. "A General Projection Property for Distribution Families." In: *Advances in Neural Information Processing Systems (NIPS)*. 2009.

[25] P. Guan, **Y. Yu**, and L. Zhang. "A Novel Facial Feature Point Localization Method on 3D Faces." In: *IEEE Conference on Image Processing (ICIP)*. 2007.

Preprints

[26] X. Chang, **Yao-Liang Yu**, Y. Yang, and E. Xing. "Semantic Pooling for Untrimmed Video Analysis." Submitted to IEEE Transactions on Pattern Analysis and Machine Intelligence. Nov. 2015. (Preliminary version appeared in ICML, 2015).

[27] **Y. Yu**, X. Zhang, and D. Schuurmans. "Generalized Conditional Gradient for Sparse Estimation." Submitted to Journal of Machine Learning Research. 2014.

Invited Talks (Selected)

- Fast Gradient Algorithms for Structured Sparsity, CAIAC-Dalhousie, 2015.
- Robust Regression and Efficient Optimization, NICTA-Canberra, 2013.
- Generalized Conditional Gradient and Its Applications, UBC-Okanagan, 2013.
- On Decomposing the Proximal Map, NIPS, 2013.
- Analysis of Kernel Mean Matching under Covariate Shift, ICML, 2012.

Lecture Notes (Selected)

- Convex Analysis, Duality, and Optimization
- Online Learning and Optimization, *Encyclopedia of Algorithms*, 2015
- The Differentiability of the Upper Envelope
- The Proximity Operator
- Various Notions of Compactness

Teaching

- Guest Lecturing
  - *Probabilistic Graphical Models* (10-708), CMU, 2015S
  - *Advanced Optimization and Randomized Methods* (10-801), CMU, 2014S
  - *Machine Learning* (CMPUT 466/551), UofA, 2012F
  - *Matrix and Convex Methods in Machine Learning* (CMPUT 656), UofA, 2010F

- Teaching Assist
  - *Computer Vision* (CMPUT 499/615), UofA, 2012W & 2011W
  - *Numerical Methods* (CMPUT 418), UofA, 2011F
  - *Introduction to Numerical Analysis* (CMPUT 340), UofA, 2009F & 2010F

- *Image Processing: Algorithms and Applications* (CMPUT 306), UofA, 2008F
- *Circuit Theory*, Fudan University, 2006F

SERVICE (REVIEWER)

- Journal of Machine Learning Research [2012 - 2015]
- Machine Learning [2014, 2015]
- Artificial Intelligence [2011, 2013, 2014]
- Neural Computation [2013]
- Theoretical Computer Science [2012]
- IEEE Transactions on Pattern Analysis and Machine Intelligence [2011]
- IEEE Transactions on Automatic Control [2009, 2012, 2014]
- IEEE Transactions on Knowledge and Data Engineering [2015]
- Pattern Recognition Letters [2015]
- Neurocomputing [2012, 2013]
- ICML [2010 - 2016], NIPS [2009, 2011 - 2015], COLT [2009], UAI [2015], AISTATS [2011], IJCAI [2013, 2016], AAAI [2014, 2015]