

# LIANGLIANG CAO

Updated 01/2019

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<http://llcao.net>

## EMPLOYMENT

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Staff Research Scientist, Google AI	10/2018 - now
Affiliated Research Associated Professor, UMass Amherst	08/2018 - now

## WORK HISTORY

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Co-founder, Switi Inc, New York City	08/2016 - 10/2018
Technical Advisor, Samsung NEXT Q Fund, New York City	04/2018 - 10/2018
Adjunct Associate Professor, Columbia University in the City of New York	01/2013 - 12/2018
Senior Research Scientist, Yahoo Labs at New York City	04/2015 - 08/2016
Research Staff Member, IBM T. J. Watson Research Center, NY	06/2011 - 04/2015

## EDUCATION

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Ph.D., University of Illinois at Urbana-Champaign	2011
M.Phil., The Chinese University of Hong Kong	2005
B. E., University of Science and Technology of China	2003

## RESEARCH INTERESTS

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Artificial Intelligence and Its Applications

## SELECTED HONORS

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- ACM SIGMM Rising Star Award, 2017
- IBM Outstanding Accomplishment for Multimedia Team, 2012
- Best Paper Award, International Workshop on Big Data Mining, 2012
- IBM Research Division Awards, 2011 - 2013
- IBM Watson Emerging Leader in Multimedia and Signal Processing, 2010
- First Place in ImageNet Large Scale Visual Recognition Challenge, 2010

## TEACHING EXPERIENCE

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“Deep Learning in Vision, Speech, and Language”,	Columbia University, Fall 2018
“Deep Learning in Vision, Speech, and Language”,	Columbia University, Spring 2017
“Deep Learning in Computer Vision and NLP”	Columbia University, Spring 2015
“Visual Recognition and Search”,	Columbia University, Spring 2014
“Visual Recognition and Search”,	Columbia University, Spring 2013

## PUBLICATION SUMMARY

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Google Scholar <http://scholar.google.com/citations?user=S-hBSfIAAAAJ&hl=en>  
Total 4500+ citations, H-Index 32.  
12 papers with more than one hundred citations.

## SELECTED PUBLICATIONS

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### Journals

12. Y. Liang, L. Jiang, L. Cao, Y. Kalantidis, L.-J. Li, A. Hauptmann, Focal Visual-Text Attention for Memex Question Answering, *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, accepted.
11. Y. Li, L. Cao, J. Zhu, J. Luo, Mining Fashion Outfit Composition Using An End-to-End Deep Learning Approach on Set Data, *IEEE Transaction on Multimedia*, Vol. 9, No. 8, pp. 1946-1955, 2017.
10. L. Wang, X. Zhao, Y. Si, L. Cao, Y. Liu. Context-associative Hierarchical Memory Model for Human Activity Recognition and Prediction. *IEEE Transaction on Multimedia*, Vol. 19, No. 3: pp. 646-659, 2017.
9. Q. You, R. Pan, L. Cao, J. Luo, Image Based Appraisal of Real Estate Properties, *IEEE Transaction on Multimedia*, Vol 19, No. 8, pp. 1946-1955, 2017.
8. Q. You, L. Cao, Y. Cong, X. Zhang, and J. Luo, A Multifaceted Approach to Social Multimedia-based Prediction of Elections, *IEEE Transaction on Multimedia*, Vol 17, No. 12, 2015.
7. J. Smith, L. Cao, N. Codella, M. Hill, M. Merler, Q. Nguyen, E. Pring, R.A. Uceda-Sosa, Massive-scale Learning of Image and Video Semantic Concepts, *IBM Journal of Research and Development*, Vol. 59, Issue 2/3, 2015.
6. W. Guo, L. Cao, T. Han, S. Yan, and C. Xu, Max-Confidence Boosting with Uncertainty for Visual Tracking, *IEEE Transaction on Image Processing*, Vol. 24, No. 5, pp. 1650-1659, 2015.
5. G.-J. Qi, S.-F. Tsai, M.-H. Tsai, L. Cao, and T. S. Huang, Web-Scale Multimedia Information Networks. *Proceedings of the IEEE (PIEEE)*, Vol. 100, No. 9, p. 2688-2704, 2012.
4. S. Chen, L. Cao, Y. Wang, J. Liu, and X. Tang, Image Segmentation by MAP-ML Estimations, *IEEE Transactions on Image Processing*, Vol 19, No. 9, p. 2254-2264, 2010.
3. L. Cao, J. Luo, H. Kautz and T. S. Huang, Image Annotation within the Contest of Personal Photo Collections, *IEEE Transactions on Multimedia*, Vol. 11, No. 2, p. 208-219, 2009.
2. J. Liu, L. Cao, Z. Li and X. Tang. Plane-Based Optimization for 3D Object Reconstruction from Single Line Drawings. *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, vol. 30 (2), p. 315-327, 2008.
1. L. Cao, J. Liu and X. Tang. What the Back of the Object Looks Like: 3D Reconstruction from Line Drawings Without Hidden Line. *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, vol. 30 (3), p. 507-517, 2008.

## Conferences

68. L. Cao, C. Wang, J. Fan, Learning Synonym Extraction via General Feature Expansions, *in submission*
67. J. Liang, L. Jiang, L. Cao, A. Hauptmann, Answer with Grouping Snippets: Focal Visual-Text Attention for Visual Question Answering, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018. (Spotlight)
66. Y. Lu, H. Lu, L. Cao, F. Wu, Learning Deterministic Policy with Target for Inter-Cell Interference Coordination in Wireless Networks, *IEEE Global Communication Conference (GlobeCom)*, 2018
65. W. Tan, S. Chang, L. Fong, C. Li, Z. Wang, L. Cao, Matrix Factorization on GPUs with Memory Optimization and Approximate Computing, *International Conference on Parallel Processing (ICPP)*, 2018.
64. H. Akbari, H. Arora, L. Cao, N. Mesgarani, Lip2Audspect: Speech Reconstruction from Silent Lip Movements Video, *IEEE International Conference on Acoustics, Speech and Signal Processing*

- (*ICASSP*), 2018.
63. Y. Li, J. Yang, Y. Song, L. Cao, J. Luo, J. Li, Learning from Noisy Labels with Distillation, *IEEE International Conference on Computer Vision (ICCV)*, 2017.
  62. L. Jiang, Y. Kalantidis, L. Cao, S. Farfade, J. Tang and A. Hauptmann, Delving Deep into Personal Photo and Video Search, *International Conference on Web Search and Data Mining (WSDM)*, 2017.
  61. L. Jiang, L. Cao, Y. Kalantidis, S. Farfade, A. Hauptmann, Visual Memory Question Answering, *AAAI*, 2017. (demo)
  60. W. Tan, L. Cao, L. Fong, Faster and Cheaper: Parallelizing Large-Scale Matrix Factorization on GPUs, *ACM Symposium on High-Performance Parallel and Distributed Computing (HPDC)*, 2016. (also appeared in Nvidia Research Highlight)
  59. W. Ma, L. Cao, L. Yu, G. Long and Y. Li, GPU-FV: Realtime Fisher Vector and Its Applications in Video Monitoring, *ACM International Conference on Multimedia Retrieval (ICMR)*, 2016.
  58. L. Cao, J. Hsiao, P. de Juan, Y. Li and B. Thomee, Incremental Learning for Fine-Grained Image Recognition, *ACM International Conference on Multimedia Retrieval (ICMR)*, 2016.
  57. C. Wang, L. Cao, J. Fan, Building Joint Spaces for Relation Extraction, *International Joint Conference on Artificial Intelligence (IJCAI)*, 2016.
  56. Y. Bai, W. Ma, Y. Li, L. Cao, W. Guo, L. Yang, Multi-Scale Fully Convolutional Network for Fast Face Detection, *British Machine Vision Conference (BMVC)*, 2016
  55. Q. You, L. Cao, H. Jin, J. Luo, Robust Visual-Textual Sentiment Analysis: When Attention meets Tree-structured Recursive Neural Networks, *ACM Conference on Multimedia (ACM MM)*, 2016.
  54. R. Schifanella, P. de Juan, J. Tetreault, L. Cao, Detecting Sarcasm in Multimodal Social Platforms, *ACM Conference on Multimedia (ACM MM)*, 2016.
  53. Y. Li, Y. Song, L. Cao, J. Tetreault, J. Luo, TGIF: A New Dataset and Benchmark on Animated GIF Description, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2016. (Spotlight)
  52. M. Gygli, Y. Song, L. Cao, Video2GIF: Automatic Generation of Animated GIFs from Video, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2016.
  51. N. Yakovenko, L. Cao, C. Raffel, and J. Fan, Poker-CNN: A Pattern Learning Strategy for Making Draws and Bets in Poker Games, *AAAI*, 2016.
  50. C. Wang, L. Cao, B. Zhou, Medical Synonym Extraction with Concept Space Models, *International Joint Conferences on Artificial Intelligence (IJCAI)*, 2015.
  49. J. Bowler, R. Feris, L. Cao, J. Wang, M. Zhou, Automated Axon Segmentation from Highly Noisy Microscopic Videos, *IEEE Winter Conference on Applications of Computer Vision (WACV)* 2015.
  48. M. Merler, L. Cao, J. R. Smith, You are what you tweet pic! gender prediction based on semantic analysis of social media images, *IEEE International Conference on Multimedia and Expo (ICME)*, 2015.
  47. L. Cao, Z. Yan, J. R. Smith, Multi-facet Learning using Deep Convolutional Neural Network for Person-Related Categories in Photos, *ACM International Conference on Multimedia Retrieval (ICMR)*, 2015.
  46. Y. Cui, Y. Xiang, K. Rong, R. Feris, L. Cao, A Spatial-Color Layout Feature for Content-based Galaxy Image Retrieval, *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2014.

45. S. Albaradei, Y. Wang, L. Cao, L.-J. Li: Learning mid-level features from object hierarchy for image classification, *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2014.
44. Y. Bao, L. Cao, H. Li, J. Tang, Cuteness Recognition and Localization in the Photos of Animals, *ACM Conference on Multimedia (ACM MM)*, 2014.
43. F. Yu, L. Cao, M. Merler, N. Codella, T. Chen, J. R. Smith; S.-F. Chang, Modeling attributes from category-attribute proportions, *ACM Conference on Multimedia (ACM MM)*, 2014.
42. Q. Chen, Z. Song, R. Feris, A. Datta, L. Cao, Z. Huang, S. Yan, Efficient Maximum Appearance Search for Large-Scale Object Detection, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2013.
41. F. Yu, L. Cao, R. Feris, J. R. Smith, S.-F. Chang, Designing Category-Level Attributes for Discriminative Visual Recognition, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2013.
40. Z. Li, S. Chang, F. Liang, T. S. Huang, L. Cao, J. R. Smith, Learning Locally-Adaptive Decision Functions for Person Verification *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2013.
39. X. Liang, L. Lin, and L. Cao, Learning Latent Spatio-Temporal Compositional Model for Human Action Recognition, *ACM Conference on Multimedia (ACM MM)*, 2013. (Oral presentation)
38. L. Cao, L. Gong, J. R. Kender, N. Codella, J. R. Smith, Learning by Focusing: A New Framework for Concept Recognition and Feature Selection, *IEEE International Conference on Multimedia and Expo*, 2013.
37. N. Codella, G. Hua, L. Cao, M. Merler, L. Gong, M. Hill, J. Smith: Large-scale video event classification using dynamic temporal pyramid matching of visual semantics, *IEEE International Conference on Image Processing (ICIP)*, 2013.
36. L. Cao, Z. Li, Y. Mu, S.-F. Chang, A Unified Submodular Framework towards Video Pooling and Hashing, *ACM Conference on Multimedia (ACM MM)*, 2012. (Oral presentation)
35. L. Cao, Y. Mu, A. Natsev, S.-F. Chang, G. Hua, J. R. Smith, Scene Aligned Pooling for Complex Video Recognition, *European Conference on Computer Vision (ECCV)*, 2012.
34. L. Cao, J. Smith, Z. Wen, Z. Yin, X. Jin, J. Han, BlueFinder: Estimate Where a Beach Photo Was Taken, *International Conference on World Wide Web (WWW)*, 2012.
33. L. Cao, H. D. Kim, M.-H. Tsai, B. Cho, Z. Li, I. Gupta, C. Zhai, and T. S. Huang, Delta-SimRank Computing on MapReduce, *1st International Workshop on Big Data, Streams and Heterogeneous Source Mining (BigMine)*, 2012. (**Best Paper Award**)
32. L. Cao, Y.-C. Chang, N. Codella, M. Merler Q.-B. Nguyen, J. R. Smith, Multimedia Analytics: Modality Classification and Case-Based Retrieval tasks of ImageCLEF2012, *ImageCLEF Workshop 2012*. (**Winner of medical image classification track**)
31. N. Codella, A. Natsev, G. Hua, M. L. Hill, L. Cao, L. Gong, J. R. Smith, Video Event Detection Using Temporal Pyramids of Visual Semantics with Kernel Optimization and Model Subspace Boosting, *IEEE International Conference on Multimedia and Expo (ICME)*, 2012
30. Z. Li, H. Ning, L. Cao, T. Zhang, Y. Gong, T. S. Huang, Learning to Search Efficiently in High Dimensions, *Advances in Neural Information Processing Systems (NIPS)*, 2011.
29. Z. Yin, L. Cao, J. Han, C. Zhai, T. S. Huang, Geographical Topic Discovery and Comparison, *International Conference on World Wide Web (WWW)*, 2011. (Oral presentation)

28. S.-F. Tsai, L. Cao, F. Tang, T. S. Huang, Compositional Object Pattern: a New Model for Album Event Recognition, *ACM Conference on Multimedia (ACM MM)*, 2011.
27. Y. Lin, F. Lv, S. Zhu, M. Yang, T. Cour, K. Yu, L. Cao, T. S. Huang, Large-scale Image Classification: Fast Feature Extraction and SVM Training, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2011.
26. Z. Yin, L. Cao, J. Han, C. Zhai, T. S. Huang, LPTA: A Probabilistic Model for Latent Periodic Topic Analysis, *IEEE International Conference on Data Mining (ICDM)*, 2011.
25. Z. Yin, L. Cao, J. Han, J. Luo, T. S. Huang, Diversified Trajectory Pattern Ranking in Geo-Tagged Social Media, *SIAM International Conference on Data Mining (SDM)*, 2011.
24. L. Cao, S.-F. Chang, N. Codella, C. Cotton, Dan. Ellis, L. Gong, M. Hill, G. Hua, J. Kender, M. Merler, Y. Mu, A. Natseve, J. Smith, IBM Research and Columbia University TRECVID-2011 Multimedia Event Detection (MED) System, *NIST TRECVID Workshop*, 2011.
23. L. Cao, Z. Liu, and T. S. Huang, Cross-dataset Action Detection, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2010.
22. K. Yu, F. Lv, Y. Lin, S. Zhu, M. Yang, L. Cao, T. S. Huang, Large Scale Image Semantic Search, *European Conference on Computer Vision (ECCV) demo*, 2010.
21. L. Cao, A. Del Pozo, X. Jin, J. Luo, J. Han and T. S. Huang, RankCompete: Simultaneous Ranking and Clustering of Web Photos, *International Conference on World Wide Web (WWW)*, 2010.
20. J. Xin, A. Gallagher, L. Cao, J. Luo and J. Han, The Wisdom of Social Media: Using Flickr for Prediction and Forecast, *ACM Conference on Multimedia (ACM MM)*, 2010.
19. X. Jin, J. Han, L. Cao, J. Luo, B. Ding, C. Lin, Visual Cube and On-Line Analytical Processing of Images, *ACM Conference on Information and Knowledge Management (CIKM)*, 2010.
18. L. Cao, Y. Tian, Z. Liu, Z. Yao, Z. Zhang, T. S. Huang: Action detection using multiple spatial-temporal interest point features. *IEEE International Conference on Multimedia and Expo (ICME)*, 2010.
17. V. Le, H. Tang, L. Cao, T. Huang: Accurate and efficient reconstruction of 3D faces from stereo images. *IEEE International Conference on Image Processing (ICIP)* 2010.
16. L. Cao, J. Luo, A. Gallagher, X. Jin, J. Han, T. Huang: A worldwide tourism recommendation system based on geotaggedweb photos, *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)* 2010.
15. X. Jin, S. Kim, J. Han, L. Cao, Z. Yin, GAD: General Activity Detection for Fast Clustering on Large Data, *SIAM International Conference on Data Mining (SDM)*, 2009.
14. Y. Hu, L. Cao, F. Lv, S. Yan, Y. Gong, and T. S. Huang, Event Detection in Complex Scenes with Spatial and Temporal Ambiguities, *IEEE International Conference on Computer Vision (ICCV)*, 2009. (Oral presentation)
13. L. Cao, J. Luo, F. Liang, and T. S. Huang, Heterogeneous Feature Machines for Visual Recognition, *IEEE International Conference on Computer Vision (ICCV)*, 2009.
12. L. Cao, J. Yu, J. Luo, and T. S. Huang, Enhancing Semantic and Geographic Annotation of Web Images via Logistic Canonical Correlation Regression, *ACM Conference on Multimedia (ACM MM)*, 2009.
11. L. Cao, J. Luo, T. S. Huang, Annotating Photo Collections by Label Propagation According to Multiple Similarity Cues, *ACM Conference on Multimedia (ACM MM)*, 2008.

10. Y. Fu, L. Cao, G. Guo, T. S. Huang: Multiple feature fusion by subspace learning. *ACM International Conference on Image and Video Retrieval (CIVR)*, 2008.
9. A. Gallagher, C. Neustaedter, J. Luo, L. Cao, T. Chen, Image Annotation Using Personal Calendars as Context, *ACM Conference on Multimedia (ACM MM)*, 2008.
8. L. Cao, M. Dikmen, Y. Fu, T. S. Huang, Gender Recognition from Body, *ACM Conference on Multimedia (ACM MM)*, 2008.
7. L. Cao, J. Luo, H. Kautz and T. S. Huang, Annotating Collections of Photos Using Hierarchical Event and Scene Models, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2008.
6. L. Cao, and L. Fei-Fei, Spatially Coherent Latent Topic Model for Concurrent Segmentation and Classification of Objects and Scenes, *IEEE International Conference Computer Vision (ICCV)*, 2007.
5. S. Chen, L. Cao, J. Liu, X. Tang: Iterative MAP and ML Estimations for Image Segmentation, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2007.
4. S. Chen, L. Cao, J. Liu, X. Tang: Automatic Segmentation of Lung Fields from Radiographic Images of SARS Patients Using a New Graph Cuts Algorithm. *International Conference on Pattern Recognition (ICPR)* 2006.
3. L. Cao, J. Liu, X. Tang: 3D object retrieval using 2D line drawing and graph based relevance reedback. *ACM Conference on Multimedia (ACM MM)*, 2006.
2. L. Cao, J. Liu and X. Tang, Degen Generalized Cylinders and Their Properties. *European Conference on Computer Vision (ECCV)*, 2006.
1. L. Cao, J. Liu and X. Tang. 3D Object Reconstruction from a Single 2D Line Drawing without Hidden Lines. *IEEE International Conference on Computer Vision (ICCV)*, 2005.

## Book Chapters

5. J. Song, X. Zhao, L. Gao, and L. Cao, Large Scale Video Understanding with Limited Training Labels, invited chapter in *Big Data Analytics for Large-Scale Multimedia Search*, edited by , published by S. Vrochidis, B. Huet, E. Chang, I. Kompatsiaris, published by Wiley & Sons, Ltd, 2019
4. L.-J. Li, R. K. Jha, B. Thomee, D. Shamma, L. Cao, and Y. Wang, Where the Photos Were Taken: Location Prediction by Learning from Flickr Photos, invited chapter in *Large-Scale Visual Geolocalization*, edited by A.R. Zamir, A. Hakeem, M. Shah, L.V. Gool, and R. Szeliski, published by Springer, 2016.
3. Y. Tian, L. Cao, Z. Liu, and Z. Zhang, Action Detection by Fusing Hierarchically Filtered Motion With Spatiotemporal Interest Point Features, invited chapter in *Human Behavior Recognition Technologies: Intelligent Applications for Monitoring and Security*, edited by Hans Guesgen and Stephen Marsland, published by Information Science Reference, 2013.
2. G.-J. Qi, L. Cao, S.-F. Tsai, M.-H. Tsai, T. S. Huang, Recent Advances in Multimedia Research and Applications, invited chapter in *Advances in Multimedia Research and Applications*, edited by L. Guan, Y. He, and S.-Y. Kung, published by CRC Press, 2012.
1. L. Cao, G.-J. Qi, S.-F. Tsai, M.-H. Tsai, A. Del Pozo, T. S. Huang, S. Lim and X. Zhang, Multimedia Information Network: Structure, Inference and Applications, invited chapter in *Social Network Data Analytics*, edited by C. Aggarwal, published by Kluwer Academic, 2011.

## Editorship

7. S. Jiang, L. Cao, J. Sang, J. Luo, R. Jain, Guest editorial: Mobile Visual Tagging with Mobile Context. *Multimedia Systems*, vol. 23, issue 6, pp. 645-646, 2017.
6. Y. Mu, Y. Yang, L. Cao, S. Yan, Q. Tian, Guest Editorial: Special Issue on Large Scale Multimedia Semantic Indexing. *Computer Vision and Image Understanding*, vol. 124, pp. 1-2, 2014.
5. R. Ji, Y. Yang, N. Sebe, K. Aizawa, L. Cao, Gest Editorial: Large-Scale Geosocial Multimedia. *IEEE MultiMedia*, Vol. 21, No. 3, pp. 7-9, 2014.
4. L. Cao, G. Friedland, L. Xie: GeoMM 2014: The Third ACM Multimedia Workshop on Geotagging and Its Applications in Multimedia. *ACM Multimedia*, pp. 1251-1252, 2014.
3. L. Cao, G. Friedland, P. Kelm: GeoMM 2013: The Second ACM Multimedia Workshop on Geotagging and Its Applications in Multimedia. *ACM Multimedia*, pp. 1091-1092, 2013.
2. I. Kompatsiaris, W. Zeng, G. Hua, L. Cao, Introduction to the Special Section of Best Papers of ACM Multimedia 2012, *ACM Transactions on Multimedia Computing, Communications, and Applications (TOMCCAP)*, vol. 9, No. 1, 2013.
1. L. Cao, G. Friedland, M. Larson: GeoMM 2012: ACM International Workshop on Geotagging and Its Applications in Multimedia. *ACM Multimedia*, pp. 1511-1512, 2012

## Patents

11. J. Tetreault, A. Pappu, E. Liberty, L. Cao, M. Liu, E. Pavlick, G. Tsur, Y. Maarek, Mail Lint: Write Better Emails, US Patent App. 15/059,596 2017.
10. Y. Song, M. Gygli, L. Cao, Automatic video segment selection method and apparatus, US Patent 9,911,223 2018
9. L. Cao, J. Fan, C. Wang, B. Xiang, B. Zhou, Semi-supervised Learning for Word Embedding, US Patent 9,672,814, 2018.
8. L. Cao, W. Tan, L. Fong, Memory-aware Matrix Factorization, US Patent 9,947,073, 2018.
7. L. Cao, N. Duan, Q. Lin, C. Wang, J. Yan, and X. Zhang, Generating a Training Model Based on Feedback, US Patent 9,659,258, 2017.
6. L. Cao, Y. Chang, and Q. Nguyen, Association of Visual Labels and Event Context in Image Data, US Patent 9,734,166, 2017.
5. L. Cao, M. Merler, J. R. Smith, Systems and Methods for Inferring Gender by Fusion of Multi-modal content, US Patent 9,471,851, 2016.
4. L. Cao, N. Codella, G. Hua, G. Leiguang, A. Natsev, and J. R. Smith, Techniques for Spatial Semantic Attribute Matching for Location Identification, US Patent 9,251,434, 2016.
3. Z. Liu and L. Cao, Adaptive Action Detection, US Patent 9,014,420, 2015.
2. L. Cao, N. Codella, G. Hua, J. R. Smith, Techniques for Ground-Level Photo Geolocation Using Digital Elevation, US Patent 9,165,217, 2015.
1. Z. Liu, Y. Tian, L. Cao, and Z. Zhang, Hierarchical filtered Motion Field for Action Recognition, US Patent 8,639,042, 2014.

## RECENT PRESS COVERAGE

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### ACM SIGMM, August 2017

- Dr. Liangliang Cao recives ACM SIGMM Rising Star Award 2017

### Techcrunch, April 2017

- ffVC and NYU are mixing researchers with investors in the name of machine intelligence

## **This Week in Machine Learning&AI, April 2017**

- Introducing the AI NexusLab Startups  
**Techcrunch, Oct. 2016**
- Detecting Sarcasm That Plays Off Images  
**Scientific American, Aug. 2016**
- Computers Can Sense Sarcasm? Yeah, Right.  
**Yahoo Blog, July 2016**
- Creating Animated GIFs Automatically from Video  
**NVidia DevBlog, May 2016**
- Accelerate Recommender Systems with GPUs  
**VICE, May 2016**
- Yahoo! Made an AI That Automatically Turns Videos Into Fire GIFs .  
**Taiwan CTS news, June 2016**
- Yahoo Taiwan Deployed the Visual Search App for Online Shopping  
**Taiwan Nownews, Nov. 2015**
- Yahoo! Supermarket App Powered Product Search with Image Queries  
**Inside Taiwan, Nov. 2015**
- Yahoo! Supermarket Provides “Mobile Visual Search” App  
**Taiwan United Daily News, Nov. 2015**
- Buy With Your Photo: A New Online Shopping App

## **STUDENT MENTORING**

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### **Summer Interns**

- Lu Jiang (2016), now Research Scientist at Google Cloud
- Yuncheng Li (2015, 2016), now Research Scientist at Snap
- Michael Gygli (2015), now Head of AI at gifs.com
- Zhicheng Yan (2013), now Research Scientist at Facebook
- Felix X. Yu (2012, 2013), now Research Scientist at Google Research

### **Students at Columbia University**

- Yizhou Wang (2017), Ph.D. student at Columbia University
- Nikolai Yakovenko (2015-2016), now Senior Researcher at NVIDIA

### **Ph.D. Defense Committe**

- Xiaoming Wu, Ph.D. (2015) at Columbia University
- Xiaodong Yang, Ph.D. (2015) at City University of New York
- Zhicheng Yan, Ph.D. (2016) at UIUC

## **PROFESSIONAL SERVICES**

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### **Society**

- IEEE, senior member
- ACM, member



### Conference/Workshop Organizer

- Industrial chair, ACM International Conference on Multimedia Retrieval (ICMR), 2017
- Area chair, ACM Conference on Multimedia (ACM MM), 2017
- Area chair, IEEE Winter Conference on Applications and Computer Vision (WACV) 2017
- Workshop chair, ACM International Conference on Multimedia Retrieval (ICMR), 2016
- Area chair, IEEE Winter Conference on Applications and Computer Vision (WACV), 2014
- Chair, Greater New York Area Multimedia and Vision Meeting, 2012
- Chair, Greater New York Area Multimedia and Vision Meeting, 2013
- Area chair, ACM Conference on Multimedia, 2012
- Founder and chair, ACM Workshop on GeoMM, 2012-2015

### Journal Reviewer

- IEEE Transaction on Pattern Analysis and Machine Intelligence
- IEEE Transaction on Knowledge and Data Engineering
- International Journal of Computer Vision
- IEEE Transaction on Multimedia
- NeuroComputing
- Pattern Recognition
- Computer Vision and Image Understanding
- ACM Transaction on TOMCCAP
- IEEE Transaction on Image Processing
- IEEE Transaction on Circuits and Systems for Video Technology
- IEEE Transaction on Vehicular Technology

### Journal Special Issue Editorship

- Guest Editor, Computer Vision and Image Understanding (CVIU), special issue on “Large Scale Multimedia Semantic Indexing”, 2013.
- Guest Editor, ACM Transactions on Multimedia Computing, Communications and Applications (TOMCCAP), special issue on “Best Papers of ACM Multimedia”, 2013.
- Guest Editor, IEEE Multimedia Magazine, special issue on “Large Scale Geosocial Multimedia”, 2014.

### Conference Reviewer/ Program Committee

- ICCV, NIPS, CVPR, ACM MM, AISTAT, ICLR, ECCV and etc.

## FUNDING EXPERIENCE

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### NSF Panelist

- NSF CISE-III-Medium 2015
- NSF Career 2013

I also have rich experience as the project lead / key personnels for total \$7M funding, including Beckman Institute Seed Project Award, UIUC Computer Science and Engineering Fellow, Kodak Research Award, HP Innovation Award, NSF EAGER Award, and IARPA ALADDIN Program.

## CONFERENCE TUTORIALS

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### Tutorial in ICME

July 2018, Shanghai, China

- Visual Search and Question Answering  
Co-present with Lu Jiang, Yannis Kalant

**Tutorial in ACM Multimedia**

Oct. 2013, Barcelona, Spain

- Massive-Scale Multimedia Semantic Modeling  
Co-present with John R. Smith

**Tutorial in CVPR**

June 2014, Columbus, OH

- Learning Visual Semantics: Models, Massive Computation and Applications  
Co-present with Shih-Fu Chang, John R. Smith and Rogerio Feris