

Zhuolin Jiang

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Email: zhuolinumd@gmail.com *Website:* <http://www.umiacs.umd.edu/~zhuolin/>

RESEARCH INTEREST **Computer Vision:** Object/Human Detection and Tracking, Object Categorization, Scene Modeling and Recognition, Image Tagging/Annotation, Face Detection/Recognition/Verification, Action Detection/Recognition

Machine Learning: Discriminative Feature Learning, Supervised Clustering, Submodular Optimization and Matroid Theory, Sparse and Low-Rank Representation, Deep Learning, On-line/Incremental/Active Learning, Transfer Learning

EMPLOYMENT **Raytheon BBN Technologies, USA** 04/2015 - Present
Scientist II

Noah's Ark Research Lab, Huawei, Hong Kong 01/2013 - 03/2015
Researcher

University of Maryland, College Park, USA 11/2011 - 12/2012
Assistant Research Scientist (a parallel rank at the Univ. of Maryland to Assistant Professor)

University of Maryland, College Park, USA 06/2010 - 10/2011
Postdoctoral Research Associate *Advisor:* Prof. Larry S. Davis

EDUCATION **University of Maryland, College Park (UMD), USA** 09/2008 - 05/2010
Exchange PhD student in Computer Science *Advisor:* Prof. Larry S. Davis

South China University of Technology (SCUT), China 09/2004 - 06/2010
Ph.D. in Computer Science GPA: 3.51/4.0 *Advisor:* Prof. Shaofa Li
Thesis: *Research on Computer Vision-based Human Action Detection and Recognition*

China University of Petroleum (CUP), China 09/2000 - 06/2004
B.Eng. in Computer Science GPA: 3.53/4.0 **Rank: 1/113** *Advisor:* Prof. Faming Gong
Thesis: *Research on Triangular Mesh Subdivision*

PUBLICATIONS (Number of Citations: 1790 based on Google Scholar)

Jingjing Zheng, **Zhuolin Jiang**, Rama Chellappa. **Submodular Attribute Selection for Visual Recognition**. *IEEE Transactions on Pattern Analysis and Machine Intelligence* (to appear), 2017.

Zhuolin Jiang*, Yaming Wang*, Larry S. Davis, Walt Andrews, Viktor Rozgic. **Learning Discriminative Features via Label Consistent Neural Network**. *IEEE Winter Conference on Applications of Computer Vision* (to appear), 2017. (* indicates equal contribution).

Yangmuzi Zhang, **Zhuolin Jiang**, Xi Chen, Larry S. Davis. **Generating Discriminative Object Proposals via Submodular Ranking**. *CVPR Workshop on Robust Features*, 2016.

Jingjing Zheng, **Zhuolin Jiang**, Rama Chellappa. **Cross-view Action Recognition via Transferable Dictionary Learning**. *IEEE Transactions on Image Processing*, 2016.

Shu Kong, **Zhuolin Jiang**, Qiang Yang. **Modeling Neuron Selectivity Over Simple Middle-level Features for Image Classification**. *IEEE Transactions on Image Processing*, 2015, 24(8): 2404-2414.

Jingjing Zheng, **Zhuolin Jiang**, Rama Chellappa, Jonathon Phillips. **Submodular Attribute Selection for Action Recognition in Video**. *Neural Information Processing Systems (NIPS)*, 2014.

Fan Yang, **Zhuolin Jiang**, Larry S. Davis. **Submodular Reranking with Multiple Feature Modalities for Image Retrieval**. *Asian Conference on Computer Vision (ACCV)*, 2014. (ORAL)

Fan Zhu, **Zhuolin Jiang**, Ling Shao. **Submodular Object Recognition**. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2014.

Fan Yang, **Zhuolin Jiang**, Larry S. Davis. **Online Discriminative Dictionary Learning for Visual Tracking**. *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2014.

Shu Kong, **Zhuolin Jiang**, Qiang Yang. **Collaborative Receptive Field Learning**. *arXiv:1402.0170*, 2014.

Shu Kong, **Zhuolin Jiang**, Qiang Yang. **Learning Mid-Level Features and Modeling Neuron Selectivity for Image Classification**. *arXiv:1401.5535*, 2014.

Zhuolin Jiang, Zhe Lin, Larry S. Davis. **Label Consistent K-SVD: Learning A Discriminative Dictionary for Recognition**. *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2013.

Jingjing Zheng, **Zhuolin Jiang**. **Learning View-invariant Sparse Representations for Cross-view Action Recognition**. *IEEE Conference on Computer Vision (ICCV)*, 2013.

Hyunjong Cho, Hyungtae Lee, **Zhuolin Jiang**. **Evaluation of LC-KSVD on UCF101 Action Dataset**. *ICCV Workshop on Action Recognition with a Large Number of Classes*, 2013.

Yangmuzi Zhang, **Zhuolin Jiang**, Larry S. Davis. **Discriminative Tensor Sparse Coding for Image Classification**. *British Machine Vision Conference (BMVC)*, 2013.

Yiliang Xu, Sangmin Oh, Fan Yang, **Zhuolin Jiang**, Naresh Cuntoor, Anthony Hoogs, Larry S. Davis. **System and Algorithms on Detection of Objects Embedded in Perspective Geometry using Monocular Cameras**. *IEEE International Conference on Advanced Video and Signal-Based Surveillance (AVSS)*, 2013.

Zhuolin Jiang, Larry S. Davis. **Submodular Salient Region Detection**. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2013.

Yangmuzi Zhang, **Zhuolin Jiang**, Larry S. Davis. **Learning Structured Low-rank Representations for Image Classification**. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2013.

Jingjing Zheng, **Zhuolin Jiang**. **Tag Taxonomy Aware Dictionary Learning for Region Tagging**. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2013.

Qiang Qiu, **Zhuolin Jiang**, Rama Chellappa. **Sparse Dictionary-based Attributes for Action Recognition and Summarization**. *arXiv:1308.0290*, 2013.

Huimin Guo*, **Zhuolin Jiang***, Larry S. Davis. **Discriminative Dictionary Learning with Pairwise Constraints**. *Asian Conference on Computer Vision (ACCV)*, 2012. (ORAL) (* indicates equal contribution, **Best Student Paper Award**)

Guangxiao Zhang, **Zhuolin Jiang**, Larry S. Davis. **Online Semi-supervised Discriminative Dictionary Learning for Sparse Representation**. *Asian Conference on Computer Vision (ACCV)*, 2012.

Jingjing Zheng, **Zhuolin Jiang**, Jonathon Phillips, Rama Chellappa. **Cross-View Action Recognition via a Transferable Dictionary Pair**. *British Machine Vision Conference (BMVC)*, 2012. (ORAL)

Zhuolin Jiang, Guangxiao Zhang, Larry S. Davis. **Submodular Dictionary Learning for Sparse Coding**. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2012.

Zhuolin Jiang, Zhe Lin, Larry S. Davis. **Recognizing Human Actions by Learning and Matching Shape-Motion Prototype Trees**. *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2012, 34(3): 533-547.

Zhuolin Jiang, Zhe Lin, Larry S. Davis. **Class Consistent k-means: Application to Face**

and Action Recognition. *Computer Vision and Image Understanding (CVIU)*, 2012, 116: 730-741.

Zhuolin Jiang, Zhe Lin, Larry S. Davis. A Unified Tree-based Framework for Joint Action Localization, Recognition and Segmentation. *Computer Vision and Image Understanding (CVIU)*, 2012.

Qiang Qiu, Zhuolin Jiang, Rama Chellappa. Sparse Dictionary-based Representation and Recognition of Action Attributes. *IEEE Conference on Computer Vision (ICCV)*, 2011.

Zhuolin Jiang, Zhe Lin, Larry S. Davis. Learning a Discriminative Dictionary for Sparse Coding via Label Consistent K-SVD. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2011.

Zhuolin Jiang, Zhe Lin, Larry S. Davis. A Tree-based Approach to Integrated Action Localization, Recognition and Segmentation. *ECCV Workshop on Human Motion*, 2010.

Zhe Lin, Zhuolin Jiang, Larry S. Davis. Recognizing Actions by Shape-Motion Prototype Trees. *IEEE 12th International Conference on Computer Vision (ICCV)*, 2009.

Zhuolin Jiang, Shaofa Li, Xiping Jia, Hongli Zhu. Research on Classic Triangular Mesh Subdivision. *Computer Engineering*, 2009, 35(6): 7-10.

Zhuolin Jiang, Shaofa Li, Xiping Jia, Hongli Zhu. Target Tracking Based on Nonparametric Clustering and Multiscale Images. *Journal of South China University of Technology: Natural Science Edition*, 2009, 37(1): 34-41.

Rendao Shen, Shaofa Li, Zhuolin Jiang. A Fast and Accurate Method of Uniform-colored Video Text Extraction. *Computer Engineering*, 2009, 35(9): 214-216.

Shengan Zhou, Shaofa Li, Zhuolin Jiang. Fast and Automatic Method of Human Body Matting with Constant Color Background. *Computer Applications*, 2009, 28(12): 179-181.

Lina Ge, Zhonghua He, Zhuolin Jiang. Encryption Algorithm Based on Circle Property. *Computer Engineering*, 2009, 35(4): 180-182.

Zhuolin Jiang, Shaofa Li, Xiping Jia, Hongli Zhu. An Improved Mean Shift Tracking Method Based on Nonparametric Clustering and Adaptive Bandwidth. *International Conference on Machine Learning and Cybernetics*, 2008.

Dongfa Gao, Zhuolin Jiang, Ming Ye. A New Approach of Dynamic Background Modeling for Surveillance Information. *International Conference on Computer Science and Software Engineering*, 2008.

Zhuolin Jiang, Shaofa Li, Dongfa Gao. Design and Implementation of a Blackboard-based System for Human Detection. *Computer Engineering*, 2008, 34(2): 196-198.

Zhuolin Jiang, Shaofa Li, Dongfa Gao. An Adaptive Mean Shift Tracking Method Using Multiscale Images. *International Conference on Wavelet Analysis and Pattern Recognition*, 2007.

Zhuolin Jiang, Shaofa Li, Dongfa Gao. A Time Saving Method for Human Detection in Wide Angle Camera Images. *International Conference on Machine Learning and Cybernetics*, 2006.

BOOK CHAPTERS

Zhuolin Jiang, Zhe Lin, Haibin Ling, Fatih Porikli, Ling Shao, Pavan K. Turaga. Discriminative Feature Learning from Big Data for Visual Recognition. *Pattern Recognition*, 2015.

Zhe Lin, Zhuolin Jiang, Larry S. Davis. Prototype-based Methods for Human Movement Modeling. *Encyclopedia of Computer Vision, Springer*, 2014.

PATENTS

Zhuolin Jiang, Qiang Yang. Picture Ranking Method, and Terminal. US Patent, Application No. 20160371541.

Zhuolin Jiang, Yangqiu Song, Qiang Yang. Method for Recognizing Target Object in Image, and Apparatus. US Patent, Application No. 20160307070.

Hongbo Jin, **Zhuolin Jiang**, Dong Liu. Information Processing Method and Service Platform. US Patent, Application No. 20160308983.

Hongbo Jin, Zhuolin Jiang. Speech Interaction Method and Apparatus. US Patent, Application No. 20150206533.

Qiang Yang, Yangqiu Song, **Zhuolin Jiang**. Method and Apparatus for Analysis of Social Networking Event. China Patent, Application No. 201410002161.4.

Zhuolin Jiang, Qiang Yang. Image Sorting Method and Device. China Patent, Application No. 201410090640.6.

Yanhui Geng, Rutong Gao, **Zhuolin Jiang**. User Location Positioning Method and Server. China Patent, Application No. 201410549080.

Hongbo Jin, **Zhuolin Jiang**, Qiang Yang, Li Qian. Application Activation method, User Terminal Equipment and Server. China Patent, Application No. 201410309015.6.

Qiang Yang, Yi Zhen, **Zhuolin Jiang**. Microblog Recommendation Method and Device. China Patent, Application No. 201410167137.6.

Zhuolin Jiang, Yi Zhen, Qiang Yang. Method and Apparatus for Data Classification. China Patent, Application No. 201410117603.X.

Hongbo Jin, **Zhuolin Jiang**. Voice Interaction Method and Device. China Patent, Application No. 201410026212.7.

Zhuolin Jiang, Shu Kong, Qiang Yang. Method and Apparatus for Image Feature Extraction. China Patent, Application No. 201410223300.6.

Hongbo Jin, **Zhuolin Jiang**, Dong Liu. Method and Business Platform for Information Processing. China Patent, Application No. 201310752380.X.

Zhuolin Jiang, Yangqiu Song, Qiang Yang. Method and System for Recognizing Objects in Images. China Patent, Application No. 201310739555.3.

Qiang Yang, Yi Zhen, **Zhuolin Jiang**. Recommendation Method and System. China Patent, Application No. 201310661450.0.

Zhuolin Jiang, Shu Kong, Qiang Yang. Method and Apparatus for Image Content Recognition. China Patent, Application No. 201410350987.X.

RESEARCH EXPERIENCE

Large Scale Image and Video Analytics

Raytheon BBN Technologies

Scientist II

04/2015 - Present

- Lead the computer vision team in BBN and serve as a Principal Investigator for a funded project.
- Developed a novel event localization algorithm for large scale event search in videos.
- Developed a novel supervised deep learning algorithm called label consistent neural network for recognition.
- Improved video event detection performance by 10% mAP, by developing a novel deep feature extraction approach.
- Developed and submitted proposals to various government agencies.

Large Scale Data Mining and Computer Vision

Huawei

Researcher

01/2013 - 03/2015

- Led the computer vision team in the Huawei Noah's Ark Research Lab.
- Proposed a novel approach to model and predict user demographic information, such as gender and age, based on multi-modal data sources including mobile sensor data (WiFi, GPS, accelerometer etc), image, voice and app installation data.

- Developed a user profiling system for user age and gender prediction based on the Hicloud data with millions of user search / downloaded / installed app data.
- Improved cross-view action recognition by 11.6% using a novel dictionary learning framework to learn view-invariant sparse representations for cross-view action recognition.
- Proposed a greedy object recognition approach based on submodularity, which improved state-of-the-art accuracy by 4.5%.

Submodular Optimization and Matroid Theory in Vision Assistant Research Scientist
UMD 06/2011 - 12/2012

- Proposed a submodular framework under matroid constraint for discriminative dictionary learning, which achieved state-of-the-art performance and more than an order of magnitude faster than many state-of-art approaches. The source code is publicly available.
- Improved salient region detection performance in still images by 6.8%, by combining high-level priors with low-level saliency into the objective function, which is optimized by a highly efficient greedy algorithm.
- Proposed a multi-layer hierarchical supervised dictionary learning framework for region tagging by exploring the given tag taxonomy, which improved state-of-the-art accuracy by up to 10.1%.
- Increased the image classification performance in the presence of data contamination by 7.9% using low-rank recovery to learn structured low-rank representations.

Sparse Representation and Discriminative Dictionary Learning Research Associate
UMD 06/2010 - 05/2011

- Proposed a novel discriminative learning approach called Label Consistent K-SVD for face, action, scene, and object category recognition, which outperformed many recently proposed sparse coding techniques. The source code is publicly available.
- Proposed an attribute dictionary learning approach via information maximization for action recognition. The source code is publicly available
- Proposed a unified dictionary learning framework with pair-wise constraints for face verification and recognition, which achieved state-of-the-art performances in both face verification and recognition applications.
- Proposed a semi-supervised dictionary learning framework for the large-scale object categorization problems.

Human Detection and Tracking Research Assistant
UMD 09/2009 - 05/2010

- Developed an efficient human and vehicle detection system based on tracking and background subtraction.
- The source code is being used in the Panasonic-UMD's Fast Object Detection Project and DARPA SBIR-Human Robot Project.

Action Detection and Recognition Research Assistant
UMD 09/2008 - 08/2009

- Proposed an efficient action recognition approach by learning and matching discriminative shape-motion prototype trees, which improved the state-of-the-art action recognition accuracy by up to 8.1%. The shape-motion representation extraction code is publicly available.
- The source code is being used in the DARPA Mind's Eye Project.

Moving Object Detection and Tracking Research Assistant
SCUT 2007 - 05/2008

- Proposed an adaptive mean shift tracking approach to track the object with varying scales.
- The source code is being used in the SCUT industrial research project (No.2004B10101032) in Guangdong province.

Human Detection and Tracking in Indoor Environments Research Assistant
SCUT 2005 - 2006

- Proposed a novel time-saving human detection and tracking approach.
- The source code is being used in the SCUT-Gree (Electric Appliances Inc.) human detection project.

**INVITED
TALKS**

Visual Recognition and Tracking via Submodularity and Sparse Representation 12/2014

Symposium on Mobile Graphics and Interactive Applications, SIGGRAPH Asia 2014

Learning Discriminative Representations Based on Sparse Representations and Sub-modular Functions 11/2014

Nanyang Technological University, Singapore

Learning Discriminative Representations for Visual Recognition 10/2014

The University of Hong Kong, Hong Kong

Supervised Dictionary Learning for Recognition 01/2013

The Hong Kong Polytechnic University, Hong Kong

Supervised Sparse Coding for Image Classification 01/2013

The Hong Kong University of Science and Technology, Hong Kong

Discriminative Dictionary Learning for Sparse Coding 01/2013

The Chinese University of Hong Kong, Hong Kong

Discriminative Dictionary Learning for Sparse Representation 07/2011

Computer Vision Student Seminar, University of Maryland, College Park

**ACADEMIC
SERVICE**

Guest Editor for the following journals:

- Lead Guest Editor for Pattern Recognition Special Issue on “Discriminative Feature Learning from Big Data for Visual Recognition”, 2014

Reviewer for the following journals and conferences:

- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
- IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)
- IEEE Transactions on Neural Networks and Learning Systems (TNNLS)
- IEEE Transactions on Multimedia (TMM)
- IEEE Transactions on Image Processing (TIP)
- IEEE Transactions on Information Forensics and Security (TIFS)
- IEEE Transactions on Cybernetics (TC)
- IEEE Transactions on Medical Imaging (TMI)
- ACM Transactions on Intelligent Systems and Technology (AIST)
- International Journal of Computer Vision (IJCV)
- Journal of Computer Science and Technology (JCST)
- IEEE Signal Processing Letters (SPL)
- Computer Vision and Image Understanding (CVIU)
- Machine Vision and Applications (MVAP)
- Image and Vision Computing (IVC)
- Signal, Image and Video Processing (SIVP)
- Pattern Recognition (PR)
- Information Fusion (IF)
- Neurocomputing (NC)

- Applied Intelligence
- Journal of Visual Communication and Image Representation (JVCI)
- European Conference on Computer Vision 2012 (ECCV2012)
- IEEE Conference on Computer Vision and Pattern Recognition 2013 (CVPR2013)
- IEEE Conference on Computer Vision 2013 (ICCV2013)
- Asian Conference on Machine Learning 2013 (ACML2013)
- IEEE Conference on Computer Vision and Pattern Recognition 2014 (CVPR2014)
- European Conference on Computer Vision 2014 (ECCV2014)
- Asian Conference on Pattern Recognition 2015 (ACPR2015)
- IEEE Conference on Computer Vision and Pattern Recognition 2015 (CVPR2015)
- Asia-Pacific Web Conference (APweb 2015)
- ACCV Workshop on My Car Has Eyes: Intelligent Vehicle with Vision Technology
- Annual Conference of the European Association for Computer Graphics (Eurographics2015)
- Asian Conference on Pattern Recognition 2015 (ACPR2015)
- IEEE Conference on Computer Vision 2015 (ICCV2015)
- International Joint Conference on Artificial Intelligence (IJCAI 2015)
- IEEE Conference on Computer Vision and Pattern Recognition 2016 (CVPR2016)
- European Conference on Computer Vision 2016 (ECCV2016)
- AAAI Conference on Artificial Intelligence 2017 (AAAI2017)
- IEEE Conference on Computer Vision and Pattern Recognition 2016 (CVPR2017)
- IEEE Conference on Automatic Face and Gesture Recognition 2017 (FG2017)

**HONORS
AND
AWARDS**

Business Development Initiative Competition, Second Place, Raytheon BBN	2016
The Sang Uk Lee Award/Best Student Paper Award at ACCV 2012	2012
Second-class Scholarship, SCUT (awarded to only 10%)	2007
First-class Scholarship, SCUT (awarded to the top 6%)	2006
Outstanding Graduate Students, SCUT (awarded to the top 6%)	2006
Second-class Scholarship, SCUT (awarded to only 10%)	2005
Outstanding Bachelor Thesis in Shandong province, China (only 10 person at CUP)	2005
Postgraduate Exempted from the Entrance Examination of SCUT (ranking first at CUP)	2004
Outstanding undergraduates in Shandong province, China, CUP	2004
China Petroleum Scholarship, CUP (only one person in CS department)	2003
First-class Scholarship, CUP (awarded to the top 3%)	2001 – 2004

**COMPUTER
SKILLS**

Operating Systems: Linux, Windows
 Languages : C, C++, Matlab, Python
 Softwares and Tools: OpenCV, OpenGL, MFC, Latex

REFERENCES

Available upon request