

**PING LUO**

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**EDUCATION**

- 2011.07—2014.09      **Ph. D.**, Department of Information Engineering, The Chinese University of Hong Kong (CUHK). Supervisor: Xiaoou Tang (founder of SenseTime) and Xiaogang Wang
- 2008.09—2010.07      **M. Eng.**, School of Software, Sun Yat-sen University (SYSU)
- 2004.09—2008.07      **B. Eng.**, School of Software, Sun Yat-sen University (SYSU)

**WORK EXPERIENCE**

- 2019—                      **Assistant Professor**, Department of Computer Science, *The University of Hong Kong*
- 2016—2019                **Research Director**, *SenseTime Group Ltd.*
- 2014—2016                **Postdoctoral Fellow**, Information Engineering, *The Chinese University of Hong Kong*  
 Working with Xiaoou Tang
- 2007—2010                **Research Assistant**, *LotusHill Computer Vision Institute*  
 Working with Song-Chun Zhu

**AWARD**

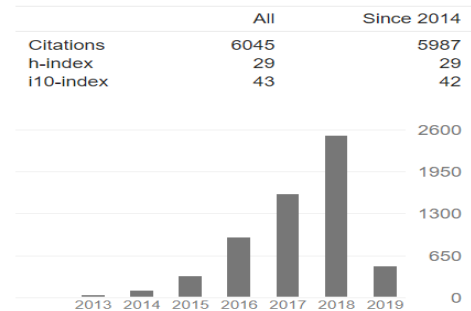
- **2018 – 1st place** in WAD 2018 Drivable Area Segmentation Challenge in CVPR2018.
- **2017 – Bronze medal** in Large-scale Video/Action Recognition Challenge in ACM MM 2017.
- **2017 – Gold medal** in Kaggle Youtube-8M Video Classification Challenge (top 1.5% = 9/650).
- **2017 – 1st place** in Tusimple Lane Detection for Autonomous Driving Challenge in CVPR 2017.
- **2017 – 1st place** in 2017 DAVIS Challenge on Video Object Segmentation.
- **2015 – Easily Accessible Paper Award in AAAI** (acceptant rate 1.5%)
- **2014 – 1st runner up**, ImageNet ILSVRC 2014, Object Detection Challenge.
  - I worked as a leader of the “CUHK\_DeepID\_Net” team who won the second place out of over 20 participants, including Oxford, Berkeley, MSRA, and Baidu.
- **2014 – NIPS Travel Award.**
- **2013 – Microsoft Research Asia Fellowships Award.**
  - 10 PhD candidates in the Asia-Pacific region are awarded.
  - Press: <http://research.microsoft.com/en-us/collaboration/global/asia-pacific/talent/fellowship.aspx>
- **2011 – Hong Kong PhD Fellowship Award (HKPF).** The award is established by the Research Grants Council (RGC) of Hong Kong and 100 PhD applicants over the world will be awarded each year.
- **2011 – Best Master Thesis Award** of Guangdong Province for my master thesis “*Object Detection and Recognition by Learning Shape Manifold*”. Only 99 graduate students at Guangdong Provinces were awarded. (acceptant rate 0.1%)
- **2008 – Best Bachelor Thesis Award** of Sun Yat-sen University for my bachelor thesis “*3D Cartoon Modeling and Parsing*”. 90 out of 4500 undergraduate students were awarded.

## GRANTS

1. National Natural Science Foundation of China (NSFC), “Deep Learning Large-scale Object Detection aided by Attributes”, No. 61503366, Principal Investigator, RMB ¥ 240K, Jan. 2016 ~ Dec. 2018
2. General Research Fund of Hong Kong (GRF), “Towards a Scalable Framework for Web-scale Semantic Tagging of Images”, No. 14236516, Co-Investigator, HKD482K, 2017~2019
3. National Natural Science Foundation of China (NSFC), “Internet based Robust Face Recognition”, Main Participant, No. 61472410, RMB ¥ 860K, Jan. 2015 ~ Dec. 2018
4. Innovation and Technology Support Programme, “Deep Learning-based Face Recognition on Cloud Computing Platform”, ITS/121/15FX, Main Participant, HKD5,646K, Nov. 2015 ~ Oct. 2017

## RESEARCH HIGHLIGHT

- My researches focus on **Big Data Analysis**, **Computer Vision**, and **Deep Learning** including but not limited to **(1)** human-centric visual perception (understanding object, human face, human body, human pose, human re-identification, human image generation) [4-8,23,25,31,34,37-40]; **(2)** scene understanding for autonomous driving [24,36,42]; **(3)** theoretical understanding optimization and generalization of deep learning [12,13,18,19,20,22,32,33]; **(4)** video surveillance [3,27-29,54,57,61]; and **(5)** FashionAI: understanding fashion images [10,15,35,38,41,55]. Please refer to my Publication List.
- I have published **more than 60 papers** in top-tier conferences and journals, including **20 first/co-first authored papers** (such as 2 ICML, 2 ICLR, 2 NIPS, 5 ICCV and 4 CVPR). My h-index is 29 and i100-index is 18 with 6000+ citations according to Google Scholar.
- I have **co-authored a book** “*Deep Learning for Human Centric Visual Analysis*” with Liang Lin and Wangmeng Zuo. The first edition (ISBN 978-9811323867) will be published by Springer in June 13, 2019.
- I have applied more than **60 patents** including **10 granted patents** (4 US, 3 CN, 2 JP, 1 KR).
- I have built **many important benchmarks** for the computer vision and machine learning community such as CelebA [47], CelebA-Mask, DeepFashion1 [41], DeepFashion2 [15], and WIDERFace [40]. **CelebA has 1000+ citations** and it was used to train DeepID, which was the first face recognition system that outperformed human performance in 2014 for the first time, featured by BBC, ABC, Science, MIT Technology news. CelebA was selected as the top-100 most cited computer vision paper.



## TEN REPRESENTATIVE WORK IN RECENT TWO YEARS

1. L. Lin, **P. Luo**, and W. Zuo, “Deep Learning for Human Centric Visual Analysis”, *1st ed. Edition, Springer*, ISBN 978-9811323867, 2019 ([a book summarized my work in computer vision and deep learning](#))
2. Z. Liu, X. Li, **P. Luo\***, C. C. Loy, X. Tang, “Deep Learning Markov Random Field for Semantic Segmentation”, *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2018 ([\\*corresponding author; the first work of MRF in ConvNet](#))
3. Z. Zhang, **P. Luo\***, C. C. Loy, and X. Tang, “Learning Deep Representation for Face Alignment with Auxiliary Attributes”, *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, No. 05 - May (vol. 38), 2016 ([\\*corresponding author; the first work of multitask deep learning for face analysis](#))

4. **P. Luo**, Z. Peng, R. Zhang, “Differentiable Learning to Learn to Normalize”, *in submission*, 2019 (the first unified formulation of normalization methods in deep learning and open up new research direction to understand all normalization methods)
5. **P. Luo**, W. Shao, X. Wang, Z. Peng, “Towards Understanding Regularization in Batch Normalization”, *International Conference on Learning Representation (ICLR)*, 2019 (the first work that theoretically understands batch normalization)
6. **P. Luo**, J. Ren, Z. Peng, R. Zhang, J. Li, “Differentiable learning-to-normalize via switchable normalization”, *International Conference on Learning Representation (ICLR)*, 2019 (the first work that opens up a new research direction where different convolutional layers have different normalization methods)
7. Z. Peng, L. Wu, J. Ren, R. Zhang, **P. Luo\***, “CUImage: A Never Ending Learning Platform on a Convolutional Knowledge Graph of Billion Web Images”, *IEEE Conference on Big Data (BigData)*, 2018, acceptance rate: 17%, **Oral** (\*corresponding author; outrageously large-scale visual representation learning)
8. **P. Luo**, G. Wang, L. Lin, X. Wang, “Deep Dual Learning for Semantic Image Segmentation”, *IEEE International Conference on Computer Vision (ICCV)*, 2017 (the first weakly-supervised model outperforms strongly-supervised ones)
9. **P. Luo**, “Learning Deep Architectures via Generalized Whitened Neural Networks”, *Thirty-fourth International Conference on Machine Learning (ICML)*, 2017, **Oral** (deep network turns optimization problem into forward computations)
10. **P. Luo**, “EigenNet: Towards Fast and Structural Learning of Deep Neural Networks”, *International Joint Conference on Artificial Intelligence (IJCAI)*, 2017, **Oral** (the first normalization in back-propagation)

### **SELECTED PATANTS**

I have applied 60+ patents. Selected US patents:

1. Methods and systems for social relation identification, X. Tang, Z. Zhang, **P. Luo**, C.C. Loy, US Patent Patent 15/858,059
2. Apparatuses and methods for semantic image labeling, X. Tang, Z. Liu, Li X., **P. Luo**, C.C. Loy, US Patent Patent 15/864,142
3. Method and system for exacting face features from data of face images, X. Tang, Z. Zhu, **P. Luo**, X. Wang, US Patent 9,710,697
4. Methods and Systems for Verifying Face Images Based on Canonical Images, X. Tang, Z. Zhu, **P. Luo**, X. Wang, US Patent 15/282,851

### **PROFESSIONAL SERVICE**

- ACM Member, IEEE Member
- TPC Member of CVPR17,18, AAAI16, ICME14, ICONIP14, ACCV14
- Reviewer for Journals
  - IEEE Transactions on Pattern Analysis and Machine Intelligence
  - International Journal of Computer Vision
  - IEEE Transactions on Systems, Man and Cybernetics: Systems
  - IEEE Transactions on Circuits and Systems for Video Technology
  - IEEE Transactions on Neural Network and Learning System
  - IEEE Transactions on Image Processing
- Reviewer for Conferences

- AAAI Conference on Artificial Intelligence (AAAI)
- Computer Vision and Pattern Recognition (CVPR)
- European Conference on Computer Vision (ECCV)
- IEEE International Conference on Computer Vision (ICCV)
- Conference on Neural Information Processing Systems (NeurIPS)

### **CONTACT OF REFEREE**

- Xiaoou Tang, xtang@ie.cuhk.edu.hk, Information Engineering, Chinese University of Hong Kong
- Xiaogang Wang, xgwang@ee.cuhk.edu.hk, Electronic Engineering, Chinese University of Hong Kong
- Ming-Hsuan Yang, mhyang@ucmerced.edu, Electrical Engineering and Computer Science, University of California at Merced
- Song-Chun Zhu, sczhu@stat.ucla.edu, Statistics and Computer Science, University of California, Los Angeles

### **PUBLICATION LIST**

#### **Book**

- [1] L. Lin, **P. Luo**, and W. Zuo, "Deep Learning for Human Centric Visual Analysis", *1st ed. Edition, Springer*, ISBN 978-9811323867, 2019  
 Springer: <https://www.springer.com/us/book/9789811323867>  
 Amazon: <https://www.amazon.com/Learning-Human-Centric-Visual-Analysis/dp/9811323860>

#### **Book Chapter**

- [2] C. C. Loy, **P. Luo**, and C. Huang, "Deep Learning Face Attributes for Detection and Alignment" in the book "Visual Attributes" by Rogerio Feris, Christoph Lampert, and Devi Parikh.

#### **Refereed Journals** (\*correspondence author)

- [3] R. Zhang, J. Li, L. Lin, **P. Luo\***, X. Wang, "SCAN: Self-and-Collaborative Attention Network for Video Person Re-identification", *IEEE Transactions on Image Processing (TIP)*, 2019
- [4] Z. Liu, X. Li, **P. Luo\***, C. C. Loy, X. Tang, "Deep Learning Markov Random Field for Semantic Segmentation", *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2018
- [5] Z. Zhang, **P. Luo**, C. C. Loy, and X. Tang, "From Facial Expression Recognition to Interpersonal Relation Prediction", *International Journal of Computer Vision (IJCV)*, 2018
- [6] S. Yang, **P. Luo**, C. C. Loy, and X. Tang, "Faceness-Net: Face Detection through Deep Facial Part Responses", *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2018
- [7] W. Ouyang, X. Zeng, X. Wang, S. Qiu, **P. Luo** et al., "DeepID-Net: Object Detection with Deformable Part Based Convolutional Neural Networks", *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, No. 07 - July (vol. 39), 2017
- [8] Z. Zhang, **P. Luo\***, C. C. Loy, and X. Tang, "Learning Deep Representation for Face Alignment with Auxiliary Attributes", *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, No. 05 - May (vol. 38), 2016
- [9] **P. Luo**, L. Lin, and X. Liu, "Compositional Shape Model Learning with Multiple Distance Metrics", *IEEE Transactions on Neural Network and Learning System (TNNLS)*, 2016

- [10] X. Liang, L. Lin, W. Yang, **P. Luo**, J. Huang, and S. Yan, "Clothes Co-Parsing via Joint Image Segmentation and Labeling with Application to Clothing Retrieval", *IEEE Transactions on Multimedia (TMM)*, 2016
- [11] L. Lin, **P. Luo**, X. Chen, and K. Zeng, "Representing and Recognizing Objects with Massive Local Image Patches", *Pattern Recognition (PR)*, 45(1): 231-240, 2012

### Refereed Conferences

- [12] **P. Luo**, Z. Peng, W. Shao, R. Zhang, J. Ren, L. Wu, "Differentiable Learning to Learn to Normalize", *in submission to ICML*, 2019
- [13] **P. Luo**, Z. Peng, J. Ren, R. Zhang, "Do Normalization Layers in a Deep ConvNet Really Need to Be Distinct?", *arXiv:1811.07727*, 2019
- [14] Y. Shen, B. Zhou, **P. Luo**, X. Tang, "FaceFeat-GAN: a Two-Stage Approach for Identity-Preserving Face Synthesis", *arXiv:1812.01288*, 2019
- [15] Y. Ge, R. Zhang, X. Tang, X. Wang, **P. Luo\***, "DeepFashion2: A Versatile Benchmark for Detection, Pose Estimation, Segmentation and Retrieval of Clothing Images", *International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019, code: <https://github.com/switchablenorms/DeepFashion2>
- [16] H. Zhou, Z. Liu, **P. Luo**, X. Tang, "Vision-Infused Deep Audio Inpainting", *in submission*, 2019
- [17] J. Han, R. Zhang, **P. Luo**, X. Wang, "Once a MAN: Towards Multi-target Attack via Learning Multi-target Adversarial Network Once", *in submission*, 2019
- [18] W. Shao, T. Meng, J. Li, R. Zhang, X. Wang, **P. Luo\***, "SSN: Learning Sparse Switchable Normalization via SparsestMax", *International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019
- [19] **P. Luo**, W. Shao, X. Wang, Z. Peng, "Towards Understanding Regularization in Batch Normalization", *International Conference on Learning Representation (ICLR)*, 2019
- [20] **P. Luo**, J. Ren, Z. Peng, R. Zhang, J. Li, "Differentiable learning-to-normalize via switchable normalization", *International Conference on Learning Representation (ICLR)*, 2019
- [21] H. Zhou, Y. Liu, Z. Liu, **P. Luo**, X. Wang, "Talking Face Generation by Adversarially Disentangled Audio-Visual Representation", *AAAI Conference on Artificial Intelligence (AAAI)*, 2019, **Oral**
- [22] G. Wang, J. Peng, **P. Luo**, L. Lin, "Kalman Normalization: Normalizing Internal Representations Across Network Layers", *Advances in Neural Information Processing Systems (NeurIPS)*, 2018
- [23] X. Zhan, Z. Liu, **P. Luo**, X. Tang, C. C. Loy, "Mix-and-Match Tuning for Self-Supervised Semantic Segmentation", *AAAI Conference on Artificial Intelligence (AAAI)*, 2018
- [24] X. Pan, **P. Luo**, J. Shi, X. Tang, "Spatial As Deep: Spatial CNN for Traffic Scene Understanding", *AAAI Conference on Artificial Intelligence (AAAI)*, 2018, **winning entry** in CVPR17 Tusimple Lane Detection Challenge
- [25] Y. Shen, **P. Luo**, J. Yan, X. Wang, X. Tang, "FaceID-GAN: Learning a Symmetry Three-Player GAN for Identity-Preserving Face Synthesis", *International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018
- [26] X. Pan, **P. Luo**, J. Shi, X. Tang, "Two at Once: Enhancing Learning and Generalization Capacities via IBN-Net", *European Conference on Computer Vision (ECCV)*, 2018, **winning entry** in CVPR18 Workshop on Autonomous Driving.
- [27] Z. Zhang, Z. Kuang, **P. Luo**, L. Feng, W. Zhang, "Temporal Sequence Distillation: Towards Few-Frame Action Recognition in Videos", *ACM Multimedia Conference (ACM MM)*, 2018
- [28] Z. Peng, L. Wu, J. Ren, R. Zhang, **P. Luo\***, "CUImage: A Never Ending Learning Platform on a Convolutional Knowledge Graph of Billion Web Images", *IEEE Conference on Big Data (BigData)*, 2018, acceptance rate: 17%, **Oral**

- [29] Z. Peng, J. Ren, R. Zhang, L. Wu, **P. Luo\***, "Scheduling Large-scale Distributed Training via Reinforcement Learning", *IEEE Conference on Big Data (BigData)*, 2018, acceptance rate: 17%, **Oral**
- [30] Y. Zhou, **P. Luo\***, "Video Classification via Relational Feature Encoding Networks", the 25th ACM Multimedia Conference (**ACM MM**) LSVIC Workshop, MountainView CA, USA, 2017, **Oral**
- [31] **P. Luo**, G. Wang, L. Lin, X. Wang, "Deep Dual Learning for Semantic Image Segmentation", *IEEE International Conference on Computer Vision (ICCV)*, 2017
- [32] **P. Luo**, "Learning Deep Architectures via Generalized Whitenened Neural Networks", *Thirty-fourth International Conference on Machine Learning (ICML)*, 2017, **Oral**
- [33] **P. Luo**, "EigenNet: Towards Fast and Structural Learning of Deep Neural Networks", *International Joint Conference on Artificial Intelligence (IJCAI)*, 2017, **Oral**
- [34] **P. Luo**, G. Wang, L. Lin, X. Wang, "Learning Object Interactions and Descriptions for Semantic Image Segmentation", *International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2017
- [35] S. Yan, Z. Liu, **P. Luo**, S. Qiu, X. Wang, and X. Tang, "Unconstrained Fashion Landmark Detection via Hierarchical Recurrent Transformer Networks", *ACM Multimedia (MM)*, 2017
- [36] X. Li, Z. Liu, **P. Luo**, C.C. Loy, X. Tang, "Not All Pixels Are Equal: Difficulty-Aware Semantic Segmentation via Deep Layer Cascade", *International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2017
- [37] Z. Zhang, **P. Luo**, C. C. Loy, and X. Tang, "Joint Representation Learning and Face Clustering in Videos", *European Conference on Computer Vision (ECCV)*, 2016
- [38] Z. Liu, S. Yan, **P. Luo**, X. Wang, X. Tang, "Fashion Landmark Detection in the Wild", *European Conference on Computer Vision (ECCV)*, 2016
- [39] **P. Luo**, Z. Zhu, Z. Liu, X. Wang, X. Tang, "Face Model Compression by Distilling Knowledge from Neurons", *AAAI Conference on Artificial Intelligence (AAAI)*, 2016, **Oral**, acceptance rate: 15%
- [40] S. Yang, **P. Luo\***, C. C. Loy, X. Tang, "WIDER FACE: A Face Detection Benchmark", *International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2016, **Oral**, acceptance rate: 3.9%
- [41] Z. Liu, **P. Luo\***, Q. Shi, X. Wang, X. Tang, "DeepFashion: Powering Robust Clothes Recognition and Retrieval with Rich Annotations", *International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2016
- [42] Z. Liu, X. Li, **P. Luo\***, C. C. Loy, X. Tang, "Semantic Image Segmentation via Deep Parsing Network," *IEEE International Conference on Computer Vision (ICCV)*, 2015, **Oral**, acceptance rate: 3.5%
- [43] Y. Tian, **P. Luo\***, X. Wang, X. Tang, "Deep Learning Strong Parts for Pedestrian Detection", *IEEE International Conference on Computer Vision (ICCV)*, 2015
- [44] Z. Zhang, **P. Luo**, C. C. Loy, and X. Tang, "Learning Social Relation Traits from Face Images", *IEEE International Conference on Computer Vision (ICCV)*, 2015
- [45] L. Yang, **P. Luo**, C. C. Loy, and X. Tang, "How much do you know about your car?", *International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2015
- [46] S. Yang, **P. Luo\***, C. C. Loy, X. Tang, "From Face Parts Responses to Face Proposal", *IEEE International Conference on Computer Vision (ICCV)*, 2015, (\*correspondence)
- [47] Z. Liu, **P. Luo\***, X. Wang, and X. Tang, "Deep Learning Face Attributes in the Wild", *IEEE International Conference on Computer Vision (ICCV)*, 2015
- [48] Y. Tian, **P. Luo\***, X. Wang, and X. Tang, "Pedestrian Detection aided by Deep Learning Semantic Tasks", *International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2015
- [49] W. Ouyang, X. Wang, X. Zeng, S. Qiu, **P. Luo**, Y. Tian, H. Li, S. Yang, Z. Wang, C.C. Loy, X. Tang, "DeepID-Net: Deformable Deep Convolutional Neural Networks for Object Detection", *International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2015

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- [50] S. Yang, **P. Luo\***, C. C. Loy, X. Tang, "Deep Representation Learning with Target Coding for Visual Recognition", *Twenty-Ninth Conference on Artificial Intelligence (AAAI)*, 2015, **easily accessible paper award**, acceptance rate: 1.5%
- [51] Z. Zhu†, **P. Luo†**, X. Wang, X. Tang, "Deep Learning and Disentangling Multi-View Representation for Face Recognition", *Advances in Neural Information Processing Systems (NIPS)*, 2014 (co-first author)
- [52] Z. Zhang, **P. Luo\***, C. C. Loy, and X. Tang, "Optimizing Facial Landmark Detection with Related Tasks", *European Conference on Computer Vision (ECCV)*, 2014
- [53] Y. Deng, **P. Luo**, C. C. Loy, X. Tang, "Pedestrian Attribute Recognition At Far Distance", *ACM Multimedia (ACM MM)*, 2014
- [54] **P. Luo**, Y. Tian, X. Wang, and X. Tang, "Switchable Deep Network for Pedestrian Detection", *International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2014
- [55] W. Yang, **P. Luo**, and L. Lin, "Clothing Co-Parsing by Joint Image Segmentation and Labeling", *International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2014
- [56] Z. Zhu†, **P. Luo†**, X. Wang, and X. Tang, "Recovering Canonical View Face Images in the Wild", *Technical Report, arXiv.org*, 2014 (co-first author)
- [57] **P. Luo**, X. Wang, and X. Tang, "Pedestrian Parsing via Deep Neural Network", *International Conference on Computer Vision (ICCV)*, 2013
- [58] **P. Luo**, X. Wang, and X. Tang, "A Deep Architecture for Robust Facial Attributes Analysis", *International Conference on Computer Vision (ICCV)*, 2013
- [59] **P. Luo**, Z. Zhu, X. Wang, and X. Tang, "Deep learning identity-preserving face space", *International Conference on Computer Vision (ICCV)*, 2013
- [60] **P. Luo**, X. Wang, and X. Tang, "Hierarchical Face Parsing via Deep Learning", *International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2012
- [61] **P. Luo**, X. Wang, L. Lin, and X. Tang, "Joint Semantic Segmentation by Searching for Compatible-Competitive References", *Proceedings of ACM Multimedia (ACM MM)*, 2012
- [62] **P. Luo**, L. Lin, and H. Chao, "Learning Shape Detector by Quantizing Curve Segments with Multiple Distance Metrics", *Proc. of European Conference on Computer Vision (ECCV)*, 2010
- [63] X. Song, **P. Luo**, L. Lin and Y. Jia, Discriminative Model for Object Representation and Detection via Sparse Features, *IEEE International Conference on Pattern Recognition (ICPR)*, 2010
- [64] M. Yang, S. Lin, **P. Luo**, L. Lin and H. Chao, Semantics-driven Portrait Cartoon Stylization, *IEEE International Conference on Image Processing (ICIP)*, 2010, Oral
- [65] **P. Luo**, J. He, L. Lin and H. Chao, Hierarchical 3D Perception From A Single Image, *IEEE International Conference on Image Processing (ICIP)*, 2009