

Xi Peng

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RESEARCH INTEREST

Deep Learning, Machine Learning, and Intelligent Data Analytics such as Vision/Language Understanding. Training deep models usually requires intensive human efforts such as tons of data annotations and specialized training skills. My research aims to answer the question: can we reduce the efforts to achieve more efficient machine intelligence? More specifically,

- Can we reduce the data efforts by learning data augmentation?
 - Learning to learn in multimodality understanding: [\[ECCV'18\]](#) [\[AAAI'18 review\]](#)
 - Competitive and competitive data augmentation: [\[CVPR'18\]](#) [\[TPAMI'18 review\]](#)
 - Adversarial image and video generation: [\[IJCAI'18\]](#) [\[ECCV'18\]](#)
- Can we improve the network performance by leveraging domain knowledge?
 - Learning disentangled representations: [\[ECCV'16 oral\]](#) [\[ICCV'17\]](#) [\[IJCV'17\]](#)
 - Learning factorization and forecasting: [\[IJCV'18\]](#) [\[TVCG'18 review\]](#) [\[BMVC'18\]](#)
 - Attribute editing and retargeting: [\[CVIU'15\]](#) [\[BMVC'16\]](#) [\[ECCV'18\]](#)
- My research has been successfully applied in human-centered AI analytics funded by NSF/NASA:
 - Vision-based workspace injury prevention and rehabilitation: [\[FG'18\]](#) [\[JOB'18\]](#) [\[THMS'18 review\]](#)
 - Detecting Early Stages of Cognitive Fatigue: [\[ACCV'10 oral\]](#) [\[TIP'12\]](#) [\[CVPRW'16\]](#)
 - Computational American sign language analysis: [\[ICCV'15\]](#) [\[ICPR'16 oral\]](#) [\[FG'16\]](#)

EDUCATION

Rutgers, The State University of New Jersey, New Brunswick, New Jersey, USA

- Ph.D. in Computer Science Sep 2012 – Oct 2017
 - Thesis: Learning Disentangled Representations in Deep Visual Understanding
 - Adviser: Prof. Dimitris N Metaxas

Institute of Automation, Chinese Academy of Science, Beijing, China

- M.S. in Computer Science Sep 2008 – Jul 2011
 - Thesis: Multi-scale Visual Object Tracking (Outstanding Master Dissertation)
 - Adviser: Prof. Ming Tang

Beihang University, Beijing, China

- B.S. in Automation Science Sep 2004 – Jul 2008

EXPERIENCE

Binghamton University - State University of New York, Binghamton, New York, USA

- Assistant Professor, Department of Computer Science Sep 2018 – Now

Rutgers, The State University of New Jersey, New Brunswick, New Jersey, USA

- Visiting Professor, Department of Computer Science Oct 2018 – Oct 2020

NEC Labs America, Cupertino, California, USA

- Research Intern, Media Analytics Group Jun 2016 – Aug 2016

IBM T. J. Watson Research Center, Yorktown Heights, New York, USA

- Research Intern, Vision Group Jun 2015 – Dec 2015

Baidu Research, Beijing, China

- Software Engineer, NLP Group Jul 2011 – Jun 2012

PUBLICATIONS

JOURNALS

- [1]Rahil Mehrizi, **Xi Peng**, Xu Xu, Shaoting Zhang, Dimitris Metaxas, and Kang Li. A computer vision based method for 3d posture estimation of symmetrical lifting. *Journal of Biomechanics (JOB, IF:2.43)*, 69:40–46, 2018.

- [2]**Xi Peng**, Rogerio S Feris, Xiaoyu Wang, and Dimitris N Metaxas. Red-net: A recurrent encoder-decoder network for video-based face alignment. *International Journal of Computer Vision (IJCV, IF:11.54)*, 126(10):1103–1119, 2018.
- [3]**Xi Peng**, Shaoting Zhang, Yang Yu, and Dimitris N Metaxas. Toward personalized modeling: Incremental and ensemble alignment for sequential faces in the wild. *International Journal of Computer Vision (IJCV, IF:11.54)*, 126(2-4):184–197, 2018.
- [4]**Xi Peng**, Junzhou Huang, Qiong Hu, Shaoting Zhang, Ahmed Elgammal, and Dimitris Metaxas. From circle to 3-sphere: Head pose estimation by instance parameterization. *Computer Vision and Image Understanding (CVIU, IF:2.39)*, 136:92–102, 2015.
- [5]Ming Tang and **Xi Peng**. Robust tracking with discriminative ranking lists. *IEEE Transactions on Image Processing (TIP, IF:5.07)*, 21(7):3273–3281, 2012.

CONFERENCES

- [6]Zhiqiang Tang, **Xi Peng**, Shijie Geng, Lingfei Wu, and Dimitris N Metaxas. Quantized densely connected u-nets for efficient landmark localization. In *European Conference on Computer Vision (ECCV)*, 2018.
- [7]Long Zhao, **Xi Peng**, Mubbasir Kapadia, and Dimitris N Metaxas. Learning to forecast and refine residual motion for image-to-video generation. In *European Conference on Computer Vision (ECCV)*, 2018.
- [8]Long Zhao, **Xi Peng**, Mubbasir Kapadia, and Dimitris N Metaxas. Learning residual motion in video generation. In *Workshops of European Conference on Computer Vision (ECCV Workshops)*, 2018.
- [9]Zhiqiang Tang, **Xi Peng**, Shijie Geng, Yizhe Zhu, and Dimitris N Metaxas. Cu-net: Coupled u-nets. In *British Machine Vision Conference (BMVC Oral)*, 2018.
- [10]Yu Tian, **Xi Peng**, Long Zhao, Shaoting Zhang, and Dimitris N Metaxas. Cr-gan: Learning complete representations for multi-view generation. In *International Joint Conference on Artificial Intelligence (IJCAI)*, 2018.
- [11]**Xi Peng**^{*}, Zhiqiang Tang^{*}, Fei Yang, Rogerio S Feris, and Dimitris N Metaxas. Jointly optimize data and network training: Adversarial data augmentation in human pose estimation. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*. ^{*} contribute equally, 2018.
- [12]Yizhe Zhu, Mohamed Elhoseiny, Bingchen Liu, **Xi Peng**, and Ahmed Elgammal. A generative adversarial approach for zero-shot learning from noisy texts. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018.
- [13]Rahil Mehri, **Xi Peng**, Zhiqiang Tang, Xu Xu, Dimitris Metaxas, and Kang Li. Toward marker-free 3d pose estimation in lifting: A deep multi-view solution. In *IEEE International Conference and Workshops on Automatic Face and Gesture Recognition (FG)*, 2018.
- [14]**Xi Peng**, Xiang Yu, Kihyuk Sohn, Dimitris N Metaxas, and Manmohan Chandraker. Reconstruction-based disentanglement for pose-invariant face recognition. In *Proceedings of the IEEE International Conference on Computer Vision (ICCV)*, 2017.
- [15]**Xi Peng**, Rogerio S Feris, Xiaoyu Wang, and Dimitris N Metaxas. A recurrent encoder-decoder network for sequential face alignment. In *European Conference on Computer Vision (ECCV Oral, Best Student Paper Runner-up)*, 2016.
- [16]**Xi Peng**, Qiong Hu, Junzhou Huang, and Dimitris N Metaxas. Track facial points in unconstrained videos. *British Machine Vision Conference (BMVC)*, 2016.
- [17]**Xi Peng**, Nalini Ratha, and Sharathchandra Pankanti. Learning face recognition from limited training data using deep neural networks. In *International Conference on Pattern Recognition (ICPR Oral, Best Student Paper Runner-up)*, 2016.
- [18]**Xi Peng**, Junzhou Huang, and Dimitris N Metaxas. Sequential face alignment via person-specific modeling in the wild. In *Workshops of Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR Workshops)*, 2016.
- [19]**Xi Peng**, Shaoting Zhang, Yu Yang, and Dimitris N Metaxas. Piefa: Personalized incremental and ensemble face alignment. In *Proceedings of the IEEE International Conference on Computer Vision (ICCV)*, 2015.

- [20]**Xi Peng**, Junzhou Huang, Qiong Hu, Shaoting Zhang, and Dimitris N Metaxas. Three-dimensional head pose estimation in-the-wild. In *IEEE International Conference and Workshops on Automatic Face and Gesture Recognition (FG)*, 2015.
- [21]**Xi Peng**, Junzhou Huang, Qiong Hu, Shaoting Zhang, and Dimitris N Metaxas. Head pose estimation by instance parameterization. In *International Conference on Pattern Recognition (ICPR)*, 2014.
- [22]Carol Neidle, Jingjing Liu, Bo Liu, **Xi Peng**, Christian Vogler, and Dimitris Metaxas. Computer-based tracking, analysis, and visualization of linguistically significant nonmanual events in american sign language (asl). In *Workshop of Language Resources and Evaluation Conference (LREC Workshops)*, 2014.
- [23]Qiong Hu, **Xi Peng**, Peng Yang, Fei Yang, and Dimitris N Metaxas. Robust multi-pose facial expression recognition. In *International Conference on Pattern Recognition (ICPR)*, 2014.
- [24]Ming Tang, **Xi Peng**, and Duowen Chen. Robust tracking with discriminative ranking lists. In *Asian Conference on Computer Vision (ACCV Oral)*, 2010.

MANUSCRIPTS UNDER REVIEW

- [25]**Xi Peng**, Zhiqiang Tang, Yizhe Zhu, and Dimitris N Metaxas. Coconet: Learning a competitive and cooperative agent for network enhancement. *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI under review)*, 2018.
- [26]Zhiqiang Tang, **Xi Peng**, Kang Li, and Dimitris N Metaxas. Towards efficient u-nets: A coupled and quantized approach. *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI under review)*, 2018.
- [27]Yu Tian, **Xi Peng**, Long Zhao, Shaoting Zhang, and Dimitris N Metaxas. Learning dual-agent for improved inference and generation. In *The Thirty-Third AAAI Conference on Artificial Intelligence (AAAI under review)*, 2018.
- [28]Rahil Mehrizi, **Xi Peng**, Xu Xu, and Kang Li. A deep neural network-based method for 3d lifting motion estimation. *Journal of Biomechanics (JOB under review)*, 2018.
- [29]Rahil Mehrizi, **Xi Peng**, Xu Xu, Shaoting Zhang, Dimitris Metaxas, and Kang Li. Predicting 3d lower-back joint load in lifting: A deep pose estimation approach. *IEEE Transactions on Human-Machine System (THMS under review)*, 2018.
- [30]Long Zhao, Fangda Han, **Xi Peng**, Xun Zhang, Mubbasir Kapadia, Vladimir Pavlovic, and Dimitris Metaxas. Sketch-based face editing in videos using identity deformation transfer. *IEEE Transactions on Visualization and Computer Graphics (TVCG under review)*, 2018.
- [31]Yu Tian, **Xi Peng**, Long Zhao, Shaoting Zhang, and Dimitris N Metaxas. Learning complete representations for improved adversarial generation and inference. *International Journal of Computer Vision (IJCV in submission)*, 2018.
- [32]Long Zhao, **Xi Peng**, Mubbasir Kapadia, and Dimitris N Metaxas. Learning residual motions in long-term video generation. *International Journal of Computer Vision (IJCV in submission)*, 2018.

PATENTS

- [33]Xiang Yu, Kihyuk Sohn, Manmohan Chandraker, and **Xi Peng**. Siamese reconstruction convolutional neural network for pose-invariant face recognition, 2018. US Patent under process.
- [34]Sharath U Pankanti, **Xi Peng**, and Nalini K Ratha. Visual object recognition, 2017. US Patent App. 15/089,707.
- [35]Ming Tang and **Xi Peng**. A classification-based multi-scale visual object tracking system, 2010. CASIA Software Patent NO. 2010SRBJ6289.

AWARDS & SCHOLARSHIPS

- IJCV special issue on Best Paper of ECCV'16 2017
- ICCV 2017 Doctoral Consortium 2017
- ECCV 2016 Best Student Paper Runner-up (6 out of 1000+) 2016
- ICPR 2016 Best Student Paper Runner-up 2016
- Outstanding Graduate Student Fellowship, Rutgers 2013 – 2014
- Outstanding Graduate Student Fellowship, Rutgers 2012 – 2013

	<ul style="list-style-type: none"> ▪ The 17th Beihang "Fengru Cup" Competition Runner-up (26 out of 600+) 2007 ▪ Excellent Academic Performance Scholarship (Top 1%), Beihang University 2006 ▪ Outstanding Academic Performance Scholarship (Top 5%), Beihang University 2005, 2007
INVITED TALKS	<ul style="list-style-type: none"> ▪ "Reduce Data and Human Efforts toward More Efficient AI", at CUNY Graduate Center, NYC, USA Jun 2018 ▪ "Learning Data Augmentation and Disentanglement for Efficient AI", at Steven Institute of Technology, NJ, USA May 2018 ▪ "Reduce Data Efforts for More Efficient AI", at Binghamton University - SUNY, NY, USA Apr 2018 ▪ "Learning Disentangled Representations in Deep Understanding", at MIT-Watson AI Lab, MA, USA Feb 2018 ▪ "Learning Disentangled Representations in Deep Understanding", at IBM Watson Research Center, NY, USA Jan 2018 ▪ "Self-supervised Disentanglement Learning via Feature Reconstruction", at ICCV'17 Doctoral Consortium, Venice, Italy Oct 2017 ▪ "Deep Visual Understanding: Methods and Applications", at Rutgers Thesis Defense, NJ, USA Oct 2017 ▪ "Learning Face Recognition from Limited Training Data", at ICPR'16 Oral Presentation, Cancun, Mexico Dec 2016 ▪ "A Recurrent Encoder-Decoder Network for Sequential Face Alignment", at ECCV'16 Oral Presentation, Amsterdam, Netherlands Oct 2016 ▪ "Disentangle Subject and Viewpoint by Feature Reconstruction", at NEC Labs America, CA, USA Aug 2016 ▪ "Robust Face Verification by Semi-supervised Alignment", IBM Watson Research Center, NY, USA, Aug 2015
CO-ADVISED STUDENTS	<ul style="list-style-type: none"> ▪ Rahil Mehrizi, Ph.D. student, co-advised with Prof. Kang Li Jan 2017 – Now ▪ Zhiqiang Tang, Ph.D. student, co-advised with Prof. Dimitris N. Metaxas Jan 2017 – Now ▪ Yu Tian, Ph.D. student, co-advised with Prof. Dimitris N. Metaxas Apr 2017 – Now ▪ Long Zhao, Ph.D. student, co-advised with Prof. Dimitris N. Metaxas Sep 2017 – Now
TEACHING	<ul style="list-style-type: none"> ▪ CS436/CS580L Intro to Machine Learning Fall 2018
SKILLS	<ul style="list-style-type: none"> ▪ Coding: Python, C/C++, OpenCV, OpenGL ▪ Deep Learning: Pytorch, Caffe, Theano ▪ Systems: Linux, GPU Cluster, Hadoop DFS
PROFESSIONAL ACTIVITIES	<p>Guest Journal Editor:</p> <ul style="list-style-type: none"> ▪ Neurocomputing (IF:3.32) SI on "Deep feature learning in cross-domain problems." 2018 <p>Journal Reviewer:</p> <ul style="list-style-type: none"> ▪ IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) IF:9.46 2017, 2018 ▪ International Journal of Computer Vision (IJCV) IF:11.54 2017, 2018 ▪ IEEE Transactions on Image Processing (TIP) IF:5.07 2012, 2016, 2017 ▪ IEEE Transactions on Human-Machine System (THMS) 2017, 2018 ▪ IEEE Transactions on Circuits and Systems for Video Technology (TCSVT) 2017 ▪ IEEE Access 2017, 2018 ▪ Neurocomputing 2016, 2017, 2018 ▪ Pattern Recognition 2016, 2018 <p>Conference Program Committee:</p>

▪ Association for the Advancement of Artificial Intelligence (AAAI)	2019
▪ Neural Information Processing Systems (NIPS)	2018
▪ International Conference on Machine Learning (ICML)	2018
▪ IEEE Conference on Learning Representations (ICLR)	2018, 2019
▪ IEEE Conference on Computer Vision and Pattern Recognition (CVPR)	2014, 2016, 2017, 2018
▪ European Conference on Computer Vision (ECCV)	2016, 2018
▪ IEEE Conference on Computer Vision (ICCV)	2015, 2017
▪ Asian Conference on Computer Vision (ACCV)	2018
▪ IEEE International Conference on Automatic Face Gesture Recognition (FG)	2018