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 Mehrizi, **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 onPattern 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. Inference and generation dual learning. In *Conference paper 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, and Kang Li. Marker-less 3d posture tracking using manifold constrained optimization. *Pattern Recognition (***PR** *under review)*, 2018.

[30]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.

[31]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.

[32]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.

[33]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

[34]Xiang Yu, Kihyuk Sohn, Manmohan Chandraker, and **Xi Peng**. Siamese reconstruction convolutional neural network for pose-invariant face recognition, 2018. US Patent under process.

[35]Sharath U Pankanti, **Xi Peng**, and Nalini K Ratha. Visual object recognition, 2017. US Patent App. 15/089,707.

[36]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
- 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

- "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

- 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

- CS436/CS580L Intro to Machine Learning Fall 2018

SKILLS

- Coding: Python, C/C++, OpenCV, OpenGL
- Deep Learning: Pytorch, Caffe, Theano
- Systems: Linux, GPU Cluster, Hadoop DFS

PROFESSIONAL ACTIVITES

Guest Journal Editor:

- Neurocomputing (IF:3.32) SI on "Deep feature learning in cross-domain problems." 2018

Journal Reviewer:

- 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

Conference Program Committee:

- 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