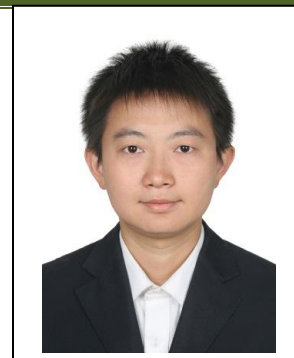


LIN XIONG (熊霖)

PERSONAL INFORMATION

Senior Research Engineer, PhD.
Panasonic R&D Center Singapore, Singapore.
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Nationality :	Chinese	Birth of Date:	15/07/1981
State of Birth:	Xi'an, Shaanxi, China	Marital Status:	Married
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RESEARCH INTERESTS

Unconstrained/Large-Scale Face Recognition, Image Generation with Adversarial Learning, Deep Learning Architecture Engineering, Person Re-identification, Image Recovery, Transfer Learning, Ensemble Learning.

EDUCATION

03/2008 – 03/2015:	Ph.D of Pattern Recognition & Intelligent System, Key Lab of Intelligent Perception and Image Understanding of Ministry of Education, Xidian University, Xi'an, China. (Supervisor: Prof. Licheng Jiao)
08/2006 – 03/2008:	M.S in Pattern Recognition & Intelligent System, Key Lab of Intelligent Perception and Image Understanding of Ministry of Education, Xidian University, Xi'an, China. (Supervisor: Prof. Li Zhang)
09/1999 – 07/2003:	B.S in Material Forming & Control Engineering, College of Mechanical & Electrical Engineering, Shaanxi University of Science & Technology (SUST), Xi'an, China

WORK EXPERIENCE

03/2018 -- Present:	Senior Research Engineer of Panasonic R&D Center Singapore, Singapore.
09/2015 -- 03/2018:	Research Engineer of Panasonic R&D Center Singapore, Singapore.
05/2015 -- 09/2015:	2012 Labs, MV OSS Technology Development Department in HuaWei Technologies Co., LTD.
01/2004 -- 09/2005:	Production team leader of assembly factory in Foxconn Technology Group.
08/2003 -- 12/2003:	Engineer of assembly factory in Foxconn Technology Group.

PROJECT EXPERIENCES

02/2018-now: Continue to focus on NIST Face Recognition Challenge and attend FRVT of NIST

1. Extend current TDFP learning framework with advanced deep architecture (SE-Net) and improve the performance of IJBA with three different models.

2. Develop new architecture of deep neural networks with GAN to frontalize the profile face in order to continue exploring recognition via generation.
3. Integrate face detection, face alignment and face recognition to one system.

12/2017-04/2018: 3D-Aided Deep Pose-Invariant Face Recognition. (Attended by the 27th International Joint Conference on Artificial Intelligence and the 23rd European Conference on Artificial Intelligence (IJCAI-ECAP), Stockholm, Sweden, July 13-19, 2018.). The target of this project is to mitigate the gap between the distribution discrepancy of the synthetic and real face images.

1. 3D-Aided Deep Pose-Invariant Face Recognition Model (3D-PIM) is proposed.
2. 3D-PIM is a novel method which recovers automatically realistic frontal faces from arbitrary poses through a 3D face model.
3. 3D-PIM incorporates a simulator with the aid of a 3D Morphable Model (3D MM) to obtain shape and appearance prior for accelerating face normalizing learning, requiring less training data.
4. It further leverages a global-local Generative Adversarial Network (GAN) with multiple critical improvements as a refiner to enhance the realism of both global structures and local details of the face simulator's output using unlabeled real data only, while preserving the identity information.

08/2017-02/2018: Towards Pose Invariant Face Recognition in the Wild. (Attended by IEEE Conference on Computer Vision and Pattern Recognition(CVPR), Salt Lake, UT, USA, 2018). The target of this project is to improve the generalization performance of generative model from profile face to frontal face and enhance the discriminability of recognition model.

1. Pose Invariant Model for face recognition in the wild is proposed.
2. PIM is a novel and unified deep architecture, containing a Face Frontalization sub-Net (FFN) and a Discriminative Learning sub-Net (DLN), which are jointly learned from end to end.
3. FFN is a well-designed dual-path Generative Adversarial Network (GAN) which simultaneously perceives global structures and local details, incorporated with an unsupervised cross-domain adversarial training and a "learning to learn" strategy for high-fidelity and identity-preserving frontal view synthesis.
4. DLN is a generic Convolutional Neural Network (CNN) for recognition with enforced cross-entropy optimization strategy for learning discriminative yet generalized feature representation.

05/2017-08/2017: High Performance Large Scale Face Recognition with Multi-Cognition Softmax and Feature Retrieval. (Attended MS-Celeb-1M Grand Challenge organized by Microsoft on International Conference on Computer Vision 2017 and Obtained First Place Award on Track 1: Recognizing One Million Celebrities (with external Data))

1. A Multi-Cognition Softmax Model (MCSM) is proposed to distribute training data to several cognition units by a data shuffling strategy.
2. One cognition unit can be viewed as a group of independent softmax models, which is designed to increase the diversity of softmax models in order to boost the performance for model ensemble.
3. A specific voting scheme named Feature Retrieval (FR) is adopted to improve the performance of MCSM.
4. Testing images with lower score from MCSM and FR are assigned new labels with higher score by merging one-shot learning results based on extra data.

01/2017-05/2017: Dual-Agent GANs for Photorealistic and Identity Preserving Profile Face Synthesis (Accepted by Neural Information Processing Systems (NIPS), Long Beach, CA, USA, 2017). The target of this project is still focusing on boosting the performance of IJB-A dataset.

1. We propose a Dual-Agent Generative Adversarial Network (DA-GAN) model which can improve the realism of a face simulator's output using unlabeled real faces, while preserving the identity information during the realism refinement.
2. We employ an off-the-shelf 3D face model as a simulator to generate profile face images with varying poses.
3. DA-GAN leverages a fully convolutional network as the generator to generate high-resolution images and an auto-

encoder as the discriminator with the dual agents.

4. Several key modifications are made to standard GAN in order to preserve pose, texture and identity and stabilize training process simultaneously with many kinds of loss functions.

10/2016-04/2017: A Good Practice Towards Top Performance of Face Recognition: Transferred Deep Feature Fusion. (Participated Face Challenge of NIST and Obtained Top 1 performance on IJB-A dataset during Mar 2017 to May 2017)

1. A unified learning framework named transferred deep feature fusion is proposed for face verification and identification.
2. Two latest DCNN models are trained in source domain with two different large datasets in order to take full advantage of complementary between models and datasets.
3. Two-stage fusion are designed, one for features and another for similarity scores.
4. One-vs-rest template-specific linear SVMs with chosen negative set is trained in target domain in order to learn a similarity metric.

03/2016-09/2016: Person Re-identification: Fusion of Deep and Handcrafted Features with Metric Learning. (Obtained the state of the art performance on CUHK03 dataset at that time)

1. We claim handcrafted features can be complementary to deep features, and propose an unsupervised feature fusion strategy with fused deep and handcrafted features.
2. We adopt a disjoint frame which not only utilizes the powerful feature extraction capability of deep convolutional neural network but also brings into play the exclusive superiority of advanced metric learning method.
3. An unsupervised feature fusion strategy is proposed not only to obtain a low dimension subspace for metric learning but also to give play to the complementarity between deep feature and handcrafted feature.
4. Feature distribution is analyzed in order to demonstrate complementarity among different features.

PUBLICATIONS

- [1] Jian Zhao*, **Lin Xiong***, Jianshu Li, Shuicheng Yan, and Jiashi Feng. "3D-Aided Dual-Agent GANs for Unconstrained Face Recognition", Accepted by *IEEE Transactions on Pattern Analysis and Machine Intelligence*, (TPAMI) vol.x (x), pp.xxx-xxx, 2018. **IF 9.455, (*Equal contribution)**
- [2] Jian Zhao*, **Lin Xiong***, Junliang Xing, Shuicheng Yan, and Jiashi Feng. "Turn Around Your Face: High-Performance Pose-Invariant Face Recognition via 3D-Driven Face Frontalization", Submitted to IJCV. **(*Equal contribution)**
- [3] Jian Zhao*, Yu Cheng*, **Lin Xiong***, Junliang Xing, Shuicheng Yan, and Jiashi Feng. "Pose Invariant Face Recognition in the Wild", Submitted to TPAMI. **(*Equal contribution)**
- [4] Jian Zhao*, **Lin Xiong***, Yu Cheng*, Jianshu Li, Li Zhou, Yan Xu, Yi Cheng, Karlekar Jayashree, Sugiri Pranata, Shengmei Shen, Junliang Xing, Shuicheng Yan and Jiashi Feng. "3D-Aided Deep Pose-Invariant Face Recognition", Accepted by 27th International Joint Conference on Artificial Intelligence and the 23rd European Conference on Artificial Intelligence (**IJCAI-ECAI**), Stockholm, Sweden, July 13-19, 2018. **(*Equal contribution). (Oral and Acceptance rate is 20.46%)**
- [5] Jian Zhao, Yu Cheng, Yan Xu, **Lin Xiong**, Jianshu Li, Fang Zhao, Karlekar Jayashree, Sugiri Pranata, Shengmei Shen, Junliang Xing, Shuicheng Yan, and Jiashi Feng. "Towards Pose Invariant Face Recognition in the Wild", Accepted by IEEE International Conference on Computer Vision and Pattern Recognition (CVPR), Salt Lake, UT, USA, 2018. **(Acceptance rate is 29.64%)**
- [6] Yan Xu, Xi Ouyang, Yu Cheng, Shining Yu, **Lin Xiong**, Sugiri Pranata, Shengmei Shen, and Junliang Xing. "Dual-Mode Vehicle Motion Pattern Learning for High Performance Road Traffic Anomaly Detection", Accepted by IEEE International Conference on Computer Vision and Pattern Recognition (CVPR) Workshop, Salt Lake, UT, USA, 2018.

- [7] **Lin Xiong**, Jayashree Karlekar, Tomoyuki Kagaya, Yan Xu, Hajime Tamura, Shengmei Shen. "Winning of Face Recognition Challenge: Ensemble of Multiple Deep Neural Networks". Accepted by Panasonic Technical Symposium, 2017 and selected as excellent paper for **oral presentation**.
- [8] Jian Zhao, **Lin Xiong**, Karlekar Jayashree, Sugiri Pranata, Shengmei Shen, and Jiashi Feng. "Dual-Agent GANs for Photorealistic and Identity Preserving Profile Face Synthesis". Accepted by Neural Information Processing Systems (NIPS), Long Beach, CA, USA, 2017. (**Acceptance rate is 20.92%**)
- [9] Yan Xu, Yu Cheng, Jian Zhao, Zhecan Wang, **Lin Xiong**, Karlekar Jayashree, Hajime Tamura, Tomoyuki Kagaya, Shengmei Shen, Sugiri Pranata, Jiashi Feng, and Junliang Xing. "High Performance Large Scale Face Recognition with Multi-Cognition Softmax and Feature Retrieval". Accepted by International Conference on Computer Vision (ICCV) Workshop, Venice, Italy, 2017. (**First Place Award on Track 1**)
- [10] Shasha Mao, Weisi Lin, Jiawei Chen, and **Lin Xiong**. "Optimizing Ensemble Combination based on Maximization of Diversity". *Electronics Letters*, vol.53 (13), pp.1042-1044, 2017. **IF 1.232**
- [11] **Lin Xiong**, Jayashree Karlekar, Jian Zhao, Jiashi Feng, Sugiri Pranata and Shengmei Shen. "A Good Practice Towards Top Performance of Face Recognition: Transferred Deep Feature Fusion". arXiv Apr 2017. <https://arxiv.org/abs/1704.00438> (**Keep the Top 1 performance on IJB-A compared with the state-of-the-art algorithms**)
- [12] Shasha Mao, **Lin Xiong***, Licheng Jiao, Tian Feng and Sai-Kit Yeung. "A novel Riemannian metric based on Riemannian structure and scaling information for fixed low-rank matrix completion". *IEEE Transactions on Cybernetics*, vol.47 (5), pp.1299-1312, 2017. **IF 8.803 (*Corresponding author)**
- [13] **Lin Xiong**, Jayashree Karlekar, Sugiri Pranata and Shengmei Shen. "Person Re-identification: Fusion of Deep and Handcrafted Features with Metric Learning". *Technical Report Sep 2016*. The brief version is accepted by Panasonic Technical Symposium, 2016.
- [14] Shasha Mao*, Licheng Jiao, **Lin Xiong***, Shuiping Gou, Bo Chen, Sai-Kit Yeung. "Weighted classifier ensemble based on quadratic form". *Pattern Recognition*, vol.48 (5), pp.1688-1706, 2015. **IF 4.582 (*Equal contribution)**
- [15] **Lin Xiong**, Shasha Mao, and Licheng Jiao. "Selective ensemble based on transformation of classifiers used SPCA." *International Journal of Pattern Recognition and Artificial Intelligence* 29.01 (2015): 1550005, 2015.
- [16] **Lin Xiong**, Licheng Jiao, Shasha Mao. "Selective ensemble based on the integer matrix linear transformation and its application to radar target recognition". *Journal of Xidian University (Natural Science)*, vol.42 (2), pp.15-22, 2015.
- [17] Fei Yin, Licheng Jiao, Fanhua Shang, **Lin Xiong**, Shasha Mao. "Double Linear Regressions for Single Labeled Image per Person Face Recognition". *Pattern Recognition*, vol.47 (4), pp. 1547-1558, 2014. **IF 4.582**
- [18] **Lin Xiong**, Licheng Jiao, Fei Yin. "Classifications with transferred samples based on RF-Spaces". In proceeding of the *4th International Conference on Audio, Language and Image Processing (ICALIP2014)*, Shanghai, July 7-9, 2014.
- [19] Shasha Mao, **Lin Xiong**, Licheng Jiao, Shuang Zhang, Bo Chen. "Isomorous Multiple Classifier Ensemble via Transformation of Rotation Forest". *Journal of Xidian University (Natural Science)*, vol.41 (5), pp.55-61, 2014.
- [20] Fei Yin, Licheng Jiao, Fanhua Shang, **Lin Xiong**, Xiaodong Wang. "Sparse Regularization Discriminant Analysis for Face Recognition". *Neurocomputing*, vol.128 (27), pp. 341-362, 2013. **IF 3.241**
- [21] Shasha Mao, **Lin Xiong**, Licheng Jiao, Shuang Zhang, Bo Chen. "Weighted ensemble based on 0-1 matrix decomposition". *Electronics Letters*, vol.49 (2), pp.116-118, 2013. **IF 1.232**
- [22] **Lin Xiong**, Licheng Jiao, Shasha Mao. "Active learning based on coupled KNN pseudo pruning". *Neural*

Computing & Applications, vol.21 (7), pp.1669-1686, 2012. **IF 4.213**

[23] Shasha Mao, Licheng Jiao, **Lin Xiong**, Shuiping Gou. "Greedy optimization classifiers ensemble based on diversity". *Pattern Recognition*, vol.44 (6), pp.1245-1261, 2011. **IF 4.582**

PROGRAMMING SKILLS

- ✧ Adept in Python, OpenCV and Matlab.
 - ✧ Skilled in MXNet and PyTorch
 - ✧ Preferred to Ubuntu, MacOS.
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HONORS

- ✧ Achieved Gold prize award in Panasonic Technology Symposium (PTS 2017).
 - ✧ Achieved the World's most accurate Face Recognition based on the IJB-A dataset provided by NIST and obtained an award prize of \$5000 from Panasonic, 2017.
 - ✧ Obtained First Place Award on Track 2: Anomaly Detection on NVIDIA AI CITY CHALLENGE from CVPR 2018 workshop.
 - ✧ Obtained First Place Award on Track 1: Recognizing One Million Celebrities (with external Data) from ICCV 2017 workshop.
 - ✧ Second prize of National Grants, Xidian University, 2009~2011;
 - ✧ Second-level award in Xidian University, 2010
 - ✧ First-level award in Xidian University, 2009
 - ✧ Second-class scholarship and the title of "merit student", Shaanxi University of Science & Technology, 2001~2003.
 - ✧ Third-class scholarship, Shaanxi University of Science & Technology, 1999~2001.
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EXTRA-CURRICULUM ACTIVITIES

07/2008--07/2009: Assistant of Chief Engineer in Shaanxi Beiren Printing Machinery Co., Ltd