

Xiang Xu

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Education

University of Houston

PH.D. IN COMPUTER SCIENCE

Face Recognition, Biometrics, Computer Vision, Deep Learning, Machine Learning, Pattern Recognition

Houston, TX, USA

Aug. 2014 - Present

Beijing University of Posts and Telecommunications

B.S. IN TELECOMMUNICATION ENGINEERING

Telecommunication, Application Development

Beijing, China

Sept. 2009 - June. 2013

Experience

Amazon AWS AI

APPLIED SCIENTIST INTERN

New York City & Seattle, WA

Summer, 2017 & 2018

- Forecasting with deep learning techniques;
- Domain Adaptation for Image Classification: Proposed novel algorithms for domain adaptation for different scenarios and outperformed state-of-the-art performance by a large margin [C4].

University of Houston

RESEARCH ASSISTANT AT COMPUTATIONAL BIOMEDICINE LAB

Houston, TX, USA

Aug. 2014 - Present

- **2D Face Recognition [C1]** Tools: Python, MXNet/Gluon
 - Performed and analyzed the current state-of-the-art face recognition algorithm on the Images with occlusions;
 - Proposed a plug-and-play attention module that helps to extract local discriminative features from non-occluded facial region;
 - Proposed a novel template generator that improves the generalization of face recognition under occlusions by **10%** in an image-based setting and outperforms the baseline by around **2%** in terms of Rank-1 accuracy in an image-set-based scenario .
- **3D-Aided 2D Face Recognition [C9]** Tools: C++, Qt, OpenCV, 3D-AFM, Caffe
 - Designed and implemented CBL 3D-Aided 2D face recognition system in C++, which is modular, easy to use, and easy to maintain. The modules include face detection, 2D face alignment, 3D model fitting, and face frontalization. To accelerate computation, it makes use of OpenMP for CPU and CUDA for GPU. The SDK is based on the libraries of OpenCV, Dlib, and Caffe [C9].
 - Extended to a generaliable 2D face recognition system with the support of MXNet and implemented an evaluation package [C5].
- **3D Face Reconstruction[C6, J3]** Tools: Python, MXNet
 - Proposed a feature aggregation learning network to predict the shape and expression parameters of 3D face model, which leverages the features from different layers from the backbone network such as ResNet-101;
 - Achieved **16%** improvement on BU-3DFE and **10%** improvement on JNU-3D comparing the state-of-the-art algorithms.
- **2D Face Analysis [C10]** Tools: Python, TensorFlow
 - Proposed a hierarchical framework to estimate head pose and facial landmarks jointly in a coarse-to-fine manner. It first estimates the coarse head pose and localizes primary landmarks using global CNN features. With this rough head pose estimation and initial landmarks, local CNN features are extracted from images patches to refine the pose estimation and update facial landmark localization .
- **2D Face alignment [C11]** Tool: MATLAB
 - Proposed a novel method for face alignment method on 2D images by combining the facial component classification and cascaded regression. The face component classification is used for deriving a better initialization for regression. An ensemble of random ferns is applied to encode the local facial features for global shape regression.

Publications

CONFERENCE

- C1 **X. Xu**, N. Sarafianos, and I. A. Kakadiaris. On Improving the Generalization of Face Recognition in the Presence of Occlusions, In *Proc. IEEE International Conference on Computer Vision*, Seoul, Korea, Oct. 27 - Nov. 2, 2019 (Under Review).
- C2 **X. Xu**, N. Sarafianos, and I. A. Kakadiaris. Daisy: Domain Adaptation from Image-based to Set-based Face Recognition, In *Proc. IEEE International Conference on Computer Vision*, Seoul, Korea, Oct. 27 - Nov. 2, 2019 (Under Review).
- C3 N. Sarafianos, **X. Xu**, and I. A. Kakadiaris. Adversarial Representation Learning for Text-to-Image Matching, In *Proc. IEEE International Conference on Computer Vision*, Seoul, Korea, Oct. 27 - Nov. 2, 2019 (Under Review).
- C4 **X. Xu**, X. Zhou, R. Venkatesan, O. Majumder, and G. Swaminathan. d-SNE: Domain Adaptation using Stochastic Neighborhood Embedding, In *Proc. IEEE Computer Vision and Pattern Recognition*, Long Beach, CA, Jun. 16 - 21, 2019.

- C5 **X. Xu** and I.A. Kakadiaris. Open Source Face Recognition Performance Evaluation Package, ArXiv preprint arXiv:1901.09447, 2019
- C6 **X. Xu**, H. Le, and I. A. Kakadiaris. On the Importance of Feature Aggregation for Face Reconstruction, In *Proc. Winter Conference on Applications of Computer Vision*, Waikoloa Village, Hawaii, Jan. 7 - 11, 2019.
- C7 N. Sarafianos, **X. Xu**, and I. A. Kakadiaris, Deep Imbalanced Attribute Classification using Visual Attention Aggregation, In *Proc. Europe Conference of Computer Vision*, Munich, Germany, Sept. 8 - 14, 2018.
- C8 L. Shi, **X. Xu**, and I. A. Kakadiaris, SSFD: A Face Detector using a Single-scale Feature Map, In *Proc. The 9th IEEE International Conference on Biometrics: Theory, Applications, and Systems*, Los Angeles, CA, Oct. 22-25, 2018.
- C9 **X. Xu**, Ha Le, P. Dou, Y.Wu, and I. A. Kakadiaris. Evaluation of a 3D-aided Pose Invariant 2D Face Recognition System. In *Proc. International Joint Conference on Biometrics*, Denver, CO, Oct. 1-4, 2017.
- C10 **X. Xu** and I. A. Kakadiaris. Joint Head Pose Estimation and Face Alignment Framework using Global and Local CNN Features. In *Proc. 12th IEEE Conference on Automatic Face and Gesture Recognition*, Washington, DC, May 30-June 3, 2017.
- C11 **X. Xu**, S. K. Shah, and I. A. Kakadiaris. Face alignment via an ensemble of random ferns. In *Proc. IEEE International Conference on Identity, Security and Behavior Analysis*, Sendai, Japan, Feb. 29 - Mar. 2, 2016 (Oral).
- C12 Y. Wu, **X. Xu**, and I. A. Kakadiaris. Towards fitting a 3D dense facial model to 2D image without landmarks. In *Proc. 7th International Conference on Biometrics: Theory, Applications and Systems*, Arlington, VA, Sept. 8 - 11, 2015.
- C13 **X. Xu**, X. Zhu and W. Deng. Accurate Eye Localization by Fusing Local, Global and Context Information. In *International Conference on Multimedia and Human-Computer Interaction*, Canada, 2013 (Accepted).

JOURNAL

- J1 Y. Zhou, X. Yang, Y. Zhang, **X. Xu**, Y. Wang, X. Chai, and W. Lin. Unsupervised adaptive sign language recognition based on hypothesis comparison guided cross validation and linguistic prior filtering. *Neurocomputing*, 149(C): 1604-1612, 2015.
- J2 L. Shi, **X. Xu**, and I. A. Kakadiaris, SSFD+: A Face Detector using a Single-scale Feature Map. *IEEE Transaction on Biometrics, Behavior, and Identity Science* (Under review).
- J3 **X. Xu**, and I. A. Kakadiaris. FR-FAN: Feature Aggregation Network for Face Reconstruction and Recognition. *IEEE Transaction on Biometrics, Behavior, and Identity Science*, 2019 (Under review).

Professional Service

- 2019 **Reviewer**, *Neurocomputing*, *Computer Vision and Pattern Recognition*, *International Conference on Biometrics*
- Reviewer**, *International Journal of Computer Vision*, *Neurocomputing*, *Signal Processing*, *Computer Vision and Pattern Recognition*, *European Conference on Computer Vision*, *International Conference of Image Processing*, *Automatic Face and Gesture Recognition*
- 2018 **Reviewer**, *Computer Vision and Pattern Recognition*, *Automatic Face and Gesture Recognition*, *Medical Image Computing and Computer Assisted Intervention*
- 2017 **Reviewer**, *Computer Vision and Pattern Recognition*, *Medical Image Computing and Computer Assisted Intervention*
- 2016 **Reviewer**, *Computer Vision and Pattern Recognition*, *Medical Image Computing and Computer Assisted Intervention*
- 2015 **Reviewer**, *Computer Vision and Pattern Recognition*
- 2014 **Reviewer**, *Asian Conference on Pattern Recognition*

Skills

Programming C/C++, Python, MATLAB, JAVA, Lua, Objective-C, SQL

Tools MxNet/Gluon, TensorFlow, Pytorch/Torch, Caffe, OpenCV, Qt, Git, OpenBR

Honors & Awards

- 2019 **Doctoral Consortium**, WACV 2019 *Waikoloa Village, HI*
- 2017 **Doctoral Consortium**, IJCB 2017 *Denver, CO*
- 2017 **Doctoral Consortium Travel Grant**, FG 2017 *Washington, DC*
- 2013 **Special Prize (11/10k+, 1%)**, Campus group, China mobile application developing competition *Beijing, China*
- 2013 **3rd Award (8/142, 6%)**, BUPT Imagine Award *Beijing, China*
- 2011 **3rd Award**, National area, Google Android Application Development Challenge *Beijing, China*
- 2011 **3rd Award**, BUPT Mobile Internet Creative Competition *Beijing, China*
- 2011 **2nd Award**, Beijing area, Google Android Application Development Challenge *Beijing, China*