Felix Juefei Xu

Curriculum Vitae

CyLab Biometrics Center
4720 Forbes Ave. CIC 1307
Pittsburgh, PA 15213, USA
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Education

2011 - 2018 **Ph.D. in Electrical and Computer Engineering**, *Carnegie Mellon University*.
Department of Electrical and Computer Engineering, College of Engineering
Advisor: Prof. Marios Savvides
Dissertation: Unconstrained Periocular Face Recognition: From Reconstructive Dictionary Learning to Generative Deep Learning and Beyond

2012 - 2017 **M.S. in Machine Learning**, *Carnegie Mellon University*.
Machine Learning Department, School of Computer Science
Advisor: Prof. Abhinav Gupta / Prof. Alexander J. Smola (Jan 2015 - Dec 2015)
Additional thesis committee member: Prof. Ruslan Salakhutdinov

2009 - 2011 **M.S. in Electrical and Computer Engineering**, *Carnegie Mellon University*.
Department of Electrical and Computer Engineering, College of Engineering
Advisor: Prof. Marios Savvides

2005 - 2009 **B.S. in Electronic Engineering**, *Shanghai Jiao Tong University*.
Department of Electronic Engineering, School of Electronic Information and Electrical Engineering

2008 **Summer Session**, *University of California at Berkeley*.
Haas School of Business and College of Engineering

Short Bio

Felix Juefei Xu (publish under *F. Juefei-Xu*) received the Ph.D. degree in Electrical and Computer Engineering from Carnegie Mellon University. During his Ph.D studies, he was working in a research group specializing in pattern recognition, machine learning, computer vision, and image processing, especially as applied to the field of biometrics, in *Carnegie Mellon CyLab Biometrics Center* under the supervision of *Prof. Marios Savvides*.

His current research is focused on a fuller understanding of deep learning where he is actively exploring new methods in deep learning that are **statistically efficient** and **adversarially robust**. His Ph.D. work is primarily focused on tackling the Pose, Expression, Resolution, Illumination, and Occlusion (Perio) challenges for unconstrained periocular face recognition using shallow and deep discriminative and generative methods, especially under the dome of self-supervised learning. He also has broader interests in pattern recognition, computer vision, machine learning, optimization, statistics, compressive sensing, and image processing. He is the recipient of multiple best/distinguished paper awards, including the **Best Poster Paper Award** of the *IEEE/IAPR International Joint Conference on Biometrics (IJCB)* in 2011, the **Best Paper Award** of the *IEEE Seventh International Conference on Biometrics: Theory, Applications and Systems (BTAS)* in 2015, the **Best Student Paper Award** of the *IEEE Eighth International Conference on Biometrics: Theory, Applications and Systems (BTAS)* in 2016, and the **ACM SIGSOFT Distinguished Paper Award** of the *IEEE/ACM International Conference on Automated Software Engineering (ASE)* in 2018.

▬▬ Research Interests

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

▬▬ Publications (Google Scholar Profile)

Dissertation

[1] **Felix Juefei-Xu**, "Unconstrained Periocular Face Recognition: From Reconstructive Dictionary Learning to Generative Deep Learning and Beyond", *PhD Dissertation, Carnegie Mellon University, 2018.*

arXiv Preprint

[1] Lei Ma, **Felix Juefei-Xu**, Minhui Xue, Qiang Hu, Sen Chen, Bo Li, Yang Liu, Jianjun Zhao, Jianxiong Yin, and Simon See, "Secure Deep Learning Engineering: A Software Quality Assurance Perspective", *arXiv preprint arXiv:1810.04538, 2018.*

[2] Alvin Chan, Lei Ma, **Felix Juefei-Xu**, Xiaofei Xie, Yang Liu, and Yew Soon Ong, "Metamorphic Relation Based Adversarial Attacks on Differentiable Neural Computer", *arXiv preprint arXiv:1809.02444, 2018.*

[3] Xiaofei Xie, Lei Ma, **Felix Juefei-Xu**, Hongxu Chen, Minhui Xue, Bo Li, Yang Liu, Jianjun Zhao, Jianxiong Yin, and Simon See, "Coverage-Guided Fuzzing for Deep Neural Networks", *arXiv preprint arXiv:1809.01266, 2018.*

[4] **Felix Juefei-Xu**, Vishnu Naresh Boddeti, and Marios Savvides, "Perturbative Neural Networks", *arXiv preprint arXiv:1806.01817, 2018.*

[5] Lei Ma, Fuyuan Zhang, Jiyuan Sun, Minhui Xue, Bo Li, **Felix Juefei-Xu**, Chao Xie, Li Li, Yang Liu, Jianjun Zhao, and Yadong Wang, "DeepMutation: Mutation Testing of Deep Learning Systems", *arXiv preprint arXiv:1805.05206, 2018.*

[6] Lei Ma, **Felix Juefei-Xu**, Fuyuan Zhang, Jiyuan Sun, Minhui Xue, Bo Li, Chunyang Chen, Ting Su, Li Li, Yang Liu, Jianjun Zhao, and Yadong Wang, "DeepGauge: Multi-Granularity Testing Criteria for Deep Learning Systems", *arXiv preprint arXiv:1803.07519, 2018.*

[7] **Felix Juefei-Xu**, Vishnu Naresh Boddeti, and Marios Savvides, "Gang of GANs: Generative Adversarial Networks with Maximum Margin Ranking", *arXiv preprint arXiv:1704.04865, 2017.*

[8] **Felix Juefei-Xu**, Vishnu Naresh Boddeti, and Marios Savvides, "Local Binary Convolutional Neural Networks", *arXiv preprint arXiv:1608.06049, 2016.*

Refereed and Published

[1] **Felix Juefei-Xu***, Rahul Dey*, Vishnu Naresh Bodetti, and Marios Savvides, "RankGAN: A Maximum Margin Ranking GAN for Generating Faces", *Asian Conference on Computer Vision (ACCV), 2018.* **(Oral Presentation)**

[2] Lei Ma, Fuyuan Zhang, Jiyuan Sun, Minhui Xue, Bo Li, **Felix Juefei-Xu**, Chao Xie, Li Li, Yang Liu, Jianjun Zhao, and Yadong Wang, "DeepMutation: Mutation Testing of Deep Learning Systems", *IEEE International Symposium on Software Reliability Engineering (ISSRE), 2018.*

[3] Lei Ma, **Felix Juefei-Xu**, Fuyuan Zhang, Jiyuan Sun, Minhui Xue, Bo Li, Chunyang Chen, Ting Su, Li Li, Yang Liu, Jianjun Zhao, and Yadong Wang, "DeepGauge: Multi-Granularity Testing Criteria for Deep Learning Systems", *ACM/IEEE International Conference on Automated Software Engineering (ASE), 2018.* **(ACM SIGSOFT Distinguished Paper Award)**

[4] **Felix Juefei-Xu**, Vishnu Naresh Boddeti, and Marios Savvides, "Perturbative Neural Networks", *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018.*

[5] **Felix Juefei-Xu** and Marios Savvides, "LAW: Locality-Aware Whitening", *IEEE International Conference on Image Processing (ICIP), 2017.* **(Oral Presentation)**

[6] Chandrasekhar Bhagavatula, **Felix Juefei-Xu**, Jason Wang, and Marios Savvides, "Three Birds, One Stone: Simultaneous Object Detection, Recognition, and Profiling Using Phase Encoded MACE Filters", *IEEE International Conference on Image Processing (ICIP), 2017.* **(Oral Presentation)**

[7] **Felix Juefei-Xu**, Vishnu Naresh Boddeti, and Marios Savvides, "Local Binary Convolutional Neural Networks", *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2017.* **(Spotlight Oral Presentation)**

[8] **Felix Juefei-Xu**, Eshan Verma, and Marios Savvides, "DeepGender2: A Generative Approach Toward Occlusion and Low Resolution Robust Facial Gender Classification via Progressively Trained Attention Shift Convolutional Neural Networks (PTAS-CNN) and Deep Convolutional Generative Adversarial Networks (DCGAN)", *Book Chapter, Deep Learning for Biometrics, (eds. B. Bhanu and A. Kumar), Springer, 2017.*

[9] **Felix Juefei-Xu** and Marios Savvides, "Learning to Invert Local Binary Patterns", *British Machine Vision Conference (BMVC), 2016.*

[10] **Felix Juefei-Xu** and Marios Savvides, "Fastfood Dictionary Learning for Periocular-Based Full Face Hallucination", *IEEE 8th International Conference on Biometrics: Theory, Applications and Systems (BTAS), 2016.* (Best Student Paper Award) **(Oral Presentation)**

[11] Paul Buchana, Irina Cazan, Manuel Diaz-Granados, **Felix Juefei-Xu**, and Marios Savvides, "Simultaneous Forgery Identification and Localization in Paintings Using Advanced Correlation Filters", *IEEE International Conference on Image Processing (ICIP), 2016.* **(Oral Presentation)**

[12] Marios Savvides, **Felix Juefei-Xu**, Utsav Prabhu, and Chandrasekhar Bhagavatula, "Unconstrained Biometric Identification in Real World Environments", *Advances in Human Factors and System Interactions, Vol. 497 of the series Advances in Intelligent Systems and Computing, pp. 231-244, 2016.*

[13] Dipan K. Pal, **Felix Juefei-Xu**, and Marios Savvides, "Discriminative Invariant Kernel Features: A Bells-and-Whistles-Free Approach to Unsupervised Face Recognition and Pose Estimation", *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016.* **(Spotlight Oral Presentation)**

[14] **Felix Juefei-Xu***, Eshan Verma*, Parag Goel, Anisha Cherodian, and Marios Savvides, "DeepGender: Occlusion and Low Resolution Robust Facial Gender Classification via Progressively Trained Convolutional Neural Networks with Attention", *Biometrics Workshop, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016.* **(Oral Presentation)**

[15] **Felix Juefei-Xu** and Marios Savvides, "Multi-class Fukunaga Koontz Discriminant Analysis for Enhanced Face Recognition", *Pattern Recognition, vol. 52, pp. 186-205, 2016.*

[16] **Felix Juefei-Xu**, Khoa Luu, and Marios Savvides, "Spartans: Single-sample Periocular-based Alignment-robust Recognition Technique Applied to Non-frontal Scenarios", *IEEE Transactions on Image Processing (TIP), vol. 24, no. 12, pp. 4780-4795, Dec. 2015.*

[17] **Felix Juefei-Xu** and Marios Savvides, "Pokerface: Partial Order Keeping and Energy Repressing Method for Extreme Face Illumination Normalization", *IEEE 7th International Conference on Biometrics: Theory, Applications and Systems (BTAS), 2015.* (Best Paper Award) **(Oral Presentation)**

[18] **Felix Juefei-Xu** and Marios Savvides, "Single Face Image Super-Resolution via Solo Dictionary Learning", *IEEE International Conference on Image Processing (ICIP), 2015.*

[19] **Felix Juefei-Xu** and Marios Savvides, "Encoding and Decoding Local Binary Patterns for Harsh Face Illumination Normalization", *IEEE International Conference on Image Processing (ICIP), 2015.* **(Oral Presentation)**

[20] **Felix Juefei-Xu** and Marios Savvides, "Pareto-optimal Discriminant Analysis", *IEEE International Conference on Image Processing (ICIP), 2015.*

[21] Niv Zehngut, **Felix Juefei-Xu**, Rishabh Bardia, Dipan K. Pal, Chandrasekhar Bhagavatula, and Marios Savvides, "Investigating the Feasibility of Image-Based Nose Biometrics", *IEEE International Conference on Image Processing (ICIP), 2015.* **(Best 10% Paper Award)**

[22] **Felix Juefei-Xu**, Dipan K. Pal, and Marios Savvides, "NIR-VIS Heterogeneous Face Recognition via Cross-Spectral Joint Dictionary Learning and Reconstruction", *Perception Beyond the Visual Spectrum (PBVS) Workshop, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015.* **(Oral Presentation)**

[23] Keshav Seshadri, **Felix Juefei-Xu**, Dipan K. Pal, and Marios Savvides, "Driver Cell Phone Usage Detection on Strategic Highway Research Program (SHRP2) Face View Videos", *Computer Vision in Vehicle Technology (CVVT) Workshop, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015.*

[24] Shreyas Venugopalan*, **Felix Juefei-Xu***, Benjamin Cowley, and Marios Savvides, "Electromyograph and Keystroke Dynamics for Spoof-Resistant Biometric Authentication", *Biometrics Workshop, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015.*

[25] **Felix Juefei-Xu***, Dipan K. Pal*, Karanhaar Singh*, and Marios Savvides, "A Preliminary Investigation on the Sensitivity of COTS Face Recognition Systems to Forensic Analyst-style Face Processing for Occlusions", *Biometrics Workshop, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015.*

[26] **Felix Juefei-Xu** and Marios Savvides, "Facial Ethnic Appearance Synthesis", *Soft Biometrics Workshop, European Conference on Computer Vision (ECCV), 2014.* **(Oral Presentation)**

[27] **Felix Juefei-Xu** and Marios Savvides, "Weight-optimal Local Binary Patterns", *Computer Vision with Local Binary Patterns Variants Workshop, European Conference on Computer Vision (ECCV), 2014.* **(Oral Presentation)**

[28] **Felix Juefei-Xu**, Dipan K. Pal, and Marios Savvides, "Hallucinating the Full Face from the Periocular Region via Dimensionally Weighted K-SVD", *Biometrics Workshop, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2014.* **(Oral Presentation)**

[29] **Felix Juefei-Xu** and Marios Savvides, "Subspace Based Discrete Transform Encoded Local Binary Patterns Representation for Robust Periocular Matching on NIST's Face Recognition Grand Challenge", *IEEE Transactions on Image Processing (TIP), vol. 23, no. 8, pp. 3490-3505, Aug. 2014.*

[30] **Felix Juefei-Xu** and Marios Savvides, "An Image Statistics Approach towards Efficient and Robust Refinement for Landmarks on Facial Boundary", *IEEE 6th International Conference on Biometrics: Theory, Applications and Systems (BTAS), 2013.*

[31] **Felix Juefei-Xu** and Marios Savvides, "An Augmented Linear Discriminant Analysis Approach for Identifying Identical Twins with the Aid of Facial Asymmetry Features", *Biometrics Workshop, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2013.* **(Oral Presentation)**

[32] **Felix Juefei-Xu**, Chandrasekhar Bhagavatula, Aaron Jaech, Unni Prasad, and Marios Savvides, "Gait-ID on the Move: Pace Independent Human Identification Using Cell Phone Accelerometer Dynamics", *IEEE 5th International Conference on Biometrics: Theory, Applications and Systems (BTAS), 2012.* **(Oral Presentation)**

[33] **Felix Juefei-Xu** and Marios Savvides, "Unconstrained Periocular Biometric Acquisition and Recognition Using COTS PTZ Camera for Uncooperative and Non-Cooperative Subjects", *IEEE Workshop on the Applications of Computer Vision (WACV), 2012.*

[34] **Felix Juefei-Xu***, Khoa Luu*, Marios Savvides, Tien Bui, and Ching Y. Suen, "Investigating Age Invariant Face Recognition Based on Periocular Biometrics", *IEEE/IAPR International Joint Conference on Biometrics (IJCB), 2011.* **(Best Poster Paper Award)**

[35] **Felix Juefei-Xu** and Marios Savvides, "Can Your Eyebrows Tell Me Who You Are?", *IEEE 5th International Conference on Signal Processing and Communication Systems (ICSPCS), 2011.*

[36] **Felix Juefei-Xu**, Miriam Cha, Marios Savvides, Saad Bedros, and Jana Trojanova, "Robust Periocular Biometric Recognition Using Multi-level Fusion of Various Local Feature Extraction Techniques", *IEEE 17th International Conference on Digital Signal Processing (DSP), 2011.*

[37] **Felix Juefei-Xu**, Miriam Cha, Joseph Heyman, Shreyas Venogopalan, Ramzi Abiantun, and Marios Savvides, "Robust Local Binary Pattern Feature Sets for Periocular Biometric Identification", *IEEE 4th International Conference on Biometrics: Theory, Applications and Systems (BTAS), 2010.*

Patent

[1] Marios Savvides and **Felix Juefei-Xu**, "Image Matching Using Subspace-Based Discrete Transform Encoded Local Binary Patterns", *United States Patent No. 9,171,226. 27 Oct. 2015.*

[2] **Felix Juefei-Xu**, Dipan K. Pal, and Marios Savvides, "Methods and Software for Hallucinating Facial Features by Prioritizing Reconstruction Errors", *United States Patent Application No. 15/307,099, June 17, 2014.*

Professional Services

Reviewer   International Journal of Computer Vision (IJCV), Springer
Reviewer   IEEE Transactions on Image Processing (TIP)
Reviewer   IEEE Transactions on Multimedia (TMM)
Reviewer   IEEE Transactions on Information Forensics and Security (TIFS)
Reviewer   IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)
Reviewer   IEEE Access
Reviewer   Pattern Recognition (PR), Elsevier
Reviewer   Pattern Recognition Letters (PRL), Elsevier
Reviewer   Neurocomputing (NEUCOM), Elsevier
Reviewer   Digital Signal Processing (DSP), Elsevier
Reviewer   Information Sciences (INS), Elsevier
Reviewer   Journal of Visual Communication and Image Representation (JVCI), Elsevier
Reviewer   Computer Methods and Programs in Biomedicine (CMPB), Elsevier
Reviewer   IET Image Processing (IPR)
Reviewer   SIAM Journal on Imaging Sciences (SIIMS)
Reviewer   IEEE Conference on Computer Vision and Pattern Recognition (CVPR)
Reviewer   Conference on Neural Information Processing Systems (NIPS)
Reviewer   Asian Conference on Computer Vision (ACCV)
Reviewer   IEEE International Conference on Biometrics: Theory, Applications, and Systems (BTAS)
Reviewer   IEEE Winter Conference on Applications of Computer Vision (WACV)
Reviewer   IEEE International Conference on Image Processing (ICIP)
Reviewer   IEEE International Conference on Biometrics (ICB)
Reviewer   IEEE/IAPR International Joint Conference on Biometrics (IJCB)
Reviewer   IEEE International Conference on Identity, Security and Behavior Analysis (ISBA)

Honors and Awards

2018   ACM SIGSOFT Distinguished Paper Award, IEEE/ACM International Conference on Automated Software Engineering (ASE)

2016   Best Student Paper Award, IEEE Eighth International Conference on Biometrics: Theory, Applications and Systems (BTAS)

2015	Best Paper Award, IEEE Seventh International Conference on Biometrics: Theory, Applications and Systems (BTAS)
2015	Best 10% Paper Award, IEEE International Conference on Image Processing (ICIP)
2015	Gold Prize, Edison Awards (group recognition of CMU CyLab Biometrics Center)
2012	Best Poster Prize, 10-701 Machine Learning Course
2011	Best Poster Paper Award, 2011 IEEE/IAPR International Joint Conference on Biometrics (IJCB)
2011	College of Engineering Dean's Tuition Fellowship, Carnegie Mellon University
2010	First Runner-up Scholarship Award in University Language Services Photo Contest
2008	Merit Student Award, Shanghai Jiao Tong University
2007	Excellent Academic Scholarship, Shanghai Jiao Tong University
2007	2nd-Prize Award, 2007 National English Contest for College Students
2006	Excellent Youth Award, Shanghai Jiao Tong University
2005	2nd-Prize Award in English Debate, Shanghai Jiao Tong University

Teaching Experience

Fall 2016	18-794 Pattern Recognition Theory (partial), Carnegie Mellon University
Fall 2015	18-794 Pattern Recognition Theory, Carnegie Mellon University
Fall 2014	18-794 Pattern Recognition Theory, Carnegie Mellon University
Fall 2013	18-794 Pattern Recognition Theory, Carnegie Mellon University
Fall 2012	18-794 Pattern Recognition Theory, Carnegie Mellon University
2007 - 2009	Advanced English-Chinese Interpretation, Shanghai New Oriental School, New Oriental Education & Technology Group Inc. (NYSE:EDU)

Language Familiarity

English	Credential of (English) Advanced Interpretation conferred by Shanghai Municipal Personnel Bureau
	TOEFL 113, Speaking 28/30
French	TEF Candidate
Chinese	Native Mandarin/Shanghainese speaker

Computer Skills

Programming	Python, C/C++, Matlab
DL platforms	Torch, PyTorch, TensorFlow, Caffe, MXNet, Theano
OS	Linux, macOS, Windows
Advanced office tools	LaTeX, Adobe Dreamweaver, Adobe Illustrator, Adobe Photoshop, Adobe Premiere Pro, Adobe Audition

Related CMU Course Work

10-725	Convex Optimization

10-701	Machine Learning
10-702	Statistical Machine Learning
10-708	Probabilistic Graphical Models
10-705	Intermediate Statistics
15-826	Multimedia Databases and Data Mining
15-853	Algorithms in the Real World
18-799	Compressive Sensing and Sparse Optimization
10-805	Deep Learning
16-720	Computer Vision
16-824	Learning Based Methods in Vision
15-862	Computational Photography
18-794	Pattern Recognition Theory
18-751	Applied Stochastic Process
18-797	Machine Learning and Signal Processing