Songyao Jiang

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EDUCATION

Northeastern University — **Boston, MA**
Ph.D. in Computer Engineering — **06/2016 – 04/2022 (expected)**
- Advisor: Prof. Yun (Raymond) Fu
- Concentration: Computer Vision and Pattern Recognition, Machine Learning.

University of Michigan — **Ann Arbor, MI**
Master of Science in Electrical and Computer Engineering — **09/2013 – 06/2015**
- Coursework: Linear Algebra, Machine Learning, Image Processing, Database Management, Embedded System Programming, etc.

Hong Kong Polytechnic University — **Hong Kong**
Bachelor of Engineering in Electrical Engineering, — **09/2009 – 06/2013**
- Coursework: Programming, Computer Architecture, Operating Systems, Analog and Digital Circuits etc.

RESEARCH INTERESTS

Computer Vision: Human Face and Gesture, Video Classifications, Human Detection and Pose Estimation, Generative Models, Adversarial Training, Skeleton-base Action Recognition, Sign Language Recognition.

RESEARCH EXPERIENCE

Northeastern University — **Boston, MA**
Research Assistant in SMILE Lab — **06/2016 – present**
- Advisor: Prof. Yun (Raymond) Fu
- Research topics: human detection, pose estimation, action recognition, sign language recognition, generative models, adversarial training.

Giaran, Inc. (later acquired by Shiseido Americas) — **Boston, MA**
Research Engineer and Founding Member — **01/2017 – 09/2017**
- Developed key algorithms in the core products, including a real-time AI color calibration system, a virtual makeup addon, removal and recommendation system and a face detection and alignment using OpenCV/Caffe in C++ and JavaScript.

Northeastern University — **Boston, MA**
Research Assistant in Power Electronics Research Group — **09/2015 – 03/2016**
- Advisor: Prof. Bradley Lehman
- Research topic: Machine learning on photovoltaic power prediction.

Tgood Limited Company — **Qingdao, China**
Research Engineer in Electric Vehicle Research Team — **05/2015 – 08/2015**
- Topic: Grouped Smart Charging Control System for Electric Vehicles
- Developed a machine learning based smart charging algorithm for massively grouped electric vehicles (EV) charging system, to mitigate the charging load on power system, utilizing renewable energy resources in micro-grids, and improve the EV battery life.

Nagoya University — **Nagoya, Japan**
Research Assistant in Suzuoki Lab — **05/2014 – 08/2014**
- Advisor: Prof. Takeyoshi Kato.
- Research topic: mathematical modelling of renewable energy.

TEACHING EXPERIENCE

Northeastern University **Boston, MA**
Teaching Assistant for Course EECE-5642: Data Visualization **Spring 2018**

- Introduces relevant topics and concepts in visualization, including computer graphics, visual data representation, physical and human vision models, numerical representation of knowledge and concept, animation techniques, pattern analysis, and computational methods.

PUBLICATIONS

- **Jiang, S.**, Sun, B., Wang, L., Bai, Y., Li, K., Fu, Y., "Skeleton Aware Multi-modal Sign Language Recognition". In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops.*
- **Jiang, S.**, Tao, Z., & Fu, Y., "Geometrically Editable Face Image Translation with Adversarial Networks". IEEE Transactions on Image Processing 30, 2771-2783.
- **Jiang, S.,** Liu, H., Wu, Y., & Fu, Y., "Spatially Constrained Generative Adversarial Networks for Conditional Image Generation". *Under Review*, 2021.
- Yin, Y., Robinson, J.P., **Jiang, S**., Fu, Y., "SuperFront: From Low-resolution to High-resolution Frontal Face Synthesis". In *ACM Multimedia (ACMMM)*, 2021.
- Yin, Y., **Jiang, S**., Robinson, J.P., Fu, Y., "Dual-attention GAN for Large-pose Face Frontalization". In *15th IEEE International Conference on Automatic Face & Gesture Recognition (FG 2019),* 2020.
- Sarkar, S., Kang, W., **Jiang, S**., Li, K., Ray, S., Luther, E., ... & Konry, T., "Machine learning-aided quantification of antibody-based cancer immunotherapy by natural killer cells in microfluidic droplets". Lab on a Chip, 20(13), 2317-2327, 2020
- Hong, Z., Sun, T., **Jiang, S**., Li, K., Fu, Y., Xu, H., Zhang, J., Liu, Y., Ye, Q., Cang H., "Harnessing Deep Learning to Overcome Photo-toxicity for Live-cell Imaging". *Under review*, 2020.
- **Jiang, S.,** Tao, Z., & Fu, Y., "Segmentation Guided Image-to-Image Translation with Adversarial Networks". In *14th IEEE International Conference on Automatic Face & Gesture Recognition (FG 2019)*, 2019.
- Alashkar, T., **Jiang, S.,** & Fu, Y., "Rule-Based Facial Makeup Recommendation System". In *12th IEEE International Conference on Automatic Face & Gesture Recognition (FG 2017)*, 2017.
- Alashkar, T., **Jiang, S.,** Wang, S., & Fu, Y., Examples-Rules Guided Deep Neural Network for Makeup Recommendation*. In AAAI Conference on Artificial Intelligence (AAAI)*, 2017.
- **Jiang, S**., Kato, T., "Dynamic Modelling of Combined Cycle Power Plant for Load Frequency Control with Large Penetration of Renewable Energy". In *7th JUACEP Research Workshop*. 2014.

OTHER RESEARCH PROJECTS

Northeastern University **Boston, MA**
Video-based Multi-person 2D Pose Estimation with Tracking **02/2020 – 07/2020**

- Improved the accuracy of pose estimation and tracking by utilizing the temporal information of the human body movement between adjacent video frames.
- Developed a novel method of extracting movement of human body using deep CNN and use this to refine the pose estimation results.
- Developing a video-based parts association algorithm for pose tracking.

Northeastern University **Boston, MA**
Face Recognition in Low-light Condition Using Transfer Learning **05/2019 – 11/2019**

- In low-light condition, we utilized Infra-red (IR) wavelength to obtain the portrait images of the target person. Information is learned from visible images and transferred to IR images,
- We developed a semi-supervised metric learning method and an unsupervised adversarial method to transfer the knowledge we learned from visible spectrum to IR spectrum.

Northeastern University **Boston, MA**
Facial Attributes Classification and Virtual Makeup Addon System **02/2016 – 04/2016**

- Constructed a classification system, which aimed to classify the facial attributes such as skin color, face shape, eye shape into their classes. We extracted predefined features from face image and trains them using multi-class SVM.
- The classes of facial attributes are used to recommend a make-up style for the user. We also built a makeup add-on system to visualize the recommended makeup.

Northeastern University **Boston, MA**
A Machine-Learning Approach of Snow Detection for PV Power Prediction **12/2015 – 03/2016**

- Detected the snow effects on PV power output during winter when PV panels experience snowfalls, a machine learning approach which converts the snow detection problem into a classification problem is created. The overall accuracy of PV power prediction was significantly improved.

PATENTS

- Yun, F., **Jiang, S.,** "Segmentation Guided Image Generation with Adversarial Networks". *US Patent 10,825,219*.
- Yun, F., **Jiang, S.,** Sun, B., "Light-Weight Pose Estimation Network with Multi-Scale Heatmap Fusion". *US Patent App No.: 62/976,099.*
- Yun, F., **Jiang, S**., "Video 2D Multi-person Pose Estimation using Multi-frame Refinement and Optimization". *WIPO Patent App. No.: WO 2020/232069*

HONORS & AWARDS

CVPR 2021 Challenge on Signer-independent Isolated Sign Language Recognition **2021**
- Won championships in both RGB track and RGB-D tracks.

CVPR 2021 Challenge on Agriculture-Vision **2021**
- Ranked 4th in supervised track

PhD Network Travel Grant, Northeastern University, USA **2019**

JUACEP Research Award, Nagoya University, Japan **2014**

Outstanding Scholarship, Hong Kong Polytechnic University **2010, 2011, 2012, 2013**

ACADEMIC SERVICE

Conference Reviewer and Co-reviewer

- International Conference on Computer Vision (ICCV)
- International Joint Conferences on Artificial Intelligence (IJCAI)
- IEEE International Conference on Automatic Face & Gesture Recognition (FG)
- IEEE International Conference on Data Mining (ICDM)
- IEEE International Conference on Multimedia Information Processing and Retrieval (MIPR)

Journal Reviewer

- IEEE Transactions on Image Processing (TIP)
- Journal of Electronic Imaging (JEI)
- Journal of Visual Communication and Image Representation (JVCI)

COMPUTER SKILLS

PyTorch, TensorFlow, OpenCV, Python, C/C++, Caffe, MATLAB, Java, JavaScript, Database Management