Shih-Yao (Mike) Lin

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Summary

- Specialize in machine learning, computer vision, and and their applications to human action recognition, hand/body pose estimation, and AI-aided medical image analysis.
- 10+ years' research experiences in human action recognition, pose estimation and motion tracking.
- Authored/coauthored 18 journal/conference papers; won best student paper awards in ACM Multimedia 2012; hold 2 patents.

Research and Work Experience

Tencent America — Palo Alto, CA
Senior Research Scientist — *Apr. 2018 – Present*

- **Human Motion Analysis**: Launched AI-powered Parkinson's Disease (PD) diagnosis clinical trial in UK with King's College London, widely reported by the BBC, the Forbes, Bloomberg, and the Finical Times.
- **2D/3D Hand Pose Estimation**: Developed an adversarial network to generate realistic training RGB and depth images for 2D/3D hand pose estimation; Related research published by BMVC'19 and WACV'20.
- **Human Posture Estimation**: Developed a video-based postural tremor detection and analysis system.

Robert Bosch LLC — Sunnyvale, CA
Postdoctoral Researcher — *Apr. 2017 – Mar. 2018*

- **Reliable Training Data Generation**: Developed a sequence-to-sequence deep generative model which can generate reliable augmented training data to learn a robust deep model for action recognition. Related research published by BMVC'18
- **Human Action/Gesture Recognition**: Developed a residual bidirectional recurrent neural network (Residual-BLSTM) for human action recognition.
- **Gesture Detection**: Developed a bidirectional-GRUs for detecting gesture from untrimmed MoCap streams

Academia Sinica — Taipei, Taiwan
Research Assistant — *Jan. 2014 – Jan. 2016*

- **Human Action Recognition**: Developed an approach based on Conditional Random Fields (CRFs) for recognizing partially observed human actions. Related research published by ACM TOMM, ICASSP'17
- **Gesture-Based User Interface**: Developed a gesture-based imaginary interface for TV remote control. Related research published by ACM MM'13, and a US patent.

National Institute of Informatics (NII) — Tokyo, Japan
Research Intern — *Aug 2013 – Dec. 2013*

- **Human Action Recognition**: Investigated machine learning algorithms for human intention discovery

Education

National Taiwan University — Taiwan
Ph.D. in Computer Science; GPA: 3.86/4.3 — *Sep. 2010 – Jan. 2016*

- **Dissertation**: "Human Action Recognition Based on Probabilistic Graphical Models"
- **Achievement**: authored/coauthored 13 journal/conference papers; won the best student paper award in ACM Multimedia 2012 and Ph.D. Dissertation Award of IICM; published 2 patents.

National Dong-Hwa University — Taiwan
M.S. in Computer Science; GPA: 3.7/4.0 — *Sep. 2006 – Sep. 2008*

- **Thesis**: "3D Human Motion Tracking Using Integrated Particle Filter and Mean Shift"
- **Achievement**: authored 2 conference and 1 top journal papers.

Publication

Selected Papers:

- L. Chen, **S.-Y. Lin**, Y. Xie, Y.-Y. Lin, W. Fan, X. Xie, **DGGAN: Depth-image Guided Generative Adversarial Networks for jointly Disentangling RGB and Depth Images and Estimating 3D Hand Pose**, IEEE Winter Conference on Applications of Computer Vision (WACV), 2020
- L. Chen, **S.-Y. Lin**, Y. Xie, H. Tang, Y. Xue, X. Xie, Y.-Y. Lin, W. Fan, **TAGAN: Tonality Aligned Generative Adversarial Networks for Realistic Hand Pose Synthesis**, British Machine Vision Conference (BMVC), 2019
- **S.-Y. Lin**, Y.-Y. Lin, **Augmenting Motion Capture Data with Neural Data Translation for Human Action Recognition**, British Machine Vision Conference (BMVC), 2018
- **S.-Y. Lin**, Y.-Y. Lin, C.-S. Chen, Y.-P. Hung, **Learning Conditional Random Fields with Augmented Observations for Partially Observed Action Recognition**, ArXiv:1811.09986
- **S.-Y. Lin**, Y.-Y. Lin, C.-S. Chen, Y.-P. Hung, **Recognizing Partially Observed Human Actions by Observation Filtering and Completion**, ACM Trans. Multimedia Computing, Communications, and Applications (TOMM), Vol. 13 No. 3, pp. 28:1 - 28:23, 2017 **(Impact Factor: 2.25)**
- **S.-Y. Lin**, Y.-Y. Lin, C.-S. Chen, Y.-P. Hung, **Learning and Inferring Human Actions with Temporal Pyramid Features based on Conditional Random Fields**, IEEE Int' Conf. Acoustics, Speech and Signal Processing (ICASSP), 2017
- **S.-Y. Lin**, C.-K. Shie, S.-C. Chen, Y.-P. Hung, **AirTouch Panel: A Re-anchorable Virtual Touch Panel**, ACM Conf. Multimedia (ACM MM), 2013
- **S.-Y. Lin**, C.-K. Shie, S.-C. Chen, Y.-P. Hung, **Action Recognition for Human-Marionette Interaction**, ACM Conf. Multimedia (ACM MM), 2012 **(Best Student Paper Award)**
- **S.-Y. Lin**, C.-K. Shie, S.-C. Chen, M.-S. Lee, Y.-P. Hung, **Human Action Recognition Using Action Trait Code**, Int' Conf. Pattern Recognition (ICPR), 2012.
- **S.-Y. Lin**, Y.-C. Lai, L.-W. Chan, and Y.-P. Hung, **Real-time 3D Model based Gesture Tracking for Multimedia Control**, Int' Conf. Pattern Recognition (ICPR), 2010
- I-C. Chang, **S.-Y. Lin**, **3D Human Motion Tracking based on Progressive Particle Filter**, Pattern Recognition (PR), Vol. 43, Issue 10, PP. 3621-3635, 2010. **(Impact Factor: 3.7)**
- **S.-Y. Lin**, I-C. Chang, **Dynamic Kernel Based Progressive Particle Filter for 3D Human Motion Tracking**, Asian Conf. Computer Vision (ACCV), 2009. **(LNCS)**
- **S.-Y. Lin**, I-C. Chang, **3D Human Motion Tracking Using Progressive Particle Filter**, Int' Symp. Visual Computing (ISVC), 2008. **(LNCS)**

Patents:

- **S.-Y. Lin**, Y. Xie, H. Tang, C. Huang, L. Han, W. Fan, **Video-based 3D Hand Pose and Mesh Estimation Based on Temporal-Aware Self-Supervised Learning**, US Patent (pending)
- **S.-Y. Lin**, Y. Xie, H. Tang, C. Huang, L. Han, W. Fan, **3D Hand Pose Estimation Based on Depth-image Guided Adversarial Networks**, US Patent (pending)
- C. Huang, Z. Qian, H. Tang, Y. Xie, **S.-Y. Lin**, K. Wang, X. Chen, Z. Huo, W. Fan, **A Deep Learning System for Detecting Acute Intracranial Hemorrhage in Non-Contrast Head CT Images**, US Patent (pending)
- C. Huang, Z. Qian, H. Tang, Y. Xie, **S.-Y. Lin**, K. Wang, X. Chen, L. Han, Z. Huo, W. Fan, **A 2.5-dimensional Convolutional Neural Network for Predicting Hematoma Expansion in Non-Contrast Head CT Images**, US Patent (pending)
- H. Tang, Y. Xie, **S.-Y. Lin**, L. Han, W. Fan, **System and Method for Automatic Recognition for Hand Activity defined in Unified Parkinson Disease Rating Scale**, US Patent (pending)
- **S.-Y. Lin**, Y. Xie, H. Tang, L. Han, W. Fan, **Realistic Hand Pose Synthesis Based on Blending Generative Adversarial Networks (BlendGAN)**, US Patent (pending)
- L. Han, H. Tang, Y. Xie, **S.-Y. Lin**, Q. Zhen, Z. Huo, W. Fan, **PDD: Parkinson Disease Detection Mobile App**, US Patent (pending)
- N. Du, K. Wang, M. Tu, S. Zhang, H. Tang, **S.-Y. Lin**, W. Fan, **A Multimodal Framework for Heart Abnormalities Analysis based on EMR/EHR and Electrocardiography**, US Patent (pending)

- L. Han, N. Du, K. Wang, M. Tu, S. Zhang, H. Tang, **S.-Y. Lin**, W. Fan, **AABB: AI Aided Bug Bits and Transmitted Disease Dentification**, US Patent (pending), US Patent (pending)
- Y. Xie, T. Yang, M. Tu, N. Du, **S.-Y. Lin**, W. Fan, **A Method for Determining Disease Symptom Relations Using Acceptance and Rejection of Random Samples**, US Patent (pending)
- **S.-Y. Lin**, Y. Xie, K. Wang, L. Han, W. Fan, **Augmenting Reliable Training Data with CycleGAN for Hand Pose Estimation**, US Patent (pending)
- Y.-P. Hung, **S.-Y. Lin**, **Re-anchorable Virtual Panel in Three-dimensional Space**, US Patent, US-20160187991-A1, filed July 23, 2015, and issued October 3, 2016
- Y.-P. Hung, **S.-Y. Lin**, **A Re-anchorable Virtual Panel in 3D Space**, Taiwan Patent, I521387, filed December 25, 2014, and issued February 11, 2016

Poster:

- S.-C. Chen, C.-W. Hsu, **S.-Y. Lin**, Kevin Lin, Y.-P. Hung, **Teleport Space: Space Navigation by Detecting the Self-Motion of a Mobile Device**, ACM SIGGRAPH Asia, 2013.

Selected Awards & Honors

- **Ph.D. Dissertation Award**, Institute of Information & Computing Machinery (IICM), 2017
- **Best Student Paper Award**, ACM Conf. Multimedia (ACM MM), 2012
  Paper title: Action Recognition for Human-Marionette Interaction
- **ACM MM Student Travel Award**, Nara, Japan, 2012
- **IEEE ICME Student Travel Award**, Melbourne, Australia, 2012

Professional Activities

Journal Reviewer:

- IEEE Transactions on Information Forensics and Security (TIFS)
- IEEE Transactions on Human-Machine Systems (THMS)
- ACM Transactions on Multimedia Computing, Communications and Applications (TOMM)
- Journal of Information Science and Engineering (JISE)

Technical Program Committee/Conference Reviewer:

- AAAI Conference on Artificial Intelligence (AAAI 2020)
- ACM Multimedia (ACM MM 2018)
- Asian Conference on Computer Vision (ACCV 2018)
- British Machine Vision Conference (BMVC 2019)
- IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2018-2020)
- International Conference on Multimedia and Expo. (ICME 2018-2020)
- International Conference on Multimedia Signal Processing (MMSP 2019)
- IEEE Winter Conference on Applications of Computer Vision (WACV 2020)
- International Conference on Computer Vision (ICCV 2019)
- International Conference on Image Processing (ICIP 2019)
- International Conference on Pattern Recognition (ICPR 2012, 2014)

Technical Skills

- **Programming Languages**: Python, C/C++
- **System**: Linux, MacOS, Windows
- **Development Libraries**: MATLAB,OpenCV, Pandas, Scipy
- **Machine Learning Toolkits**: Tensorflow, Keras, PyTorch, Openpose

Reference

- **Dr. Yen-Yu Lin** (Ph.D. Advisor)
  Professor, Department of Computer Science, National Chiao Tung University, Taiwan
  Email: lin@cs.nctu.edu.tw
  Homepage: https://sites.google.com/site/yylinweb/
- **Dr. Yusheng Xie** (Former Colleague)
  Applied Scientist, Amazon, Palo Alto, CA
  Email: yushx@amazon.com
- **Dr. Yen-Lin Chen** (Research Mentor)
  Software Engineer, Google Inc., Mountain View, CA
  Email: yenn99@gmail.com