

Chung-Ching Lin

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Research Scientist

IBM Research AI, New York

Research Interests

Adaptive and Efficient Action Recognition

Video Instance Segmentation, Object Detection and Classification

Multi Object Tracking, Clustering, and Re-Identification

Multi-Face Tracking to Help AI Follow the Action

(<https://www.ibm.com/blogs/research/2018/07/multi-face-tracking/>)

Few-Shot Learning

Deep Reinforcement Learning

Hyper-Parameter Optimization

Bayesian Modeling, Variational Auto Encoder

3D Reconstruction

Stitching

Education

Georgia Institute of Technology

Department of Electrical and Computer Engineering

Ph.D. (May 2012)

Major in Computer Vision, Machine Learning and Pattern Recognition

Thesis: “Detecting and Tracking Moving Objects from a Moving Platform”

Experiences

IBM Research AI, Yorktown NY

Researcher, working on activity recognition, object tracking, instance segmentation, clustering, re-identification for multimedia and surveillance videos

2014 – present

IBM T. J. Watson Research, Yorktown NY

Post-doctoral Researcher, worked on stitching, registration, recognition, and motion analysis algorithms for video summarization

2012 - 2014

Siemens Corporate Research, Princeton NJ

Research Intern, worked on 3D medical image processing

Summer 2011

Georgia Institute of Technology, Atlanta GA

Graduate Student Researcher, worked on segmentation, classification, multi-view geometry, detection, and tracking for cameras on the moving platform

2007 – 2012

Selected Research Projects

IARPA Deep Intermodal Video Analytics (DIVA) Project (<https://www.iarpa.gov/index.php/research-programs/diva>)

Research lead, robust and accurate video instance segmentation tracking based on a modified Variational Autoencoder architecture [CVPR'20]

Research lead, adaptive frame resolution for efficient activity recognition [ECCV'20]

Research lead, adaptive temporal gating for efficient activity recognition [Submitted to NeurIPS'20]

Adaptive redundancy reduction for efficient activity recognition [Submitted to NeurIPS'20]

Workshop organizer, Moving Cameras: From Body Cameras to Drones workshop [ICCV'19]
(<https://sites.google.com/view/mcmvs2019>)

Rank #1 on TRECVID 2018 ActEV (<https://actev.nist.gov/1B-Evaluation>)

Intelligent Video Analytics (IVA) for Safety & Security

(https://www.ibm.com/support/knowledgecenter/en/SS88XH_2.0.0/iva/kc_welcome.html)

Research lead, prior-less person tracking and re-identification on unconstrained videos based on conceptually-different Co-occurrence framework and Gaussian Process Model [CVPR'18]

Multi-modal Analysis for Disney Star Wars (<https://www.youtube.com/watch?v=Qh8RuDWija4>)

Enable Artificial Intelligence to analyze C-3PO robot of Star Wars

Medical Image Analysis for Skin Cancer (<https://www.ibm.com/blogs/research/2016/11/identifying-skin-cancer-computer-vision/>)

Develop techniques in computer vision that could enable clinical staff to use pictures to screen for melanoma [MICCAI'18 Workshop]

Visual Recognition for IBM Watson Developer Cloud (Custom trained object detection)

(<https://www.ibm.com/watson/services/visual-recognition>)

DARPA Power Efficiency Revolution for Embedded Computing Technologies (PERFECT) Project

(<https://www.darpa.mil/program/power-efficiency-revolution-for-embedded-computing-technologies>)

A distributed bundle adjustment algorithm for 3D reconstruction [ICCV'17 workshop]

A robust stitching method to optimize visual effect [CVPR'15]

A system for UAV video summarization and 3D scene understanding

Designed robust stitching, registration, recognition, and motion analysis algorithms for Unmanned aerial vehicle (UAV) videos using SIFT and MSER detector, 2014

Developed "Saliency-based Aerial Video Essence 2" (SAVE²) demo program achieving 10000X reduction in video summarization time, GEOINT (The United States Geospatial Intelligence), 2013

Built a reliable method to solve 3D distortion problems for creating a panorama from different aerial videos captured by multiple UAV cameras, 2013

Designed advanced stitching and registration algorithms for nanometer-scale image applications using Levenberg-Marquardt, 2012

Established new segmentation and pattern recognition methods to analyze the heterogeneous panoramas and extract high-level chip features/functions, 2012

Selected Publications (Peer Reviewed)

[“Video Instance Segmentation Tracking with a Modified VAE Architecture”](#),

C.-C. Lin, Y. Hung, R. Feris, L. He

Computer Vision and Pattern Recognition (CVPR), 2020 [[pdf](#)] [[supp](#)]

“AR-Net: Adaptive Frame Resolution for Efficient Action Recognition”,

Y. Meng, **C.-C. Lin**, R. Panda, P. Sattigeri, L. Karlinsky, A. Oliva, K. Saenko, R. Feris

European Conference on Computer Vision (ECCV), 2020

“AdaFuse: Adaptive Temporal Fusion Network for Efficient Action Recognition”,

Y. Meng, **C.-C. Lin**, R. Panda, P. Sattigeri, L. Karlinsky, A. Oliva, K. Saenko, R. Feris

(NeurIPS 2020 in submission)

“VA-RED²: Video Adaptive Redundancy Reduction”,

B. Pan, R. Panda, **C.-C. Lin**, C. Fosco, Y. Meng, A. Andonian, A. Oliva, K. Saenko, R. Feris

(NeurIPS 2020 in submission)

[“A Prior-Less Method for Multi-Face Tracking in Unconstrained Videos”](#),

C.-C. Lin, Y. Hung

Computer Vision and Pattern Recognition (CVPR), 2018 [[pdf](#)] [[supp](#)]

“Collaborative Human-AI (CHAI): Evidence-Based Interpretable Melanoma Classification in Dermoscopic Images”,

N. C. F. Codella, **C.-C. Lin**, A. Halpern, M. Hind, R. Feris, J. R. Smith

Inter. Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) Workshop, 2018

“Distributed Bundle Adjustment”

K. N. Ramamurthy, **C.-C. Lin**, S. Pankanti, A. Y. Aravkin, R. Viguier

International Conference on Computer Vision (ICCV) Workshop, 2017

[“Adaptive As-Natural-As-Possible Image Stitching”](#)

C.-C. Lin, S. Pankanti, K. N. Ramamurthy, A. Y. Aravkin,

Computer Vision and Pattern Recognition (CVPR), 2015 [[pdf](#)] [[supp](#)]

“Mobile Camera Analytics: Emerging scenarios, challenges, and applications”

C.-C. Lin, S. Pankanti, G. Ashour, D. Porat, J. R. Smith

IBM Journal of Research and Development, 2015

“Automatic Video Content Summarization Using Geospatial Mosaics of Aerial Imagery”

R. Viguier, **C.-C. Lin**, H. AliAkbarpour, F. Bunyak, S. Pankanti, G. Seetharaman and K. Palaniappan,

IEEE International Symposium on Multimedia (ISM), 2015

“Multi-Modality Mobile Image Recognition Based on Visual and Thermal Cameras”

J.-H. Lai, **C.-C. Lin**, C.-F. Chen, C.-Y. Lin

IEEE International Symposium on Multimedia (ISM), 2015

“Accurate Coverage Summarization of UAV Videos”

C.-C. Lin, S. Pankanti, J. Smith,

Applied Imagery Pattern Recognition (AIPR) annual workshops, 2014

“Automated Mapping of Very Large Areas of VLSI Circuit using SIL”

C.-C. Lin, F. Stellari

International Symposium for Testing and Failure Analysis (ISTFA), 2014

“Dynamic Multi-Object Detection and Tracking from a Moving Platform”

C.-C. Lin, M. Wolf

Computer Vision and Pattern Recognition (CVPR) Workshop, 2013

“Automatic Registering and Stitching of TEM/STEM Image Mosaics”

C.-C. Lin et. al.

International Symposium for Testing and Failure Analysis (ISTFA), 2013

“Monocular Online learning for Road Region Labeling and Object Detection from a Moving Platform”

C.-C. Lin, M. Wolf

International Symposium on Visual Computing (ISVC), 2011

“Detecting Moving Objects Using a Camera on a Moving Platform”

C.-C. Lin, M. Wolf

International Conference on Pattern Recognition (ICPR), 2010

“Belief Propagation for Detecting Moving Objects from a Moving Platform”

C.-C. Lin, M. Wolf

International Conference on Image Processing, Computer Vision and Pattern Recognition (IPCV), 2010

“MCMC-based Feature-guided Particle Filtering for Tracking Moving Objects from a Moving Platform”

C.-C. Lin, Wayne Wolf

International Conference on Computer Vision (ICCV) Workshop, 2009

Invention Disclosures

Advanced system and method for automated focusing of microscope, filed 2018

System and Method of PCB Printed Content Quality, filed 2017

Integrated Circuit Defect Detection Using Pattern Images, filed 2017

System and method for perspective preserving stitching and summarizing views, **US Patent 9,569,874**, issued 2017

Surface reflectance reduction in images using non-specular portion replacement, **US Patent 10,255,674**, issued 2019

Distributed processing for producing three-dimensional reconstruction, **US Patent 10,217,225**, issued 2019

System and method for relating corresponding points in images with different viewing angles, **US Patent 9,400,939**, issued 2016

System, method, and recording medium for compressing aerial videos, **US Patent 10,306,267**, issued 2019

System, method and recording medium for detecting events for interest from, **US Patent 10,204,291**, issued 2019

System and method for non-destructive reverse engineering for VLSI chips, filed 2015

Additional

Machine Learning and Deep Learning Tools: PyTorch, Tensorflow, MXNet, Caffe

Programming: Python, C/C++, MATLAB, Verilog, Perl, Assembly language

Last updated: July 2nd, 2020