Ming-Yu Liu

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Research interest: Computer vision, deep unsupervised learning, deep reinforcement learning

Education

- **University of Maryland College Park, Maryland** — **College Park, MD, USA**
  Electrical and Computer Engineering, Ph.D. — *2006 – 2012*
  Dissertation: Discrete optimization methods for segmentation and matching
  Adviser: Rama Chellappa
- **National Chiao Tung University** — **Hsinchu, Taiwan**
  Electrical Engineering, B.A. — *1999 – 2003*

Professional Experiences

- **Nvidia Research** — **Santa Clara, CA, USA**
  Senior Research Scientist — *2016 – now*
  - Conducted fundamental and applied research in computer vision and deep learning.
  - Applied fields: virtual reality, artificial intelligence, and autonomous driving
- **Mitsubishi Electric Research Laboratories (MERL)** — **Cambridge, MA, USA**
  Principal Research Scientist — *2012 – 2016*
  - Conducted fundamental and applied research in computer vision and deep learning.
  - Applied fields: autonomous driving, factory automation
  - Computer vision expertise: object detection, semantic segmentation and labeling, pose estimation, image classification, domain adaptation, depth super-resolution
  - Deep learning expertise: deep convolutional neural nets, deep generative adversarial nets, attention mechanism and recurrent neural nets, recursive context propagation nets
  - Published 10+ high impact scientific papers
  - Earned 6 US patents
  - Product launched: MELFA-3D vision system
- **Intel** — **Taipei, Taiwan**
  Software Engineering Intern — *2005 – 2006*
  Intel X-Scale ARM-based embedded system software development for smart TV applications
- **Army** — **Taiwan**
  Paratrooper Platoon Leader, Military Rank: Second Lieutenant — *2003 – 2005*

Earned Patents

- US 9,558,268: Method for semantically labeling an image of a scene using recursive context propagation
- US 8,428,363: Method for segmenting images using superpixels and entropy rate clustering
- US 8,983,177: Method for increasing resolutions of depth images
- US 8,908,913: Voting-based pose estimation for 3D sensors
- US 9,195,904: Method for detecting objects in stereo images
- US 9,280,827: Method for determining object poses using Weighted Features

Awards

- Best paper honorable mention by Robotics: Science and System Conference RSS, 2015
- R&D 100 Award by R&D magazine, 2014
- University of Maryland College Park, Fellowship, 2011

Publications

- **Deep 360 Pilot: Learning a Deep Agent for Piloting through 360 Sports Videos**
  Hou-Ning Hu*, Yen-Chen Lin*, Ming-Yu Liu, Hsien-Tzu Cheng, Stanley Chang, Min Sun
  CVPR 2017
- **CASENet: Deep Category-Aware Semantic Edge Detection**
  Zhiding Yu, Chen Feng, Ming-Yu Liu, Srikumar Ramalingam
  CVPR 2017
- **Tactics of Adversarial Attack on Deep Reinforcement Learning Agents**
  Yen-Chen Lin, Zhang-Wei Hong, Yuan-Hong Liao, Meng-Li Shih, Ming-Yu Liu, Min Sun
  IJCAI 2017
- **Unsupervised Image-to-Image Translation Networks**
  Ming-Yu Liu, Thomas Breuel, and Jan Kautz
  arXiv preprint arXiv:1702.01478
- **Attentional Network for Visual Object Detection**
  Kota Hara, Ming-Yu Liu, Oncel Tuzel, and Amir-massoud Farahmand
  arXiv preprint arXiv:1702.01478
- **Deep Active Learning for Civil Infrastructure Defect Detection and Classification**
  Chen Feng, Ming-Yu Liu, Chieh-Chi Kao, and Teng-Yok Lee
  International Workshop on Computing in Civil Engineering (IWCCE), 2017
- **Coupled Generative Adversarial Networks**
  Ming-Yu Liu, Oncel Tuzel
  NIPS 2016
- **R-CNN for Small Object Detection**
  Chenyi Chen, Ming-Yu Liu, Oncel Tuzel, Jianxiong Xiao
  ACCV 2016
- **Gaussian Conditional Random Field Network for Semantic Segmentation**
  Raviteja Vemulapalli, Oncel Tuzel, Ming-Yu Liu, Rama Chellappa
  CVPR 2016
- **Deep Gaussian Conditional Random Field Network: A Model-based Deep Network for Denoising**
  Raviteja Vemulapalli, Oncel Tuzel, Ming-Yu Liu
  CVPR 2016
- **Learning to Remove Multipath Distortions in Time-of-Flight Range Images for a Robotic Arm Setup**
  Kilho Son, Ming-Yu Liu, Yuichi Taguchi
  ICRA 2016
- **Unsupervised Network Pretraining via Encoding Human Design**
  Ming-Yu Liu, Arun Mallya, Oncel Tuzel, Xi Chen
  WACV 2016
- **Layered Interpretation of Street View Images**
  Ming-Yu Liu, Shuoxin Lin, Srikumar Ramalingam, Oncel Tuzel
  RSS 2015
- **Recursive Context Propagation Network for Semantic Scene Labeling**
  Abhishek Sharma, Oncel Tuzel, Ming-Yu Liu
  NIPS 2014
- **Learning to Rankd 3D Features**
  Oncel Tuzel, Ming-Yu Liu, Yuichi Taguchi, Arvind Raghunathan
  ECCV 2014
- **Joint Geodesic Upsampling of Depth Images**
  Ming-Yu Liu, Oncel Tuzel, Yuichi Taguchi
  CVPR 2013
- **Cluster Analysis via Maximizing a Submodular Function subject to a Matroid Constraint**
  Ming-Yu Liu, Oncel Tuzel, Srikumar Ramalingam, Rama Chellappa
  TPAMI 2014

- **Model-Based Vehicle Pose Estimation and Tracking in Videos Using Random Forests**
  Michael Hodlmoser, Branislav Micusik, Marc Pollefeys, Ming-Yu Liu, Martin Kampel
  3DV 2013
- **Fast Object Detection and Pose Estimation in Heavy Clutter for Robotic Bin-Picking**
  Ming-Yu Liu, Oncel Tuzel, Ashok Veeraraghavan, Yuichi Taguchi, Tim K. Marks, Rama Chellappa
  IJRR 2012
- **Voting-Based Pose Estimation for Robotic Assembly Using a 3D Sensor**
  Changhyun Choi, Yuichi Taguchi, Oncel Tuzel, Ming-Yu Liu, Srikumar Ramalingam
  ICRA 2012
- **A Grassmann Manifold-based Domain Adaptation Approach**
  Jingjing Zheng, Ming-Yu Liu, Rama Chellappa, P Jonathan Phillips
  ICPR 2012
- **Classification and Pose Estimation of Vehicles in Videos by 3D Modeling**
  Michael Hödlmoser, Branislav Micusik, Ming-Yu Liu, Marc Pollefeys, Martin Kampel
  3DV 2012
- **Entropy Rate Superpixel Segmentation**
  Ming-Yu Liu, Oncel Tuzel, Srikumar Ramalingam, Rama Chellappa
  CVPR 2011
- **Fast Directional Chamfer Matching**
  Ming-Yu Liu, Oncel Tuzel, Ashok Veeraraghavan, Rama Chellappa
  CVPR 2010
- **Pose Estimation in Heavy Clutter using a Multi-Flash Camera**
  Ming-Yu Liu, Oncel Tuzel, Ashok Veeraraghavan, Rama Chellappa, Amit Agrawal, Haruhisa Okuda
  ICRA 2010

Services

- **Reviewer**: IEEE TIP, IEEE SPL, CVIU
- **Technical committee**: CVPR, ICCV, ECCV, NIPS, ICRA, AAAI

Tutorials

- Deep Learning for Vision Guided Language Generation and Image Generation, ACCV 2016
- Theory and Applications of Generative Adversarial Networks, CVPR 2017

Programming Skills

Programming Languages: C++, Python, Matlab
Libraries: PyTorch, Caffe, EIGEN, OpenGL, Coin-OR, GUROBI
Opensource Code:

- Coupled generative adversarial network algorithm
- Fast directional chamfer matching algorithm
- Entropy rate superpixel segmentation algorithm
- Joint geodesic depth upsampling algorithm