# DE-AN HUANG

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## RESEARCH INTERESTS

Computer Vision, Robotics, and Machine Learning.

## EDUCATION

**Stanford University, Stanford, USA**                                          *Sep. 2015 - Jun. 2020*
Ph.D. in Computer Science
Advisors: Fei-Fei Li and Juan Carlos Niebles

**Carnegie Mellon University, Pittsburgh, USA**                        *Aug. 2013 - Dec. 2014*
M.Sc. in Robotics
Advisor: Kris M. Kitani, GPA: 4.11

**National Taiwan University, Taipei, Taiwan**                                          *June 2012*
B.S. in Electrical Engineering, minor in Mathematics
Overall GPA: 3.76/4.0, Major GPA: 3.93/4.0

## AWARDS AND HONORS

- Lam Research Thesis Award, Lam Research Corporation, Taiwan, 2012.
- NVIDIA Graduate Fellowship, 2019

## PUBLICATIONS

### Book Chapter

1. K. M. Kitani, **D.-A. Huang**, and W.-C. Ma. "Activity Forecasting: An Invitation to Predictive Perception." *Book: Group and Crowd Behavior for Computer Vision*, Chapter 12, 2017.

### Journal Paper

2. **D.-A. Huang**, L.-W. Kang, Y.-C. F. Wang, and C.-W. Lin. "Self-Learning Based Image Decomposition with Applications to Single-Image Denoising." *IEEE Transactions on Multimedia*, volume 16, number 1, pages 83-93, 2014.

### Conference Papers

3. L. Fan, G. Wang, **D.-A. Huang**, Z. Yu, L. Fei-Fei, Y. Zhu, and A. Anandkumar. "SECANT: Self-Expert Cloning for Zero-Shot Generalization of Visual Policies." *International Conference on Machine Learning (ICML)*, 2021.

4. C.-Y. Chang, **D.-A. Huang**, D. Xu, E. Adeli, L. Fei-Fei, and J. C. Niebles. "Procedure Planning in Instructional Videos." *European Conference on Computer Vision (ECCV)*, 2020.

5. B. Pan, H. Cai, **D.-A. Huang**, K.-H. Lee, A. Gaidon, E. Adeli, and J. C. Niebles. "Spatio-Temporal Graph for Video Captioning with Knowledge Distillation." *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020.

6. **D.-A. Huang**, Y.-W. Chao*, C. Paxton*, X. Deng, L. Fei-Fei, J. C. Niebles, A. Garg, D. Fox. "Motion Reasoning for Goal-Based Imitation Learning." *International Conference on Robotics and Automation (ICRA)*, 2020.

7. D. Xu, R. Martín-Martín, **D.-A. Huang**, Y. Zhu, S. Savarese and L. Fei-Fei. "Regression Planning Networks." *Neural Information Processing Systems (NeurIPS)*, 2019.

8. B. Wang, E. Adeli, H.-K. Chiu, **D.-A. Huang**, and J. C. Niebles. "Imitation Learning for Human Pose Prediction." *IEEE International Conference on Computer Vision (ICCV)*, 2019.

9. **D.-A. Huang**, D. Xu, Y. Zhu, A. Garg, L. Fei-Fei, S. Savarese, and J. C. Niebles. "Continuous Relaxation of Symbolic Planner for One-Shot Imitation Learning." *International Conference on Intelligent Robots and Systems (IROS)*, 2019.

10. C.-Y. Chang, **D.-A. Huang**, Y. Sui, L. Fei-Fei, S. Savarese, and J. C. Niebles. "D3TW: Discriminative Differentiable Dynamic Time Warping for Weakly Supervised Action Alignment and Segmentation." *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019.

11. **D.-A. Huang**\*, S. Nair\*, D. Xu\*, Y. Zhu, A. Garg, L. Fei-Fei, S. Savarese, and J. C. Niebles. "Neural Task Graphs: Generalizing to Unseen Tasks from a Single Video Demonstration." *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019 **(oral)**.

12. H.-K. Chiu, E. Adeli, B. Wang, **D.-A. Huang**, and J. C. Niebles. "Action-Agnostic Human Pose Forecasting." *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2019.

13. J.-T. Hsieh, B. Liu, **D.-A. Huang**, L. Fei-Fei, and J. C. Niebles. "Learning to Decompose and Disentangle Representations for Video Prediction." *Neural Information Processing Systems (NIPS)*, 2018.

14. B. Liu, S. Yeung, E. Chou, **D.-A. Huang**, L. Fei-Fei, and J. C. Niebles. "Temporal Modular Networks for Retrieving Complex Compositional Activities in Video." *European Conference on Computer Vision (ECCV)*, 2018.

15. M. Guo, E. Chou, **D.-A. Huang**, S. Song, S. Yeung, and L. Fei-Fei. "Neural Graph Matching Networks for Fewshot 3D Action Recognition." *European Conference on Computer Vision (ECCV)*, 2018.

16. M. Guo, A. Haque, **D.-A. Huang**, S. Yeung, and L. Fei-Fei. "Focus on the Hard Things: Dynamic Task Prioritization for Multitask Learning." *European Conference on Computer Vision (ECCV)*, 2018.

17. **D.-A. Huang**\*, S. Buch\*, L. Dery, A. Garg, L. Fei-Fei, and J. C. Niebles. "Finding It: Weakly-Supervised Reference-Aware Visual Grounding in Instructional Video." *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018 **(oral)**.

18. **D.-A. Huang**, V. Ramanathan, D. Mahajan, L. Torresani, M. Paluri, L. Fei-Fei, and J. C. Niebles. "What Makes a Video a Video: Analyzing Temporal Information in Video Understanding Models and Datasets." *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018 **(spotlight)**.

19. K.-H. Zeng, W. B. Shen, **D.-A. Huang**, M. Sun, and J. C. Niebles. "Visual Forecasting by Imitating Dynamics in Natural Sequences." *IEEE International Conference on Computer Vision (ICCV)*, 2017.

20. **D.-A. Huang**, J. J. Lim, L. Fei-Fei, and J. C. Niebles. "Unsupervised Visual-Linguistic Reference Resolution in Instructional Videos." *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2017.

21. Z. Luo, B. Peng, **D.-A. Huang**, A. Alahi, L. Fei-Fei. "Unsupervised Learning of Long-Term Motion Dynamics for Videos." *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2017.

22. W.-C. Ma, **D.-A. Huang**, N. Lee, and K. M. Kitani. "Forecasting Interactive Dynamics of Pedestrians with Fictitious Play." *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2017.

23. **D.-A. Huang**, L. Fei-Fei, and J. C. Niebles. "Connectionist Temporal Modeling for Weakly Supervised Action Labeling." *European Conference on Computer Vision (ECCV)*, 2016.

24. **D.-A. Huang**, M. Ma*, W.-C. Ma*, and K. M. Kitani. "How Do We Use Our Hands? Discovering a Diverse Set of Common Grasps." To appear in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2015 **(* indicates equal contribution)**.

25. **D.-A. Huang**, A. M. Farahmand, K. M. Kitani, and J. A. Bagnell. "Approximate MaxEnt Inverse Optimal Control and its Application for Mental Simulation of Human Interactions." *Twenty-Ninth AAAI Conference on Artificial Intelligence (AAAI)*, 2015.

26. **D.-A. Huang** and K. M. Kitani. "Action-Reaction: Forecasting the Dynamics of Human Interaction." *European Conference on Computer Vision (ECCV)*, 2014.

27. **D.-A. Huang** and Y.-C. F. Wang. "Coupled Dictionary and Feature Space Learning with Applications to Cross-Domain Image Synthesis and Recognition." *IEEE International Conference on Computer Vision (ICCV)*, 2013.

28. **D.-A. Huang** and Y.-C. F. Wang. "With One Look: Robust Face Recognition Using Single Sample Per Person." *ACM Multimedia (ACM-MM)*, short paper, Oct. 2013.

29. R.-Y. Huang, **D.-A. Huang**, H.-J. K. Chiang, J.-H. R. Jiang, and F. Fages. "Species Minimization in Computation with Biochemical Reactions." *International Workshop on Bio-Design Automation (IWBDA)*, 2013.

30. C.-Y. Tsai, **D.-A. Huang**, M.-C. Yang, L.-W. Kang, and Y.-C. F. Wang. "Context-Aware Single Image Super-Resolution Using Locality-Constrained Group Sparse Representation." *Visual Communications and Image Processing (VCIP)*, 2012 **(invited paper for oral presentation)**.

31. **D.-A. Huang**, J.-H. R. Jiang, R.-Y. Huang, and C.-Y. Cheng. "Compiling Program Control Flows into Biochemical Reactions." *IEEE/ACM International Conference on Computer-Aided Design (ICCAD)*, 2012.

32. **D.-A. Huang**, L.-W. Kang, C.-Y. Tsai, M.-C. Yang, C.-W. Lin, and Y.-C. F. Wang. "Context-Aware Single Image Rain Removal." *IEEE International Conference on Multimedia & Expo (ICME)*, 2012 **(selected as Top 13% paper for oral presentation)**.

33. M.-C. Yang*, **D.-A. Huang***, C.-Y. Tsai, and Y.-C. F. Wang. "Self-Learning of Edge-Preserving Single Image Super-Resolution via Contourlet Transform." *IEEE International Conference on Multimedia & Expo (ICME)*, 2012 **(* indicates equal contribution)**.

## WORK AND RESEARCH EXPERIENCE

**NVIDIA Research**                                                                 *Santa Clara, USA*
*Research Scientist with Prof. Anima Anandkumar*                                     6/29/2020 - Present

- Video Instance Segmentation Framework without Video-based Training.
- Transformer-based Attention Model to Improve Unsupervised Video Prediction.

- Dynamic Data Ratio Adjustment for Fair Training on Real and Generated Data.

**Stanford Vision and Learning Lab, Stanford University**     *Stanford, USA*
*Graduate Student with Prof. Fei-Fei Li and Dr. Juan Carlos Niebles*     Sep. 2015 - Jun. 2020
- Weakly Supervised Actions Labeling in Videos
- Unsupervised and Weakly-Supervised Learning in Instructional Videos
- Task Learning from Video Demonstrations

**NVIDIA Seattle Robotics Lab**     *Seattle, USA*
*Research Intern with Prof. Dieter Fox*     June 2019 - September 2019
- Motion Reasoning for Goal-Based Imitation Learning

**Facebook Applied Machine Learning**     *Menlo Park, USA*
*Research Intern with Dr. Vignesh Ramanathan*     June 2017 - September 2017
- Analyzing Temporal Information in Video Understanding Models

**Computational Vision and Geometry Lab , Stanford University**     *Stanford, USA*
*Graduate Research Assistant with Prof. Silvio Savarese*     March 2016 - June 2016
- End-to-end Multi-object Tracking

**Microsoft Research**     *Redmond, USA*
*Research Intern with Dr. Zicheng Liu*     May 2015 - August 2015
- Kinect-based People Tracking and Recognition

**Disney Research**     *Pittsburgh, USA*
*Research Intern with Dr. Leonid Sigal*     February 2015 - May 2015
- Semi-supervised Actor Labeling in TV Series
- Large-Scale Zero-Shot Learning

**The Robotics Institute, Carnegie Mellon University**     *Pittsburgh, USA*
*Graduate Research Assistant with Dr. Kris M. Kitani*     October 2013 - December 2014
- Prehensile Analysis using First-Person Vision
- Approximate Maximum Entropy Inverse Optimal Control
- Human Interaction Forecasting

**Multimedia and Machine Learning Lab, Academia Sinica**     *Taipei, Taiwan*
*Research Assistant with Dr. Yu-Chiang Frank Wang*     August 2012 – June 2013
*Undergraduate Research Assistant*     February 2011 – July 2012
- Cross-Domain Image Synthesis and Recognition
- Single-Sample Per Person Face Recognition
- Single Image Denoising, Super-Resolution, and Rain Streak Removal

**Applied Logic and Computation Lab, National Taiwan University**     *Taipei, Taiwan*
*Undergraduate Student with Prof. Jie-Hong Roland Jiang*     July 2011 - July 2012
- Compiling Program Control Flows into Biochemical Reactions

## TEACHING EXPERIENCE

Teaching Assistant at Carnegie Mellon University for:
- 16-385 Computer Vision, Spring 2014, Instructor: Kris M. Kitani

- 15-463 Computational Photography, Fall 2014, Instructor: Kris M. Kitani

Teaching Assistant at Stanford University for:
- CS231N Convolutional Neural Networks for Visual Recognition, Spring 2017, Instructors: Fei-Fei Li, Justin Johnson, and Serena Yeung
- CS231N Convolutional Neural Networks for Visual Recognition, Spring 2020, Instructors: Fei-Fei Li, Ranjay Krishna, and Danfei Xu

## PROFESSIONAL ACTIVITY

Reviewer for
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- IEEE Transactions on Image Processing
- IEEE Transactions on Multimedia
- IEEE Transactions on Circuits and Systems for Video Technology
- IEEE Transactions on Computational Imaging
- IEEE Access
- International Journal of Computer Vision (IJCV)
- Neurocomputing
- Image and Vision Computing
- AAAI 2016, 2017, 2020
- CVPR 2018, 2019
- ECCV 2018
- ICCV 2019
- NIPS 2018, 2019
- ACCV 2018
- ICML 2019
- ICRA 2020
- IROS 2020
- CoRL 2020

Program Committee for
- Precognition Workshop, CVPR 2019, CVPR 2020
- Learning from Unlabeled Videos (LUV) Workshop, CVPR 2019