

## Michael S. Ryoo

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### Education

**The University of Texas at Austin** 2004~2008  
Ph.D. in Electrical and Computer Engineering, August 2008  
M.S. in Electrical and Computer Engineering, August 2006  
**Korea Advanced Institute of Science and Technology (KAIST)** 2000~2004  
B.S. in Computer Science, *magna cum laude*, August 2004

### Professional Appointments

**SUNY Empire Innovation Associate Professor** Stony Brook, NY  
Department of Computer Science, Stony Brook University (2019.09 ~)  
**Research Scientist (partial appointment)** NYC, NY  
Robotics at Google (2019.08 ~)  
**Founder and CTO** South Korea  
EgoVid Inc. (2016.08 ~2019.08)  
**Visiting Faculty** Mountain View, CA  
Google Brain – “Robotics at Google” (2018.09 ~ 2019.08)  
**Assistant Professor** Bloomington, IN  
Department of Computer Science (CS), Indiana University Bloomington (2015.08 ~ 2019.08)  
**Research Affiliate (adjunct)** Pasadena, CA  
NASA’s Jet Propulsion Laboratory (NASA-JPL) (2015.08 ~)  
**Research Technologist** Pasadena, CA  
NASA’s Jet Propulsion Laboratory (NASA-JPL) (2011.10 ~ 2015.07)  
**Research Scientist (military duty for South Korea)** South Korea  
Electronics and Telecommunications Research Institute (ETRI) - a national lab (2008.09 ~ 2011.09)

### Selected Awards and Honors

- **Best Paper Award**  
*CVPR Workshop on Deep Learning for Robot Vision (DLRV)*, 2017 (sponsored by Google/Facebook/ACRV).  
Lee & Ryoo, “Learning Robot Activities from First-Person Human Videos Using Convolutional Future Regression”
- **Best Paper Award in Robot Vision**  
*IEEE International Conference on Robotics and Automation (ICRA)*, 2016.  
Gori, Aggarwal, Matthies & Ryoo, “Multi-Type Activity Recognition in Robot-Centric Scenarios”
- **Best Paper Award Nominee (2<sup>nd</sup> place in Best Enabling Technology)**  
*ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, 2015.  
Ryoo *et al.*, “Robot-Centric Activity Prediction from First-Person Videos: What Will They Do to Me?”

### Research Funding

- [Ongoing] (PI) IITP grant by South Korean Ministry of Science and ICT, “Semantic Action Policy Learning and State Inference for Mobile Robot Intelligence,” 2020.01~2020.12, ~\$75,000 for 12 months, with Electronics and Telecommunications Research Institute (ETRI).

- [Ongoing] **(PI)** NSF Information and Intelligent Systems (IIS): Core Programs, “RI: Small: Collaborative: Understanding Human-Object Interactions from First-person and Third-person Videos,” 2018.08~2021.08, \$250,000 for 36 months, with Y. J. Lee (UC Davis).
- [Ongoing] **(PI)** NSF Computer and Network Systems (CNS): Core Programs, “CSR: Small: Collaborative: Decentralized Real-Time Machine Learning Systems on Near-User Edge Devices,” 2018.08~2021.08, \$250,000 for 36 months, with H. Kim (Gatech).
- [Past] **(PI)** IITP grant by South Korean Ministry of Science and ICT, “Semantic Action Policy Learning and State Inference for Mobile Robot Intelligence,” 2018.01~2019.12, ~\$130,000 for 24 months, with Electronics and Telecommunications Research Institute (ETRI).
- [Past] **(PI)** ARL’s Robotics Collaborative Technology Alliance (RCTA), Task P5-5 “Human Activity Recognition with Context Learning” (2016) and T2C1S2D “Predicting Human Intent and Activity Possibilities” (2017-2018), 2016.01~ 2018.12, \$220,000 for 36 months.
- [Past] **(PI)** ICT R&D program of South Korean Ministry of Science, “Recognizing Objects and Events from Videos for XD-Media Special Effects,” 2016.01~2017.12, ~\$260,000 for 24 months, with Electronics and Telecommunications Research Institute (ETRI).
- [Past] **(co-PI)** DARPA’s Simplifying Complexity in Scientific Discovery (SIMPLEX), Task “Action Recognition and Learning from a First-Person View,” 2015.03~2016.03, \$90,000 for 12 months, with S.-C. Zhu (UCLA).
- [Past] **(PI)** NVIDIA hardware donation program, 2015, 2016.
- [Past] **(co-PI, subtask-PI)** ARL’s Robotics Collaborative Technology Alliance (RCTA), Task P5-2 “Understanding of Human Interactions and Reactions,” Phase1: 2012.04~2014.12, “Semantic Understanding of Human Activities,” Phase2: 2015.01~ 2015.12, ~\$500,000, with L. Matthies (JPL).
- [Past] **(PI)** NASA-JPL B&P Funding, “Group Activity Recognition from Aerial Videos,” etc., 2013~2014, \$17,000.
- [Past] **(PI)** Otis Elevator Korea, “Detection of Abnormal Activities in Elevators Using Cameras,” 2011, \$60,000.

## Talks

### Tutorials

- *Unifying Human Activity Understanding*  
IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Long Beach, CA, June 2019.  
(Speakers: Gunnar Sigurdsson, M. S. Ryoo)
- *Human Activity Recognition*  
IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Salt Lake City, UT, June 2018.  
(Speakers: M. S. Ryoo, Greg Mori, Kris Kitani)
- *Emerging Topics in Human Activity Recognition*  
IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Columbus, OH, June 2014.  
(Speakers: M. S. Ryoo, Ivan Laptev, Greg Mori, Sangmin Oh)
- *Activity Recognition for Visual Surveillance*  
IEEE Conference on Advanced Video and Signal-based Surveillance (AVSS), Beijing, China, Sep. 2012.  
(Speakers: M. S. Ryoo, Anthony Hoogs, Arslan Basharat, Sangmin Oh)
- *Frontiers of Human Activity Analysis*  
IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Colorado Springs, CO, June 2011.  
(Speakers: J. K. Aggarwal, M. S. Ryoo, Kris Kitani)
- *Understanding Videos – Human Activity Analysis*  
11<sup>th</sup> Pacific Rim International Conference on Artificial Intelligence (PRICAI), Daegu, Korea, August 2010.  
(Speakers: M. S. Ryoo, Kris Kitani)

## Selected keynote talks

- *Searching Representations for Robot Learning (tentative)*, ECCV Workshop on 4D Vision, Glasgow, UK, August 2020.
- *Video Architecture Search*, CVPR Workshop on Neural Architecture Search and Beyond for Representation Learning, Seattle, WA, June 2020.
- *Representing Motion in Videos*, ICCV Workshop on Moving Cameras, Seoul, Korea, October 2019.
- *Robots Anticipating Future Scene*, ECCV Workshop on Anticipating Human Behavior, Munich, Germany, September 2018.
- *Human Activity Recognition from Anonymized Videos*, Joint BMTT-PETS Workshop on Tracking and Surveillance (PETS), in conjunction with CVPR, Honolulu, HI, July 2017.
- *Activity Recognition from Persons' Viewpoint and Robots' Viewpoint*, International Workshop on Human Activity Analysis with Highly Diverse Cameras, in conjunction with WACV, Santa Rosa, CA, March 2017.
- *First-Person Activity Recognition: What Are They Doing and What Will They Do to Me?* The 4th International Workshop on Pervasive Eye Tracking and Mobile Eye-Based Interaction (PETMEI), in conjunction with UbiComp, Seattle, WA, September 2014.
- *First-Person Activity Recognition: Understanding Human Interactions from Egocentric Videos*, ICCV Workshop on Understanding Human Activities: Context and Interaction, Sydney, Australia, December 2013.

## Selected invited talks and department seminars

- *Machine Learning Research*  
Department Seminar (AI), KAIST, Daejeon, Korea, October 2019.
- *Representation Learning for Video Understanding*  
Department Seminar (CS), Yale University, New Haven, CT, February 2019.
- *Deep Learning with Human/Robot Activity Videos*  
AI and Machine Learning Seminar (ECE), Purdue University, West Lafayette, IN, September 2018.
- *Robot Perception and Action Using Convolutional Human Activity Models*  
Department Seminar (CS), University of North Carolina, Chapel Hill, NC, February 2018.
- *Human Activity Recognition from a Robot's Viewpoint*  
Invited Talk, ARO Workshop on Multimodal Data Analysis for Human Activity Detection and Understanding, Marina del Rey, CA, August 2016.
- *Human Activity Recognition from a Robot's Viewpoint*  
VASC Seminar (RI), Carnegie Mellon University, Pittsburgh, PA, February 2016.
- *First-Person Activity Prediction*  
Department Seminar (CS), University of Central Florida, Orlando, FL, February 2014.
- *First-Person Computer Vision – Understanding Egocentric Video Observation*  
Department Seminar (CSE), Seoul National University, Seoul, Korea, May 2013.
- *Human Activity Recognition for Real-World Scenarios: Prediction and Cross-Domain Composition*  
Institute Seminar (IRIS), University of Southern California, Los Angeles, CA, March 2012.
- *Computer Vision for Videos – From Objects to Events and Activities*  
Department Seminar (CS), KAIST, Daejeon, Korea, May 2011.
- *Stochastic Representation and Recognition of High-level Group Activities*  
Invited Talk, Intl. Workshop on Stochastic Image Grammars (SIG) with CVPR, Miami, FL, June 2009.

## Media coverage

- *Video Architecture Search*  
Article, Google AI Blog, October 17, 2019.

- *Decoding the Language of Human Movements*  
Interview, Communications of the ACM, Vol. 57, Issue 12, pages 12-14, December 2014.

## Publications

### Preprints

- [1] A. Piergiovanni, A. Angelova, and M. S. Ryoo, “Tiny Video Networks,” arXiv:1910.06961, October 2019.

### Refereed conference publications

- [2] A. Piergiovanni, A. Angelova, A. Toshev, and M. S. Ryoo, “Adversarial Generative Grammars for Human Activity Prediction,” *European Conference on Computer Vision (ECCV)*, August 2020.  
[oral acceptance rate: 2.8%]
- [3] M. S. Ryoo, A. Piergiovanni, J. Kangaspunta, and A. Angelova, “AssembleNet++: Assembling Modality Representations via Attention Connections,” *European Conference on Computer Vision (ECCV)*, August 2020. [acceptance rate: 27.1%]
- [4] X. Gu, W. Luo, M. S. Ryoo, and Y. J. Lee, “Password-conditioned Anonymization and Deanonimization with Face Identity Transformers,” *European Conference on Computer Vision (ECCV)*, August 2020.  
[acceptance rate: 27.1%]
- [5] X. Wang, X. Xiong, M. Neumann, A. Piergiovanni, M. S. Ryoo, A. Angelova, K. M. Kitani, and W. Hua, “AttentionNAS: Spatiotemporal Attention Cell Search for Video Classification,” *European Conference on Computer Vision (ECCV)*, August 2020. [acceptance rate: 27.1%]
- [6] A. Piergiovanni, A. Angelova, and M. S. Ryoo, “Evolving Losses for Unlabeled Video Representation Learning,” *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, June 2020.  
[oral acceptance rate: 5.7%]
- [7] M. S. Ryoo, A. Piergiovanni, M. Tan, and A. Angelova, “AssembleNet: Searching for Multi-Stream Neural Connectivity in Video Architectures,” *International Conference on Learning Representations (ICLR)*, April 2020. [acceptance rate: 26.5%]
- [8] A. Piergiovanni and M. S. Ryoo, “Unseen Action Recognition with Multimodal Learning,” *IEEE Winter Conference on Applications of Computer Vision (WACV)*, March 2020.
- [9] A. Piergiovanni, A. Angelova, and M. S. Ryoo, “Differentiable Grammars for Videos,” *AAAI Conference on Artificial Intelligence (AAAI)*, February 2020. [oral acceptance rate: ~5%]
- [10] A. Piergiovanni, A. Wu, and M. S. Ryoo, “Learning Real-World Robot Policies by Dreaming,” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, November 2019.
- [11] M. U. Kim, H. Lee, H. J. Yang, and M. S. Ryoo, “Privacy-Preserving Robot Vision with Anonymized Faces by Extreme Low Resolution,” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, November 2019.
- [12] A. Wu, A. Piergiovanni, and M. S. Ryoo, “Model-based Behavioral Cloning with Future Image Similarity Learning,” *Conference on Robot Learning (CoRL)*, October 2019.  
[acceptance rate: 27.6%]
- [13] A. Piergiovanni, A. Angelova, A. Toshev, and M. S. Ryoo, “Evolving Space-Time Neural Architectures for Videos,” *International Conference on Computer Vision (ICCV)*, October 2019.  
[acceptance rate: 25.0%]
- [14] A. Piergiovanni and M. S. Ryoo, “Temporal Gaussian Mixture Layer for Videos,” *International Conference on Machine Learning (ICML)*, Long Island, CA, June 2019.  
[acceptance rate: 22.6%]
- [15] A. Piergiovanni and M. S. Ryoo, “Early Detection of Injuries in MLB Pitchers from Video,” *IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, Long Island, CA, June 2019.

- [16] A. Piergiovanni and M. S. Ryoo, "Representation Flow for Action Recognition," *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Long Island, CA, June 2019. [acceptance rate: 25.2%]
- [17] Z. Ren, Y. J. Lee, and M. S. Ryoo, "Learning to Anonymize Faces for Privacy Preserving Action Detection," *European Conference on Computer Vision (ECCV)*, Munich, Germany, September 2018. [acceptance rate: 31.8%]
- [18] M. Xu, C. Fan, Y. Wang, M. S. Ryoo, and D. J. Crandall, "Joint Person Segmentation and Identification in Synchronized First- and Third-person Videos," *European Conference on Computer Vision (ECCV)*, Munich, Germany, September 2018. [acceptance rate: 31.8%]
- [19] C. Fan, J. Lee, and M. S. Ryoo, "Forecasting Hands and Objects in Future Frames", *European Conference on Computer Vision Workshops (ECCVW)*, Munich, Germany, September 2018.
- [20] A. Piergiovanni and M. S. Ryoo, "Learning Latent Super-Events to Detect Multiple Activities in Videos," *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Salt Lake City, UT, June 2018. [acceptance rate: 29.6%]
- [21] A. Piergiovanni and M. S. Ryoo, "Fine-grained Activity Recognition in Baseball Videos," *IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, Salt Lake City, UT, June 2018.
- [22] M. S. Ryoo, K. Kim, and H. J. Yang, "Extreme Low Resolution Activity Recognition with Multi-Siamese Embedding Learning," *AAAI Conference on Artificial Intelligence (AAAI)*, New Orleans, LA, February 2018. [acceptance rate: 24.6%]
- [23] J. Lee and M. S. Ryoo, "Learning Robot Activities from First-Person Human Videos Using Convolutional Future Regression," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, Canada, September 2017.
- [24] I. Gori, J. K. Aggarwal, L. Matthies, and M. S. Ryoo, "Multi-Type Activity Recognition from a Robot's Viewpoint," *the 26th International Joint Conference on Artificial Intelligence (IJCAI)*, Melbourne, Australia, August 2017 (invited). [acceptance rate: 26.0%]
- [25] C. Fan, J. Lee, M. Xu, K. K. Singh, Y. J. Lee, D. J. Crandall, and M. S. Ryoo, "Identifying First-person Camera Wearers in Third-person Videos," *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Honolulu, HI, July 2017. [acceptance rate: 29.2%]
- [26] T. Shu, X. Gao, M. S. Ryoo, and S.-C. Zhu, "Learning Social Affordance Grammar from Videos: Transferring Human Interactions to Human-Robot Interactions," *IEEE International Conference on Robotics and Automation (ICRA)*, Singapore, May 2017.
- [27] M. S. Ryoo, B. Rothrock, C. Fleming, and H. J. Yang, "Privacy-Preserving Human Activity Recognition from Extreme Low Resolution," *AAAI Conference on Artificial Intelligence (AAAI)*, San Francisco, CA, February 2017. [acceptance rate: 24.6%]
- [28] A. Piergiovanni<sup>1</sup>, C. Fan<sup>1</sup>, and M. S. Ryoo, "Learning Latent Sub-events in Activity Videos Using Temporal Attention Filters," *AAAI Conference on Artificial Intelligence (AAAI)*, San Francisco, CA, February 2017 (<sup>1</sup>equal contribution). [acceptance rate: 24.6%]
- [29] T. Shu, M. S. Ryoo, and S.-C. Zhu, "Learning Social Affordance for Human-Robot Interaction," *the 25th International Joint Conference on Artificial Intelligence (IJCAI)*, New York City, NY, July 2016. [acceptance rate: 24%]
- [30] M. S. Ryoo, B. Rothrock, and L. Matthies, "Pooled Motion Features for First-Person Videos," *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Boston, MA, June 2015. [acceptance rate: 28%]
- [31] M. S. Ryoo, T. Fuchs, L. Xia, J. K. Aggarwal, and L. Matthies, "Robot-Centric Activity Prediction from First-Person Videos: What Will They Do to Me?," *ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, Portland, OR, March 2015. [acceptance rate: 25.4%]  
**Best Paper Award Nominee**

- [32] L. Xia, I. Gori, J. K. Aggarwal, and M. S. Ryoo, "Robot-Centric Activity Recognition from First-Person RGB-D Videos," *IEEE Winter Conference on Applications of Computer Vision (WACV)*, HI, January 2015. [*1<sup>st</sup>-round acceptance rate: 30.0%*]
- [33] Y. Iwashita, A. Takamine, R. Kurazume, and M. S. Ryoo, "First-Person Animal Activity Recognition from Egocentric Videos," *International Conference on Pattern Recognition (ICPR)*, Stockholm, Sweden, August 2014.
- [34] Y. Iwashita<sup>1</sup>, M. S. Ryoo<sup>1</sup>, T. J. Fuchs, and C. Padgett, "Recognizing Humans in Motion: Trajectory-based Aerial Video Analysis," *British Machine Vision Conference (BMVC)*, Bristol, U.K., September 2013 (<sup>1</sup>equal contribution). [*acceptance rate: 29.8%*]
- [35] M. S. Ryoo and L. Matthies, "First-Person Activity Recognition: What Are They Doing to Me?," *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Portland, OR, June 2013. [*acceptance rate: 26.2%*]
- [36] J. H. Joung, M. S. Ryoo, S. Choi, and S. R. Kim, "Reliable Object Detection and Segmentation Using Inpainting," *IEEE/RSJ International Intelligent Robots and Systems (IROS)*, Algarve, Portugal, October 2012.
- [37] M. S. Ryoo, "Human Activity Prediction: Early Recognition of Ongoing Activities from Streaming Videos," *International Conference on Computer Vision (ICCV)*, Barcelona, Spain, November 2011. [*acceptance rate: 23.7%*]
- [38] M. S. Ryoo, "Interactive Learning of Human Activities Using Active Video Composition," *International Workshop on Stochastic Image Grammars (SIG)*, in *Proceedings of International Conference on Computer Vision Workshops (ICCVW)*, Barcelona, Spain, November 2011.
- [39] J. H. Joung, M. S. Ryoo, S. Choi, W. Yu, and H. Chae, "Background-aware Pedestrian/Vehicle Detection System for Driving Environments," *IEEE Conference on Intelligent Transportation Systems (ITSC)*, Washington, D.C., October 2011.
- [40] M. S. Ryoo and W. Yu, "One Video is Sufficient? Human Activity Recognition Using Active Video Composition," *IEEE Workshop on Applications of Computer Vision (WACV)*, Kona, Hawaii, January 2011.
- [41] M. S. Ryoo, J. Lee, J. H. Joung, S. Choi, and W. Yu, "Personal Driving Diary: Constructing a Video Archive of Everyday Driving Events," *IEEE Workshop on Applications of Computer Vision (WACV)*, Kona, Hawaii, January 2011.
- [42] M. S. Ryoo, J. H. Joung, S. Choi, and W. Yu, "Incremental Learning of Novel Activity Categories from Videos," *the 16<sup>th</sup> International Conference on Virtual Systems and Multimedia (VSMM)*, Seoul, Korea, October 2010 (invited).
- [43] M. S. Ryoo, C.-C. Chen, J. K. Aggarwal, and A. Roy-Chowdhury, "An Overview of Contest on Semantic Description of Human Activities (SDHA) 2010," *International Conference on Pattern Recognition (ICPR) Contests*, Istanbul, Turkey, August 2010. [*acceptance rate: 38%*]
- [44] M. S. Ryoo<sup>1</sup>, J. T. Lee<sup>1</sup>, and J. K. Aggarwal, "Video Scene Analysis of Interactions between Humans and Vehicles Using Event Context," *ACM International Conference on Image and Video Retrieval (CIVR)*, Xian, China, July 2010 (invited, <sup>1</sup>equal contribution). [*oral acceptance rate: 10.5%*]
- [45] J. T. Lee, M. S. Ryoo, and J. K. Aggarwal, "View Independent Recognition of Human-Vehicle Interactions Using 3-D Models," *IEEE Workshop on Motion and Video Computing (WACV/WMVC)*, Snowbird, UT, December 2009.
- [46] M. S. Ryoo and J. K. Aggarwal, "Spatio-Temporal Relationship Match: Video Structure Comparison for Recognition of Complex Human Activities," *International Conference on Computer Vision (ICCV)*, Kyoto, Japan, October 2009. [*acceptance rate: 23.2%*]
- [47] M. S. Ryoo and J. K. Aggarwal, "Human Activities: Handling Uncertainties Using Fuzzy Time Intervals," *International Conference on Pattern Recognition (ICPR)*, Tampa, FL, December 2008.
- [48] M. S. Ryoo and J. K. Aggarwal, "Observe-and-Explain: A New Approach for Multiple Hypotheses Tracking of Humans and Objects," *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Anchorage, AK, June 2008. [*acceptance rate: 31.6%*]

- [49] M. S. Ryoo and J. K. Aggarwal, "Recognition of High-level Group Activities Based on Activities of Individual Members," *IEEE Workshop on Motion and Video Computing (WACV/WMVC)*, Copper Mountain, CO, January 2008. [*oral acceptance rate: 33.3%*]
- [50] J. T. Lee, M. S. Ryoo, M. Riley, and J. K. Aggarwal, "Real-time Detection of Illegally Parked Vehicles using 1-D Transformation," *IEEE International Conference on Advanced Video and Signal based Surveillance (AVSS)*, London, UK, September 2007.
- [51] M. Bhargava, C.-C. Chen, M. S. Ryoo, and J. K. Aggarwal, "Detection of Abandoned Objects in Crowded Environments," *IEEE International Conference on Advanced Video and Signal based Surveillance (AVSS)*, London, UK, September 2007.
- [52] M. S. Ryoo and J. K. Aggarwal, "Hierarchical Recognition of Human Activities Interacting with Objects," *International Workshop on Semantic Learning Applications in Multimedia (SLAM)*, in *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Minneapolis, MN, June 2007.
- [53] M. S. Ryoo and J. K. Aggarwal, "Robust Human-Computer Interaction System Guiding a User by Providing Feedback," *the 20<sup>th</sup> International Joint Conference on Artificial Intelligence (IJCAI)*, Hyderabad, India, January 2007. [*acceptance rate: 34.7%*]
- [54] M. S. Ryoo and J. K. Aggarwal, "Semantic Understanding of Continued and Recursive Human Activities," *International Conference on Pattern Recognition (ICPR)*, Vol. 1, pp. 379~382, Hong Kong, August 2006.
- [55] M. S. Ryoo and J. K. Aggarwal, "Recognition of Composite Human Activities through Context-Free Grammar based Representation," *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Vol. 2, pp. 1709-1719, New York City, NY, June 2006. [*acceptance rate: 28.1%*]
- [56] H. S. Yang, Y. Seo, M. S. Ryoo, and H. Jung, "Affective Communication System with Emotional Memories for Multimodal Interaction with Humanoids," *the 11<sup>th</sup> International Conference on Virtual Systems and Multimedia (VSMM)*, October 2005.
- [57] D. Pardoe, M. Ryoo, and R. Miikkulainen, "Evolving Neural Network Ensembles for Control Problems," *Genetic and Evolutionary Computation Conference (GECCO)*, Washington, D.C., June 2005.
- [58] M. S. Ryoo, Y. Seo, H. Jung, and H. S. Yang, "Affective Dialogue Communication System with Emotional Memories for Humanoid Robots," *International Conference on Affective Computing and Intelligent Interaction (ACII)*, LNCS 3784, pp. 819-827, October 2005.
- [59] H. Jung, Y. Seo, M. S. Ryoo, and H. S. Yang, "Affective Communication System with Multimodality for Humanoid Robot AMI," *IEEE-RAS/RSJ International Conference on Humanoid Robots (Humanoids)*, Los Angeles, CA, November 2004.

## Journal publications

- [60] A. Wu<sup>\*</sup>, A. Piergiovanni, and M. S. Ryoo, "Model-Based Robot Imitation with Future Image Similarity," *International Journal of Computer Vision (IJCV)*, 2019.
- [61] R. Hadidi<sup>\*</sup>, J. Cao, M. Woodward, M. S. Ryoo, and H. Kim, "Distributed Perception by Collaborative Robots," *IEEE Robotics and Automation Letters (RA-L)*, 2018. [*IROS 2018 presentation*]
- [62] M. S. Ryoo<sup>\*</sup> and L. Matthies, "First-Person Activity Recognition: Feature, Temporal Structure, and Prediction," *International Journal of Computer Vision (IJCV)*, 119(3):307–328, 2016.
- [63] I. Gori, J. K. Aggarwal, L. Matthies, and M. S. Ryoo<sup>\*</sup>, "Multi-Type Activity Recognition in Robot-Centric Scenarios," *IEEE Robotics and Automation Letters (RA-L)*, 1(1):593-600, 2016. [*ICRA 2016 presentation*]  
**ICRA 2016 Best Paper Award in Robot Vision**
- [64] M. S. Ryoo<sup>\*</sup>, S. Choi<sup>1</sup>, J. H. Joung<sup>1</sup>, J.-Y. Lee<sup>1</sup>, and W. Yu, "Personal Driving Diary: Automated Recognition of Driving Events from First-Person Videos," *Computer Vision and Image Understanding (CVIU)*, 117(10): 1299-1312, October 2013 (<sup>1</sup>equal contribution).

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<sup>\*</sup> Corresponding author

- [65] J. K. Aggarwal\* and M. S. Ryoo, "Toward a Unified Framework of Motion Understanding," *Image and Vision Computing (ImaVis)*, 30(8):465-466, August 2012.
- [66] M. S. Ryoo\* and J. K. Aggarwal, "Stochastic Representation and Recognition of High-level Group Activities," *International Journal of Computer Vision (IJCV)*, 93(2):183-200, June 2011.
- [67] J. K. Aggarwal and M. S. Ryoo\*, "Human Activity Analysis: A Review," *ACM Computing Surveys (CSUR)*, 43(3), April 2011.
- [68] M. S. Ryoo\*, K. Grauman, and J. K. Aggarwal, "A Task-Driven Intelligent Workspace System to Provide Guidance Feedback," *Computer Vision and Image Understanding (CVIU)*, 114(5):520-534, May 2010.
- [69] J. T. Lee\*, M. S. Ryoo, M. Riley, and J. K. Aggarwal, "Real-time Illegal Parking Detection in Outdoor Environments Using 1-D Transformation," *IEEE Transactions on Circuits and Systems for Video Technology (T-CSVT)*, 19(7):1014-1024, July 2009.
- [70] M. Bhargava, C.-C. Chen\*, M. S. Ryoo, and J. K. Aggarwal, "Detection of Object Abandonment Using Temporal Logic," *Machine Vision and Applications (MVA)*, 20(5):271-281, June 2009.
- [71] M. S. Ryoo\* and J. K. Aggarwal, "Semantic Representation and Recognition of Continued and Recursive Human Activities," *International Journal of Computer Vision (IJCV)*, 82(1), 1-24, April 2009.

## Theses

- "Semantic Representation and Recognition of Human Activities," Ph.D. Dissertation, the University of Texas at Austin, August 2008.  
**Outstanding Dissertation Award Nominee**
- "Semantic Understanding of Continued and Recursive Activities using Context-Free Grammar," M.S. Thesis, the University of Texas at Austin, August 2006.  
**Outstanding Thesis Award Nominee**
- "Affective Dialogue Communication System with Emotional Memories for Humanoid Robots," B.S. Thesis, Korea Advanced Institute of Science and Technology (KAIST), August 2004.

## Other Awards and Honors

- **Best Poster Award**  
*The 10<sup>th</sup> Joint Workshop on Machine Perception and Robotics (MPR)*, Beijing, Oct. 2014.  
Iwashita, Takamine, Kurazume & Ryoo, "First-Person Animal Activity Recognition from Egocentric Videos"
- **Best Video Award** (sponsored by IEEE RO-MAN)  
*The 6<sup>th</sup> Korea Robotics Society Annual Conference (KRoC)*, 2011.  
Ryoo et al., "Personal Driving Diary: Constructing a Video Archive of Everyday Driving Events"
- **Outstanding Dissertation/Thesis Award Nominee, 2007 and 2009**  
The only candidate nominated by the Department of ECE, the University of Texas at Austin.
- **UT Engineering Doctoral Fellowship, 2006.9 ~ 2008.8**  
Full tuition and \$10,000 annual supplemental stipend to support research (3 years granted).  
Supported by the College of Engineering, the University of Texas at Austin.
- **David Bruton Jr. Graduate School Fellowship, 2006**
- **Korea Foundation for Advanced Studies Fellowship** (supported by SK), 2004.8 ~ 2008.8  
Full scholarship awarded for tuition and living expenses, \$50,000 annually, for Ph.D. study (5 years granted).  
One of the five recipients selected from nationwide (South Korea) in Computer Science.
- **Professional Development Award, the University of Texas at Austin, 2006 and 2007**
- **KAIST Undergraduate Scholarship, 2000.3 ~ 2004.1**  
Full scholarship awarded for tuition and living expenses.



## Professional Activities

### Organizer/Chair

- Local organizing chair, ACM/IEEE International Conference on Human-Robot Interaction (HRI) 2018
- Lead organizer, the 4<sup>th</sup> Workshop on Egocentric (First-Person) Vision, with CVPR 2016
- Organizer, the 3<sup>rd</sup> Workshop on Egocentric (First-Person) Vision, with CVPR 2014
- Lead organizer, ICPR Contest on Semantic Description of Human Activities (SDHA), with ICPR 2010

### Program committee member

- Area chair, International Conference on Learning Representations (ICLR), 2021
- Area chair, International Conference on Learning Representations (ICLR), 2020
- Area chair, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2019
- Area chair, IAPR International Conference on Machine Vision Applications (MVA), 2017
- PC member, AAAI Conference on Artificial Intelligence (AAAI), 2017
- PC member, International Joint Conference on Artificial Intelligence (IJCAI) 2016
- Area chair, IEEE Winter Conference on Applications of Computer Vision (WACV), 2016
- PC member, AAAI Conference on Artificial Intelligence (AAAI), 2016
- PC member, Workshop on Computational Models of Social Interactions and Behavior, with CVPR 2014
- PC member, Vision Meets Cognition Workshop, with CVPR 2014
- PC member, Workshop on Action Recognition with Large Number of Classes, with ICCV 2013
- PC member, Workshop on Wearable Computer Vision Systems, with ICCV 2013
- PC member, International Joint Conference on Artificial Intelligence (IJCAI) 2011
- PC member, International Workshop on Stochastic Image Grammars (SIG), with ICCV 2011
- PC member, International Workshop on Human Behavior Understanding (HBU), 2010, 2011, 2014
- PC member, Workshop on Use of Context in Video Processing (UCVP), 2009, 2010, 2011

### Journal reviewer

- IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), International Journal of Computer Vision (IJCV), Computer Vision and Image Understanding (CVIU), IEEE Transactions on Image Processing (T-IP), IEEE Transactions on Circuits and Systems for Video Technology (T-CSVT), Image and Vision Computing Journal (ImaVis), IEEE Transactions on Systems, Man and Cybernetics (SMC), Pattern Recognition, etc.

## Advising

### Past students

- AJ Piergiovanni, Department of CS, Indiana University (Ph.D., 2020), currently at Google Brain
- Alex Seewald, Department of CS, Indiana University (M.S., 2018), currently at Cerner Corporation
- Maria Soledad Elli, Department of CS, Indiana University (M.S., 2017), currently at Intel

### Current students

- Alan Wu, Department of ISE, Indiana University (Ph.D. student)
- Cristina Mata, Department of CS, Stony Brook University (Ph.D. student)
- Kumara Kahatapitiya, Department of CS, Stony Brook University (Ph.D. student)
- Jinghuan Shang, Department of CS, Stony Brook University (Ph.D. student)
- Xiang Li, Department of CS, Stony Brook University (Ph.D. student)

### **Ph.D. defense/proposal committee member of**

- Srijan Das, INRIA (Ph.D. 2020 expected)
- Chenyou Fan, Department of CS, Indiana University (Ph.D. 2018)
- Sven Bambach, Department of CS, Indiana University (Ph.D. 2016)
- Stefan Lee, Department of CS, Indiana University (Ph.D. 2016)
- Josh Harguess, Department of ECE, the University of Texas at Austin (Ph.D. 2011)
- Birgi Tamersoy, Department of ECE, the University of Texas at Austin (M.S. 2009)

### **Teaching Experience**

- ***CSE 525 Intro to Robotics, Stony Brook University:*** Spring 2020,  
Instructor: M. S. Ryoo  
Scope: an introductory Robot Learning course for graduate students focusing on deep reinforcement learning.
- ***CS/INFO B490/I400 Intro to Computer Vision, Indiana University Bloomington:*** Spring 2016/2017/2018,  
Instructor: M. S. Ryoo  
Scope: an introductory Computer Vision course for undergraduate students.
- ***CS/INFO B659/I590 Vision for Intelligent Robotics, Indiana University Bloomington:*** Fall 2015/2016/2017,  
Instructor: M. S. Ryoo  
Scope: a graduate seminar course on state-of-the-art Computer Vision algorithms and their applications to Robotics.
- ***ME/CS 132a Introduction to Vision-based Robot Navigation, California Institute of Technology:*** Winter 2015,  
Instructors: L. Matthies, R. Brockers, B. Rothrock, T. Fuchs, S. Weiss, and M. S. Ryoo  
Scope: current topics in robotics research in the area of autonomous navigation and vision, including perception.