

Roozbeh Mottaghi

CONTACT INFORMATION

Allen Institute for AI
Seattle, WA

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EDUCATION

University of California-Los Angeles, Los Angeles, California USA

PhD., Computer Science **Sep 2008 to Sep 2013**
Advisor: Alan Yuille (since 2009)

Georgia Institute of Technology, Atlanta, Georgia USA

M.Sc., Computer Science **Aug 2006 to Aug 2008**

Simon Fraser University, Burnaby, British Columbia Canada

M.A.Sc., Engineering Science **Sep 2003 to Apr 2006**

Sharif University of Technology, Tehran, Iran

B.Sc., Computer Engineering **Sep 1999 to Jul 2003**

AWARDS & HONORS

- Outstanding Reviewer Award, CVPR 2017.
- Graduate Fellowship, University of California, Los Angeles, 2008-2009.
- The only recipient of Marshall D. Williamson Fellowship, Georgia Institute of Technology, 2007.
- Cy and Emerald Keyes Graduate Scholarship in Expert Systems, Simon Fraser University, 2006.
- Graduate Fellowship, Simon Fraser University, 2004.
- Clark, Wilson Graduate Scholarship in Expert Systems, Simon Fraser University, 2004.
- Ranked under 100 in Iran National University Entrance Examination among 400,000 students, 1999.

RESEARCH EXPERIENCE

Allen Institute for Artificial Intelligence (AI2)

Research Scientist **Jan 2015 to now**

Vicarious

Senior Researcher **Oct 2014 to Dec 2014**

Computational Vision and Geometry Lab, Stanford University

Postdoctoral Researcher **Sep 2013 to Sep 2014**

- Worked on methods for 3D scene understanding and pose estimation.

Toyota Technological Institute, Chicago, Illinois

Visiting Student

Sep 2012 to Nov 2012

- Proposed a new approach for object detection, which combined bottom-up grouping with top-down detection. This approach achieved the state-of-the-art performance on the PASCAL dataset, which was the main dataset for object detection in the vision community.

Toyota Technological Institute, Chicago, Illinois

Research Intern

Jan 2012 to Apr 2012

- Developed hybrid human-machine CRF models to identify the bottlenecks in machine scene understanding.

**Center for Cognition, Vision, and Learning, UCLA
(formerly: Center for Image and Vision Science)**

Research Assistant

Jul 2009 to Sep 2013

- Developed efficient learning and inference methods for hierarchical Markov Random Fields used for object detection.
- Developed techniques for learning rich description of objects. The goal is to go beyond the traditional bounding box representation and describe objects in terms of their silhouette and parts.

Honda Research Institute, Mountain View, California

Summer Intern

Jun 2010 to Sep 2010

- Developed a compositional generative method to learn part-based models of objects. The goal was simultaneous learning of the structure and the parameters of the object model.

Center for Embedded Networked Sensing (CENS), UCLA

Research Assistant

Jan 2009 to Jun 2009

- Developed a vision-based method to estimate the traffic flow on streets.

BORG lab, College of Computing, Georgia Institute of Technology

Research Assistant

Aug 2006 to May 2008

- Member of LAGR (Learning Applied to Ground Robots) team.
- Developed a visual place learning and recognition method for robot localization.

Autonomy lab, School of Computing Science, Simon Fraser University

Research Assistant

Jan 2004 to Apr 2006

- Developed a probabilistic reasoning method based on particle filters to track multiple targets in presence of long-term occlusions.

Robocup lab, Sharif University of Technology

Research Assistant

Sep 2000 to Jun 2003

- Member of SharifCESR small size soccer playing robots which participated in 2001 and 2002 Robocup world championship competitions in the United States and Japan.

PUBLICATIONS

K. Ehsani, H. Bagherinezhad, J. Redmon, **R. Mottaghi**, and A. Farhadi. **Who Let The Dogs Out? Modeling Dog Behavior From Visual Data**, in Conference on Computer Vision and Pattern Recognition (CVPR), 2018.

K. Ehsani, **R. Mottaghi**, and A. Farhadi. **SeGAN: Segmenting and Generating the Invisible**, in Conference on Computer Vision and Pattern Recognition (CVPR), 2018. (**Spotlight presentation**)

Y. Zhu*, D. Gordon*, E. Kolve, D. Fox, L. Fei-Fei, A. Gupta, **R. Mottaghi**, and A. Farhadi. **Visual Semantic Planning using Deep Successor Representations**, in International Conference on Computer Vision (ICCV), 2017. (* Equal contribution)

R. Mottaghi, C. Schenck, D. Fox, and A. Farhadi. **See the Glass Half Full: Reasoning about Liquid Containers, their Volume and Content**, in International Conference on Computer Vision (ICCV), 2017.

Y. Zhu, **R. Mottaghi**, E. Kolve, J. Lim, A. Gupta, L. Fei-Fei, and A. Farhadi. **Target-driven Visual Navigation in Indoor Scenes using Deep Reinforcement Learning**, in International Conference on Robotics and Automation (ICRA), 2017.

R. Mottaghi, M. Rastegari, A. Gupta, and A. Farhadi. **“What happens if...” Learning to Predict the Effect of Forces in Images**, in European Conference on Computer Vision (ECCV), 2016.

Y. Xiang, W. Kim, W. Chen, J. Ji, C. Choy, H. Su, **R. Mottaghi**, L. Guibas, and S. Savarese. **ObjectNet3D: A Large Scale Database for 3D Object Recognition**, in European Conference on Computer Vision (ECCV), 2016.

R. Mottaghi, H. Bagherinezhad, M. Rastegari, and A. Farhadi. **Newtonian Image Understanding: Unfolding the Dynamics of Objects in Static Images**, in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016.

R. Mottaghi, H. Hajishirzi, and A. Farhadi. **A Task-oriented Approach for Cost-sensitive Recognition**, in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016.

R. Mottaghi, S. Fidler, A. Yuille, R. Urtasun, and D. Parikh. **Human-Machine CRFs for Identifying Bottlenecks in Scene Understanding**, in IEEE Transaction on Pattern Analysis and Machine Intelligence (TPAMI), 2016.

A. Yuille, **R. Mottaghi**. **Complexity of Representation and Inference in Compositional Models with Part Sharing**, To appear in Journal of Machine Learning Research (JMLR), Special Issue on Representation Learning, 2015.

R. Mottaghi, Y. Xiang, S. Savarese. **A Coarse-to-Fine Model for 3D Pose Estimation and Sub-category Recognition**, in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015.

Y. Xiang*, C. Song*, **R. Mottaghi**, S. Savarese. **Monocular Multiview Object Tracking with 3D Aspect Parts**, in European Conference on Computer Vision (ECCV), 2014. (* Equal contribution)

R. Mottaghi, X. Chen, X. Liu, S. Fidler, R. Urtasun, A. Yuille. **The Role of Context for Object Detection and Semantic Segmentation in the Wild**, in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2014.

X. Chen, **R. Mottaghi**, X. Liu, N. Cho, S. Lee, S. Fidler, R. Urtasun, A. Yuille. **Detect What You Can: Detecting and Representing Objects using Holistic Models and Body Parts**, in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2014.

Y. Xiang, **R. Mottaghi**, S. Savarese. **Beyond PASCAL: A Benchmark for 3D Object Detection in the Wild**, in IEEE Winter Conference on Applications of Computer Vision (WACV), 2014.

A. Yuille, **R. Mottaghi**. **Complexity of Representation and Inference in Compositional Models with Part Sharing**, in International Conference on Learning Representations (ICLR), 2013.

R. Mottaghi, S. Fidler, J. Yao, R. Urtasun, and D. Parikh. **Analyzing Semantic Segmentation Using Human-Machine Hybrid CRFs**, in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2013.

S. Fidler, **R. Mottaghi**, A. Yuille, R. Urtasun. **Bottom-up Segmentation for Top-down Detection**, in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2013.

R. Mottaghi. **Augmenting Deformable Part Models with Irregular-shaped Object Patches**, in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2012.

R. Mottaghi, A. Ranganathan, and A. Yuille. **A Compositional Approach to Learning Part-based Models of Objects**, in International Conference on Computer Vision (ICCV), Workshop on 3D Representation and Recognition, 2011.

J. Lee, **R. Mottaghi**, C. E. Pippin, and T. Balch. **Graph-based Planning Using Local Information for Unknown Outdoor Environments**, in International Conference on Robotics and Automation (ICRA), 2009.

R. Mottaghi, M. Kaess, A. Ranganathan, R. Roberts. **Place Recognition based Fixed-lag Smoothing for Environments with Unreliable GPS**, in International Conference on Robotics and Automation (ICRA), 2008.

R. Mottaghi and R. T. Vaughan. **An Integrated Particle Filter and Potential Field Method Applied to Cooperative Multi-Robot Target Tracking**, Autonomous Robots Journal, 23(1): 19-35, 2007.

R. Mottaghi and R. T. Vaughan. **An Integrated Particle Filter & Potential Field Method for Cooperative Robot Target Tracking**, in International Conference on Robotics and Automation (ICRA), 2006, Orlando, Florida.

R. Mottaghi and S. Payandeh. **An Overview of a Probabilistic Tracker for Multiple Cooperative Tracking Agents**, in International Conference on Advanced Robotics (ICAR), Seattle, USA, 2005.

R. Mottaghi and S. Payandeh. **Coordination of Multiple Agents for Probabilistic Object Tracking**, in Canadian Conference on Computer and Robot Vision, Victoria, Canada, 2005.

M. T. Manzuri (in alphabetical order after the first author), H. R. Chitsaz, R. Ghorbani, P. Karimian, A. R. Mirazi, M. Motamed, **R. Mottaghi**, P. Sabzmeydani. **Sharif CESR Small Size Robocup Team**, A. Birk, S. Coradeschi, S. Tadokoro editors, **Robocup 2001: Robot Soccer World Cup V**. Lecture notes in Artificial Intelligence 2377, p. 595, Springer-Verlag, Berlin, 2002.

SERVICE TO THE ACADEMIC COMMUNITY

- Reviewer, CVPR 2015-2018, ICCV 2015 and 2017, ECCV 2016 and 2018, NIPS 2016-2018, EMNLP 2017, CORL 2017, ICRA 2017-2018, TPAMI, CVIU, Journal of Mathematical Imaging and Vision, IEEE Transactions on Multimedia, IPSN 2009, Mobisys 2009, Autonomous Robots.
- Organizer, Workshop on Visual Understanding Across Modalities held at CVPR 2017.
- Program Committee Member, Workshop on 3D Representation and Recognition (3dRR), 2013 and 2015.
- Member of the organizing team of Robocup (Robot Worldcup) 2007 held in Atlanta, Georgia.

TALKS

- Carnegie Mellon University, May 2017
- MIT, May 2017
- Facebook, April 2017
- UC Berkeley, April 2017
- University of Washington, Machine Learning Lunch, February 2017
- AI2, December, 2014
- Yahoo Labs, November 2014
- eBay Research Labs, June 2014
- NEC Labs, April 2014
- University of Michigan, Ann Arbor, Systems Science Seminar, April 2013
- Carnegie Mellon University, VASC seminar, March 2013

PATENT

- A. Ranganathan and **R. Mottaghi**. **Learning part-based models of objects**, US20130279800 A1, 2013.

MEDIA

- **Why scientists are teaching AI to think like a dog**, *NBC News*, April 26, 2018.
- **“Dog Cam” Trains Computer Vision Software for Robot Dogs**, *IEEE Spectrum*, April 18, 2018.
- **Researchers teach AI to think like dogs and find out what they know about the world**, *The Verge*, April 14, 2018.
- **Forget cloning dogs, A.I. is the real way to let your pooch live forever**, *Digital Trends*, April 13, 2018.
- **Who’s a good AI? Dog-based data creates a canine machine learning system**, *TechCrunch*, April 11, 2018.
- **This AI thinks like a dog**, *MIT Technology Review*, April 11, 2018.
- **The idea of robot butlers fuels our fantasies – and our fears**, *CBC News*, March 9, 2018.
- **Virtual reality training ground helps robots prepare for the real world**, *Digital Trends*, February 19, 2018.
- **AI2-THOR Interactive Simulation Teaches AI About Real World**, *IEEE Spectrum*, February 15, 2018.
- **What Robots Can Learn from Babies**, *MIT Technology Review*, August 30, 2016.

TEACHING EXPERIENCE

- TA, *Introduction to Computer Science I*, UCLA, Winter 2010
- TA, *Introduction to Computer Science I*, UCLA, Fall 2009
- TA, *Computer Network Fundamentals*, UCLA, Fall 2008
- TA, *Computer Architecture*, Simon Fraser University, Fall 2005
- TA, *Assembly Language & System Programming*, Sharif University of Technology, Spring 2001
- TA, *Pascal Programming*, Sharif University of Technology, Spring 2001