

# ABHINAV SHRIVASTAVA

Ph.D. Candidate  
Robotics Institute, School of Computer Science  
Carnegie Mellon University

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## EDUCATION

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- Ph.D. Candidate, Robotics, **Carnegie Mellon University** 08/2012 - 08/2017 (expected)  
Thesis: Discovering and Leveraging Visual Structure for Large-scale Recognition  
Thesis Committee: [Abhinav Gupta](#) (chair), [Martial Hebert](#), [Deva Ramanan](#), [Alexei A. Efros](#), [Jitendra Malik](#)  
Awarded Microsoft Research Ph.D. Fellowship (2014-16)
- M.S., Robotics, **Carnegie Mellon University** 08/2010 - 12/2011  
Thesis: Data-driven Visual Similarity for Image Matching  
Advisors: [Alexei A. Efros](#), [Martial Hebert](#)
- B.Tech., Computer Science & Engineering, **Jaypee Institute of Information Technology (JIIT)** 08/2006 - 05/2010  
Major Project: A Hypermedia Development Tool for Movie-based Comic Strip Rendering  
Awarded Vice Chancellor Gold Medal

## RESEARCH EXPERIENCE

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- Assistant Professor, **University of Maryland, College Park** deferred till 08/2018
- Research Assistant, **Google Research** 07/2016 - till date  
Collaborators: [Abhinav Gupta](#), [Rahul Sukthankar](#), [Jitendra Malik](#)  
Topics: Top-down mechanisms for object recognition
- Research Intern, **Microsoft Research** 05 - 08/2015  
Collaborators: [Ross Girshick](#), [Larry Zitnick](#); both now at Facebook AI Research  
Topics: Hard-example mining for object detectors, semi-supervised learning
- Research Intern, **Google Research** 05 - 08/2013  
Collaborators: [Mark Segal](#), [Rahul Sukthankar](#), [Thomas Leung](#)  
Topic: Incorporating geometry in deep neural networks
- Research Intern, **Microsoft Research** 05 - 08/2012  
Collaborators: [Sanjeev Mehrotra](#) and [Jin Li](#)  
Topic: Large-scale indexing and nearest-neighbor search for high-dimensional data points
- Graduate Research Assistant, **Carnegie Mellon University** 2011, 08/2012 - till date  
Research Associate III, **Carnegie Mellon University** 01 - 05/2012

## SELECTED AWARDS & HONORS

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- Outstanding Reviewer Award, CVPR 2015
- Microsoft Research Ph.D. Fellowship 2014-16
- Best Student Paper Award, WACV 2014
- CNN's Top-10 Ideas of 2013 (Thinking Tech) ([link](#)) 2013
- CRA Research Highlight, Computing Community Consortium 2011
- Vice Chancellor Gold Medal (awarded to Rank 1 out of 120), JIIT 2010

## PUBLICATIONS

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### Manuscripts under review

- [1] **A. Shrivastava**, R. Sukthankar, J. Malik and A. Gupta  
Beyond Skip Connections: Top-Down Modulation for Object Detection  
Under review at: *IEEE International Conference on Computer Vision (ICCV), 2017*
- [2] C. Sun, **A. Shrivastava**, S. Singh, and A. Gupta  
Revisiting Unreasonable Effectiveness of Data in Deep Learning Era  
Under review at: *IEEE International Conference on Computer Vision (ICCV), 2017*

### Peer-Reviewed Journal and Conference Publications

- [3] X. Wang, **A. Shrivastava**, and A. Gupta  
A-Fast-RCNN: Hard Positive Generation via Adversary for Object Detection  
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2017*
- [4] **A. Shrivastava** and A. Gupta  
Contextual Priming and Feedback for Faster R-CNN  
In: *European Conference on Computer Vision (ECCV), 2016*
- [5] **A. Shrivastava** and A. Gupta  
Training Region-based Object Detectors using Online Hard Example Mining  
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016*  
**Oral Presentation** (3.9% oral acceptance rate) (4<sup>th</sup> place in MS COCO Detection Challenge)
- [6] I. Misra, **A. Shrivastava**, A. Gupta and M. Hebert  
Cross-stitch Networks for Multi-task Learning  
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016*  
**Spotlight Presentation** (9.7% spotlight acceptance rate)
- [7] I. Misra, **A. Shrivastava**, A. Gupta and M. Hebert  
Watch and Learn: Semi-Supervised Learning of Object Detectors from Videos  
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015*
- [8] E. M. Aminoff, M. Toneva, **A. Shrivastava**, X. Chen, I. Misra, A. Gupta and M. J. Tarr  
Applying Artificial Vision Models to Human Scene Understanding  
In: *Frontiers in Computational Neuroscience, 2015*
- [9] X. Chen, **A. Shrivastava** and A. Gupta  
Object Discovery and Segmentation via Discriminative Visual Subcategories  
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2014*
- [10] I. Misra, **A. Shrivastava**, A. Gupta and M. Hebert  
Data-driven Exemplar Model Selection  
In: *IEEE Winter Conference on Applications of Computer Vision, 2014*  
**Oral Presentation, Best Student Paper Award**
- [11] **A. Shrivastava** and A. Gupta  
Building Parts-based Object Detectors via 3D Geometry  
In: *IEEE International Conference on Computer Vision (ICCV), 2013*
- [12] X. Chen, **A. Shrivastava** and A. Gupta  
NEIL: Extracting Visual Knowledge from Web Data  
In: *IEEE International Conference on Computer Vision (ICCV), 2013*  
**Oral Presentation** (2.52% oral acceptance rate), <http://neil-kb.com>  
**Popular Press:** CNN (Top-10 Ideas 2013), Newsweek, Forbes, Yahoo! News, BBC News, AP, Business Insider, Slashdot, Engadget, Engadget, Techradar.

- [13] **A. Shrivastava**, S. Singh and A. Gupta  
 Constrained Semi-Supervised Learning using Attributes and Comparative Attributes  
 In: *European Conference on Computer Vision (ECCV), 2012*  
**Oral Presentation** (2.8% oral acceptance rate)
- [14] **A. Shrivastava**, T. Malisiewicz, A. Gupta and A. Efros  
 Data-driven Visual Similarity for Cross-domain Image Matching  
 In: *ACM Transactions of Graphics, (SIGGRAPH Asia), 2011*  
**Oral Presentation** (18% acceptance rate)  
**Popular Press:** *TechCrunch, Y! Hacker News, Computing Community Consortium (Research Highlight of the week), Science Daily*

### Invited Papers and Posters

- [15] **A. Shrivastava**, A. Gupta and A. A. Efros  
 Real-time Household Object Detection from First-person's view using Exemplar-SVMs  
 In: *IEEE Workshop on Egocentric Vision at CVPR, 2012* (Extended Abstract & Poster)
- [16] T. Malisiewicz, **A. Shrivastava**, A. Gupta and A. A. Efros  
 Exemplar-SVMs for Visual Object Detection, Label Transfer and Image Retrieval  
 In: *International Conference on Machine Learning (ICML), 2012*  
 (Invited Applications Talk + Extended Abstract)

### Technical Reports

- [17] T. Zhou, **A. Shrivastava**, G. Obozinski, A. Gupta and A. A. Efros  
 Measuring and Increasing the capacity of Natural HOG Statistics  
*Technical Report, Carnegie Mellon University*
- [18] I. Misra, **A. Shrivastava** and M. Hebert  
 HOG and Spatial Convolution on SIMD Architecture  
*Technical Report, Carnegie Mellon University*

## ACADEMIC ACTIVITY & SERVICE

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### Program Committee & Reviewing:

Conference Area Chair: CVPR'18

Conference Reviewer: CVPR'12-17, ICCV'11-17, ECCV'12-16, NIPS'12-15, ACCV'12-14, SIGGRAPH'14,  
 AAAI'15, 3DV'14-15

Journal Reviewer: IJCV, TPAMI, CVIU, TKDE

### University Activity:

Master's Admissions Committee, Robotics Institute, CMU	2015-16
Master's Thesis Committee, CMU: Shreyansh Daftry, Krishna Kumar Singh, Tanmay Batra	2014 - till date
Ph.D. Qualifier Committee, CMU: Aayush Bansal, Ishan Misra, Xiaolong Wang	2015 - till date

### Teaching Assistant:

Geometry-based Methods in Vision (16-822), CMU. (Instructor: <a href="#">Martial Hebert</a> )	Spring 2013
Data Structures, IIIT	2008-09
Microprocessors and Controllers, IIIT	2008-09

## SELECTED TALKS, SEMINARS & LECTURES

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### *Top-down Mechanisms in Bottom-up Deep Networks*

Workshop on Deep Learning, University of Maryland, College Park, May 2017

### *The Small and the Rare: the Twin Menace of Visual Recognition*

Colloquium: University of Maryland, College Park, Mar. 2017

GRASP Seminar: University of Pennsylvania, Feb. 2017

### *Training Region-based Object Detectors with Online Hard Example Mining*

Conference: CVPR, Jun. 2016, [video](#)

### *NEIL: Extracting Visual Knowledge from Web Data*

CMU VASC Seminar, Nov. 2013

Conference: ICCV, Dec. 2013, [video](#)

Guest Lecture (Course): Visual Recognition, University of Pittsburgh, Feb 2015

### *Constrained Semi-Supervised Learning using Attributes and Comparative Attributes*

CMU VASC Seminar, Sep. 2012

Conference: ECCV, Oct. 2012, [video](#)

Guest Lecture (Course): Visual Recognition, University of Pittsburgh, Feb. 2015

### *Data-driven Visual Similarity for Cross-domain Image Matching*

Conference: SIGGRAPH Asia, Dec. 2011

Guest Lecture (Course): Visual Recognition, University of Pittsburgh, Feb. 2015

### *Overview of Object Detection with historical context*

Course: Learning Based Methods in Vision, CMU, Oct. 2013

### *Semantic vs Visual Subcategories in Computer Vision and Neuroscience*

Course: The Visual World as seen by the Neurons and Machines, Mar. 2014

### *Building Part-based Object Detectors via 3D Geometry*

CMU VASC Seminar, Nov. 2013

### *Tutorial on Caffe toolbox*

Course: Big Data Approaches, CMU, Sep. 2014

### *Vanishing Point Estimation, and applications to Scene-layout Estimation*

Guest Lecture (Course): Geometry-based Methods in Vision, CMU, 2013-16

### *Indexing in High-dimensional spaces (for large-scale nearest neighbor search)*

Industry: Bing, Microsoft, Aug. 2012

Tutorial, CMU, Sep. 2012

### *Tutorial and Workshop on Automated Robotics (Micro-mouse)*

Course: Microprocessors and Controllers, JIIT, 2008-09

Guest Lecture: Computer Society of India (CSI) Week, IGIT, IP University (India), 2008

Guest Lecture: IEEE Week, NIEC (India), 2008

Workshop: IEEE Winter Academic Program, JIIT, 2008

## SELECTED MEDIA COVERAGE

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The Greatest Hits, and Misses, of an Image-Learning AI	Discover Magazine, 2015
Thinking Tech (Top-10 Ideas of 2013)	CNN, 2013
Computer Learns Common Sense From The Internet	Forbes, 2013
Watch out, WATSON. You've got competition	Newsweek, 2013
Computer uses images to teach itself common sense	BBC News, 2013
New research aims to teach computers common sense	Yahoo! News, 2013
Researchers Are Trying To Teach Computers Common Sense	Business Insider, 2013
New research aims to teach computers common sense	Associated Press (AP), 2013
CMU AI Learning Common Sense By Watching the Internet	Slashdot, 2013
Carnegie Mellon computer learns common sense through pictures, shows what it's thinking	Engadget, 2013
Meet NEIL, the computer that thinks like you do	Techradar, 2013
CMU Researchers One-Up Google Image Search & Photosynth With Visual Similarity Engine	Techcrunch, 2011
Computerized method for matching images in photos, paintings, sketches created	Science Daily, 2011
A better search for visually similar images	Y! Hacker News, 2011
CMU algorithm matches sketches, paintings to photographs	New Atlas (formerly Gizmag), 2011
Identifying Similar Images Across Domains, CRA Research Highlight	Computing Community Consortium, 2011

## UNDERGRADUATE ACTIVITIES

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### Selected Robotics Competitions:

Finalists, Robo-Relay, IIT, Kharagpur	2008
Runner-up, Line Follower, Delhi College of Engineering	2008
Finalist, Maze Ablaze, Delhi College of Engineering	2008
Winner, Cross Terrain Racing, USIT, Indraprastha (IP) University	2007
Winner, Trash Collection, IGIT, Indraprastha (IP) University	2007
Runner-up, Chequered Flag, IGIT, Indraprastha (IP) University	2007

### Selected Positions Held:

Technical Research Coordinator, Creativity and Innovation Cell in Robotics, IIIT	2008-09
Sun Campus Ambassador (for Sun Microsystems Inc.), IIIT	2008
President, IIIT Youth Club (student union), IIIT	2008-09
Team Leader, Microsoft Go-Alive Challenge, IIIT	2008
Treasurer, EBULLIENCE, IIIT	2007
Chief Project Coordinator, 2D Graphics (managing more than 800 students), IIIT	2007