Samarth Manoj Brahmbhatt

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EDUCATION

Doctor of Philosophy, Robotics
Georgia Institute of Technology, School of Interactive Computing, GA — expected May 2019

Master of Science in Engineering, Robotics
University of Pennsylvania, PA. GPA: 3.74/4.00 — May 2014

Bachelor of Technology, Electronics & Communication Engineering
Nirma University, Ahmedabad, India. GPA: 9.04/10.00 — May 2012

PUBLICATIONS

- "Single Image 3D Object Detection and Pose Estimation for Grasping" - Menglong Zhu, Kosta Derpanis, Yinfei Yang, **Samarth Brahmbhatt**, Mabel Zhang, Cody Phillips and Kostas Daniilidis (Accepted at IEEE International Conference on Robotics and Automation 2014)
- "RoboCup 2013 Humanoid Kidsize League Winner" - Daniel D. Lee, Seung-Joon Yi, Stephen McGill, Yida Zhang, Larry Vadakedathu, **Samarth Brahmbhatt**, Richa Agrawal and Vibhavari Dasagi (Accepted at Robocup Symposium 2014)
- "Practical OpenCV" - **Samarth Brahmbhatt** (book published by Apress Media LLC)

RESEARCH EXPERIENCE

GRASP Laboratory, University of Pennsylvania — Spring 2014
Detecting Partially Occluded Objects in Images (Masters' Thesis)

- Augmented the DPM object detection algorithm to detect up to 60% occluded objects
- Used HOG features and graph-cuts to segment all pixels inside the bounding box to object/non-object
- Used Structural SVM to train HOG feature and graph edge weights

GRASP Laboratory, University of Pennsylvania — Fall 2013
Active Deformable Part models inference implementation
Wrote MEX implementation of the A-DPM object-detection algorithm inference part. This algorithm treats part inference order in DPM as a scheduling problem and achieves up to 3x speedup over Cascade-DPM.

GRASP Laboratory, University of Pennsylvania — Summer 2013
Detection and 6-DOF pose estimation of objects from a single 2D image
System to detect objects using their shape and estimate their 6-DOF pose by matching the outline with a pre-computed 3D model. Works in heavily cluttered scenes. Contributed to:

- Dynamic programming based object outline matching for pose estimation
- Motion-field based algorithm for iteratively deciding the pose of the 3D model in space to match its silhouette with outline of detected object
- Putting the silhouette extraction, detection and pose-estimation modules together into an efficient pipeline executable on a Willow Garage PR2 robot

GRASP Laboratory, University of Pennsylvania Spring 2013
Robocup 2013 Humanoid Kid-size soccer international competition
Our team won the Kid-size competition after competing against international teams. Contributed to:

- Particle filter based localization system that used goal posts and field lines as landmarks and odometry information from the walk engine
- Player self-localization orientation disambiguation based on goalkeeper ball estimate

Schneider India Innovation Challenge 2011 August 2011
Fuel saving at traffic signals

- Designed and prototyped a system that used accelerometers, magnetometers and wireless communication to automatically switch off engines of cars opposite red signals at traffic intersections

TEACHING EXPERIENCE

Teaching Assistant for

- Introduction to Robotics (MEAM 520): Responsible for weekly office hours and conducting a class project on mobile robots.
- Design of Mechatronic systems (MEAM 510): Responsible for weekly lab hours and conducting a newly added project in which students make an autonomous golfer robot.

ACADEMIC PROJECTS

Learning in Robotics (ESE 650) Spring 2013

- RGB-D point-cloud registration for 3D mapping (wiki)
- Planar Simultaneous Localization and Mapping using a particle filter (wiki)
- Image panoramas using 3-DOF orientation tracking by an Unscented Kalman Filter (wiki)
- Path planning in aerial photographs using imitation learning (wiki)
- Probabilistic color image segmentation using Gaussian Mixture Models (wiki)

Computer Vision and Computational Photography (CIS 581) Fall 2013

- Logo replacement using Shape Context feature matching (wiki)
- Panoramas by Corner appearance feature matching (wiki)
- Image Morphing by Thin Plate Splines (wiki)

Machine Perception (CIS 580) Spring 2013

- Image stitching using vanishing points and matching points (wiki)
- Logo warping using perspective transforms (wiki)

Intro to Parallel Programming (Udacity Online Course) Summer 2014

- Tone mapping using histogram equalization
- Poisson blending of masked images

COMPUTER SKILLS

- *Programming Languages*: C, C++, Python, Matlab
- *Libraries and Tools*: OpenCV, CUDA, Point Cloud Library, iPython, Vim, Git LaTeX
- *Operating Systems*: Microsoft Windows, Linux flavors, ROS

HONORS

- Best overall student in the Electronics and Communication department, Nirma University
- Second prize for final year project, Electronics and Communication department, Nirma University
- Dhirubhai Ambani Scholarship for all four years of undergraduate study

References available upon request.