Samarth Manoj Brahmbhatt

E-mail: samarth.robo@gatech.edu
Webpage: www.cc.gatech.edu/~sbrahmbh
GitHub: https://github.com/samarth-robo
LinkedIn: https://www.linkedin.com/in/samarth-manoj-brahmbhatt-a145515b

EDUCATION

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

Master of Science in Engineering, Robotics
University of Pennsylvania, PA. — May 2014

Bachelor of Technology, Electronics & Communication Engineering
Nirma University, Ahmedabad, India. — May 2012

PUBLICATIONS

1. "DeepNav: Learning to Navigate Large Cities" - **Samarth Brahmbhatt**, James Hays, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2017*
2. "StuffNet: Using 'Stuff' to Improve Object Detection" - **Samarth Brahmbhatt**, Henrik Christensen and James Hays, *IEEE Winter Conference on Applications of Computer Vision (WACV) 2017*
3. "Occlusion-Aware Object Localization, Segmentation and Pose Estimation" - **Samarth Brahmbhatt**, Heni Ben Amor and Henrik Christensen, *British Machine Vision Conference (BMVC) 2015*
4. "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, *IEEE International Conference on Robotics and Automation (ICRA) 2014*
5. "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, *RoboCup 2013: Robot World Cup XVII, Springer Berlin Heidelberg 2014*
6. "Practical OpenCV" - **Samarth Brahmbhatt**, *book published by Apress Media LLC*

RESEARCH EXPERIENCE

Institute for Robotics and Intelligent Machines, Georgia Tech — Fall 2014 - present
Graduate Research Assistant

- Learning to navigate large cities using Convolutional Neural Networks (CNNs) (Pub. 1)
- Object detection and semantic segmentation using CNNs (Pub. 2)
- Detection and 3D pose estimation of partially occluded objects (Pub. 3)

NVIDIA Research — Summer 2017
Deep Learning and Simultaneous Localization and Mapping (SLAM) research

- Working on deep learning for image- and video-based relocalization

Dextro, Inc. New York City — Summer 2015
Improving CNN-based object localization using local context

- Implemented a Convolutional Neural Network system for object localization and semantic segmentation (Pub. 2)
- Used semantic segmentation as a local context signal to improve object detection
- Implemented CPU and GPU versions of various required layers in Caffe

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 (Pub. 3)

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 (Pub. 4). 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

COURSEWORK

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++, Python, Matlab
- *Libraries and Tools*: OpenCV, CUDA, Caffe, PyTorch, Vim, Git, LaTeX

References available upon request.