

Karthik Desingh

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Research Interest My Ph.D. research focuses on *Perception for Goal-directed Mobile Manipulation*. Specifically, I am developing algorithms that can enable a personal robot to perceive objects in cluttered scenes in order to perform goal-directed household tasks. My research interests lie primarily in robot perception under uncertainty. Broadly towards solving problems in robotics, computer vision and machine learning.

Education	University of Michigan, Ann Arbor, USA Ph.D. in Computer Science and Engineering Advisor: Prof. Chad Jenkins	2016 - Present
	Brown University, USA Master of Science in Computer Science Advisor: Prof. Chad Jenkins	2013 - 2015
	International Institute of Information Technology, India Master of Science in Computer Science Thesis: Visual Saliency and Next Best View Models for Object Recognition and Search Advisor: Prof. K Madhava Krishna	2010 - 2013
	Osmania University, India Bachelor of Engineering in Electronics and Communication	2004 - 2008

Experience in Robotics and Vision	University of Michigan Ann Arbor, MI, USA Assisting <i>Programming and Intro to Data structures</i> course in teaching computer science fundamentals and programming in C++. Course page	Graduate Student Instructor Sept 19 - Dec 19
	University of Michigan Ann Arbor, MI, USA Assisted <i>Autonomous Robotics Laboratory</i> course covering state estimation algorithms for mobile robots. Course videos	Graduate Student Instructor Jan 19 - Apr 19
	Brown University Providence, RI, USA Assisted <i>Designing Humanity Centered Robots</i> course to build robots from scratch. Course page	Teaching Assistant Aug 15 - Dec 15
	Brown University Providence, RI, USA Assisted <i>Human Robot Interaction</i> seminar course covering state-of-the-art SLAM research. Course page	Teaching Assistant Aug 14 - Dec 14
	Google Summer of Code Providence, RI Worked towards implementation of RGB-D Segmentation algorithms for Point Cloud Library. Project page	Student Developer Summer 2014
	Robotics Research Center - IIIT Hyderabad, India Worked as an administrator and developer of online course material with applets on Robotic/AI algorithms. Project page	Graduate Intern Jun 10 - Jun 13

Publications and Articles	K. Desingh , J. Pavlasek, C. Kokenoz, O. C. Jenkins	RSS Workshop 2019
	<i>Tracking Large Scale Articulated Models with Belief Propagation for Task Informed Grasping and Manipulation - Best workshop paper</i>	
	J. Pavlasek, K. Desingh , O. C. Jenkins	RSS Workshop 2019
	<i>Scene Understanding using Part-Based Object Affordances</i>	
	K. Desingh , S. Lu, A. Pipari, O. C. Jenkins	Science Robotics May 2019
	<i>Efficient Nonparametric Belief Propagation for Pose Estimation and Manipulation of Articulated Objects</i>	
	K. Desingh , S. Lu, A. Pipari, O. C. Jenkins	ICRA 2019
	<i>Factored Pose Estimation of Articulated Objects using Efficient Nonparametric Belief Propagation</i>	
	S. Masnadi, J. J. LaViola, J. Pavlasek, X. Zhu, K. Desingh , O. C. Jenkins	ICRA Workshop'19
	<i>Sketching Affordances for Human-in-the-loop Robotic Manipulation Tasks</i>	
	K. Desingh , A. Pipari, O. C. Jenkins	arXiv 2018
	<i>Pull Message Passing for Nonparametric Belief Propagation</i>	
	Z. Zeng, Y. Zhou, O. C. Jenkins, K. Desingh	IROS 2018
	<i>Semantic Mapping with Simultaneous Object Detection and Localization</i>	
	K. Desingh , A. Pipari, O. C. Jenkins	ICRA Workshop-MRP 2018
	<i>Analysis of Goal-directed Manipulation in Clutter using Scene Graph Belief Propagation</i>	
	M. Maghoumi, J. LaViola, K. Desingh , O. C. Jenkins	ICRA 2018
	<i>GemSketch: Interactive Image-Guided Geometry Extraction from Point Clouds</i>	
	S. R. Gouravajhala, J. Yim, K. Desingh , Y. Huang, O. C. Jenkins, W. S. Lasecki	HCOMP 2018
	<i>EURECA: Enhanced Understanding of Real Environments via Crowd Assistance</i>	
	Z. Sui, L. Xiang, O. C. Jenkins, K. Desingh	IJRR 2017
	<i>Goal-directed Robot Manipulation through Axiomatic Scene Estimation</i>	
	N. Daskalova, K. Desingh , A. Papoutsaki, D. Schulze, H. Sha, J. Huang	UbiComp 2017
	<i>Lessons Learned from Two Cohorts of Personal Informatics Self-Experiments</i>	
	K. Desingh , O. C. Jenkins, L. Reveret, Z. Sui	Humanoids 2016
	<i>Physically Plausible Scene Estimation for Manipulation in Clutter</i>	
	K. Desingh , M. Maghoumi, J. J. LaViola, O. C. Jenkins	RSS Workshop 2016
	<i>Object Manipulation in Cluttered Scenes Informed by Physics and Sketching</i>	
	Z. Sui, O. C. Jenkins, K. Desingh	IROS 2015
	<i>Axiomatic Particle Filtering for Goal-directed Robotic Manipulation</i>	
	Z. Sui, O. C. Jenkins, K. Desingh	ICRA Workshop 2015
	<i>Axiomatic Scene Estimation for Robotic Manipulation</i>	
	K. Desingh , K. M. Krishna, D. Rajan, C. V. Jawahar	BMVC 2013
	<i>Depth really Matters: Improving Visual Salient Region Detection with Depth</i>	
	K. Desingh , A. Nagariya, K. M. Krishna	ICVGIP 2012
	<i>Viewpoint based Mobile Robotic Exploration aiding Object Search in Indoor Environment</i>	

Professional Service and Volunteering

- Served as a **reviewer** for conference and journal proceedings:
 - IEEE International Conference on Robotics and Automation (ICRA).
 - IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).
 - Robotics: Science and Systems (RSS).
 - IEEE-RAS International Conference on Humanoid Robots (Humanoids).
 - AAAI Conference on Artificial Intelligence.
 - International Joint Conferences on Artificial Intelligence (IJCAI).
 - Autonomous Robots Journal (AURO).
 - Served as a **staff mentor** for Fall 2017 freshmen in University of Michigan Mentorship Program.
 - Served on the University of Michigan CSE Ph.D. admissions committee for Fall 2018
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Notable Activities and Awards

- Presented Poster at NEMS 2019 (New York, NY).
 - Research Talk at ML conference 2019 (Ann Arbor, MI).
 - Presented Paper at ICRA 2019 (Montreal, Canada).
 - Invited Poster at Amazon Graduate Research Symposium 2019 (Seattle, WA)
 - Presented Poster at Michigan AI Symposium 2018 (Ann Arbor, MI).
 - Participated in the AI Honors competition 2018 with research talk.
 - Presented Poster at NSF PI meeting 2018 (Arlington VA).
 - Presented Paper at ICRA 2018 (Brisbane, Australia).
 - Presented Poster at Engineering Graduate Symposium (EGS) 2017 (Ann Arbor, MI).
 - Presented Poster at NEMS 2017 (Boston, MA).
 - Presented Paper at IEEE Humanoids Conference 2016 (Cancun, Mexico).
 - Presented Poster at RSS 2016 Workshop (Ann Arbor, MI).
 - Presented at ICRA 2015 PhD Forum (Seattle, WA).
 - Co-presented talk at NEMS 2015 (Boston, MA).
 - PCL - Point Cloud Library Developer and Contributor.
 - “Best Microsoft Project Award” - Hack@Brown 2015.
 - “Best Performer Award” Capgemini 2008.
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Relevant Courses

Mobile Robotics, Computer Vision, Computer Graphics, Artificial Intelligence, Human Robot Interaction, Topics in Optimization, Statistical Methods in AI, Machine Learning