Karthik Desingh

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Research Experience

Postdoctoral Scholar 2020 - Present
University of Washington, Seattle, USA
PI: Prof. Dieter Fox

Graduate Student Research Assistant 2016 - 2020
University of Michigan, Ann Arbor, USA
PI: Prof. Chad Jenkins

Graduate Student Research Assistant 2013 - 2015
Brown University, Providence, USA
PI: Prof. Chad Jenkins

Research Assistant 2010 - 2013
International Institute of Information Technology, Hyderabad, India
PI: Prof. K Madhava Krishna

Education

University of Michigan, Ann Arbor, USA 2016 - 2020
Ph.D. in Computer Science and Engineering
Thesis: Efficient Belief Propagation for Perception and Manipulation in Clutter
Advisor: Prof. Chad Jenkins
Committee: Prof. Dmitry Berenson, Prof. Benjamin Kuipers, Prof. Edwin Olson, Prof. Gaurav Sukhatme

Brown University, USA 2013 - 2015
Master of Science in Computer Science
Advisor: Prof. Chad Jenkins

International Institute of Information Technology, India 2010 - 2013
Master of Science in Computer Science
Thesis: Visual Saliency and Next Best View Models for Object Recognition and Search
Advisor: Prof. K Madhava Krishna

Osmania University, India 2004 - 2008
Bachelor of Engineering in Electronics and Communication

Teaching Experience

University of Washington Support Teaching Staff
Seattle, WA, USA Mar 21 - Jun 21
Supporting staff for projects with Duckietown robots
Course page

University of Washington Guest Lecturer
Seattle, WA, USA Mar 21
Guest lectured on state estimation in robotics.
Course page

University of Michigan Graduate Student Instructor
Ann Arbor, MI, USA Sept 19 - Apr 20
Assisting *Programming and Intro to Data structures* course in teaching computer science fundamentals and programming in C++.
Course page

University of Michigan Graduate Student Instructor
Ann Arbor, MI, USA Jan 19 - Apr 19
Assisted *Autonomous Robotics Laboratory* course covering state estimation algorithms for mobile robots.
Course videos

Brown University — Teaching Assistant
Providence, RI, USA — Aug 15 - Dec 15
Assisted *Designing Humanity Centered Robots* course to build robots from scratch.
Course page

Brown University — Teaching Assistant
Providence, RI, USA — Aug 14 - Dec 14
Assisted *Human Robot Interaction* seminar course covering state-of-the-art SLAM research.
Course page

International Institute of Information Technology — Teaching Assistant
Hyderabad, India — Aug 12 - Dec 12
Assisted *Mobile Robotics* course covering state estimation algorithms for mobile robots.

Publications and Articles

A. Opipari, C. Chen, S. Wang, J. Pavlasek, **K. Desingh**, O. C. Jenkins — arXiv 2021
Differentiable Nonparametric Belief Propagation

J. Pavlasek, S. Lewis, **K. Desingh**, O. C. Jenkins — IROS 2020
Parts-Based Articulated Object Localization in Clutter Using Belief Propagation

T. Cohn, O. C. Jenkins, **K. Desingh**, Z. Zeng — RA-L 2020 (IROS)
TSBP: Tangent Space Belief Propagation for Manifold Learning

K. Desingh, J. Pavlasek, C. Kokenoz, O. C. Jenkins — RSS Workshop 2019
Tracking Large Scale Articulated Models with Belief Propagation for Task Informed Grasping and Manipulation - **Best workshop paper**

J. Pavlasek , **K. Desingh**, O. C. Jenkins — RSS Workshop 2019
Scene Understanding using Part-Based Object Affordances

K. Desingh, S. Lu, A. Opipari, O. C. Jenkins — Science Robotics May 2019
Efficient Nonparametric Belief Propagation for Pose Estimation and Manipulation of Articulated Objects

K. Desingh, S. Lu, A. Opipari, O. C. Jenkins — ICRA 2019
Factored Pose Estimation of Articulated Objects using Efficient Nonparametric Belief Propagation

S. Masnadi, J. J. LaViola, J. Pavlasek, X. Zhu, **K. Desingh**, O. C. Jenkins — ICRA Workshop'19
Sketching Affordances for Human-in-the-loop Robotic Manipulation Tasks

K. Desingh, A. Opipari, O. C. Jenkins — arXiv 2018
Pull Message Passing for Nonparametric Belief Propagation

Z. Zeng, Y. Zhou, O. C. Jenkins, **K. Desingh** — IROS 2018
Semantic Mapping with Simultaneous Object Detection and Localization

K. Desingh, A. Opipari, O. C. Jenkins — ICRA Workshop-MRP 2018
Analysis of Goal-directed Manipulation in Clutter using Scene Graph Belief Propagation

M. Maghoumi, J. LaViola, **K. Desingh**, O. C. Jenkins — ICRA 2018
GemSketch: Interactive Image-Guided Geometry Extraction from Point Clouds

S. R. Gouravajhala, J. Yim, **K. Desingh**, Y. Huang, O. C. Jenkins, W. S. Lasecki — HCOMP 2018
EURECA: Enhanced Understanding of Real Environments via Crowd Assistance

Z. Sui, L. Xiang, O. C. Jenkins, **K. Desingh** — IJRR 2017
Goal-directed Robot Manipulation through Axiomatic Scene Estimation

N. Daskalova, **K. Desingh**, A. Papoutsaki, D. Schulze, H. Sha, J. Huang — UbiComp 2017
Lessons Learned from Two Cohorts of Personal Informatics Self-Experiments

K. Desingh, O. C. Jenkins, L. Reveret, Z. Sui — Humanoids 2016
Physically Plausible Scene Estimation for Manipulation in Clutter

K. Desingh, M. Maghoumi, J. J. LaViola, O. C. Jenkins — RSS Workshop 2016
Object Manipulation in Cluttered Scenes Informed by Physics and Sketching

Z. Sui, O. C. Jenkins, **K. Desingh** — IROS 2015
Axiomatic Particle Filtering for Goal-directed Robotic Manipulation

Z. Sui, O. C. Jenkins, **K. Desingh** — ICRA Workshop 2015
Axiomatic Scene Estimation for Robotic Manipulation

K. Desingh, K. M. Krishna, D. Rajan, C. V. Jawahar — BMVC 2013
Depth really Matters: Improving Visual Salient Region Detection with Depth

K. Desingh, A. Nagariya, K. M. Krishna — ICVGIP 2012
Viewpoint based Mobile Robotic Exploration aiding Object Search in Indoor Environment

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Professional Service and Volunteering

- Served as a **reviewer** for conference and journal proceedings:
  - IEEE Robotics and Automation Letters (RA-L).
  - Autonomous Robots Journal (AURO).
  - 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 Inteligence.
  - International Joint Conferences on Artificial Intelligence (IJCAI).
  - International Conference on Robot Learning (CoRL).
- Served in the program committee for conference and journal proceedings:
  - International Joint Conferences on Artificial Intelligence (IJCAI) 2021.
  - International Conference on Robot Learning (CoRL) 2020.
- 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
- Organized robot demonstrations for programs such as EGS@CSE 18, GEECS Research lab tour, CS Kick start and for CSE visit day.
- Organized UW Robotics Colloquium for the terms Autumn 2020, Winter 2021, and Spring 2021.

Notable Activities and Awards

- Invited Research Talk at UW (Seattle, WA)
- Invited Research Talk at USC (Los Angeles, CA)
- Invited Research Talk at Yale (New Haven, CT)
- 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.

Mentored Students

- T. Cohn (UG University of Michigan)
- C. Kokenoz (UG University of Michigan) to (MS University of Michigan)
- A. Nagariya (UG IIIT Hyderabad) to (Ph.D. Texas A&M)
- A. Opipari (UG, MS University of Michigan) to (Lincoln labs)
- C. Chen (MS University of Michigan)
- S. Wang (MS University of Michigan)
- N. Pusalkar (MS University of Michigan)
- S. Lu (MS University of Michigan) to (Ph.D. Rutgers University)
- X. Zhu (MS University of Michigan)
- Y. Zhou (MS University of Michigan) to (Google)