Kevin Doherty

CONTACT INFORMATION

Woods Hole Oceanographic Inst.
266 Woods Hole Rd. MS# 07
Woods Hole, MA 02543

Phone: (732) 759-1012
E-mail: kdoherty@mit.edu
WWW: http://web.mit.edu/kdoherty/www

RESEARCH INTERESTS

My interests lie at the intersection of autonomous robotics and machine learning, particularly in high-level autonomy, statistical inference, planning, and exploration.

EDUCATION

Massachusetts Institute of Technology, Cambridge, Massachusetts
Woods Hole Oceanographic Institution, Woods Hole, Massachusetts

Ph.D. AeroAstro, Applied Ocean Science and Engineering, June 2017 - Present
- Advisor: Yogesh Girdhar

Stevens Institute of Technology, Hoboken, New Jersey

B.E. with Thesis, Electrical Engineering, September, 2013 - May, 2017.
- Thesis Topic: "Learning-aided 3D Occupancy Mapping for Mobile Robots"
- Advisor: Brendan Englot, Reader: Philippos Mordohai
- Minor: Computer Science
- GPA: 3.97 / 4.0

PROFESSIONAL EXPERIENCE

WARP Lab, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts

Graduate Research Assistant **June, 2017 - Present**
Researcher in the WHOI Autonomous Robotics and Perception (WARP) Lab. Studying unsupervised learning methods, including Bayesian nonparametric models and deep generative models, with application to underwater robotics, particularly in tasks like semantic mapping, human-robot interaction, and distributed learning.

Robust Field Autonomy Lab, Stevens Institute of Technology, Hoboken, New Jersey

Undergraduate Research Assistant **May, 2015 - May, 2017**
Studied autonomous robotics with specific interest in the problems of mapping and exploration. Investigated techniques to reduce the number of steps needed to completely explore an environment. Developed a method to enable fusion of several inferred local maps computed using different models. Current work is focused on the application of new machine learning algorithms to map inference.

MIT Lincoln Laboratory, Lexington, Massachusetts

Summer Research Intern **June, 2016 - August, 2016**
Developed algorithms for semantic map filtering and object localization with application to search using lightweight UAVs and UUVs. Integrated algorithms into a SLAM system with the goal of enhancing situational awareness for a user via a heads-up display.

Cizr Tennis www.cizr.com, Austin, Texas

Part-time Software Engineering Intern **December, 2014 - Present**
Back- and front-end development for a tennis video annotation and editing platform. Built several features currently in production for uploading matches, saving match events, and generating and sharing highlight reels.

Resolute Innovation www.resoluteinnovation.com, New York City, New York

Part-time Software Engineering Intern **December, 2014 - June, 2016**
Prototyped web crawlers and parsers for the backend of a university tech-transfer search engine.

Built support for user accounts and saved documents. Studied techniques for machine learning-assisted expert data curation.

Refereed Publications

K. Doherty, J. Wang, and B. Englot, "Bayesian Generalized Kernel Inference for Occupancy Map Prediction", *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, May 2017.

K. Doherty, J. Wang, and B. Englot, "Probabilistic Map Fusion for Fast, Incremental Occupancy Mapping with 3D Hilbert Maps", *IEEE International Conference on Robotics and Automation (ICRA)*, 8 pp., May 16-21, 2016.

S. Bai, J. Wang, K. Doherty, and B. Englot. "Inference-Enabled Information-Theoretic Exploration of Continuous Action Spaces", *The International Symposium on Robotics Research (ISRR)*, September 12-15, 2015.

Other Publications

K. Doherty, Y. Girdhar, "Unsupervised Spatial-Semantic Maps for Human-Robot Collaboration in Communication-Constrained Environments", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Poster. To appear, September 24-28, 2017.

K. Doherty, J. Wang, and B. Englot, "Bayesian Learning with Generalized Kernels for Occupancy Map Prediction", *IEEE MIT Undergraduate Research Technology Conference*, Poster. November 4-6, 2016.

Open Source Releases

Learning-aided 3D Mapping Library (LA3DM)

Library providing implementation of recent learning-based mapping approaches developed at the Robust Field Autonomy Lab at Stevens Institute of Technology with Jinkun Wang.
`https://github.com/RobustFieldAutonomyLab/la3dm`

Professional Activities

Student Volunteer at *Robotics: Science and Systems (RSS)* 2017.

Reviewer for *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* 2017.

Reviewer for *IEEE Robotics and Automation Letters (RA-L) / IEEE International Conference on Robotics and Automation (ICRA)* 2017.

Honors and Awards

IEEE Robotics and Automation Society ICRA Travel Grant. 2017.

ICFNJ Research Symposium Grant, in support of undergraduate research on underwater robotics. 2015.

Computer Skills

Languages:

- Professional experience: Python, Scala, C++, Java, Coffeescript/Javascript, HTML, CSS
- Some experience: LaTeX, MATLAB, Bash scripting

Tools:
ROS, Gazebo, PCL, OpenCV, TensorFlow, Git, Jenkins CI

Other Activities

IEEE Robotics and Automation Society (RAS), Tau Beta Pi (TBP) Honor Society, Eta Kappa Nu (HKN) Honor Society, PADI SCUBA Diver

Relevant Coursework

Advanced Robotics, Computer Vision, Machine Learning, 3D Computer Vision, Introduction to Robotics, Artificial Intelligence