Yoonchang Sung

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Education

Virginia Tech, Blacksburg, USA
Ph.D. in Electrical & Computer Engineering, September 2014–Present
Advisor: Pratap Tokekar

Korea University, Seoul, Korea
M.S. in Mechanical Engineering, August 2013
Advisor: Woojin Chung

Korea University, Seoul, Korea
B.S. in Mechanical Engineering, February 2011

Employment

Research Assistant, September 2016–Present
Dept. of Electrical & Computer Engineering, Virginia Tech, Blacksburg, USA
Advisor: Pratap Tokekar

Research Assistant, September 2014–August 2016
Dept. of Mechanical Engineering, Virginia Tech, Blacksburg, USA
Advisor: Brian Lattimer & Tomonari Furukawa

Research Intern, August 2013–June 2014
Center for Bionics, Korea Institute of Science and Technology, Seoul, Korea
Supervisor: JongSuk Choi

Research Assistant, March 2011–August 2013
Dept. of Mechanical Engineering, Korea University, Seoul, Korea
Advisor: Woojin Chung

Teaching

Teaching Assistant
Dept. of Electrical & Computer Engineering, Virginia Tech, Blacksburg, USA
ECE 4984: SS:Robot Motion Planning, Guest Lecturer: Introduction to ROS, August 2018

Dept. of Mechanical Engineering, Korea University, Seoul, Korea
MECH 210: Computer Aided Mechanical Drawing, Spring 2012
MECH 328: Machine Component Design, Fall 2011

Publications

Journal Articles
In Preparation
[*J7*] **Y. Sung**, and P. Tokekar, "A competitive algorithm for online multi-robot exploration of a translating plume," *IEEE Transactions on Robotics (T-RO)*, Note: In Preparation.

[*J6*] **Y. Sung**, J. Das, and P. Tokekar, "An introduction to decision-theoretic tools

for robotic environmental monitoring," *IEEE Robotics and Automation Magazine (RAM)*, Note: In Preparation.

[*J*5] Z. Zhang, J. Lee, JM Smereka, **Y. Sung**, L. Zhou, and P. Tokekar, "Tree search techniques for minimizing detectability and maximizing visibility," *IEEE Robotics and Automation Letters (RA-L)*, Note: In Preparation.

Under Review

[*J*4] **Y. Sung**, AK Budhiraja, RK Williams, and P. Tokekar, "Distributed assignment with limited communication for multi-robot multi-target tracking," *Autonomous Robots (AURO)*, *Special Issue on Robot Communication Challenges*, Note: Conditionally Accepted.

[*J*3] **Y. Sung**, and P. Tokekar, "GM-PHD filter for searching and tracking an unknown number of targets with a mobile sensor with limited FoV," *IEEE Transactions on Automation Science and Engineering (T-ASE)*, Note: Revision Under Review.

Published

[*J*2] C. Knabe, R. Griffin, J. Burton, G. Cantor-Cooke, L. Dantanarayana, G. Day, O. Ebeling-Koning, E. Hahn, M. Hopkins, J. Neal, J. Newton, C. Nogales, V. Orekhov, J. Peterson, M. Rouleau, J. Seminatore, **Y. Sung**, J. Webb, N. Wittenstein, J. Ziglar, A. Leonessa, B. Lattimer, and T. Furukawa, "Team VALOR's ESCHER: A novel electromechanical biped for the DARPA Robotics Challenge," *Journal of Field Robotics (JFR)*, 34(5): pp. 912-939, 2017.

[*J*1] **Y. Sung**, and W. Chung, "Hierarchical sample-based joint probabilistic data association filter for following human legs using a mobile robot in a cluttered environment," *IEEE Transactions on Human-Machine Systems (T-HMS)*, 46(3): pp. 340-349, 2016.

Refereed Conference Publications

In Preparation

[*C*12] **Y. Sung**, and P. Tokekar, "Optimal sampling of a hazardous plume using a heterogeneous team of aerial and surface robots ," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2019)*, Note: In Preparation.

[*C*11] **Y. Sung**, and P. Tokekar, "Robot routing algorithms for translational TSP with neighborhoods," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2019)*, Note: In Preparation.

Published

[*C*10] **Y. Sung**, and P. Tokekar, "A competitive algorithm for online multi-robot exploration of a translating plume," *IEEE International Conference on Robotics and Automation (ICRA 2019)*, Note: Accepted.

[*C*9] Z. Zhang, J. Lee, JM Smereka, **Y. Sung**, L. Zhou, and P. Tokekar, "Tree search techniques for minimizing detectability and maximizing visibility," *IEEE International Conference on Robotics and Automation (ICRA 2019)*, Note: Accepted.

[*C*8] **Y. Sung**, AK Budhiraja, RK Williams, and P. Tokekar, "Distributed simultaneous action and target assignment for multi-robot multi-target tracking," *IEEE International Conference on Robotics and Automation (ICRA 2018)*, 2018.

[*C*7] **Y. Sung**, and P. Tokekar, "Hierarchical GM-PHD filter for false alarm reduction in search and tracking task," *US-KOREA Conference on Science, Technology and Entrepreneurship (UKC 2017)*, 2017.

[*C*6] **Y. Sung**, and P. Tokekar, "Algorithms for searching and tracking an unknown and varying number of mobile targets using a limited FoV sensor," *IEEE Interna-*

tional Conference on Robotics and Automation (ICRA 2017), 2017.

[$C5$] JH Kim, **Y. Sung**, and B. Lattimer, "Bayesian estimation based real-time fire-heading in smoke-filled indoor environments using thermal imagery," *IEEE International Conference on Robotics and Automation (ICRA 2017)*, 2017.

[$C4$] **Y. Sung**, and T. Furukawa, "Information measure for the optimal control of target searching via the grid-based method," *International Conference on Information Fusion (Fusion 2016)*, 2016.

[$C3$] B. Lattimer, J. Starr, J. McNeil, C. Nogales, J. Peterson, J. Ziglar, J. Burton, C. Knabe, **Y. Sung**, J. Seminatore, R. Griffin, J. Newton, V. Orekhov, M. Rouleau, M. Hopkins, D. Hong, and D. Lee, "Humanoid firefighting robot for structure fires," *International Conference and Exhibition on Fire Science and Engineering (Interflam 2016)*, 2016.

[$C2$] D. Cha, H. Cho, J. Jin, H. Kwon, J. Kim, H. Lee, J. Seong, C. Moon, H. Kim, **Y. Sung**, and W. Chung, "Tracking human legs for an indoor mobile robot with a single laser range finder," *International Conference on Engineering and Applied Sciences (ICEAS 2015)*, 2015.

[$C1$] **Y. Sung**, and W. Chung, "Human tracking of a mobile robot with an onboard LRF(Laser Range Finder) using human walking motion analysis," *International Conference on Ubiquitous Robots and Ambient Intelligence (URAI 2011)*, 2011.

Refereed Workshop Publications

[$W2$] **Y. Sung**, S. Buebel, and P. Tokekar, "Detecting and mapping hazardous plumes with aerial and surface robots," *IEEE International Conference on Robotics and Automation (ICRA 2018) Workshop on Robot Teammates Operating in Dynamic, Unstructured Environment*, 2018.

[$W1$] **Y. Sung**, AK Budhiraja, RK Williams, and P. Tokekar, "Distributed simultaneous action and target assignment for multi-robot multi-target tracking," *IEEE International Conference on Robotics and Automation (ICRA 2017) Workshop on Multi-robot Perception-driven Control and Planning*, 2017.

Book Chapters

[$B1$] C. Knabe, R. Griffin, J. Burton, G. Cantor-Cooke, L. Dantanarayana, G. Day, O. Ebeling-Koning, E. Hahn, M. Hopkins, J. Neal, J. Newton, C. Nogales, V. Orekhov, J. Peterson, M. Rouleau, J. Seminatore, **Y. Sung**, J. Webb, N. Wittenstein, J. Ziglar, A. Leonessa, B. Lattimer, and T. Furukawa, "Team VALOR's ESCHER: A Novel Electromechanical Biped for the DARPA Robotics Challenge," *The DARPA Robotics Challenge Finals: Humanoid Robots To The Rescue. Springer, Cham.*, pp. 583-629, 2018.

Posters

[$P1$] **Y. Sung**, and W. Chung, "Implementation of JPDAFs to track humans for a mobile robot with a laser range finder," *IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN 2013)*, 2013.

Patents

Y. Sung, and W. Chung, "Leg tracking method based on SJPDAF method," KR (No. 10-1573620)

Service

Workshop Co-organizer

Workshop on Decision Making for Robotic Environmental Monitoring, RSS 2019, Note: In Preparation.

Reviewer

Journals: IEEE Transactions on Automation Science and Engineering (T-ASE)

Conferences: IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), IEEE International Conference on Robotics and Automation (ICRA), Workshop on the Algorithmic Foundations of Robotics (WAFR), International Conference on Autonomous Agents and Multiagent Systems (AAMAS)

Skills

Software

C/C++, Python, Julia, Lua, MATLAB, ROS, ArduPilot, PX4, MAVROS, OpenCV, TensorFlow

Hardware

UAV: DJI (F450/Matrice), *UGV*: Pioneer 3-DX and Husky, *Sensor*: camera, RGB-D camera and LiDAR

Honors

Awards

Conference Travel Awards: ICRA 2017, ICRA 2018
DARPA Robotics Challenge (DRC) Finalist, 2015

Graduate Fellowship

Research Assistant Scholarships, Virginia Tech, Blacksburg, USA, Fall 2014–Present
The Welfare Section Scholarship, Korea University, Seoul, Korea, Fall 2012, Spring 2012
The Second Stage of BK21 Scholarship, Korea University, Seoul, Korea, Spring 2011
Research Assistant Scholarships, Korea University, Seoul, Korea, Fall 2011

Undergraduate Fellowship

Best Honors Scholarships, Korea University, Seoul, Korea, Spring 2010
Honors Scholarships, Korea University, Seoul, Korea, Fall 2010, Spring 2009, Fall 2008
National Science Scholarship, Korea University, Seoul, Korea, Fall 2009

References

Dr. Pratap Tokekar, Assistant Professor
Electrical and Computer Engineering, Virginia Tech, Blacksburg, USA

Dr. Ryan K. Williams, Assistant Professor
Electrical and Computer Engineering, Virginia Tech, Blacksburg, USA

Dr. Jnaneshwar Das, Alberto Enrique Behar Research Professor
School of Earth and Space Exploration, Arizona State University, Tempe, USA

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