GREY

Senior Software Engineer

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EMPLOYMENT & RESEARCH

Robotics Middleware Framework for Healthcare
Open Robotics

📅 May 2018 – Ongoing   ◉ Singapore

Designing and implementing open source software and open specifications to enable and enhance integration of heterogeneous robotics systems, with a focus on the healthcare sector. Healthcare facilities have remarkably complex logistical needs, which could be solved using sufficiently well-integrated robotics systems. However, no single vendor can currently provide a complete solution for what is needed, so as a vendor-neutral third-party open source middleware developer, we are uniquely positioned to define an open specification for how various vendors can integrate their systems into an effective coherent solution.

Robotics Software and Physics Simulation
Open Robotics

📅 July 2017 – May 2018   ◉ Mountain View, CA, USA

Designed and implemented open source software to facilitate robotics research, development, testing, and deployment. This includes development of middleware, simulation tools, and CLI/GUI utilities.

Humanoid Robot Motion Planning
Graphics Lab & AMBER Lab

📅 August 2015 – July 2017   ◉ Atlanta, GA, USA

Developed algorithms to efficiently perform locomotion and manipulation planning for humanoid robotic platforms.

Humanoid Robot Teleoperation
Humanoid Robotics Lab

📅 August 2011 – August 2015   ◉ Atlanta, GA, USA

Developed software systems to allow human users to teleoperate humanoid robots to perform complex tasks which reflect the needs of various disaster scenarios.

DARPA Robotics Challenge Trials
Team DRC-Hubo

📅 August 2012 – December 2014   ◉ Atlanta, GA, USA

Worked on a multi-institute team to participate in a DARPA-sponsored competition. Helped to develop and maintain core software systems at all levels of the teleoperation pipeline, and co-piloted several of the DRC tasks.

Swarm Control Testbed
Aerospace Robotics and Control Lab

📅 May 2010 – August 2011   ◉ Urbana-Champaign, IL, USA

Designed and implemented a closed-loop hardware testbed for examining control algorithms on autonomous flying swarms and small-scale model aircraft.

EDUCATION

Ph.D. in Robotics
Georgia Institute of Technology

📅 August 2011 – July 2017

Advised by: C. Karen Liu, Aaron Ames, and Mike Stilman

B.Sc. in Aerospace Engineering
University of Illinois at Urbana-Champaign

📅 August 2007 – May 2011

PROJECTS

RMF
Designer and maintainer

SOSS
Co-designer and co-maintainer

Dynamic Anim. and Robotics Toolkit
Co-designer and co-maintainer

Ignition Physics
Designer and co-maintainer

Gazebo
Contributor and co-maintainer

ROS1
Contributor

ROS2
Contributor

LANGUAGES

C++   Python   Java   Matlab

ROBOTICS INTERESTS

Planning   Locomanipulation
Dynamics   Controls   Teleoperation

DESIGN FOCUS

Correctness   Reliability   Robustness
Maintainability   User-friendliness

PUBLICATIONS

🎓 Doctoral Thesis

- Grey, Michael Xander (2017). "High Level Decomposition for Bipedal Locomotion Planning". PhD thesis. Georgia Institute of Technology.

📄 Journal Article

- Zucker, Matt et al. (2015). "A General-purpose System for Teleoperation of the DRC-HUBO Humanoid Robot". In: *Journal of Field Robotics* 32.3, pp. 336–351.

👥 Conference Proceedings

- Grey, Michael X., Aaron D. Ames, and C. Karen Liu (2017a). "Footstep and Motion Planning in Semi-unstructured Environments Using Randomized Possibility Graphs". In: *IEEE Int'l Conf. on Robotics and Automation (ICRA)*.
- – (July 2017b). "Probabilistic Completeness of Randomized Possibility Graphs Applied to Bipedal Walking in Semi-unstructured Environments". In: *Proceedings of Robotics: Science and Systems*. Cambridge, Massachusetts. DOI: 10.15607/RSS.2017.XIII.029.
- Grey, Michael X, Caelan R Garrett, et al. (2016). "Humanoid manipulation planning using backward-forward search". In: *Intelligent Robots and Systems (IROS), 2016 IEEE/RSJ International Conference on*. IEEE, pp. 5467–5473.
- Hubicki, Christian M et al. (2016). "Work those arms: Toward dynamic and stable humanoid walking that optimizes full-body motion". In: *Robotics and Automation (ICRA), 2016 IEEE International Conference on*. IEEE, pp. 1552–1559.
- Grey, Michael, Sungmoon Joo, and Matt Zucker (2014). "Planning heavy lifts for humanoid robots". In: *Humanoid Robots (Humanoids), 2014 14th IEEE-RAS International Conference on*. IEEE, pp. 640–645.
- Luo, Jingru et al. (2014). "Robust ladder-climbing with a humanoid robot with application to the darpa robotics challenge". In: *Robotics and Automation (ICRA), 2014 IEEE International Conference on*. IEEE, pp. 2792–2798.
- Grey, Michael X, Neil Dantam, et al. (2013). "Multi-process control software for hubo2 plus robot". In: *Technologies for Practical Robot Applications (TePRA), 2013 IEEE International Conference on*. IEEE, pp. 1–6.
- O'Flaherty, Rowland et al. (2013). "Humanoid robot teleoperation for tasks with power tools". In: *Technologies for Practical Robot applications (TePRa), 2013 ieee international conference on*. IEEE, pp. 1–6.

TEACHING

Volunteer Instructor
Code in the Community

📅 August 2019 – Ongoing

Code in the Community is a program that provides free coding lessons to children of disadvantaged families in Singapore. As instructor, my role is to prepare educational presentations, explain programming concepts to the class, lead the students through hands-on assignments, and provide students with one-on-one help to supplement the efforts of the assistants.

Volunteer Assistant
Code in the Community

📅 May 2019 – July 2019

As assistant, my role was to help keep the students focused and organized, as well as provide students with one-on-one guidance as they worked through the hands-on assignments.

Teaching Assistant
Georgia Institute of Technology

📅 August 2013 – May 2014

CS 8803: Humanoid Robotics. Multidisciplinary project-oriented class which introduced students to the fundamentals of planning, control, and operation for humanoid robot platforms. In addition to providing technical assistance to the students, I taught a series of voluntary "crash courses" for students who lacked some of the necessary technical background for the class.

Aerospace Department Tutor
University of Illinois at Urbana-Champaign

📅 August 2010 – May 2011

Assisted fellow aerospace undergraduates with technical courses, both fundamental and domain-specific. This position was sponsored by the Aerospace Department at the University of Illinois.