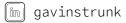
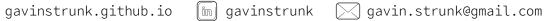
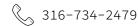
Gavin Strunk

Robotics Research Scientist









EXPERIENCE

SCIENTIFIC SYSTEMS CO INC. (SSCI) | Senior Research Engineer June 2019 - Current | Woburn, MA

- → USV Tight Formation Control w/ Force Feedback: Developed nonlinear maritime vessel control strategy to enable underactuated ships to navigate up to sea state 5 in a train by utilizing compression forces between vessels.
- → **Density Swarm Control:** Collaborated on CubeSat constellation controller to maintain satellite distribution density while changing orbits.
- → Autonomy Decision Explanation Engine: Collaborated on an explainable autonomy engine that learns a black box autonomy system decision making process and explains the actions in human readable text using MDP-based model.

SCHLUMBERGER | SENIOR ROBOTICS RESEARCH SCIENTIST January 2017 - June 2019 | Boston, MA

- → Autonomous Underwater Vehicle Autonomy: Developed a novel autonomy system that achieved extremely high reliability by decoupling fault tolerance from business logic intelligence. Operated four open water field tests completing over a month of test days with zero failures.
- → Abstract USV Formation Control: Simplified operators control of 30 USVs using centralized abstract control law to maneuver based on a time varying elliptical grouping and distribution.
- → Tight Tolerance Peg-In-Hole(PIH) Manipulation: Designed task level optimizer for 0.001" - 0.008" accuracy PIH sequencing that improved performance time on a UR5/UR10 by 58% utilizing ROS and MOVEIT.
- → Negative Feature Extraction in Point Clouds: Designed an algorithm to extract open (negative) feature templates in point cloud data to determine location of holes in 3D objects for placing pegs.

SCHLUMBERGER | EMBEDDED CONTROLS ENGINEER February 2014 - January 2017 | Houston, TX

- → PMSM Control for Drilling Tool: Implemented PID permanent magenet synchronous motor controller that supported resolver feedback and sensorless field oriented control
- → Continuous Integration System: Designed and maintained CIS using Jenkins, GIT, and automated deployment scripts

RECENT PUBLICATIONS

- 1. G. Strunk, "Greedy Clustering-Based Algorithm for Improving Multi-point Robotic Manipulation Sequencing", arXiv:2205.02662 [cs.RO], May 2022.
- 2. A. Jarrot, A. Gelman, G. Choi, A. Speck, G. Strunk et al., "High-speed underwater acoustic communication for multi-agent supervised autonomy," 2021 Fifth Underwater Communications and Networking Conference (UComms), 2021
- 3. A. Speck, A. Croux, A. Jarrot, G. Strunk et al., "Supervised Autonomy for Advanced Perception and Hydrocarbon Leak Detection," Global Oceans 2020
- 4. Vincent, Jack, Vannuffelen, Stephane, Ossia, Sepand, Speck, Andrew, Strunk, Gavin, et al. "Supervised Multi-Agent Autonomy for Cost-Effective Subsea Operations." Offshore Technology Conference, Houston, Texas, USA, May 2020

SKILLS

PROGRAMMING

MATLAB/Simulink • Python • C++ • LATEX

LIBRARIES/FRAMEWORKS

ROS/ROS2 • OMPL • IPOPT • Pytorch • Tensorflow • CASADI • OpenCV • PCL

TOOLS/PLATFORMS

Git • Jenkins • Atlassian • Docker • Linux

EDUCATION

UDACITY

DEEP REINFORCEMENT LEARNING Nanodegree Completed: November 2018

DEEP LEARNING NANODEGREE Completed: December 2017

UNIVERSITY OF KANSAS

Ph.D Mechanical Engineering "Ultracapacitor Development and Implementation Management System" Graduated: August 2014 GPA: 3.8 / 4.0

UNIVERSITY OF KANSAS

M.S. MECHANICAL ENGINEERING "Parallelized Distributed Embedded Control System implemented on 2D robotic walking machine" Graduated: December 2010 GPA: 3.79 / 4.0

RESEARCH INTERESTS

- → Reinforcement Learning
- → Model Predictive Control
- → Guaranteed Safe Control
- → Trajectory Optimization
- → Underactuated Systems