Scott M. Shaw

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Experience

National University of Singapore: Multi-Agent Robotic Motion Laboratory
Student Researcher | Gait Generation and Leg Failure **January - September 2022**

- Created an algorithm to inexpensively generate stable gaits that use a subset of the robot's available legs
- Facilitated reactive responses to single and multi-leg failures by enabling transitions to stable gaits that are generated online, preventing loss of stability and maximizing forward progression of the robot
- Improved usability of gait design and transition methods to support student learning and research
- Taught visiting student researchers about CPG-based locomotion, gait design, and gait transitions
- Examined more strict leg failure constraints (e.g., joint specific breakages) to determine if partially functioning legs may be used to stabilize the robot; planning on using these ideas for future research

Student Researcher | Gait Design and Transitions **January - September 2021**

- Shaw, Scott, and Guillaume Sartoretti. "Keyframe-based CPG for Stable Gait Design and Online Transitions in Legged Robots." *2022 IEEE 61st Conference on Decision and Control (CDC)*. IEEE, 2022.
- Implemented online, real-time gait transitions on a hexapod robot while ensuring stable locomotion and forward progression using a central pattern generator (CPG)-based controller
- Leveraged robot's inertial measurement unit (IMU) feedback to guarantee stability during gait transitions
- Applied gait transitions to support versatile applications on the robot, such as mobile manipulation
- Learned about various mathematical representations of CPGs and their use as legged robot controllers
- Developed skills with ROS/Gazebo and PyBullet to simulate experiments on the robot
- Collaborated with students in the lab on research and to run on-robot experiments
- Participated in weekly lab meetings to share progress and collaborate with other students

Skills

Robotics: Motion Planning (PRM, RRT*), Controllers (PID, CPG), Kinematics, Transforms
ML: Regression (Linear/Ridge/Logistic), Neural Networks (Perceptrons/Autoencoders/DNN/CNN), Generative Models (GDA/NB), Boosting (Adaboost/Gradient Boosting), Active Learning, Q-Learning
Language Libraries: C++: Eigen
Python: Numpy, Scipy, Sklearn, Pytorch, Pybullet, OMPL, Pygame, Pinocchio, Pandas
Programming Languages: Python, C++, Bash, Lua, JavaScript
OS/Software: Linux, Git, ROS2, Gazebo, Solidworks, Fusion 360

Education

Northeastern University, Boston, MA
Khoury College of Computer Sciences **May 2023**
Bachelors of Science in Computer Science, AI Concentration | Mathematics Minor
Related Coursework:
Robotics Science and Systems, Artificial Intelligence, Machine Learning and Data Mining I/II, Algorithms and Data, Object-Oriented Design, Software Engineering, Programming in C++ Numerical Analysis, Multivariable Calculus, Linear Algebra, Probability and Statistics

Northeastern University London, London, UK **August - December 2019**
Northeastern University Study Abroad Program, Computer Science