Scott M. Shaw

shaw.sc@northeastern.edu | scott-shaw.github.io | 267-273-4960

Education

Northeastern University, Boston, MA

Khoury College of Computer Sciences

Bachelors of Science in Computer Science | AI Concentration | Mathematics Minor **Expected May 2023**

GPA: 3.60/4.00, Dean's List

Related Coursework: Robotic Science and Systems, Artificial Intelligence, Machine Learning and Data Mining I/II, Algorithms and Data, Object-Oriented Design, Software Engineering, Numerical Analysis, Multivariable Calculus, Linear Algebra, Probability and Statistics

Northeastern University London, London, UK

Northeastern University Study Abroad Program - Fall Semester 2019, Computer Science

The Haverford School, Haverford, PA

Experience

National University of Singapore: Multi-Agent Robotic Motion Laboratory (MARMoT Lab)

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

- 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 Gazebo/ROS & 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

Student Researcher | Gait Generation and Leg Breakage **January - September 2022**

- First author on contribution published at CDC 2022, detailing methods and results from previous research
- Extended previous work on gait transitions to enable responses to leg breakages (i.e., transition to a stable gait when a leg fault is detected without losing stability and maximizing forward progression)
- Created an algorithm to inexpensively generate stable gaits to adapt to single or multi-leg breakages
- Enabled reactive transitions to generated gaits to respond to leg breaks online for continuous locomotion
- Currently working on expanding gait generation research to work towards another publication
    - Looking into more strict leg breakage constraints (e.g., joint specific breakages)
    - Adapting gait to produce adequate footfalls for the environment whenever not possible

Projects

Autonomous Q-Learning Agent

- Created an autonomous agent using Epsilon-Greedy Q-Learning to play the game, Greed
- Learned about basics of reinforcement learning, specifically, Q-Learning
- Compared the performance of Q-Learning agent to other agents with various static strategies
- Gained knowledge about creating good reward functions and improving performance of RL-based agents

Classification of ASL Fingerspelling Alphabet using a Convolutional Neural Network (CNN)

- Designed and implemented a CNN using PyTorch to classify letters of the ASL Fingerspelling Alphabet
- Experimented with various network structures and hyperparameters to improve performance

Skills

Programming Languages: C++, Python, JavaScript, Typescript, Java

Language Libraries: Eigen (C++), Numpy, Scipy, Sklearn, Pytorch, Pybullet, Pandas (Python)

OS/Software: Linux, Git, ROS, Gazebo, Solidworks, Windows/MacOS