Phillip Hyatt

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Work Experience / Skills

Research Assistant
Robotics and Dynamics Laboratory (April 2014-Present)

- Authored and co-authored many peer-reviewed publications on models, estimation, and advanced control methods for high degree of freedom robots
- Developed several Model Predictive Control algorithms for high degree of freedom robots as well as comparisons with state of the art optimal control algorithms (iterative LQR, Reinforcement Learning, Dynamic Programming)
- Created modeling and simulation tools, including contact simulation using linear complimentarity constraints.
- Developed Monte Carlo Tree Search based method for multi-robot path planning
- Managed and mentored undergraduate students working on robotics projects
- Gained practical experience with: C++, Python, Matlab, ROS, CUDA, Linux, Model Predictive Control, Optimization, Dynamic System Modeling, Advanced Control Methods, Extended Kalman Filters, Particle Filters, SLAM, Tensorflow, Pytorch

Robotics and Advanced Dynamics Teaching Assistant
Brigham Young University (September 2018-April 2019)

- Received the ME Department Outstanding Graduate TA Award for two consecutive semesters
- Tutored students in concepts related to rigid body kinematics, dynamics and robot control
- Worked with the professor to prepare and administer a practical robotics lab on hardware
- Advised and assisted students in hardware-based projects

Robotics Intern
Draper Laboratories (Summers of 2016 & 2017)

- Worked as part of a team to develop a Convolutional Neural Network capable of recognizing and estimating object poses from RGBD data
- Created an automated data collection and labeling method which doubled the data collection rate
- Developed a Deep Neural Network capable of predicting contact forces given arm state and a given environment
- Gained practical experience with: Pytorch, Tensorflow, Machine Learning, Data collection and Preparation

Education

PhD in Mechanical Engineering / Robotics	Graduation:	June 2020	GPA: 3.68
BS in Mechanical Engineering	Graduation:	April 2016	GPA: 3.64

Relevant University Courses:

Robotics, Robotic Vision, Autonomous Systems, Control Theory, Mechatronics, Advanced Dynamics, Neuromechanics, Deep Neural Networks, Solar System Astronomy, Advanced C++ Programming

Awards

- Utah NASA Space Grant Consortium fellowship - Received a fellowship and renewal for research in high degree of freedom robot control
- Outstanding TA Awards- Recognized twice as Outstanding graduate TA in the ME department based on faculty and student ratings
- Research Presentation Award - Received 2nd Prize in University wide competition for presenting research to a lay audience
- Graduate Research Fellowship - Awarded highest honor offered to graduate students in the Department of Mechanical Engineering
- Graduate Student Society Travel Award - Received compensation for travel to robotics conferences based on quality of previous publications
- Undergraduate Research Grant - Received competitive undergraduate research grant for work in compliant robotic modeling and control

Peer Reviewed Publications

- *Model-based Control of Soft Actuators Using Learned Nonlinear Discrete-time Models; Frontiers in Robotics and AI 2019**
- *Configuration Estimation for Accurate Position Control of Large-Scale Soft Robots; IEEE/ASME Transactions on Mechatronics 2018*
- *Real-Time Evolutionary Model Predictive Control using a Graphics Processing Unit; IEEE Humanoids 2017**
- *A New Soft Robot Control Method: Using Model Predictive Control for a Pneumatically Actuated Humanoid; IEEE Robotics & Automation Magazine 2016*
- *Comparing Model Predictive Control and Input Shaping for Improved Response of Low-Impedance Robots; IEEE Humanoids 2015*

Publications Under Review

- *Multi-Robot Path Planning using Monte Carlo Tree Search**
- *Real-Time Nonlinear Model Predictive Control of Robots using a Graphics Processing Unit**

Publications in Preparation for Submission

- *Parallelized and Parameterized Model Predictive Control for Real-Time Control of High Degree of Freedom Robots**
- *Adaptive Model-Based Control Methods for Large-Scale Soft Robots**

*First author