ROBERT DYRO

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I am deeply committed to advancing the field of autonomous systems and machine learning applications through proven, effective research. My foremost objective is to identify and execute solutions that deliver substantial and meaningful results. I am driven by the pursuit of technical knowledge for real-world applications that push the boundaries of technology.

EDUCATION

Stanford University   Stanford, CA

PhD in Robotics, GPA 3.93   2020 - present

MS in Aeronautics & Astronautics Engineering, GPA 3.89   2018 - 2020

University of California, Los Angeles   Los Angeles, CA

BS in Aerospace Engineering, Minor in Philosophy, GPA 3.94, Summa Cum Laude   2014 - 2018

RELEVANT COURSEWORK

Convex Optimization I & II   ■   Reinforcement Learning   ■   Meta-Learning   ■   Large-scale Matrix Computations
CS 1, 2 & 3 ■ Robot Autonomy ■ Optimal and Learning-based Control ■ Decision Making under Uncertainty ■ Game Theory
Model Reduction   ■   ML with Graphs   ■   ML Theory   ■   Trustworthy & Explainable ML   ■   ML under Distribution Shift

EXPERIENCE

Graduate Student, Autonomous Systems Laboratory (ASL) at Stanford University   Stanford, CA

Stress Testing Autonomous Vehicles via Counterfactual Editing of Trained Behavior Models   2023

  - extracting learned behavior distribution for realistic counterfactual generation via efficient and scalable Hessian sketching

Fast Online Intent Inference in Autonomous Driving   2022

  - developed a fast structured parametric behavior inference method for online behavior identification in autonomous driving

Second-Order Sensitivity Analysis for Bilevel Optimization   2021

  - 2nd order sensitivity analysis of optimization, enabling much faster optimization of bilevel/inverse/sensitivity problems

Control under Arbitrary Uncertainty using Particle Model Predictive Control   2020

  - implemented and experimentally evaluated consensus control particle MPC for control under arbitrary uncertainty

Convex Last-layer Meta-learning for Behavior & Physics-based Modeling   2019

  - incorporated constraints into the meta-learning model for structured learning to allow adding a priori modeling knowledge

PhD Intern, Cruise   San Francisco, CA

Machine Learning Acceleration - Architecture Optimization - Zero-Shot Neural Architecture Search   June - December 2022

Research Intern, Toyota Research Institute   Los Altos, CA

Intelligent Driver Behavior Modeling using Human Interpretable Rules   June - September 2020

  - embedded human logic within path planning using Signal Temporal Logic (STL) to capture human-interpretable specification

Student Researcher, TANMS at UCLA   Los Angeles, CA

Multi-Physics Dynamics Simulation in Computational Multiferroic Systems   2017

TECHNICAL EXPERIENCE

Projects:

- *torch2jax* - zero-overhead PyTorch computation wrapping for JAX computation graph under JIT and autodifferentiation
- automatic short answer grading (NLP) via meta-learning using BERT and T5 NLP models
- from scratch realistic quadratic program solver implementation for CUDA optimizations exploration
- fair and robust machine learning via local explainability enforcement exploiting the LIME technique
- experimental dynamic graph autodifferentiation library for full sparse 1st & 2nd order matrix algebra differentiation
- large-scale parametric evaluation of stochastic control algorithms on a high-performance computing (HPC) *Slurm* cluster
- experimentally evaluated lifted NNs, convex reformulation of deep NNs
- optimal driving and intersection collision avoidance via Monte Carlo Tree Search for partially observable planning
- model-free policy optimization reinforcement learning for drone control
- designed a remote-operated field electrical power system and data acquisition system for student hybrid rocket project
- teaching experience in introduction to computer science for scientific computation (Matlab) & introduction to electronics

Software Skills:

advanced project experience in Python, Julia, C++, C, Matlab   ■   advanced project experience with JAX, PyTorch, TF, ROS
experience with embedded systems, Linux, HPC, Slurm, AWS, Docker, CUDA   ■   working knowledge of Fortran, JavaScript

MISC

Aero & Astro Student Advisory Committee ■ LA Marathon ■ General Ham Radio License ■ PADI Assistant Instructor