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Bassel El Mabsout

PUBLICATIONS

Mabsout B.*, Mysore S.*, Saenko K., Mancuso R. . How to train your quadrotor: A framework for consistently smooth and responsive flight control via reinforcement learning. *ACM Trans. Cyber-Phys. Syst., 5(4)* 2021

Mabsout B.*, Mysore S.*, Saenko K., Mancuso R. . Regularizing Action Policies for Smooth Control with Reinforcement Learning. *ICRA* 2021

Mysore S., Mabsout B., Mancuso R., Saenko K. . Honey. I Shrunk The Actor: A Case Study on Preserving Performance with Smaller Actors in Actor-Critic RL. *IEEE Conference on Games (CoG)* 2021

Mabsout B. . Tree Shaping, a solution to the expression problem showcased via a compiler for a programming language named Puler. *Masters Thesis, Boston University* 2023

ONGOING RESEARCH

Population Descent Submitted
A natural-selection based Memetic algorithm which adaptively controls hyperparameter selection via a normalized fitness function – PREPRINT

Sim2Real Adaptation via Anchored Learning Submitting
Anchors allow for adapting RL-based controllers on the fly while mitigating the issue of catastrophic forgetting. Our method does so by finding controllers which satisfy performance conditions both in simulation and reality – PREPRINT

Safety-critical controller learning Ongoing
We construct learned bounded Lyapunov functions for maintaining safety under a differential equation and on residual dynamics. Adapting controllers to improve the probability of safety and performance in the real world – SOURCE

State-estimation using Gaussian splatting Ongoing
The pose of a quadrotor is estimated by combining Gaussian splatting with an onboard camera feed. Estimation occurs in real-time on the embedded system

Multi-objective RL via generalized-mean scalarization Ongoing
We use the generalized-mean for scalarizing a normalized multi-Q-value function forming a continuous specification in a multi-objective RL setting

PROJECTS

Stochastic dynamics learning *BU/MIT*
Achieving safer learned model-based control requires accurate models, given most real-world systems are stochastic, we built Generative Adversarial Networks which modeling the distribution of the system's trajectories – SOURCE

Honda Ridesharing *SAIL*
In collaboration with BU's SAIL and Honda, we worked on privacy preserving (using MPC) preferential ride-sharing. My responsibilities included defining optimization constraints so users with similar preferences get pooled together

Seizure Prediction *Machine learning -- CS542*
A Kaggle competition project which accurately predicted seizure activity in epileptic patients. Utilizing machine learning techniques, we achieved the highest score with a significant margin (AUC score of 0.92) – PREPRINT

Finding a NASH-ε Equilibrium *Complexity Theory -- CS535*
This term paper simplifies an existing proof of the complexity class specifying the run-time of finding approximate Nash equilibria – PREPRINT

Haskell Blog *Personal Blog*

EDUCATION

MS & PhD 09/2018 --
Boston University

BS 09/2012 -- 05/2015
American University of Beirut

MENTORSHIP EXPERIENCE

RISE – Mentored Abhinav Pomalapally via the RISE program performing research in Gradient-based optimization. This work led to his acceptance to UC Berkeley and produced a paper.

BU Spark – Mentored five students in building a quadrotor for control research. This project evolved into the Gaussian Splatting research work.

CS 654 – Created projects for 24 students mentoring them in work that led to research contributions. They modeled and controlled an AmazingBall System while minimizing the sim2real gap

Efficient RL – Mentored two graduate students in performing power-efficent RL for pedestrian collision avoidance in Carla-sim, balancing cloud and local computation

WORK EXPERIENCE

Scanman *Freelancer* 12/2020 --
Created Scanman, a barcode based inventory tracker acquired by Meathouse to solve long-standing supply chain inefficiencies

Zahera *Cofounder - CTO* 07/2018 -- 09/2022
Zahera is an app-based photo printing service currently installed on > 15000 devices. I worked on designing the products, building and improving the technologies used, and managing 2 developers

AUB *Researcher* 06/2016 -- 08/2018
I wrote neural-swarm, a collection of experimental optimization algorithms for learning decentralized swarm control in Haskell

CCC *Software Developer* 05/2015 -- 05/2017
I worked on the core team of C3D, a leading 3D-based construction project control application. I implemented several key features, optimizations, and bug fixes in the Java based application

SKILLS

PROGRAMMING LANGUAGES *(by familiarity)*	Haskell • Nix • Python • Java • C • Processing • (Java,Type)script • Coq • SQL • Bash • C++ • Elm • C# • F# • ATS • Lean • GLSL • WGSL • Clojure • Matlab
FRAMEWORKS & LIBRARIES	Tensorflow • Pytorch • Keras • Numpy • Scipy • Pandas • Jax • Spinning Up • Pybullet • Gurobi • React-Native • Expo • Megaparsec • Extension-Schemes • Polysemy • Firebase
MARKUP	LaTeX • HTML • CSS • Markdown • XML • Typst
TOOLS	Git • Nix • GNU utils • Makefiles • Soldering

MISC

PEER REVIEWED VENUES	ICLR • ICRA • ROBOT • EMSOFT • COG • DATE • ECRTS • RTSS • TJCA

I created a Haskell blog hosted on IPFS about programming language concepts such as automatic differentiation and dependently typed vector construction which garnered some interest and was featured on Haskell News

PRESENTATIONS WASP • Galois • BU AIR • BU Systems Seminar • HRI-EU • ICRA 2021 • and CoG 2021

NATIONALITIES Lebanese and Portuguese