

Bassel El Mabsout

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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 Pomalappally 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-efficient 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 • Clojure • Matlab
FRAMEWORKS & LIBRARIES	Tensorflow • Pytorch • Keras • Numpy • Scipy • Pandas • Spinning Up • Pybullet • Gurobi • React-Native • Expo • Megaparsec • Extension-Schemes • Polysemy • Firebase
MARKUP TOOLS	LaTeX • HTML • CSS • Markdown • XML Git • Nix • GNU utils • Makefiles • Soldering

MISC

PEER REVIEWED VENUES	ICRA • ROBOT • TJCA • EMFOOT • COG • DATE • ECRTS • RTSS
PRESENTATIONS	WASP • Galois • BU AIR • BU Systems Seminar • HRI-EU • ICRA 2021 • and CoG 2021

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

NATIONALITIES Lebanese and Portuguese