Abdul Rahman Kreidieh

CONTACT INFORMATION

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EDUCATION

University of California, Berkeley (*August 2016 - December 2022*)
- MSc/Ph.D. in CEE Systems Engineering
- Advised by Alexandre M. Bayen
- Area of research: Efficient learning methods in mixed-autonomy traffic
- Courses Taken: Deep Reinforcement Learning; Nonlinear Systems: Analysis, Stability, and Control; Statistical Models: Theory and Application

American University of Beirut (*September 2012 - May 2016*)
- Bachelors in Mechanical Engineering
- Courses Taken: Introduction to Analysis; Computer Vision; Robotics; Electronics; Instrumentation; Control Systems; Dynamic Systems Analysis; Thermodynamics; Fluid Mechanics; Mechanical Design

SKILLS

Computer Skills: Python, Matlab, C++, TensorFlow, PyTorch, Linux, AWS, SQL, Mongo

Languages: Fluent in English and Arabic.

EXPERIENCE

Graduate Student Researcher | UC Berkeley (*May 2017 - December 2022*)
- Developed an open-source framework for running deep reinforcement learning experiments in traffic microscopic simulators, see: https://github.com/flow-project/flow.
- Conducted computational studies validating the efficacy of reinforcement learning techniques in generating meaningful and diverse control strategies for automated vehicles.
- Designed, implemented, and tested hierarchical reinforcement learning algorithms for traffic control and robotics problems, see: https://github.com/AboudyKreidieh/h-baselines.

Research Intern, Smart City AI | Nissan Alliance SV Lab (*September 2021 - December 2021*)
- Designed a framework for macroscopic traffic state estimation via connected vehicles.
- Implemented various traffic state estimators and conducted hyperparameter studies on these estimators to determine the effect of certain features on key performance indicators.
- Created visualization tools for monitoring the aggregate state of traffic in real-time.

Intern - Connected Vehicle Research | Toyota InfoTech Labs (*June 2021 - August 2021*)
- Developed a lightweight tool for validating the performance of different lane assignment strategies in simulations of throughout-restricted traffic.
- Formulated and implemented a multi-level hierarchical control mechanism for cooperative lane change assistance across multiple traffic segments.

Visiting Student Researcher | Glaser Lab, UC Berkeley (*May 2015 - August 2015*)
- Collaborated with a team on designing a communication protocol for wireless, system-level communication of sensors in the Sierra Nevada.
- Programmed an earthquake simulator with LabVIEW to perform position/force PID control tasks and prevent failures and faults.

TEACHING

Course: Deep multi-agent reinforcement learning with applications to autonomous traffic *(Aug–Dec 2018)*
- Developed the course curriculum and prepared homework problems in TensorFlow.
- Provided lectures on various topics in multiagent RL, including non-stationary, communication, and its connections to hierarchical RL.
- Supervised and guided students through their semester-long projects.

Course: Introduction to Computer Programming for Scientists and Engineers *(Jan–May 2017)*
- Led lab sessions consisting of around 20 students and mentored them through their development.
- Formulated homework and exam problems in Matlab.

SELECTED PUBLICATIONS

Flow: A Modular Learning Framework for Mixed Autonomy Traffic. *IEEE Transactions on Robotics* (2021).

Inter-Level Cooperation in Hierarchical Reinforcement Learning. arXiv preprint arXiv:1912.02368 (2019).

Emergent Behaviors in Mixed-Autonomy Traffic. *Conference on Robot Learning* (2017).

Awards and Achievements

AWS Machine Learning Research Award (*2017, 2019*)

2019 Summer Fellow UC Berkeley, CEE Department (*April 2019*)

Outstanding Graduate Student Award UC Berkeley, Institute of Transportation Studies (*December 2018*)

Siemens Future Makers Challenge Placed 3rd (*April 2018*)

Jane Lewis Fellowship UC Berkeley, Graduate Division (*Fall 2016 - Spring 2017*)

Dean's Honor List Faculty of Engineering and Architecture, AUB (*2012 - 2016*)

Volunteer Work

STEM Outreach Visit (*July 2019*)

- Prepared and hosted a tour of four research labs within UC Berkeley to a group of high school students.

Lebanese Red Cross, Youth Department (*August 2011 - March 2013*)

- Assisted with workshops in schools, environmental awareness projects, and various other activities.
- Organized the center's inventory and prepared an inventory list.