Abdul Rahman Kreidieh

CONTACT
INFORMATION

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EDUCATION

University of California, Berkeley (*August 2016 - present*)
- MSc/PhD in CEE Systems Engineering
- Advised by Alexandre M. Bayen
- Area of research: Applications of deep reinforcement learning (RL) to mixed-autonomy traffic control
- 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: Intro to Analysis; Computer Vision; Robotics; Electronics; Instrumentation; Control Systems; Dynamic Systems Analysis; Thermodynamics; Fluid Mechanics; Mechanical Design

SKILLS

Computer Skills: Expert: Python, TensorFlow, Linux — Proficient: C++, Matlab, AWS, SQL, Mongo

Languages: Fluent in English and Arabic.

EXPERIENCE

Graduate Student Researcher | UC Berkeley (*May 2017 - present*)
- Developing an open-source computational framework for running deep reinforcement learning experiments in traffic microscopic simulators, see: https://github.com/flow-project/flow.
- Utilizing reinforcement learning to generate meaningful control strategies for automated vehicles.
- Designing, implementing, and testing 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 V2V communication and macroscopic traffic state estimation on the cloud.
- Implemented various traffic state estimators, and conducted hyperparameter studies on these estimators to determine the effect of certain features on key performance indicators (KPIs).
- Developed visualization tools for monitor the state of traffic in real time.

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

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

TEACHING

Course: Deep multi-agent reinforcement learning with applications to autonomous traffic *(Aug−Dec 2018)*
- Developed the course curriculum and designed homework problems in TensorFlow.
- Provided lectures on various topics in multiagent RL, including non-stationary, communication, and its connections to hierarchical RL.
- 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 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).

Dissipating stop-and-go waves in closed and open networks via deep reinforcement learning. *IEEE International Conference on Intelligent Transportation Systems* (2018).

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.