Ramón Darío Iglesias

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Education

Stanford University **01/2016-06/2019 (expected)**
Ph.D. at the Autonomous Systems Laboratory
Advisor: Marco Pavone
Focus: Optimal Control of Autonomous Fleets.

Stanford University **09/2012-06/2014**
M.S. in Civil Engineering
Focus: Data Analysis and Optimization.

The University of Texas at Austin **08/2007-06/2012**
B.S. in Civil Engineering

Recent Experience

Lyft Inc., San Francisco, CA **6/2018-9/2018**
Research Science Intern
Worked on improving the performance of Lyft's self-driving pilot:

- Developed an algorithm that leverages demand forecasts and stochastic programming to optimize self-driving fleet movements in real-time. Simulation results show significant improvements in pickup time when compared to human drivers.
- Performed steady-state analyses to characterize upper bound (using network flows) and expected improvements (using queueing theory) based on historical data. This along with power analyses allowed us to design experiments in production.
- Deployed the prepositioning algorithm to a self-driving pilot in Las Vegas as part of an A/B test to understand the impact of prepositioning in ridesharing fleets.

Stanford University, Stanford, CA **1/2016-Present**
Researcher
Devising methods to model and control large fleets of autonomous vehicles (Autonomous Mobility-on-Demand, or AMoD):

- Developed a queueing-theoretical framework to characterize AMoD systems under heterogeneous constraints (e.g. road congestion, battery charging) that is amenable to optimization by casting it as a linear program [6, 4].
- Leveraged network flow theory to optimize the interaction between autonomous, electric fleets and the power grid [3, 2].
- Devised and trained recurrent neural networks to predict short-term travel demand and developed a stochastic model predictive controller that leverages these forecasts to operate in real-time large fleets of autonomous vehicles [5, 1].
- Collaborated with Toyota to implement vehicle relocation algorithms in their carsharing system, Ha:mo, in Japan. Developed a web application (React frontend, Python backend) that allows human operators to visualize the current and forecasted state of the system as well as receive rebalancing tasks that optimize for vehicle availability.

Side projects in representation learning:

- Investigated the impact of multi-task learning on the learned representations of convolutional neural networks. Results show increased predictive power with respect to representations observed in the Inferior Temporal (IT) cortex of primates.
- Developing deep learning methods to learn embedded, controllable representations of nonlinear systems from high-dimensional observations.

SunPower, Richmond, CA **01/2015-01/2016**
Software Engineer
Architected and developed software for the Financial Products team:

- Built a new pricing engine (Python backend), reducing the cost by 80% and the response time by 90%.
- Developed an internal data processing web application to run and visualize complex financial analyses (Python backend, Angular frontend).
- Built the continuous integration pipeline (Docker, Salt, git) for the Financial Products team allowing for faster and safer developing iterations.

Stanford University, Stanford, CA **10/2013-12/2014**
Researcher
Developed methods to optimize wind farm contractors operational costs:

- Built Markov chain models to forecast the expected number of days lost due to high winds by month and the best hours of the day to work each month using historical wind speed measurements and numerical weather prediction models.
- Developed a data processing and optimization pipeline for converting GIS files of wind farms into optimal erection schedules. It consists of parsing the input files into a weighted graph and solving the crane schedule as a Traveling Salesman Problem.
- Built a web application (Angular frontend, Python backend) for wind farm contractors to leverage the wind forecasting and crane scheduling models to make better decisions on the design and construction schedule of the wind farm.

Skills

Software: Python (Numpy, Pandas, Tensorflow, PyTorch, Flask), Javascript (React, AngularJS, D3, Leaflet), R; AWS, Spark, Git, Docker, CircleCI, PostgreSQL, LaTeX

Coursework: Machine Learning, Data Mining, Decision Making under Uncertainty, Optimization, Deep Learning, Data Visualization, Optimal Control, State Estimation, Web Development

Publications

[1] M. Tsao, R. Iglesias, and M. Pavone. Stochastic model predictive control for Autonomous Mobility on Demand. In *Proc. IEEE Int. Conf. on Intelligent Transportation Systems*, 2018. In Press.

[2] F. Rossi, R. Iglesias, M. Alizadeh, and M. Pavone. On the interaction between Autonomous Mobility-on-Demand systems and the power network: Models and coordination algorithms. *IEEE Transactions on Control of Network Systems*, 2018. Submitted.

[3] F. Rossi, R. Iglesias, M. Alizadeh, and M. Pavone. On the interaction between Autonomous Mobility-on-Demand systems and the power network: Models and coordination algorithms. In *Robotics: Science and Systems*, 2018.

[4] R. Iglesias, F. Rossi, R. Zhang, and M. Pavone. A BCMP network approach to modeling and controlling autonomous mobility-on-demand systems. *Int. Journal of Robotics Research*, 2018.

[5] R. Iglesias, F. Rossi, K. Wang, D. Hallac, J. Leskovec, and M. Pavone. Data-driven model predictive control of Autonomous Mobility-on-Demand Systems. In *Proc. IEEE Conf. on Robotics and Automation*, 2018.

[6] R. Iglesias, F. Rossi, R. Zhang, and M. Pavone. A BCMP network approach to modeling and controlling Autonomous Mobility-on-Demand systems. In *Workshop on Algorithmic Foundations of Robotics*, 2016.