Daniele Gammelli

Engineer with a passion for learning-theory, mathematics, statistics and computer science. Enthusiast about exploring AI in the advancement towards reliable autonomy.

Email: gammelli@stanford.edu
Github: https://github.com/DanieleGammelli
Office: Durand 009, Stanford, CA

Education

Technical University of Denmark, DTU Management, Kgs. Lyngby, Denmark
Ph.D. in Machine Learning and Operations Research. Advisor: Francisco C. Pereira. Fall 2022.

Sapienza University of Rome, Rome, Italy
MSc in Management Engineering - Applied Mathematics (Honours). 2018
BSc in Management Engineering. 2016

Experience

Stanford University, Postdoctoral Researcher, Current
Advisor: Marco Pavone
Developing methodologies for the analysis, design and control of autonomous systems, with a particular emphasis on large-scale robotic networks and autonomous aerospace vehicles.

Technical University of Denmark, Graduate Researcher, Jan 2019 - Sep 2022
Advisor: Francisco C. Pereira
Working on developing probabilistic models at the intersection of perception, prediction and control within intelligent transportation systems.

Stanford University, Visiting Researcher, Oct 2021 - Mar 2022
Advisor: Marco Pavone
Working on learning-based control strategies for the dynamic control of autonomous mobility-on-demand systems.

Amazon EU, Mathematical Optimization Intern, Aug 2018 - Jan 2019
Designed and implemented deep learning architectures for shipping volume forecasting in warehouses across Europe. The project was recognized with Amazon's "**Door Desk Award**"

Insitutional Responsibilities

Research Fellow, Center for Aerospace Autonomy Research (CAESAR) at Stanford, 2023-Current

Selected Papers in Preparation

16. Structured Policies in Reinforcement Learning and Control.

Daniele Gammelli, James Harrison, Sumeet Singh, Carolin Samantha Schmidt, Thomas Lew, Justin Luke, Karthik Gopalakrishnan, Filipe Rodrigues, Marco Pavone.

15. Transformers for Trajectory Optimization.

    Daniele Gammelli, Davide Celestini, Tommaso Guffanti, Marco Pavone, Simone D'Amico.

14. Offline Reinforcement Learning for Network Optimization via Bi-Level Policies.

    Carolin Samantha Schmidt, Daniele Gammelli, James Harrison, Marco Pavone, Francisco C. Pereira, Filipe Rodrigues.

13. Graph Learning for Transferable Traffic Flow Prediction.

    Mohamed Eldafrawi, Daniele Gammelli, Francisco C. Pereira, Guido Gentile.

Preprints and Papers Under Review

12. Real-time Control of Electric Autonomous Mobility-on-Demand Systems via Graph Reinforcement Learning.

    Aaryan Singhal, Daniele Gammelli, Justin Luke, Karthik Gopalakrishnan, Dominik Helmreich, Marco Pavone.

    Under Review at European Control Conference (ECC), 2024.

11. Learning to Control Autonomous Fleets from Observation via Offline Reinforcement Learning.

    Carolin Samantha Schmidt, Daniele Gammelli, Francisco C. Pereira, Filipe Rodrigues.

    Under Review at European Control Conference (ECC), 2024.

Publications[1]

10. Transformers for Trajectory Optimization with Application to Spacecraft Rendezvous

    Tommaso Guffanti*, Daniele Gammelli*, Simone D'Amico, Marco Pavone.

    IEEE Aerospace Conference, 2024.

9. Graph Reinforcement Learning for Network Control via Bi-Level Optimization.

   Daniele Gammelli, Kaidi Yang, James Harrison, Marco Pavone, Filipe Rodrigus, Francisco C. Pereira.

   International Conference on Machine Learning (ICML), 2023.

   Learning on Graphs Conference, 2023.

8. Graph Meta-Reinforcement Learning for Transferable Autonomous Mobility-on-Demand.

   Daniele Gammelli, Kaidi Yang, James Harrison, Filipe Rodrigues, Francisco C. Pereira, Marco Pavone.

   ACM SIGKDD Conference on Knowledge Discovery and Data Mining, 2022 (**Oral**).

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[1]Google Scholar: `https://scholar.google.com/citations?user=C9ZbB3cAAAAJ&hl=en`

7. Recurrent Flow Networks: A Recurrent Latent Variable Model for Density Modelling of Urban Mobility.

Daniele Gammelli, Filipe Rodrigues.

Pattern Recognition, 2022.

ICML Workshop on Invertible Neural Networks and Learning Systems, 2021.

6. Generalized Multi-Output Gaussian Process Censored Regression.

Daniele Gammelli, Kasper Pryds Rolsted, Dario Pacino, Rodrigues Filipe.

Pattern Recognition, 2022.

5. Graph Neural Network Reinforcement Learning for Autonomous Mobility-on-Demand Systems.

Daniele Gammelli, Kaidi Yang, James Harrison, Filipe Rodrigues, Francisco C. Pereira, Marco Pavone.

IEEE Conference on Decision and Control (CDC), 2021.

ICML Workshop on Reinforcement Learning for Real Life, 2021. **Best paper candidate**

4. Predictive and Prescriptive Performance of Bike-Sharing Demand Forecasts for Inventory Management.

Daniele Gammelli, Yihua Wang, Dennis Prak, Filipe Rodrigues, Stefan Minner, Francisco C. Pereira.

Transportation Research Part C: Emerging Technologies, 2021.

3. Estimating Latent Demand of Shared Mobility through Censored Gaussian Processes.

Daniele Gammelli, Inon Peled, Filipe Rodrigues, Dario Pacino, Haci A. Kurtaran, Francisco C. Pereira.

Transportation Research Part C: Emerging Technologies, 2020.

2. Considering Patient Clinical History Impacts Performance of Machine Learning Models in Predicting Course of Multiple Sclerosis.

Ruggiero Seccia, Daniele Gammelli, Fabio Dominici, Silvia Romano, Anna Chiara Landi, Marco Salvetti, Andrea Tacchella, Andrea Zaccaria, Andrea Crisanti, Francesca Grassi, Laura Palagi.

Plos One, 2020.

1. A Machine Learning Approach to Censored Bike Sharing Demand Modeling.

Daniele Gammelli, Inon Peled, Filipe Rodrigues, Dario Pacino, Haci A. Kurtaran, Francisco C. Pereira.

Transportation Research Board Annual Meeting, 2020. **Lectern session**

Books and Theses

2. Optimal and Learning-based Control.
   James Harrison, Daniele Gammelli, Spencer Richards, Edward Schmerling, Marco Pavone.
   In Progress.

1. Learning and Control for Adaptive Transportation Systems.
   Daniele Gammelli.
   PhD Thesis, Technical University of Denmark, 2022.

Other Dissemination

Data Skeptic Podcast, Spotify, December 2021
In the episode, we talk about the opportunities and challenges in the use of machine learning for intelligent transportation systems.

https://open.spotify.com/episode/danielegammelli

Teaching

Stanford AA203: Optimal and Learning-Based Control
Principal Instructor (Spring 2023).
Co-designed a new course on optimal control and reinforcement learning. Lectured, wrote course notes, supervised projects, and held office hours.

DTU 42186: Model-Based Machine Learning
Teaching Assistant (Spring 2020, 2021).
Probabilistic Graphical Models, Bayesian inference, Probabilistic programming (Pyro + PyTorch & STAN).

DTU 02456: Deep Learning
Project Supervisor (Winter 2019, 2020).
Projects including, but not limited to: Normalizing Flows, Neural Attention Models, Mixture Density Networks, Convolutional LSTMs, VAEs, Deep Kalman Filters, Bayesian Deep Learning.

Guest Lectures:
Center for Automotive Research at Stanford (CARS) - Tutorial on Graph Reinforcement Learning: RL, Graph Neural Networks and Applications to Mobility (link)

Service

Program Committee:
Workshop on Bridging Learning and Algorithmic Fairness in the Operation of Urban Infrastructure and Network Systems (Conference on Cyber-Physical Systems and the Internet-of-Things, San Antonio, Texas, 2023)

Conference Reviewing:
International Conference on Machine Learning (ICML)

Conference on Neural Information Processing Systems (NeurIPS)
International Conference on Learning Representations (ICLR)
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
IEEE International Conference on Robotics and Automation (ICRA)
European Control Conference (ECC)
IEEE International Conference on Intelligent Transportation Systems (ITSC)
Transportation Research Board Annual Meeting (TRB)

Journal Reviewing:
Journal of Machine Learning Research (JMLR)
IEEE Transactions on Robotics (T-RO)
International Journal of Forecasting
Statistics and Computing
Journal of Guidance, Control, and Dynamics
Transportation Research Part C: Emerging Technologies
Transportation Research Part B: Methodological
IEEE Transactions on Intelligent Transportation Systems
Transportation (PORT)
Cities

Supervision and Mentoring

PhD Advisor:
Carolin Samantha Schmidt (DTU - Management Engineering), 2023-Current

Research Mentor:
Michelle Ho (PhD; Stanford AA), 2023-Current
Davide Celestini (PhD; Politecnico di Torino), 2023-Current
Aaryan Singhal (BSc; Stanford CS - AI & Systems), 2023-Current
Benedikt Schesch (MSc; ETH - Computer Science), 2023-Current
Connie Liou (PhD; Stanford AA), 2023
Peter Mørch (MSc; DTU - Applied Mathematics and Computer Science), 2022
Marco Enzo Squillacioti (MSc; DTU - Applied Mathematics and Computer Science), 2022
Aikaterini Antonoudi (MSc; DTU - Management Engineering), 2021
Andreas Arambatzis (MSc; DTU - Management Engineering), 2021
Tobias Gylling Konradsen (MSc; DTU - Applied Mathematics and Computer Science), 2021
Christian Dandanell Glissov (MSc; DTU - Applied Mathematics and Computer Science), 2021
Mathias Niemann Tygesen (MSc; DTU - Applied Mathematics and Computer Science), 2020
Kasper Pryds Rolsted (MSc; DTU - Applied Mathematics and Computer Science), 2020
Nikolaos Nakis (MSc; DTU - Applied Mathematics and Computer Science), 2020

Outreach:
Mentor for the Ignited Fellowship, 2023-Current: provide mentorship for high-school teachers with full-time summer fellowships, with the goal of bringing modern and engaging real-world examples to the classroom.
Ardsher Ahmed - High School Teacher, Greenfield High School, Greenfield, CA

Industry & Start-ups:

Locago - Technical Advisor, 2023-Current: provide technical mentorship focusing on developing AI/ML algorithms for the optimal control and rebalancing of shared micro-mobility systems.

Honors and Awards

Kaj and Hermilla Ostenfeld's Excellence Research Fund
Ottomønsted Research Fund
IDELLA Foundation Research Grant
Reinholdt W. Jorck og Hustrus Fond