

Cédric Rommel

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Research Interests

Deep learning, data augmentation, invariance/equivariance learning, neuroscience, ML for signal processing, representation learning, interpretable ML, model-based reinforcement learning, optimization, ...

Education

INRIA, École Polytechnique (CMAP)

Paris, France

PHD IN MACHINE LEARNING AND OPTIMAL CONTROL

Nov. 2015 - Oct. 2018

Data analysis for aircraft trajectory optimization

Supervised by Frédéric Bonnans and Pierre Martinon, from the COMMANDS team.

CIFRE funding by company Safety Line.

MINES ParisTech

Paris, France

MASTER OF SCIENCE AND ENGINEERING

Sep. 2011 - Jun. 2015

Mathematics, Statistics, Control Theory, Optimization, Signal Processing, Software Engineering.

Experience

INRIA - Parietal team

Paris, France

POSTDOCTORAL RESEARCHER - ADVISED BY ALEXANDRE GRAMFORT AND THOMAS MOREAU

Dec. 2020 - Today

- Research in the field of automatic data augmentation, invariance learning and deep learning for computational neuroscience.
- Contribution to open-source libraries: **skorch**, **braindecode**.
- Creation of automatic data augmentation open-source library (*to be released*)
- Co-supervision of a 6-month internship.

MINES ParisTech

Paris, France

TEACHING ASSISTANT

Nov. - Dec. 2020

Introduction to machine learning for master students (with Prof. Chloé-Agathe Azencott)

Ava Accessibility

Paris, France

CHIEF SCIENTIST - HEAD OF AI

Nov. 2018 - Dec. 2020

- Technical & scientific lead of the AI team (3 to 5), in charge of the company's AI strategy, team management, hiring and collaborations.
- Original research in deep learning for speech processing with applications for deaf and hard-of-hearing accessibility (real-time open set speaker recognition and diarization, contrastive metric learning, online clustering, ...).
- Design data acquisition and preprocessing pipelines, to create relevant in-house datasets for models training.
- Design, implementation, training, deployment and monitoring of AI models.

INRIA, Safety Line

Paris, France

MACHINE LEARNING RESEARCHER (*PhD Candidate*)

Nov. 2015 - Oct. 2018

- Explored how to leverage available historical flight data from black-boxes to plan more fuel efficient trajectories.
- Designed interpretable and physically consistent statistical models of dynamical systems, as well as techniques to control them safely.
- Research in model-based offline reinforcement learning, functional data density estimation, multi-task learning and feature selection.
- Implemented models into python packages used in the commercial product OptiClimb to deliver efficient trajectories to airliners.

Reviewing duties

NeurIPS 2019/2020/2021, ICML 2020/2021/2022, ICLR 2022, JBHI

Skills

Proficient in: Python, Git, LaTeX

Machine Learning: Pytorch, Tensorflow, scikit-learn

Notions of: NodeJS, C++

Fluent in: French, Portuguese, English, Spanish

Publications and pre-prints

- **Cédric Rommel**, Thomas Moreau, and Alexandre Gramfort. Deep invariant networks with differentiable augmentation layers. *Under review*, 2022
- **Cédric Rommel**, Joseph Paillard, Thomas Moreau, and Alexandre Gramfort. Data augmentation for learning predictive models on EEG: a systematic comparison. *Under review*, 2022
- **Cédric Rommel**, Thomas Moreau, Joseph Paillard, and Alexandre Gramfort. CADDA: Class-wise Automatic Differentiable Data Augmentation for EEG Signals. In *International Conference on Learning Representations (ICLR)*, 2022
- **Cédric Rommel**, Frédéric Bonnans, Baptiste Gregorutti, and Pierre Martinon. Quantifying the Closeness to a Set of Random Curves via the Mean Marginal Likelihood. *ESAIM: Probability and Statistics*, 2021
- **Cédric Rommel**, Frédéric Bonnans, Pierre Martinon, and Baptiste Gregorutti. Gaussian mixture penalty for trajectory optimization problems. *Journal of Guidance, Control, and Dynamics*, 42(8):1857–1862, 2019
- **Cédric Rommel**. *Data analysis for aircraft trajectory optimization*. PhD thesis, Université Paris-Saclay, École Polytechnique, INRIA, 2018
- **Cédric Rommel**, Frédéric Bonnans, Baptiste Gregorutti, and Pierre Martinon. Structured Feature Selection of Continuous Dynamical Systems for Aircraft Dynamics Identification. *HAL*, 2018
- **Cédric Rommel**, Frédéric Bonnans, Baptiste Gregorutti, and Pierre Martinon. Block sparse linear models for learning structured dynamical systems in aeronautics. *HAL*, 2018
- **Cédric Rommel**, Frédéric Bonnans, Baptiste Gregorutti, and Pierre Martinon. Aircraft Dynamics Identification for Optimal Control. In *7th European Conference for Aeronautics and Space Sciences*, 2017