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 Candiate*) *Nov. 2015 - Oct. 2018*

- Explored how to leverage available historical flight data from black-boxes to plan more fuel efficient trajectories.
- Designed iterpretable 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

Notions of: NodeJS, C++

Machine Learning: Pytorch, Tensorflow, scikit-learn

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
- Joseph Paillard, **C. Rommel**, 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