Quentin Bertrand

Education

2018–2021 **PhD in Computer Science**, *Inria*, Saclay.

2017–2018 **MS in Computer Science**, *École Normale Supérieure*, Cachan.

2014–2017 **BS and MS in Engineering**, *École polytechnique*, Palaiseau.

Research highlights

I am currently a third year Ph.D. student in statistics and optimization under the supervision of Joseph Salmon and Alexandre Gramfort (core scikit-learn contributor). I work on model calibration for high dimensional sparse linear regression applied to brain signals reconstruction:

- Coordinate descent algorithms:
  - Proposed Anderson extrapolation to accelerate coordinate descent algorithms [1].
  - Showed support identification and local linear convergence of coordinate descent [2].
- Model calibration as a hyperparameter optimization problem:
  - Developed algorithms for fast hyperparameter optimization of Lasso-type models [3].
  - We are pushing this project further with a high quality implementation.
- Model calibration as a statistical problem:
  - Theoretically studied the statistical influence of smoothing parameters for the *square-root Lasso* and the *multivariate square-root Lasso* [4].
  - Formulated optimization problems to handle sparse linear regression with correlated noise as smoothing-based optimization problems, [5], code.

Work Experience

2017 **Stanford Research Institute**, *Research Intern*, Menlo Park, CA.

- Worked on the DARPA project Probabilistic Programming for Advanced Machine Learning.
- Developed and implemented new algorithms to compute exact bounds in graphical models.

References

[1] **Q. Bertrand** ; M. Massias: Anderson acceleration of coordinate descent. In: *arXiv preprint arXiv:2011.10065* (2020)

[2] Q. Klopfenstein* ; **Q. Bertrand*** ; A. Gramfort ; J. Salmon ; S. Vaiter: Model identification and local linear convergence of coordinate descent. In: *arXiv preprint arXiv:2010.11825* (2020)

[3] **Q. Bertrand*** ; Q. Klopfenstein* ; M. Blondel ; S. Vaiter ; A. Gramfort ; J. Salmon: Implicit differentiation of Lasso-type models for hyperparameter optimization. In: *ICML* (2020)

[4] M. Massias* ; **Q. Bertrand*** ; A. Gramfort ; J. Salmon: Support recovery and sup-norm convergence rates for sparse pivotal estimation. In: *AISTATS* (2020)

[5] **Q. Bertrand*** ; M. Massias* ; A. Gramfort ; J. Salmon: Handling correlated and repeated measurements with the smoothed multivariate square-root Lasso. In: *NeurIPS* (2019)

Teaching

2020-2021 Python for Data Science, MS X-HEC.

2019-2021 Optimization for Data Science, MS Data Science, Prof.: A. Gramfort and R. Gower.

2019-2020 Numerical Methods and Applications, BS ENSAE, Prof: S. M. Kaber.

Awards

2019 NeurIPS travel award, I was awarded a grant from GDRIA to visit Samuel Vaiter.

Miscellaneous

On my free time I like to swim and to play chess (2200 elo).