Florentin Coeurdoux

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Education

INP (Institut National Polytechnique) — Toulouse, France
Ph.D. in Applied Mathematics and Statistics — *Nov 2020 – Dec 2023 (Expected)*

- Conducted impactful research applying machine learning and sampling algorithms to intricate statistical inference problems, resulting in **6 first-author publications in top-tier journals and conferences**. Passionately led research, guided interns, delivered educational lectures, and shared findings in global seminars and conferences.

ENSAI (Ecole Nationale de la Statistique et de l'Analyse de l'Information) — Rennes, France
M.Sc. in Applied Mathematics and Statistics; ***Valedictorian - GPA 3.9/4*** — *Sep 2015 – Sept 2019*

Work Experience

Oxford University — Oxford, UK
Visiting Research Scientist (alongside PhD) — *Nov 2022 – Apr 2023*

- Conceptualize Monte Carlo algorithm for black-hole images yielding the most accurate reconstruction so far.
- Implement parallel multi-GPU Monte Carlo and deep learnig methods using Python, MPI and Cuda.
- Collaborate with world-class scientists, fostering cross-disciplinary knowledge exchange and contributing to joint research papers.

AssessFirst — Paris, France
Head of Data Science (alongside PhD) — *Dec 2021 – Nov 2022*

- Lead all Data Science initiative at AssessFirst and set the AI/ML roadmap for the company.
- Conceptualize variational optimization algorithm served to 100k users, accelerating inference by 30%.
- Developed distributed NLP, cutting processing time by 40%, enabling swift analysis of large datasets.
- Oversaw server-side Python code-base refactoring, boosting code quality and reducing system errors by 20%.
- Designed hiring statistical pattern dectection algorithm, securing 1.1M€ contract with 2024 JO committee.

Credit Mutuel Arkéa — Rennes, France
Quantitative Developer — *Apr 2019 – Nov 2020*

- Developed multivariate time series forecasting algorithm to signal overdraft risk, used daily by 1.2 million users.
- Migrated the vanilla and exotic option pricing codebase from VBA to C++, resulting in a 25% reduction in execution time and 11% improved accuracy thanks to a better suited importance sampling agorithm.
- Created a dynamic budget allocation system with deep reinforcement learning using Pytorch.
- Designed and automated high-level SQL queries using advanced data analysis techniques to generate reports.

Beaumanoir Group — Saint-Malo, France
Data Engineer (Intern) — *May 2018 – Aug 2018*

- Automated ETL processes and updated data streamlining processes, resulting in a 25% redundancy reduction.
- Setting up a Microsoft Azure Data Lake to manage vast datasets, optimizing accessibility and scalability.

Projects

Solar Energy Prediction for Total Energy | *GitHub*

- Implementation of an LSTM model with PyTorch to predict solar panel energy production analyzing images from a sky camera, solar panel internal sensors and weather data.

Plane Spotter for Vinci Airport | *GitHub*

- Detect and classify aircrafts according to their brand, model, and airline using video streams from cameras in an airport apron. CNN Based model trained with Tensor Flow deployed on a Docker Container.

Hackathon Winner (La Nuit de l'Info)

- Create a real-time weather dashboard using C++ that fetches weather data from a public API and displays it in a user-friendly graphical interface.

Skills

Programming: Python, C++, C, R, Matlab, LaTeX, VBA.

Technologies: Docker, Git, Linux, AWS, SQL, Distributed System, openMP, MPI.

Languages: French (Native), English (Fluent), German (Elementary).

Publications

- **F. Coeurdoux**, N. Dobigeon, P. Chainais, "Split Gibs Plug-and-Play Sampler: Diffusion Models for inverse problem". In 1st round of review, *IEEE Transactions on Signal Processing*.
- **F. Coeurdoux**, N. Dobigeon, P. Chainais, "Normalizing flow sampling with Langevin dynamics in the latent space". In 1st round of review, *Journal of Machine Learning Research*.
- **F. Coeurdoux**, N. Dobigeon, P. Chainais, "Learning optimal transport between two empirical distributions with normalizing flows", *European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML-PKDD)*, Grenoble, France, 2022.
- **F. Coeurdoux**, N. Dobigeon, P. Chainais, "Sliced-Wasserstein normalizing flows: beyond maximum likelihood training", *European Symposium on Artificial Neural Networks (ESANN)*, Bruges, Belgium, 2022.
- **F. Coeurdoux**, N. Dobigeon, P. Chainais, "Méthode MCMC plug-and-play avec a priori génératif profond", *Colloque GRETSI*, Grenoble, France, 2023.
- **F. Coeurdoux**, N. Dobigeon, P. Chainais, "Approximation du transport optimal entre distributions empiriques par flux de normalisation", *Colloque GRETSI*, Nancy, France, 2022.

Invited talks

- Workshop : *Geostatistics Days*, "Solving Inverse Problem with deep learning", Mines Paris PSL, Sept 2023.
- Seminar : *IOP seminar*, "Split Gibs Plug-and-Play Sampler: Diffusion Models for inverse problem", University of Bordeaux, May 2023.
- Workshop : *Interfacing Bayesian statistics and machine learning*, "Langevin based Normalizing flow sampling", Bayes Centre, Edinburgh, Jan 2023.
- Seminar : *D^2 Reading Group*, "Normalizing flow sampling with Langevin dynamics in the latent space", Oxford University, Dec 2022.
- Seminar : *SC Seminar*, "Diffusion based model, stochastic optimal transport", IRIT, Sept 2022.
- Seminar : *CRIStAL Seminar*, "Learning optimal transport between two empirical distributions with normalizing flows", Centrale de Lille, Oct 2022.

Teaching

- Convex optimization - INP-ENSEEIHT (Toulouse, France)
- Probability - INP-ENSEEIHT (Toulouse, France)
- Statistics - INP-ENSEEIHT (Toulouse, France)
- Algorithms and C++ Programming - INP-ENSEEIHT (Toulouse, France)
- Lebesgue integration - INP-ENSEEIHT (Toulouse, France)

References

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