

Tanguy Lefort

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GitHub: tanglef

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Ph.D student in machine learning: expertise in deep-learning and crowdsourcing

Experience

Ph.D Student

IMAG, University of Montpellier and INRIA Montpellier, France

10/2021 – Present

- **Supervisors:** Benjamin Charlier (CNRS), Alexis Joly (INRIA) and, Joseph Salmon (CNRS)
- **Research Focus:** Noisy labels in crowdsourced classification datasets with expert feedback
- Identify data ambiguity in cooperative annotation datasets using neural networks margins
- Standardized framework in a Python library: `peerannot` (<https://peerannot.github.io/>)
- Compare crowdsourcing aggregation strategies in a high class and large number of workers real dataset with `Pl@ntNet`

Intern

IMAG, Montpellier, France

03/2021 – 08/2021

- Master's thesis on High dimensional optimization for penalized linear models with interactions
- **Supervisors:** Benjamin Charlier and Joseph Salmon
- Benchmark descent methods for linear models with L1 and L2 penalties and first-order interactions
- Applied strategies for GPU acceleration and applied them to genomics datasets

IMAG, Montpellier, France

07/2020 – 08/2020

- Contributed to the `PyKeOps` library under the supervision of Benjamin Charlier
- Rewrote Scipy's Fortran conjugate gradient routine for symbolic matrices in `PyKeOps`
- Benchmarked Ridge-Tikhonov regularization and worked on optimal transport problems

Education

Master Biostatistics, Montpellier, France

2019–2021

- Theoretical and applied statistics and probabilities
- Classification algorithms, survival analysis, and modelization of populations

Bachelor in mathematics, Dijon, France

2016–2019

- Bachelor with honors, specialized in applied mathematics
- Final project on skeletonization algorithm for gamma-ray surgery

Publications

Journal

- *Peerannot: classification for crowdsourced image datasets with Python* in **Computo** by T. Lefort, B. Charlier, A. Joly and J. Salmon in **Computo** 2024
- *Identify ambiguous tasks combining crowdsourced labels by weighting Areas Under the Margin* in **TMLR** by T. Lefort, B. Charlier, A. Joly and J. Salmon 2024

In Proceedings of Conferences

- (Under review) *Weighted majority vote using Shapley values in crowdsourcing* by T. Lefort, B. Charlier, A. Joly and J. Salmon 2024
- *Cooperative learning of Pl@ntNet's Artificial Intelligence algorithm using label aggregation* in Journées des statistiques de France by T. Lefort, A. Affouard, , B. Charlier, J. Salmon, P. Bonnet and A. Joly 2024
- *Weighting areas under the margin in crowdsourced datasets* in Journées des statistiques de France by T. Lefort, B. Charlier, A. Joly and J. Salmon 2023
- *Crowdsourcing label noise simulation on image classification tasks* in Journées des statistiques de France by T. Lefort, B. Charlier, A. Joly and J. Salmon 2022
- *Benchopt: Reproducible, efficient and collaborative optimization benchmarks* in **NeurIPS 2022** by T. Moreau, M. Massias et. al 2022

Other involvements

Open source library contributions

- Lead developer of the Peerannot library for handling crowdsourced datasets in image classification
- Developer on the BenchOpt library for reproducible benchmarks in optimization problems

Community services

- Reviewer for *Computo* journal 2023 – Current
- Co-organizer of the Ph.D seminar at IMAG, University of Montpellier 2022–2023

Teaching

- Co-advisor of Guillaume Demoor (Mines Alès) with F-D. Collin and G. Durif, Master's internship of 4 months on *Converting math formula images to LaTeX encoding with machine learning* 2024
- Advisor of 4 master students in the creation of a data visualization workshop on genomics data at the Montpellier Omics Days conference 2023
- TA for Convex Optimization to undergraduate mathematics students 2021–2023
- TA for a first-year biology course covering mathematical concepts 2021–2023
- TA for mathematical undergraduates covering logic and proof techniques 2023
- TA for second year undergraduates in chemistry: linear algebra, derivation and integration 2023

Talks

- *Apprentissage collaboratif d'espèces de plantes et agrégation de labels dans Pl@ntNet*, IA-ECO seminar, UMR MARBEC. 03/2024
- *ChatGPT & co, Myths and Reality. Everything you wanted to ask about Deep Learning but did not dare to ask*, General knowledge Seminar with Francois David Collin, IMAG. 10/2023
- *Data collection from a crowd: where is the noise coming from?* at Ph.D students seminar, IMAG. 09/2023
- *Weighting areas under the margin in crowdsourced datasets* at Journées des Statistiques de France (JDS) Univ. Bruxelles 07/2023
- *Learning from crowds: going beyond aggregation schemes* at ML-MTP seminar, Univ. Montpellier 02/2023
- *Improve learning combining crowdsourced labels by weighting Areas Under the Margin* at ML-MTP seminar, Univ. Montpellier 10/2022
- *Crowdsourcing label noise simulation on image classification tasks* at Journées des Statistiques de France (JDS) Univ. Lyon. 06/2022
- *High dimensional optimization for penalized linear models with interactions using graphics card computational power* at Probability and Statistics (EPS) team seminar 11/2021
- *Introduction to neural networks* with Joseph Salmon at ML-MTP seminar, Univ. Montpellier 10/2021
- *Paper club Ridge Regularization: an Essential Concept in Data Science* by Trevor Hastie with Florent Bascou at ML-MTP seminar 04/2021

Skills

- **Tools and Languages:** Python, R, Git, L^AT_EX, JavaScript, HTML, CSS
- **Machine learning algorithms:** logistic regression, trees, SVM, dimension reduction methods, KNN, neural networks (from CNN to ViT and more)
- **Languages:** French, English, Spanish, Italian (in decreasing order)