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William de Vazelhes

Education

2021 to 2025 (expected) **PhD Candidate**, MBZUAI, UAE, ML.
I am currently working on optimization for machine learning (zeroth-order optimization and sparsity, in particular hard-thresholding algorithms). First-author paper published at **Neurips 2022**.

2012 to 2016 **Master of Science**, CentraleSupelec, (part of Paris-Saclay), France, SIR major (Machine Learning and Signal Processing).
Machine Learning, Numerical Optimization, Image and Speech Processing, Statistics and Probabilities, High Performance Computing, Software Engineering, Electrical Engineering.

Jan. 2014 to June 2014 **ERASMUS Programme**, Universidad Carlos III, Madrid, Spain.
Medical Image Processing, Multimodality Imaging, Telecommunications, Communication Theory.

2010 to 2012 **Preparatory School**, Stanislas, Paris, *PCSI-PSI*.
Preparation in Mathematics and Physics for the French Engineering Schools competition. Algebra, Bases of Topology and Set Theory, Linear Algebra, Real Analysis, Multivariate Analysis, Differential Equations, Physics

Experience (5y+)

Dec. 2019 to April 2021 **Research Student**, Huawei & Universite Gustave Eiffel, Paris, France.
I worked on the links between Information Theory and Machine Learning, as well as Optimal Transport.

Sept. 2017 to Aug. 2019 **Research Engineer**, Inria, Magnet Team, Lille, France.
I worked on a scikit-learn compatible package for metric learning, under the supervision of Aurelien Bellet. (https://github.com/scikit-learn-contrib/metric-learn) **(1K+☆, 50+ cit.)**. I improved pre-existing algorithms performance, for instance by vectorizing computations in novel ways, changing the iterative methods for optimizing the algorithms, solving problems due to numerical uncertainties, or check-proofing the algorithms by testing them on mathematical toy problems. I have commited a few **contributions to scikit-learn, including a new algorithm** : Neighborhood Components Analysis (NCA). I also worked part time with members of the MAGNET team on a research project using sparse PCA for word embeddings (equivalent of a master's research project). The idea was that standard PCA is statistically inconsistent in high dimensions (like that of co-occurence matrices), but not sparse PCA.

Oct. 2016 to July 2017 **Data Scientist**, Sidetrade, Boulogne-Billancourt, France.
I improved and interpreted several algorithms previously prototyped, including a relational linkage algorithm (RLA), using elasticsearch and scikit-learn. I also designed and analyzed mail classification algorithms (using for instance Naive Bayes, SVC, Logistic Regression, Feature Selection...).

Apr. 2016 to Sept. 2016 **Research Intern**, Orange Labs, Chatillon, France, *Report here*.
I worked on Deep Reinforcement Learning for Human-Machine Dialogue, under the supervision of Romain Laroche. I implemented several algorithms to maximize the score when playing against a human in a negotiation game, and analyzed the policy, value, and score evolution along the training, to find ways to improve them, on this particular problem.

Jan. 2015 to July 2015 **Research Intern**, Polytechnique Montreal, Montreal, Canada, *Report here*.
I computed and implemented a MAP criterion (and its gradient) from a statistical model of tomographic projections, for reconstructing a 3D image in Computed Tomography, and optimized it with a conjugate gradient method (l-bfgs-b). I analyzed the conditions of convergence of this criterion (initial conditions, different parameters).

Programming Skills

python (NumPy, SciPy, Scikit-Learn, Pandas, Matplotlib, Pytorch, Jax, Tensorflow)

Languages

French (mother tongue), English (fluent), Spanish (intermediate), Moroccan Darija (beginner)