Vincent Roger, (PhD)

Data and Machine Learning Scientist

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Skills

AI Project Lifecycle: Audit, study of needs, data collection, feature engineering, model development, deployment, and post-deployment maintenance.

Machine Learning Techniques: Supervised, self-supervised, and semi-supervised learning; deep neural networks (big and small data); sequence learning (RNN, GRU, transformers, HMM); generative models (Diffusion, GAN, DPGMM).

Data Engineering & Visualization: Big data analysis, signal processing (image and audio), interactive visualizations.

MLOps: Prototyping, API development, microservices (Docker), CI/CD with GitHub Actions, testing with Pytest, model tracking with MLFlow, versioning with DVC.

Programming Languages & Tools: Python, Numpy, Scipy, Falcon, PyTorch, Scikit-learn, Pandas, Modin, Plotly, Streamlit.

Project Management: Organized (Second Brain philosophy), leadership, team collaboration, risk management, deadline handling, solution design, technical documentation (MkDocs).

Languages: French (Native), English (C1).

Work Experience

Machine learning and data engineer, ongoing, *Kiviak Instrument* Toulouse 2023–Now
Remote work with responsibility for selecting data and technologies used. Designed and developed models integrated as microservices for automatic music sample labeling. Developed signal processing prototypes (time-stretching and pitch-shifting algorithms). Created and integrated signal processing APIs as microservices. Participated in the development of the associated frontend (TypeScript). Development of time stretching algorithms for real time applications. Currently leading the development of sample generation models based on diffusion models.

PhD, three years and three months, *IRIT* Toulouse 2018–2022
People with ENT cancers have speech difficulties after surgery or radiation therapy. It is important for the practitioner to have a measure that reflects the severity of speech. I propose two approaches to create an automatic measure, although with little data (about 1h of audio recordings for 128 speakers). The first one is based on "few shot" methods, while the second one is based on entropic measurement of speech features (learned with a self-supervised model on an annexed corpus). Our results on the latter have allowed us to consider a medical application. Thus, I obtained a grant to supervise an engineer in order to realize an application delivered to the Toulouse University Hospital.

Study Engineer, two years, *LIS* Toulon 2016–2018
Following my previous contract, I created a deep self-supervised model representation of underwater acoustic environments to help categorize the different behaviors of cetaceans within range of buoys. I then created a deep model for the classification of 1500 bird species. For these two problems, I had large volumes of data.

Study Engineer, teen months, *LIS - TVT Innovation* Toulon 2015-2016
Following the installation of buoys in the sea equipped with microphones, we have large quantities of data. My work consisted in modeling the bioacoustic environment using generative models. Thanks to this, I was able to produce a report of narwhal activities in relation to lunar activity.

Associations

Volunteer work, ongoing, *Toulouse Data Science* Toulouse 2023-Now
Participate in the organization of in-person events.

Volunteer work, 1 year and 6 months, *Toulouse Dataviz* Toulouse 2022-2024
Participated in the organization of in-person events, the creation of posters, and the delivery of training sessions for middle school students and the general public.

Teaching

Tutorials to generate images 2024
A series of tutorials I developed to teach the Diffusers library. All code is available on GitHub, and the tutorials are published on my blog. More details can be found here: `https://github.com/vroger11/diffusers-tutorials`.

Substitute Teacher, Paul Sabatier University Toulouse 2019-2021
- *Model and computer science* (14h of project class): Supervision of Master projects for machine learning on automatic speech recognition.
- *Introduction to TensorFlow* (6h of tutorial class): for Master students.
- *Probability and statistics* (16h of tutorial class): basic use of the statistical functions Scipy and Numpy for Master students.
- *Introduction to Python* (116h of tutorial class): for Bachelor students in computer science, economics and biologist Master students.
- *Introduction to Network* (10h of tutorial class): basic knowledge of the OSI model and use of basic commands to describe the state of the network for undergraduate students.

Substitute Teacher, University of Toulon Toulon 2017-2018
- *Machine Learning basis* (8h of practical class): teaching and writing of practical works on the use of neural models with TensorFlow for Master students.
- *Basic Algorithmic* (8h of tutorial class): algorithmic proofs and sorting algorithms for undergraduate students.
- *Graph Theory* (12h of tutorial class and 57h of practical class): teaching and participating in the writing of graph theory subjects for undergraduate students.

Education

PhD, Computer Science, *Paul Sabatier University* Toulouse 2022
I improved my communication during presentation and on the radio.

Master Degree, Artificial Intelligence, *Paul Sabatier University* Toulouse 2015
Statistical models, Signal Processing, Pattern Recognition, Robot control, and Management.

Bachelor Degree, Computer Science, *Paul Sabatier University* Toulouse 2013
Fundamental in development tools, low-level programming, Statistics, Probabilistic and Calculus.

University degree in technology, Computer Science, *IUT Paul Sabatier* Toulouse 2011
Two-year degree in technical Computer Science skills and ways to design applications for the industry.

Hobbies

Blogging: About tutorials, projects, visualization contests and tips about the Linux environment.

Sports: Weight training (thrice a week), running (twice a week), I finished the marathon of Toulouse.

Readings: I read about productivity, health, sport and Japanese Shōnens.