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, prototyping, 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); network compilation and quantization for efficiency.

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

MLOps: Cloud deployment and storage (OVH, S3-compatible solutions), API development (FastAPI), microservices (Docker), CI/CD (GitHub Actions), testing (Pytest), model tracking (MLFlow), data versioning (DVC), dependency managers (UV, Conda and Poetry).

Programming Languages & Tools: Python, Numpy, Scipy, PyTorch, Lightning, TorchAO, TensorRT, Scikit-learn, Pandas/Polars, Plotly, Streamlit, Diffusers, Transformers.

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.

Projects

Hackaviz 2025 Participation 2025
Participating in Hackaviz 2025 using Python, Streamlit and Plotly to create interactive data visualizations. Live demo: `https:`

//vroger11-hackaviz-2025.streamlit.app/. Code repository: https://github.com/vroger11/hackaviz-2025.

Tutorials to create SpeechBot 2025 - Ongoing

An innovative voice assistant integrating advanced speech recognition (speech-to-text), large language models (LLM), and speech synthesis (text-to-speech) for a seamless interactive experience. Designed for tutorials on my website. Code here: https://github.com/vroger11/SpeechBot.

Tutorials on Image Generation with Diffusion Models 2024

Created a series of tutorials to teach the Diffusers library, covering key concepts and practical implementations. 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.

Online Esports Visualizations 2022

Developed data-driven visualizations for Age of Empires 2 tournaments by collecting and analyzing data from web APIs. The visualizations gained significant traction, accumulating over 100k views and generating hundreds of comments on Reddit. Explore the related blog posts here.

Teaching

Substitute Teacher, Paul Sabatier University — Toulouse — 2019-2021

Taught Python, probability and statistics, machine learning, and networking to undergraduate and master's students, totaling 162 hours. Supervised machine learning projects on automatic speech recognition and introduced students to TensorFlow.

Substitute Teacher, University of Toulon — Toulon — 2017-2018

Taught machine learning (TensorFlow), algorithmics, and graph theory to undergraduate and master's students, totaling 85 hours, while also contributing to course material development.

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.

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.

Hobbies

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

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

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