

**Vincent Roger**, (PhD)

**Passionate 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 for both big and small data; sequence learning (RNNs, GRUs, transformers, HMMs); natural language processing (speech-to-text, speech/audio synthesis, LLM); generative models (Diffusion, GANs, DPGMMs); neural network optimization (compilation and quantization).

**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 management (UV, Conda and Poetry).

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

**Project Management:** Organization (Second Brain philosophy), leadership, team collaboration, risk management, deadline handling, solution design and 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. Developed a part of the associated frontend (TypeScript). Developed and optimized time-stretching algorithms for real-time applications. Currently leading and developing 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. Developed two approaches for automatic speech assessment, despite having limited 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**, ten months, *LIS - TVT Innovation* Toulon 2015-2016  
Following the installation of buoys in the sea equipped with microphones, we collected 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

Proposed a dashboard in Hackaviz competition 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 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

Enhanced public speaking skills through presentations and radio appearances.

### 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 computer science, focusing on application design for industry use cases.

## Associations

### Volunteer work, ongoing, *Toulouse Data Science*

 Toulouse

2023-Now

Organization of in-person events.

### Volunteer work, 1 year and 6 months, *Toulouse Dataviz*


 Toulouse


2022-2024

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 data visualization, Machine Learning and tutorials.

 **Sports:** Disciplined athlete, completed the Toulouse Marathon, training regularly in weightlifting and running.

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

