Bernardo Torres

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https://bernardo-torres.github.io | github.com/bernardo-torres | linkedin | scholar

Researcher in artificial intelligence/machine learning for audio and music. My current research focuses on the intersection between signal processing and deep learning for music information retrieval, source separation and synthesis, with a focus on unsupervised and self-supervised methods.

Education

Telecom Paris, Institut Polytechnique de Paris — *Paris, France*

Ph.D. Student in Computer Science / Artificial Intelligence for Audio and Music — 2023-Present

Data-driven analysis-by-synthesis for music source separation and transformation

Advisors: Prof. Geoffroy Peeters, Prof. Gaël Richard

ENS Paris-Saclay, MVA — *Gif-sur-Yvette, France*

M.S. in Computer Science and Applied Mathematics — 2021-2022

Mathematics, Vision and Learning (MVA) master's program. **Highest honors**.

Deep Learning, Artificial Intelligence, Audio and Speech processing, Computer Vision

Telecom Paris, Institut Polytechnique de Paris — *Paris, France*

B.S. in Computer Science — 2020-2022

Machine Learning, Signal Processing, Embedded Systems. **GPA: 4.0/4.0**

Universidade Federal de Minas Gerais — *Belo Horizonte, Brazil*

B.S. in Electrical Engineering — 2016-2022

Electrical, Electronics and Computer Engineering

Work Experience

Sony Computer Science Laboratories — *Paris, France*

Research Intern — Apr. 2022-Sep. 2022

Research in voice transformation for singers a music production context. I worked with deep generative models, neural audio synthesis, speech and self-supervised learning.

Advisor: Stefan Lattner

Radix Engineering and Software — *Belo Horizonte, Brazil*

Data Science Intern — Jul. 2019 - May 2020

Worked with data science and machine learning with a focus in predictive maintenance and anomaly detection.

Trained and deployed models based on statistical quality control and LSTM networks.

Publications

Torres, B., Peeters, G. and Richard, G., 2024. Unsupervised Harmonic Parameter Estimation Using Differentiable DSP and Spectral Optimal Transport. *In IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2024)*.

Richard, G., Chouteau, P. and **Torres, B.**, 2024. A Fully Differentiable Model for Unsupervised Singing Voice Separation. *In IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2024)*.

Torres, B., Lattner, S. and Richard, G., 2023. Singer Identity Representation Learning using Self-Supervised Techniques. *In International Society for Music Information Retrieval Conference (ISMIR 2023)*.

Teaching Experience

Telecom Paris, Institut Polytechnique de Paris — *Paris, France*

Teaching Assistant — 2023-Present

Deep Learning I, from IP Paris' Data Science M. S. program
TSIA 201 Signal Processing
TSIA 206 Speech and audio processing

TSIA 203 Introduction to Deep Leaning

Awards and Scholarships

BRAFITEC excellence double degree scholarship

Two-year scholarship Granted by CAPES foundation 2020-2022

Projects

Formula SAE UFMG - Formula Student Team from UFMG *Belo Horizonte, Brazil*

Head of Electronics 2018-2019

Lead a group of 8 people in the design, manufacturing and testing of the electrical subsystems of a racecar prototype

Designed, developed and deployed an embedded data acquisition system

Team Member 2017-2019

Designed the team's first telemetry system, from embedded board design to user interface development

Skills

Programming Languages: Python, C, C++, SystemVerilog
Machine learning: PyTorch, Scipy, Numpy, Scikit-learn, TensorFlow
Spoken Languages: Portuguese (native), English (fluent, C2), French (fluent), Spanish (B2)
Other/Interests: Music, Sound synthesis, Electronic Music Production/Mixing, Meditation, Philosophy