Bernardo Torres

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

Researcher in 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 Machine Learning and Signal Processing for Audio and Music — 2023-Present

- Data-driven analysis-by-synthesis for music source separation and transformation
- Advisors: Prof. Geoffroy Peeters, Prof. Gaël Richard

École Normale Supérieure Paris-Saclay — Gif-sur-Yvette, France

M.S. in Computer Science and Applied Mathematics, MVA. **Highest honors**. — 2021-2022

- MVA stands for Mathematics, Vision and Learning (Apprentissage). Top AI Research Master in France.
- Deep Learning, Artificial Intelligence, Audio and Speech processing, Computer Vision

Telecom Paris, Institut Polytechnique de Paris — Paris, France

B.S. in Computer Science / Engineering Diploma, **GPA: 4.0/4.0**. — 2020-2022

- Machine Learning, Signal Processing and Embedded Systems majors.

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 using self-supervised learning and neural audio synthesis.
- 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

[1] **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)*.

[2] 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)*.

[3] **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

Skills

Deep Learning: PyTorch, TensorFlow
Programming Languages: Python, C, C++, SystemVerilog
Other: Scikit-Learn, Git, Librosa
Spoken Languages: Portuguese (native), English (fluent, C2), French (fluent), Spanish (B2)
Interests: Music, Sound synthesis, Electronic Music Production/Mixing, Meditation, Philosophy

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