Niccolò Antonello Curriculum Vitae

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: LinkedIn
: nantonel.github.io
: Boston, United States

Experience

Summary: Applied Scientist with more than 10 years of experience developing innovative audio and acoustic solutions. Expertise in signal processing, numerical optimization, and open-source software. Passionate about contributing to the future of technology through cutting-edge research and development.

Amazon Boston, USA
Applied Scientist in the Alexa wakeword metrics & data team January 2022 –Present
- Design algorithms for audio quality estimation of generative models (text-to-speech, music generation)
- Generation and optimization of evaluation audio datasets using statistics, text-to-speech and novel data augmentation algorithms
- Define and research novel metrics for measuring performance of Alexa wakeword models using A/B test, weekly business reviews and device/model launch decisions
- Time series modeling and analysis for outlier detection to prevent customer experience degradation
- Develop and maintain large codebase and complex privacy-preserving data pipelines

Idiap Research Institute Martigny, CH
Postdoc Researcher in the Speech & Audio Processing Group April 2019 –April 2021
- Research on out-of-distribution in neural networks and customizable keyword spotting which resulted in a patent application in collaboration with Logitech (SHAPED)
- Research on automatic speech recognition (ASR) acoustic model training exploiting sparsity (SHISSM)
- Build an open-source ASR model training framework

KU Leuven Leuven, BE
Postdoc Researcher at STADIUS (Center for Dynamical Systems, Signal Processing, and Data Analytics) September 2018 –April 2019
- Research on dereverberation & speech enhancement algorithms under the European Union's Horizon 2020 research and innovation program / ERC Consolidator Grant: SONORA

KU Leuven Leuven, BE
PhD Researcher at STADIUS (Center for Dynamical Systems, Signal Processing, and Data Analytics) May 2013 –August 2018
- Develop novel algorithms for solving *inverse problems* for *dereverberation* and *room identification* using *numerical acoustics models* and *compressed sensing* (DREAMS Marie Skłodowska-Curie fellowship)
- Published 3 Journal papers and 5 conference papers as first author
- Released 5 open-source packages for numerical optimization and acoustic simulations

Imperial College London London, UK
Visiting Researcher at SAP (Speech and Audio Processing group) May –Sept. 2015
- "Royal Society Summer Science Exhibition 2015 - Sound Interactions" event organization

Technical University of Denmark Lyngby, DK
Research Assistant at DTU Acoustic Technology 2012 –2013
- Research on compensation of flux modulation distortion in loudspeaker with patent application

Technical skills

- **Programming:** Python, SQL, Matlab, Julia, C/C++
- **Libraries:** PyTorch, pandas, TensorFlow, Keras
- **Tools:** AWS, spark, linux, git, LaTeX, vim
- **Laboratory:** Brüel & Kjær PULSE system analyzer, Klippel R&D System

Soft skills

- **Languages:** Italian (native), English (Proficient), French, Spanish (Conversational)
- **Teamwork:** project management & PhD supervision in fast-paced multi-disciplinary environment
- **Others:** O1-VISA award, creative & critical thinking, drawing, music theory

Education

KU Leuven Leuven, BE

PhD at STADIUS Center for Dynamical Systems, Signal Processing, and Data Analytics 2013 –2018

- Thesis title: " Solving inverse problems in room acoustics using physical models, sparse regularization and numerical optimization," Supervisors: Toon van Waterschoot, Marc Moonen

Technical University of Denmark Lyngby, DK

M.Sc, Engineering Acoustics 2010 –2012

- Thesis title: "Balanced Armature Transducers for Hi-fi Systems"

Università degli Studi di Padova Padova, IT

B.Sc, Electrical Engineering 2007 –2010

Projects

Full list of projects: https://nantonel.github.io/software/

- **TIDIGITSRecipe.jl**: A Julia recipe for training an ASR system using the TIDIGITS database
- **HMMGradients.jl**: Gradient computation for Hidden Markov Models (HMMs) training
- **StructuredOptimization.jl**: Structured optimization for nonsmooth nonlinear problems
- **ImageMethodReverb.jl**: Room acoustics impulse responses generator using the randomized Image Method

Publications

Full list of publications on Google scholar

1. **N. Antonello**, P. N. Garner, "A t-distribution based operator for enhancing out of distribution robustness of neural network classifiers," *IEEE Signal Process. Letters*, vol. 27, pp.1070-1074, 2020.
2. **N. Antonello**, E. De Sena, M. Moonen, P. A. Naylor, and T. van Waterschoot, "Joint acoustic localization and dereverberation through plane wave decomposition and sparse regularization," *IEEE/ACM Trans. Audio, Speech Lang. Process.*, vol. 27, no. 12, pp. 1893-1905, Dec. 2019.
3. **N. Antonello**, E. De Sena, M. Moonen, P. A. Naylor and T. van Waterschoot, "Room impulse response interpolation using a sparse spatio-temporal representation of a reverberant sound field", *IEEE/ACM Trans. Audio, Speech Lang. Process.*, vol. 25, no. 10, pp. 1929-1941, Oct. 2017.
4. E. De Sena, **N. Antonello**, M. Moonen, and T. van Waterschoot, "On the modeling of rectangular geometries in room acoustic simulations", *IEEE/ACM Trans. Audio, Speech Lang. Process.*, vol. 23, no.6, pp. 774-768, Apr. 2015.

Patents

1. A. Salarian, M. Cernak, P. Mainar, J. Chardon **N. Antonello**,"Hybrid voice command processing," US11763814B2, Dec. 2022.
2. F. T. Agerkvist, **N. Antonello**, and A. Christensen,"Loudspeaker assembly with suppression of magnetic flux modulation distortion," WO Patent App. PCT/EP2014/073 655, May 2015.