Eduardo Fonseca

PhD Candidate

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My thesis focuses on audio dataset creation, audio signal representations and deep learning for sound event recognition. My research interests include signal processing and machine learning with applications to machine listening, as well as sound and music computing and acoustics.

PhD status

Oct 2016 – present **Music Technology Group, Universitat Pompeu Fabra, Barcelona**.
I am half way through my PhD under the supervision of Dr. Xavier Serra. My most recent contributions include organizing a Kaggle audio tagging competition and a paper about learning sound event classifiers in presence of label noise, both carried out in collaboration with Daniel P. W. Ellis from the Sound Understanding Team in Google AI Perception. My thesis is partially funded by a 2017 Google Faculty Research Award for the creation of the FSD dataset. The expected thesis submission date is fall of 2020.

Work Experience

April 2016 – present **AudioCommons project**,
Music Technology Group, Universitat Pompeu Fabra, Barcelona,
PhD Candidate.
Creation of the Freesound Datasets platform used to build and maintain several open audio datasets. Development of deep learning approaches for acoustic scene and sound event classification.

Sept 2014 – March 2016 **PHONEDRIVE project**,
Telefónica R&D & Technical University of Madrid,
R&D Engineer.
Design of a system for driving pattern recognition by means of signals of smartphone sensors (accelerometers and gyroscopes).

June 2015 **Forensic Acoustics**,
Spanish National Research Council (CSIC),
Freelance Acoustic Engineer.
Analysis of speech recordings carried out in CSIC's Phonetics Laboratory with forensic acoustic purposes.

Oct 2010 – Dec 2013 **HECCO (Communications Coverage Evaluation Tool) project**,
INECO & Technical University of Madrid,
R&D Engineer.
Machine learning and signal processing for objective speech quality assessment in air-ground communications. In addition, I participate in a project using speech signal processing for sleep apnoea detection.

July 2006 **Sound Technician Internship**,
Radiotelevisión Española,
Intern.
Audio production of news bulletin and basic tv programmes.

Sept 2003 – June 2004 **Radio station Coordinator**,
San Juan Evangelista University Residence.
Management tasks and maintenance of equipment in an amateur radio studio.

Publications (also available at google scholar)

[1] Eduardo Fonseca, Manoj Plakal, Daniel P. W. Ellis, Frederic Font, Xavier Favory, and Xavier Serra. Learning sound event classifiers from web audio with noisy labels. Submitted to International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2019.

[2] Eduardo Fonseca, Manoj Plakal, Frederic Font, Daniel P. W. Ellis, Xavier Favory, Jordi Pons, and Xavier Serra. General-purpose tagging of freesound audio with audioset labels: Task description, dataset, and baseline. In *Detection and Classification of Acoustic Scenes and Events 2018 Workshop (DCASE2018)*, Surrey, UK, 2018.

[3] Eduardo Fonseca, Rong Gong, and Xavier Serra. A simple fusion of deep and shallow learning for acoustic scene classification. In *Proceedings of the 15th Sound and Music Computing Conference (SMC 2018)*, Limassol, Cyprus, 2018.

[4] Xavier Favory, Eduardo Fonseca, Frederic Font, and Xavier Serra. Facilitating the manual annotation of sounds when using large taxonomies. In *Proceedings of the 23rd Conference of Open Innovations Association FRUCT*, Bologna, Italy, 2018.

[5] Rong Gong, Eduardo Fonseca, Dmitry Bogdanov, Olga Slizovskaia, Emilia Gómez Gutiérrez, and Xavier Serra. Acoustic scene classification by fusing lightgbm and vgg-net multichannel predictions. In *Detection and Classification of Acoustic Scenes and Events 2017 Workshop (DCASE2017)*, 2017.

[6] Eduardo Fonseca, Rong Gong, Dmitry Bogdanov, Olga Slizovskaia, Emilia Gómez Gutiérrez, and Xavier Serra. Acoustic scene classification by ensembling gradient boosting machine and convolutional neural networks. In *Detection and Classification of Acoustic Scenes and Events 2017 Workshop (DCASE2017)*, 2017.

[7] Eduardo Fonseca, Jordi Pons, Xavier Favory, Frederic Font, Dmitry Bogdanov, Andrés Ferraro, Sergio Oramas, Alastair Porter, and Xavier Serra. Freesound datasets: a platform for the creation of open audio datasets. In *Proceedings of the 18th International Society for Music Information Retrieval Conference (ISMIR 2017)*, pages 486–493, Suzhou, China, 2017.

Teaching Experience

July 2018 **Introduction to Python and music**, *Girls in Data Science Seminar*, Universitat Pompeu Fabra.

2016 – present **Sound and Music Processing**, *Bachelor's degree in Audiovisual Systems Engineering*, Universitat Pompeu Fabra.

2016 – 2017 **Audio Signal Processing for Music Applications**, *Coursera*, Stanford University & Universitat Pompeu Fabra.

2017 **Lab of Signals and Systems**, *Bachelor's degree in Audiovisual Systems Engineering*, Universitat Pompeu Fabra.

Awards

2017 **Google Faculty Research Award**.
Project proposal developed under the supervision of Dr. Xavier Serra focused on the creation of FSD, a large-scale, open audio dataset for sound event recognition based on Freesound content organized with the AudioSet Ontology.

Co Curricular

2018 **Detection and Classification of Acoustic Scenes and Events (DCASE) 2018 Task2 Organizer**, Music Technology Group & Google's Sound Understanding Team.
Co-organization of the *General-purpose audio tagging of Freesound content with AudioSet labels* competition, which was run on the Kaggle platform with 558 teams participating.

2017 **Sónar Innovation Challenge Mentor**, Sónar Festival & Music Technology Group.
Co-mentoring a team of technologists in the development of a tool for 3D exploration of Freesound based on sound similarity.

Education

2014 **Master's Degree in Telecommunications Engineering**, *specialisation in Communications*,
Technical University of Madrid (Spain).
This qualification has been accredited by the Accreditation Board for Engineering and Technology (ABET).

2009 **Master of Science (MSc) in Engineering**, *specialisation in Acoustics*,
Aalborg University (Denmark).

2007 **Bachelor's Degree in Telecommunications Engineering**, *specialisation in Sound and Image*,
Technical University of Madrid (Spain).

2007 **Erasmus scholarship**,
Helsinki Polytechnic Stadia (Finland), (currently Helsinki Metropolia University of Applied Sciences).
Bachelor's final project and additional courses on digital signal processing and English communication.

Languages

Spanish Native Speaker

English High level — *2010 Certificate in Advanced English (CAE), Grade B, University of Cambridge*

2007 International English Language Testing System (IELTS) Academic Version, Grade 7, University of Cambridge

2000 Grade nine in Spoken English for Speakers of other Languages, Trinity College London

Danish Basic level — *2009 DU3 modul 2, Aalborg Sprogskole*

Computer & Technical Skills

Languages *High*: Python, MATLAB, Keras | *Basic*: Tensorflow, Torch, Lua, HTML, C/C++, Java, Tcl/Tk

Software Linux, MAC OSX, Windows, LaTeX, office-related software, WaveSurfer, Audacity, Sonic Visualizer

Acoustics *Simulation*: CATT Acoustics, EASE | *Measurement*: MLSSA, 01 dB Symphonie, Brüel & Kjær PULSE

Received Courses

2017 **Workshop on acoustic array settings for spectacles**, *1 week*,
Universitat Pompeu Fabra.

2015 **Course on *Machine Learning***, *3 months*,
Stanford University through Coursera.

2014 **Workshop on *Multichannel Audio***, *14 hours*,
Laboral Centro de Arte y Creacion Industrial (Gijon, Spain).

2010 **Workshop on *Experimental Audio with Sonotron***, *20 hours*,
Laboral Centro de Arte y Creacion Industrial (Gijon, Spain).

2005 **Course on *Telecommunication Infrastructure Projects***, *3 credits*,
Technical University of Madrid.