

Computational Intelligence Algorithms for Digital Audio Applications

IJCNN 2017 Special Session

<http://www.ijcnn.org/>

THEME AND SCOPE

Computational Audio Processing techniques have been largely addressed by scientists and technicians in many application areas, like entertainment, human-machine interfaces, security, forensics, and health. Developed services in these fields are characterized by a progressively increase of complexity, interactivity and intelligence, and the usage of the Computational Intelligence paradigm allowed to achieve a remarkable degree of automation with excellent performance.

Diverse types of signals are usually involved in the process, in dependence on the problems under study. These typically correspond to distinct research topics, some of which have already reached a high maturity level. In the “music” case study, music information retrieval and automated music generation are the major topic of interest, with many diverse sub-topics therein; for “speech”, we can immediately refer to speech/speaker recognition, but also the topics intimately related to the analysis of speech signals (affective computing and spoken language processing, just to name a few), and their generation from text (Text-to-Speech); in the case of “sound”, acoustic monitoring, acoustic scene understanding and sound separation/detection/identification have lately seen an increasing interest in many living environments scenarios; in the case of “animal vocalisations”, some efforts have been recently spent in the automatic classification and recognition of animal species by means of their emitted sounds.

In the difference fields, state of the art performance has recently been obtained by using data-driven learning system, often represented by variants of deep neural network architectures. Several challenges still remain open, due to the increasing complexity of the tasks, the presence of non-stationary operating conditions, the difference between laboratory and real acoustic scenarios, and the necessity to respect hard real-time constraints, also when the amount of data to process is big and battery-powered devices are involved. In some other application contexts, the challenge is facing a scarce amount of data to be used for training, and suitable architectures and algorithms need to be designed on purpose. Moreover, also the employment of cross-domain approaches to exploit the information contained in diverse kinds of environmental audio signals are often needed, as recently investigated by some pioneering works. Last but not least, a key issue in Computational Audio Processing is given by the capability to learn representative features at different abstraction layers without the support of supervised actions. Again, the deep learning paradigm recently allowed reaching relevant achievements in this sense, with many open issues to explore.

In the light of this analysis, it is indeed of great interest for the scientific community to understand how and to what extent novel Computational Intelligence-based techniques (with special attention to Neural Network ones) can be efficiently employed in Digital Audio. The aim of the session is thus to focus on the most recent advancements in the Computational Intelligence field and on their applicability to Digital Audio problems. Driven by the success encountered at IJCNN2014 in Beijing (China), IJCNN2015 in Killarney (Ireland), and IJCNN2016 in Vancouver (Canada), the proposers of this session are motivated to revive and exceed the experience and to build, in the long-term, a solid reference within the Computational Intelligence community for the Digital Audio field.

TOPICS

Potential topics include, but are not limited to:

- *Computational Audio Analysis*
- *Deep Learning algorithms in Digital Audio*
- *Neural Architectures for Audio Processing*
- *Transfer, Weakly Supervised, and Reinforcement Learning for Audio*
- *Music Information Retrieval*
- *Neural Methods for Music/Speech Generation*
- *Speech and Speaker Analysis and Classification*
- *Voice Conversion*
- *Species recognition from animal vocalisations*
- *Sound Detection and Identification*
- *Acoustic Source Separation*
- *Acoustic Novelty Detection*
- *Computational methods for Wireless Acoustic Sensor Networks*
- *Acoustic Scene Classification*
- *Brain inspired Auditory Scene Analysis*
- *Cross-domain Audio Analysis*
- *Speech and Audio Forensics*
- *Audio Tagging*
- *Audio-based Security Systems*
- *Intelligent Audio Interfaces*

IMPORTANT DATES

- ~~November 15, 2016~~ **December 01, 2016**: Paper submission deadline [Extended!]
- **January 20, 2017**: Notification of paper acceptance
- **February 20, 2017**: Camera-ready deadline
- **May 14-19, 2017**: Conference days

ORGANIZERS

Emanuele Principi Università Politecnica delle Marche, Italy
Aurelio Uncini Università La Sapienza, Italy
Björn Schuller University of Passau, Germany/Imperial College London, UK
Stefano Squartini Università Politecnica delle Marche, Italy

e.principi@univpm.it
aurel@ieee.org
schuller@ieee.org
s.squartini@univpm.it

<http://a3lab.dii.univpm.it/news/ijcnn2017-special-session>