

Computational Intelligence Algorithms for Digital Audio Applications

IJCNN 2016 Special Session

<http://www.wcci2016.org/>

THEME AND SCOPE

Computational Intelligence (CI) techniques are largely used to face complex modelling, prediction, and recognition tasks in different research fields. One of these is represented by Digital Audio, which finds application in entertainment, security, forensics and health. Anyone can experience a large variety of services and products including Digital Audio technologies, undoubtedly characterized by a progressively increase of complexity, interactivity and intelligence.

The typical methodology adopted in these engineering solutions consists in extracting and manipulating useful information from the audio stream to pilot the execution of automatized services. Several technical areas in Digital Audio, involving different kinds of audible signals, share such an approach. In the "music" case study, music information retrieval is the major topic to address, with many diverse sub-topics therein; for "speech", we can immediately refer to speech/speaker recognition, but also the many diverse topics intimately related to the computational analysis of speech signals (affective computing and spoken language processing, just to name a few); in the case of "sound", acoustic fingerprint/signature, acoustic monitoring and sound detection/identification have lately seen an ever increasing interest in the larger field. Moreover, also cross-domain approaches to exploit the information contained in diverse kinds of environmental audio signals have recently been investigated. In many application contexts, this appears in conjunction with data coming from other media, such as textual and visual data, for which specific fusion techniques are required.

In dealing with these problems, the adoption of data-driven learning systems is often a "must", and the recent success encountered by deep neural architectures (in Speech Recognition, for instance) lends further evidence of this. Inherent challenges are, however, coming with technological issues, due to the presence of non-stationary operating conditions and hard real-time constraints, often made harder by the big amount of data to process. 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. Last but not least, a key issue in Intelligent Audio Applications is given by the capability to learn representative features at different abstraction layers in an unsupervised way.

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, in the light of all the aforementioned aspects. The aim of the session is therefore 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) and IJCNN2015 in Killarney (Ireland), the proposers of this session are highly motivated to revive and exceed the experience.

TOPICS

Potential topics include, but are not limited to:

- *Computational Audio Analysis*
- *Deep Learning algorithms in Digital Audio*
- *Transfer, Weakly Supervised, and Reinforcement Learning for Audio*
- *Music Information Retrieval*
- *Speech and Speaker Analysis and Classification*
- *Sound Detection and Identification*
- *Acoustic Source Separation*
- *Acoustic Novelty Detection*
- *Computational Methods for Wireless Acoustic Sensor Networks*
- *Brain Inspired Auditory Scene Analysis*
- *Cross-domain Audio Analysis*
- *Speech and Audio Forensics*
- *Audio-based Security Systems*
- *Intelligent Audio Interfaces*

IMPORTANT DATES

- ~~January 15, 2016~~ **January 31, 2016**: Paper submission deadline
- **March 15, 2016**: Notification of paper acceptance
- **April 15, 2016**: Camera-ready deadline
- **July 25-29, 2016**: Conference days

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