IEEE Journal on Selected Topics in Signal Processing

Special Issue on

Acoustic source localization and tracking in dynamic real-life scenes

Summary: Acoustic source localization is a well-studied topic in signal processing, but most traditional methods incorporate simplifying assumptions such as a point source, free-field propagation of the sound wave, static acoustic sources, time-invariant sensor constellations, and simple noise fields. However, these assumptions may be seriously violated in a range of emerging applications, such as audio recording with mobile devices (e.g. cell phones, extreme cameras, and robots), video conferencing on the go, and recording for 3D reproduction and virtual reality. In these applications, the environment is extremely challenging, with spatially distributed sources, reverberation, complex noise fields, multiple concurrent speakers, interferences, and time-varying sources and sensors positions.

The proposed special issue aims to present recent advances in the development of signal processing methods for localization and tracking of acoustic sources and the associated theory and applications. To address the challenges raised by the real-life environment, novel methods that use modern array processing, speech processing and data inference tools, become a necessity.

As these challenges involve both audio processing and sensor arrays, this proposal is timely and relevant to researchers from both acoustic signal processing domain and array processing domain. The guest editors are therefore coming from both communities. It comprises of current and past chairs of the respective technical committees (Audio and Acoustic Signal Processing – AASP and Sensor and Sensor Array and Multichannel – SAM TCs). This special issue proposal follows successful special sessions in major conferences: “Learning-based Sound Source Localization and Spatial Information Retrieval” (ICASSP2016), “Speaker localization in dynamic real-life environments” (ICASSP2017), “Acoustic Scene Analysis and Signal Enhancement using Microphone Array” (EUSIPCO2017), “Acoustical Signal Processing for Hearables” (EUSIPCO2017).

Topics of interest include (but are not limited to):

- Localization in multipath and reverberant environments
- Tracking moving sources
- Performance bounds on localization and tracking
- Dynamic platforms for localization and tracking (e.g. robots, cell phones, hearables, hearing aids)
- Binaural localization using head-related transfer functions (HRTFs)
- Localization “behind the walls”
- Distributed algorithms for wireless acoustic sensor networks (WASNs) for localization
- Simultaneous localization and mapping (SLAM)
- Acoustic scene analysis
- Detection and localization acoustic events (e.g. falls, footsteps)
- Learning-based localization (e.g. dimensionality-reduction, regression, clustering, classification, sparse representations, dictionary learning)

- Bayesian localization and tracking algorithms (e.g. sequential Monte-Carlo, particle filters, Probability Hypothesis Density (PHD) methods)
- Localization using ray tracing

Prospective authors should follow the instructions given on the IEEE JSTSP webpage: https://signalprocessingsociety.org/publications-resources/ieee-journal-selected-topics-signal-processing, and submit their manuscript through the web submission system at: https://mc.manuscriptcentral.com/jstsp-ieee.

List of Guest Editors:

Sharon Gannot, Bar-Ilan University, Israel
Martin Haardt, Technische Universität Ilmenau, Germany
Walter Kellermann, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany
Peter Willett, University of Connecticut, USA

Important Dates (suggested):

- Manuscript submission: ~~May 1, 2018~~ EXTENDED: July 1, 2018*
- 1st review completed: ~~July 1, 2018~~ September 1, 2018
- Revised manuscript due: ~~September 1, 2018~~ November 1, 2018
- 2nd review completed: ~~November 1, 2018~~ December 15, 2018
- Final manuscript due: ~~December 15 2018~~ January 15, 2019
- Publication: March 2019

*The manuscript submission due date to this special issue has been extended by two months, to 1 Jul 18, to allow interested authors to use the dataset from the LOCATA challenge organized by the AASP TC. The use of this dataset is not mandatory.