

Università Politecnica delle Marche

DSP Algorithms and Adaptive Systems for Audio applications – A3lab Group at Univpm

Università Politecnica delle Marche is an emerging university well ranked in Italy, being positioned well inside the first fifteen (CRUI ranking) or better (1st place according to CENSIS ranking for medium academia). Its DEIT department, operating in the areas of Electronics, ICT and Digital Signal Processing, is actively involved in the hARTES project through the 3media research Group, supported by its participating laboratories Semedia and A3lab.

The A3lab subgroup actively works in the DSP areas, both linear and non-linear (including Artificial Neural Networks – ANN) for signal processing, with particular reference to multimedia data processing. It has about 20 years of history, although the A3lab name is much more recent denoting an increasing interest for real time digital Audio Processing. Research activities nowadays include:

- Adaptive Systems and ANN Non linear systems identification, machine learning, static and dynamic neural networks, natural gradient learning algorithms
- Blind Signal Processing Blind source separation, multichannel blind deconvolution, source blind cancellation
- Audio Quality Enhancement Audio restoration, noise reduction, acoustic echo cancellation, audio quality assessment
- Immersive Audio Rendering Loudspeakers line array, multichannel equalization, cross-talk cancellation

Special efforts have been recently made on digital car audio, developing innovative algorithms and software tools for multi-purpose audio processing and evaluation of in-vehicle audio quality. Collaboration with other hArtes partners (Faital, Leaff) already exist on automotive audio topics. Currently, the research effort is focusing on innovative equalization algorithms based on multirate techniques, and advanced approaches to audio rendering based on digital filter design theory and psychoacoustical models.

The Semedia subgroup actively works in the Semantic Web area with particular reference to multimedia metadata processing. It has a much shorter history and nowadays it is working on Multimedia Metadata extraction/processing (MPEG-7 and others, especially for audio), Semantic Web processing (infrastructures, user interface), Distributed Collaborative Metadata environments, Semantic Web based Textual Encoding and applications.

For more information see:

<http://www.univpm.it>

<http://www.deit.univpm.it>

<http://www.a3lab.deit.univpm.it>

<http://semedia.deit.univpm.it>