

Implementation of a real-time auralization setup for loudspeakers

Supervisors: Adrien Vidal, Richard Kronland-Martinet

Tel: 04 91 16 42 84

Mail: {vidal,kronland}@prism.cnrs.fr

Laboratory: Perception Représentation Image Son Musique (PRISM), UMR 7061 CNRS-AMU

Address: 31, Chemin Joseph Aiguier, 13009 Marseille, FRANCE

<https://www.prism.cnrs.fr/>

Context:

The PRISM laboratory is equipped with a multi-sensory immersion platform that allows the user to be immersed in virtual environments. The sound rendering is processed through a 42-loudspeakers array, by convolution of 3D impulse responses. For certain applications, such as the simulation of instrumental playing in different acoustic environments, it is necessary to capture the musician's playing with one or more microphones located within the device. Without specific processing, this configuration leads to an acoustic looping phenomenon (known as the acoustic feedback effect).

Internship subject:

The objective of this internship is to implement a real-time auralization setup on the 42-loudspeaker system in order to compensate for the loudspeaker contributions and create an anti-feedback effect.

Work to be done:

First of all, a literature review on auralization devices and existing techniques for cancelling acoustic looping will be realized.

The core of the work will then consist of implementing the anti-feedback system, possibly by testing several techniques.

A first simplified approach can be conducted, using a single microphone and a single loudspeaker. When the results are conclusive, an implementation with 42 loudspeakers and 42 microphones will be implemented.

The contribution of acoustic feedback cancellation will be measured objectively.

At the end of this work, a report will be written.

Required skills:

- Audio processing (Max/MSP et Matlab)
- Real-time audio (Max/MSP)
- Motivation for research work
- Autonomy

Compensation: around 600€ / month

Internship period: from February to August 2023