

## BEP Project

Audio source separation for Magnetic Resonance Imaging (MRI)  
acoustic noise components

### Description

MRI is a very powerful and non-invasive technique for medical imaging. However, most patients get annoyed or even scared, only because MRI can be very loud during scans (louder than a jet engine!). The main source of this noise comes from vibrating gradient coils - they are affected by the Lorentz force as the currents in them are rapidly switched. In addition, there are other noise sources in the imaging room, such as helium pump and air handling equipment.

To understand the MRI acoustic noise better, in this project we will use spatial source separation to decompose the noise signal into its main components. This will enable studying the noise caused by the gradient currents directly, and eventually lead to developing quieter MRI.

### Goals & Steps

1. Set-up and familiarization with Audio Processing Toolboxes
2. Recognize and characterize the main components of the MRI acoustic noise.
  - a. Comparison of blind and non-blind source separation methods
  - b. Comparison of model based and machine learning based methods
3. Development and optimization of algorithms to digitally separate gradient noise from the MRI sound recordings.

### Contact

Please find all information about our lab on [www.mars-lab.eu](http://www.mars-lab.eu) and don't hesitate to get in contact if you are interested in MRI research.

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