



Electrodes coordinates estimation for electrocorticography (ECoG) recordings

During electrophysiological recordings, it is vital to record every setting and parameter for future use. One of the most important settings is the channels position. A channel positions standard is already available for electroencephalography (EEG) recordings via the 10-20 system. This is unfortunately not the case for electrocorticography (ECoG). EEG is a non-invasive method to record brain signal, as opposed to ECoG, which is invasive.

If the coordinates of each electrode of an ECoG recording are not known, they might be estimated using an MRI image. As far as we know, however, no work has been done yet in this area for this particular brain imaging application. The knowledge of individual channel positions (here: 64 channels) in general and amongst themselves is particularly useful to determine functional connectivity or causation of a cognitive state.

The tasks for electrode coordinates estimation may include converting the 2D image to 3D, performing image registration between the template image and other brain mapping coordinates such as MNI and Talairach, before deriving the coordinates. An evaluation of the method is also expected using existing ECoG/MRI databases with known parameters.

Requirements:

- Basic knowledge of image processing
- Programming experience in R / Matlab

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