Non-invasive algorithm to discriminate different atrial flutter cases from simulated BSPMs with RQA analysis

Motivation
Atrial flutter (AFI) is a common reentrant arrhythmia, characterized by a self-sustainable mechanism and an electrical signal that propagates along different pathways from that of a normal heartbeat. Although AFI is not a direct cause of death, it can lead to even fatal complications, such as stroke or heart attack. For this reason, it is essential to identify and recognize this condition, so that it can be promptly treated. Nowadays, to know how to best treat this pathology, it is needed to discriminate with high precision which type of AFI the subject is affected. To do this, invasive methods of signal acquisition are required, such as intracardiac catheters. It would be best to try to identify with more precision the type and the location of the AFI, using non-invasive methods, such as body surface potential maps (BSPMs), in order to avoid the use of invasive methods or to decrease the procedure time of the ablation therapy.

Task
The aim of this work is to implement a new algorithm that is able to identify the patterns characterizing the AFI through the use of simulated BSPMs. To do this, it will be necessary to apply the Recurrence Quantification Analysis (RQA) over all the BSP signals, and to observe how these attributes are distributed over the torso, looking for reliable patterns.

This research work goes through the biosignal processing field.

Notice
- Prior knowledge in MATLAB is essential
- English is required

Fields of Research
- Biosignal Analysis

Project
- Body Surface Potential Maps and ECG-signals of AF

Start date
- As soon as possible

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