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Approaches to the Processing and Segmentation of Non-electrical Biological Signals

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Abstract

In this paper, the signal processing of non-electrical biosignals is studied and a number of results are presented. One of the most famous examples is that of the respiratory cycle. So that recordings of respiratory signals can often have a series of artifacts/noises at the time of signal acquisition. To eliminate these noises, a variety of high-performance digital filters are needed. Carrying out a filtering as thorough as possible depending on the type of signal given for analysis and the type of filter chosen for processing. After filtering, the biosignals can be exported, allowing a doctor to analyze this information and establish a diagnosis or a certain medical behavior. The working and display interface of the processed signals was developed with the help of the MATLAB 2021B software for the digital filtering of the signals and also for their segmentation according to the type of recognized noise. Having introduced a series of functions necessary for filtering and segmenting the signals given in the analysis. The digital filter specific to respiratory cycles being Butterworth that responds to the frequency range of interest. In addition to this filter, the High pass, Low pass filters and last but not least the Notch 50 Hz filter were also implemented. Certain functions were also introduced to segment signals according to function. Recommendations are presented for selecting the most appropriate topology for the applied filter, whether it is finite impulse response or infinite impulse response. In order to check the filter results, we accessed the public database “ICBHI 2017 Challenge”. This reference database supports those who want to



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evolve in the field of respiratory parameter analysis and research. The paper compares (before and after filtering) a series of respiratory biosignals, which can be exported for analysis and comparison.

Keywords: digital filters, non-electrical biosignals, segmentation signals

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