



Título: Direct One-to-all Lead Conversion on 12-Lead Electrocardiogram

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Resumo:

The Electrocardiogram (ECG) test is instrumental in daily clinical practice. It comprises the signal from different leads jointly analyzed by the cardiologist to conclude the diagnosis.

However, the complete set of ECG signals needs to be collected in a clinical environment with the help of professionals and appropriate equipment. With the emergence of smartwatches, users can perform the ECG test more comfortably and easily. Although collecting one lead at a time is possible, more is needed for a complete clinical analysis. Some works sought to facilitate obtaining the ECG test by reconstructing a set of leads from a smaller set. Most works start from more than one lead, and others have also carried out this reconstruction from a single lead, but with restrictions like considering aligned segments of a single beat or segments of fixed length. The present work achieved the best results in the literature for reconstructing several of the 11 leads from lead I, considering segments without fixed size. These results were possible through a neural network architecture for the direct conversion (point-by-point) of ECG leads, with the following advantages over other alternatives: the possibility of being trained with signal segments of different frequencies and durations without changing the architecture, complexity adjustment to avoid overfitting on small datasets and ability to deal with raw data. Our architecture achieved the average value of Pearson correlation of 0.75 on a cross-database evaluation against the current value of 0.39.

Banca examinadora:

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