Università degli Studi di Pavia

Dottorato di Ricerca in Bioingegneria e Bioinformatica

ECG Interpretation through real-time temporal abduction

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Abstract

This work proposes a new framework for the interpretation of biosignals. The proposal is different from the state of the art techniques since it is based on the use of abductive reasoning, which is defined as the inference to the best explanation for the observed phenomena. Its main advantage resides in its non-monotonic nature, which treats all conclusions as conjectures obtained from the evidence available at a given time, and that may be rejected or modified by any posterior information. Thus, while a classical arrhythmia classifier using deductive reasoning is unable to properly classify an ECG fragment affected by noise where cardiac beats have not been detected, an abductive interpreter is able to surmise the presence of a beat from its context, in the same way a person is able to reconstruct a word without hearing all the phonemes. The work done so far includes a theoretical formalism for knowledge representation based on the concept of temporal abstraction pattern, which allows the abductive formulation of explanatory hypotheses; and a set of algorithms responsible for obtaining an effective interpretation with an assumible computational cost.

I dottorandi e gli interessati sono caldamente invitati a partecipare

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