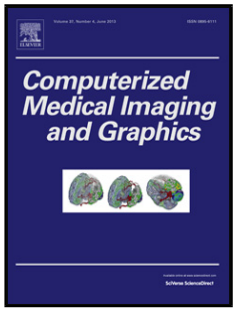

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Multi-dimensional Proprio-proximus Machine Learning for Assessment of Myocardial Infarction

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Highlights:

Our key contributions are:

(i) The generation of clinical indices/features based on computational geometry and cardiac modeling for representing segments in left ventricle (LV) and analysis;

(ii) The usage of multiple but sifted features in representing each segment and

(iii) The proposal of utilizing neighbouring information to further improve the analysis performance. The overall processing procedure is quite generic and easy to implement, and it is also adaptable when new data is coming in.

Validation of our approach was performed in a study involving 30 patients with a first time myocardium infarction ("heart attack") and 9 age- and sex-matched volunteers. Comparative classification results in separating the Infarcted from the Non-infarcted showed that:

(i) Multiple sifted clinical features will have better capability to differentiate those two groups;

(ii) Incorporating neighbouring information can significantly improve the classification performance and

(iii) Classification performance can be improved by oversampling technique, especially in situation of severe class imbalance (i.e. the number of samples from two classes are greatly different).

Based on the analysis results, a set of basis clinical features were also suggested. The designed procedure of analysis is very promising with its potentiality to assist clinicians to have fast diagnosis of Infarcted regions in LV.

Abstract: