

Semiautomatic Calculation of Ejection Fraction Using Echocardiographic Image Processing

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Abstract : In this paper, we present a semi-automatic tool for calculating ejection fraction from an echocardiographic video signal which is derived from a database in DICOM format, of Clinica de la Costa - Barranquilla. Described in this paper are each of the steps and methods used to find the respective calculation that includes acquisition and formation of the test samples, processing and finally the calculation of the parameters to obtain the ejection fraction. Two imaging segmentation methods were compared following a methodological framework that is similar only in the initial stages of processing (process of filtering and image enhancement) and differ in the end when algorithms are implemented (Active Contour and Region Growing Algorithms). The results were compared with the measurements obtained by two different medical specialists in cardiology who calculated the ejection fraction of the study samples using the traditional method, which consists of drawing the region of interest directly from the computer using echocardiography equipment and a simple equation to calculate the desired value. The results showed that if the quality of video samples are good (i.e., after the pre-processing there is evidence of an improvement in the contrast), the values provided by the tool are substantially close to those reported by physicians; also the correlation between physicians does not vary significantly.

Keywords : echocardiography, DICOM, processing, segmentation, EDV, ESV, ejection fraction

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