

عنوان مقاله:

Extraction of Respiratory Signal Based on Image Clustering and Intensity Parameters at Radiotherapy with External Beam: A Comparative Study

محل انتشار:

مجله فیزیک و مهندسی پزشکی، دوره 6، شماره 4 (سال: 1395)

تعداد صفحات اصل مقاله: 12

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خلاصه مقاله:

Background: Since tumors located in thorax region of body mainly move due to respiration, in the modern radiotherapy, there have been many attempts such as; external markers, strain gage and spirometer represent for monitoring patients's breathing signal. With the advent of fluoroscopy technique, indirect methods were proposed as an alternative approach to extract patients's breathing signals. Materials and Methods: The purpose of this study is to extract respiratory signals using two available methods based on clustering and intensity strategies on medical image dataset of XCAT phantom. Results: For testing and evaluation methods, correlation coefficient, standard division, amplitude ratio and different phases are utilized. Phantom study showed excellent match between correlation coefficient, standard division, amplitude ratio and different phase. Both techniques segmenting medical images are robust due to their inherent mathematical properties. Using clustering strategy, lung region borders are remarkably extracted regarding intensity-based method. This may also affect the amount of amplitude signal. Conclusion: To evaluate the performance of these methods, results are compared with slice body volume (SBV) method. Moreover, all methods have shown the same correlation coefficient of ۹۹%, but at different amplitude ratio and different phase. In SBV method, standard division and different phase are better than clustering and intensity methods with $SDR=۴.۷۱$ mm, and $SDL=۴.۱۲$ mm and average different phase ۱.۴۷ %, but amplitude ration of clustering method is significantly more remarkable than SBV and intensity methods.

کلمات کلیدی:

Surrogate Breathing Signal, Motion Management, Clustering Method, Intensity Method, Slice Body Volume, External Beam Radiotherapy

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