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X-ray carpal-bone image boundary feature analysis using region statistical feature based level set method for skeletal age assessment application

Pan LIN, Chongxun ZHENG, Feng ZHANG, Yong YANG

Keywords

carpal-bone radiograph, skeletal age (estimation), anisotropic diffusion filter, level set method, region statistical information

Abstract

Skeletal age assessment is one of the important applications of hand radiography in the area of pediatric radiology. Feature analysis of the carpal-bones can reveal the important information for skeletal age assessment. The present work in this paper faces the problem of the detection of carpal-bone features from X-ray image. A novel and effective segmentation technique is presented in this work with carpal-bone image for skeletal age estimation. Carpal-bone segmentation is a critical operation of the automatic skeletal age assessment system. This method consists of two procedures. First, the original carpal-bone image is preprocessed via anisotropic diffusion filter. Then, the carpal-bone image is segmented by region based level set method. The basic idea of the region based level set method is to add a force that takes into account the information within the regions in order to add robustness and more efficiently separate homogeneous regions. Experiments are carried out on X-ray images of carpal-bone. The experimental results show that incorporating region statistical information into the level set method, an accurate and robust segmentation can be achieved.

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