

Level set method for segmentation of infrared breast thermograms. 2014

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Abstract

Breast thermography is a physiological test that provides information based on the temperature changes in breast. It records the temperature distribution of a body using the infrared radiation emitted by the surface of that body. Precancerous tissue and the area around a cancerous tumor have higher temperature due to angiogenesis, and higher chemical and blood vessel activity than a normal breast; hence breast thermography has potential to detect early abnormal changes in breast tissues. It can detect the first sign of forming up cancer before mammography can detect. The thermal information can be shown in a pseudo colored image where each color represents a specific range of temperature. Various methods can be applied to extract hot regions for detecting suspected regions of interests in the breast infrared images and potentially suspicious tissues. Image segmentation techniques can play an important role to segment and extract these regions in the breast infrared images. Shape, size and borders of the hottest regions of the images can help to determine features which are used to detect abnormalities. In this paper, three image segmentation methods: k-means, fuzzy c-means and level set are discussed and compared. These three methods are tested for different cases such as fibrocystic, inflammatory cancer cases. The hottest regions of thermal breast images in all cases are extracted and compared to the original images. According to the results, level set method is a more accurate approach and has potential to extract almost exact shape of tumors.

Keywords: breast, thermography, level set, k-means fuzzy c-means

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