

A color-based high temperature extraction method in breast thermogram to classify cancerous and healthy cases using SVM

ABSTRACT

Breast cancer claims thousands of lives every year. Detecting the disease early can save lives. There is a quite growing research towards detecting cancer from breast thermograms; nevertheless few have investigated role of the color channels on segmentation and feature extraction using different measurements which include sensitivity, accuracy, and specificity. The objective of this research is three fold. Firstly, to investigate the impact of using the green and blue channels on segmenting both the left and right breasts toward improving cancer detection. Secondly, the impact of using features based on three channels: Red and Green and Blue. Thirdly, we compare between the impacts on classification performance when using mean based on a grayscale version of the color image and when using the mean based on three color channels. In this research, we use thermogram images from Brazil. Each patient in the images dataset has undergone a mammogram and based on the mammogram the patient is labeled as being sick or not sick. To classify an image as being normal or not, a histograms-based method is developed first. Extracting the high heat which represents the body temperature that exists in the breast area of the image can give a strong indication of some kind of abnormality present in a breast. Here, we used the histogram based technique to process an image to produce either one that represents the high heat, some high heat or none in the breast and then we correlate some features from the extracted image related to three color channels to support the abnormality indication. Using extracted features and SVM, we achieved high measurements in differentiating between cancerous and healthy images and also noticeable improvement over the original cropped images using the same features.

Keyword: Thermograms; Segmentation; SVM; Feature extraction