Software for classification of thermal imaging for medical applications

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The use of infrared imaging in health care is not a recent phenomena. The application of thermography in breast cancer screening study started in 1956 when Lowson discover that the skin temperature over a cancer in the breast was higher than that of a normal tissue. He also showed that the venous blood draining of the cancer is often warmer than its arterial supply. However, the premature use of thermology without standardization of a protocol concerning patient preparation, temperature controlled enviroment and without physicians training let to its demise. Now, several papers and studies have been published to reappraise the use IR in breast cancer detection for the following reason. New generation of IR cameras have been development with better accuracy. There has been deeper understanding of the patho-physiology of heat generation in cancered tissue. In such an application, the advanced techniques of image processing can be used. [1,2]

One of the popular methods for breast cancer detection is to make comparison between contralateral images. Unfortunately, due to various reasons, like fatigue or careless small asymmetries might not be easy to detect. Therefore, it is important to eliminate these mistakes. The aim of our study is create software dedicated for breast cancer diagnosis in order to provide more objective diagnostic results. We used three groups of parameters to describe image futures. The first order statistical parameters, second order statistical parameters defined on so-called co-occurrence matrix, and additionally, the parameter based on image transformation, such a wavelet analysis [3,4].

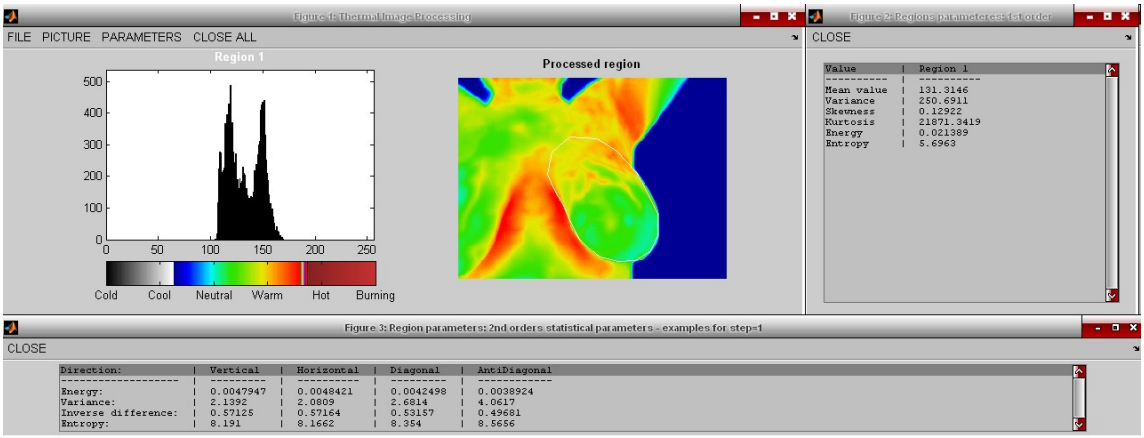

Fig. 1. Histogram and calculated features of a thermal image

One analyzed asymmetries by computing differences of values of these parameters. We plan to use Artificial Neural Network for classification but we need enough data for the learning phase. In Laser Diagnostic and Therapy Center which is at Technical University of Lodz, there was created laboratory for diagnosis of breast diseases. In the same place and in the same time patient can make thermography, digital mammography, and ultrasonography. In this laboratory started screening program so we hope that we collected images for learing Artificial Neural Network.

References

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