

FRACTAL DIMENSION FOR CHARACTERIZATION OF FOCAL BREAST LESIONS

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The cancer is one of the illnesses that more kill in the whole world, arriving to provoke 7.6 million deaths during the year of 2008 [1]. Although the medicinal advances, as much in the treatment as in diagnosis, the amount of cases of the illness is increasing yearly. They is esteem that until the year the 2030 number of deaths provoked for cancer will increase approximately in 45% [2]. Among the worst cancers can highlight the lung, stomach, liver, colon and breast [1]. In the women the breast cancer is most lethal. In Brazil they are esteem that in 2010, 12.705 had died in result of this type of cancer [3]. One of the forms to diminish these high numbers is the detection of the illness in its initial period of training [2,4]. Faster is diagnosed breast carcinoma patient, the greater the chances of healing and minors are the risk of mutilation. Therefore, there is great concern to discuss measures that enable early diagnosis [5].

Mammography is considered to be the most efficient way to detect the disease [6] and the examination is responsible for a significant decrease in deaths. However, it is not always possible to have conclusive results through this exam. The characteristics of some types of breast and limitations of mammography equipment may impair the visualization of images, interfering in identifying nodules and may lead to erroneous results of diagnosis [5,7].

In intention to minimize mistakes in the analysis of examinations and assisting the diagnostic, each time more is used techniques of picture processing, to diminish noises, to improve contrasts and to identify edges of the nodules, that can be studied and be analyzed as a fractal due its structures and characteristics [8]. The similarity between the fractals and the nodules suggests that the calculation of the fractal dimension can be used as a form of classification of mammograms [9]. The Fractals are shapes that have fractional dimension, not obeying traditional Euclidean geometry where objects have entire dimensions [10,11]. Among the various ways of calculating the fractal dimension, we can highlight as the object of this study using the techniques of Hausdorff-Besicovitch and Box- counting for the analysis of nodules found in groups of mammograms.

After segmenting the images and calculating its fractal dimension we can make a comparative degree between the gotten data. After this comparison the values obtained with the calculation of the dimension of malignant and benign masses, we can perceive that generally malignant nodules possess bigger fractal dimension that the benign nodules. This indicates a possible relationship between the fractal dimension and the current state in which it is studied in the breast exam.

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