Fractal Dimension Applied to radiographic Study of Nodules in the Breast

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This research is based on the study of the fractal dimension of nodular lesions in radiographic images. The purpose is to calculate the irregularity of the outline of breast nodules. In addition, to prove if the fractal dimension is a tool to alert the radiologist about potential malignancy of the nodule. The box counting method is based on the fractal property of self-similarity and it can be implemented with specialized software. When observing and analyzing the findings it can be interpreted that there is a relationship between the fractal dimension and the irregularity of the nodules. By analyzing the images, it is noticeable that there is a relationship between the irregularity and the malignancy of the nodule. A sample cases was studied. It was found that 93% of benign cases are located below the threshold 1.408 and only one case has a fractal dimension higher than this value. On the other hand, 89% of the malignant cases have a fractal dimension above 1.408, only two cases have a fractal dimension less than this value. The hypothesis is validated by the results found. For a future research, analyzing the change in the fractal dimension of nodular lesions in the process of metastasizes breast cancer will be considered.

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