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DATABASE MAMMOGRAPHIC IMAGES UNDER PERUVIAN CASES AND DETECTION OF MICROCALCIFICATIONS BASED ON FRACTAL CHARACTERISTICS PROGRAMMATICALLY GPGPU

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Abstract. Breast cancer is cancer that attacks more often in women, so it is important early detection. Microcalcifications is the first sign that comes before breast cancer develops.

In this paper we propose to create a database with mammographic images based on Peruvian casuistry, for it pictures of a medical center where mammographic examinations were performed with a system of indirect radiology, ie conventional equipment and chassis to capture was compiled images, with them you have 44 cases with the presence of

microcalcifications and 100 cases without the presence of microcalcificaiones, the images are in Dicom format and in original PNG and PNG marked by the specialist which indicates the presence of microcalcification. The size of the images of the dictionary are 50 x 50 pixels because it is the maximum size of images that can hold a microcalcification. The images will be posted on the www.bioingenieriperu.edu.pe page.

With the images a dictionary of images of microcalcification and no microcalcifications to analyze their fractal descriptors are implemented. Among them worked with the fractal dimension, worked with unsupervised classifier. The encoding is performed using matlab tool for both conventional programming and programming for the GPU.
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1 INTRODUCTION

The database on-line mammographic images is one of the first results of research on the detection of pathologies present in mammographic images for analysis in the Peruvian case mix, so now there are different databases with mammographic images being one of the most important base of DDSM data implemented by the University of South Florida, our research is focused on the ca-suística Peruvian, not counting a repository where present these cases, so it became necessary to implement a base experimental data to be used to develop algorithms thus making it objective of this is to provide a database of purely Peruvian casuistry.

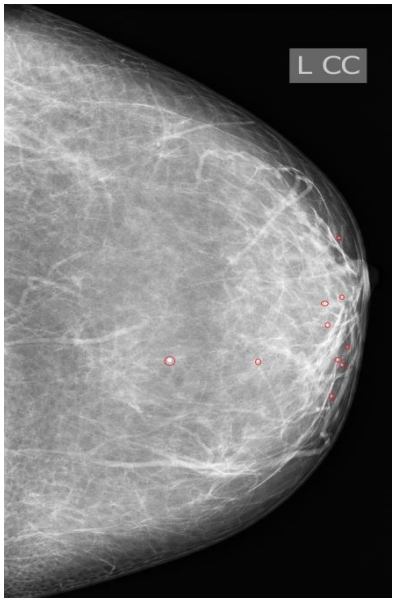


Figure 1: Image of a mammography

2 THE PROPOSED METHOD

the present work has three components

A. implementation of a database with peruvian casuistry.
B. construction of a picture dictionary with microcalcifications.
C. description of fractal images caraterística for dictionary.

A.- implementation of a database with peruvian casuistry. I will implement a database with 44 cases of patients with presence of microcalcifications images and 100 cases of patients without the presence of microcalcifications.

ACCESS TO DATABASE

To access the database using the following address http://www.bioingenieriaperu.edu.pe/ where the access to the database of mammography.

B.- **Construction of a picture dictionary with microcalcifications**, a dictionary with 100 images and 100 images microcalcifications was implemented without the presence of microcalcifications, as shown in the following figure.

Image with microcalcification	Image without microcalcification
	
	
	

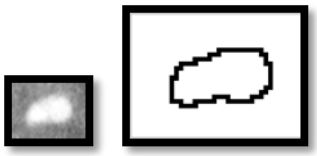
Figure 2: Picture Dictionary

C.- Description of fractal images caraterística for dictionary, for the analysis of fractal feature, the fractal dimension of the images of the dictionary was calculated, as shown in the following images.

IMAGE WITH MICROCALCIFICATION

Dimensión fractal
1.9568

Figure 3: Image dictionary with microcalcification



dimensión fractal
1.8881

Figure 4: Image dictionary with microcalcification

dimensión fractal
1.9339

Figure 5: Image dictionary with microcalcification

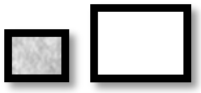
IMAGE WITHOUT MICROCALCIFICATION

dimensión fractal
2.0000

Figure 6: Image dictionary without microcalcification

dimensión fractal
1.8562

Figure 7: : Image dictionary without microcalcification



dimensión fractal
1.9036

Figure 8: : Image dictionary without microcalcification

AN INTERFACE WAS IMPLEMENTED IN MATLAB ALGORITHMS TO TEST AND EVALUATE THE TIME DELAY IN THE PROCESS USING CPU AND GPU

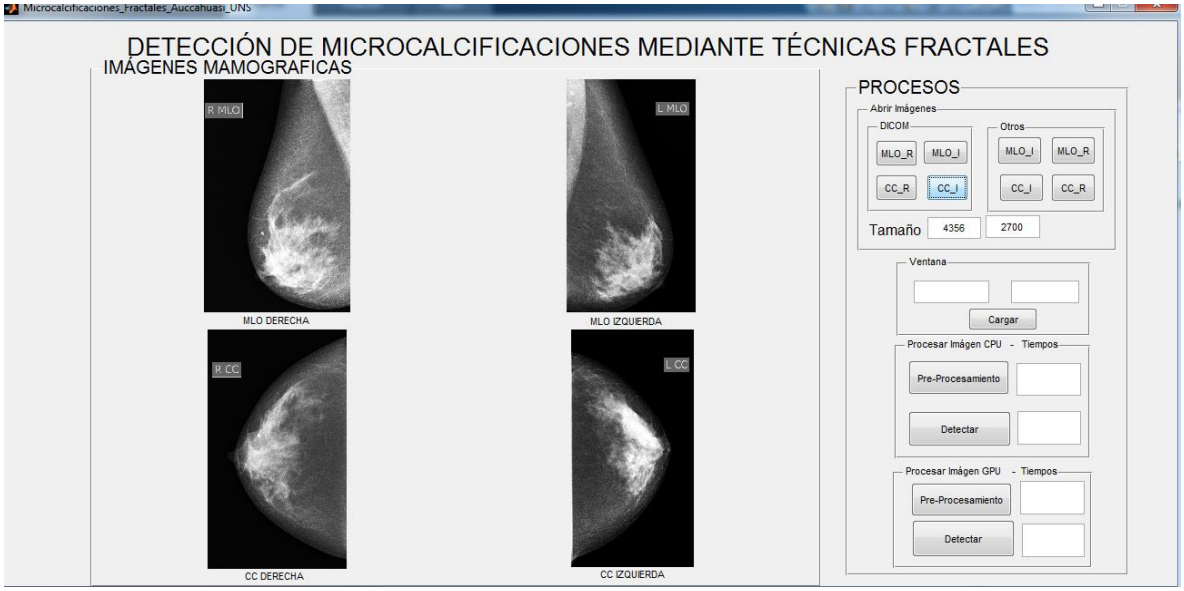


Figure 9: Application for the detection of microcalcifications

4 CONCLUSIONS

we conclude that the images used in the dictionary is 50 x 50 pixels because it is the maximum size of images that can contain a microcalcification, the application is developed using the Matlab tool to assess the computational time, thereby encoding two types, one with and the other conventional programming GPU programming is developed, to measure processing time.
A first result has a sensitivity of 90% with a specificity of 89%.

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