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NOISE REMOVAL AND CLASSIFICATION OF ULTRASOUND IMAGE USING MACHINE LEARNING ALGORITHM

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Abstract

A clamor decreasing technique dependent on shearlet change and a Laplacian pyramid channel is displayed. A non subsampled laplacian pyramid channel is utilized to break down the loud picture in this way deteriorating the picture into high-recurrence and low-recurrence subbands. In view of the limit work and the relationship of the shearlet coefficients in the transformation domain, an improved edge shrinkage calculation is proposed to play out the edge shrinkage preparing on the shearlet coefficients of the high-recurrence subbands. The low-recurrence subbands in the change space are prepared by the Laplacian pyramid channel, and a denoised ultrasonic image is acquired by the inverse transformation of the shearlet. At that point the spatial regularization on superpixels to make divided areas increasingly reduced. The division pipeline involves the calculation of superpixels and the calculated pixels are used for the extraction of descriptors, for example, shading and surface and it is followed by delicate grouping, utilizing a standard classifier for regulated learning and the image is segmented using graph cut methodology. We utilize this division pipeline on four real-time applications in therapeutic imaging. The proposed strategy was applied to 31 genuine PCOS ultrasound pictures got from patients and contrasted and three techniques.

Keywords - *Supervised learning, PCOS, Shearlet transformation, Graph cut.*

INTRODUCTION

PCOS is the disorder due to the imbalance of female sex hormones. It is because of the excessive secretion of follicle-stimulating hormone and luteinizing hormone that cause the follicle remains immature. This also stops ovulation and secrets excessive androgen and estrogen. After this secretion, the follicle forms into cysts and also leads to secrete insulin which causes diabetes to the patient. Ultrasound imaging uses high-frequency sound waves that will be examining areas and the echoes that are reflected will be captured as an image. Transvaginal ultrasound is used to detect the cysts which are painless treatment with less radiation. This technique will produce a clearer image than an abdominal ultrasound. This technique uses a pen-shaped probe to detect the cysts in the ovaries.

LITERATURE SURVEY

In Golay-Coded Excitations for Rotational Intravascular Ultrasound Imaging, the author have been proposed intravascular ultrasound imaging techniques. It employs towering imaging frequencies from the range of 20 to 60MHZ. It is used to visualize the deep of the ultrasound structure with a high

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signal attenuation. It is used to reduce the signal to noise ratio. They have established this method effectively on newly harvested pig coronary arteries.[1]

Hyperspectral Imaging In Blood Cell Classification using Modulated Gabor and CNN, the author has been proposed the cell classification, particularly it includes white blood cells(WBCs). It prevents the disease and used for diagnosis. They have used the concept of neural networks and Gabor wavelet and it is based on the medical hyperspectral imaging(MHSI). The main objective is to obtain the frequency domain from the convolutional kernel. This system has better performance when compared with the traditional CNN and supports Support Vector Machine(SVM).[2]

In Deep Learning Applications in Medical Image Analysis, the author used a machine learning algorithm for image recognition and it focuses on CNN. It includes classification, segmentation, and detection.[3]

The Detection of Tumor in Magnetic Resonance Images, the author has proposed tumor detection in the images plays a vital role in the medical field. Handling the nonlinear distribution of original data is a challenge in tumor detection. There is another technique to solve this problem is SVM in the detection of a tumor.

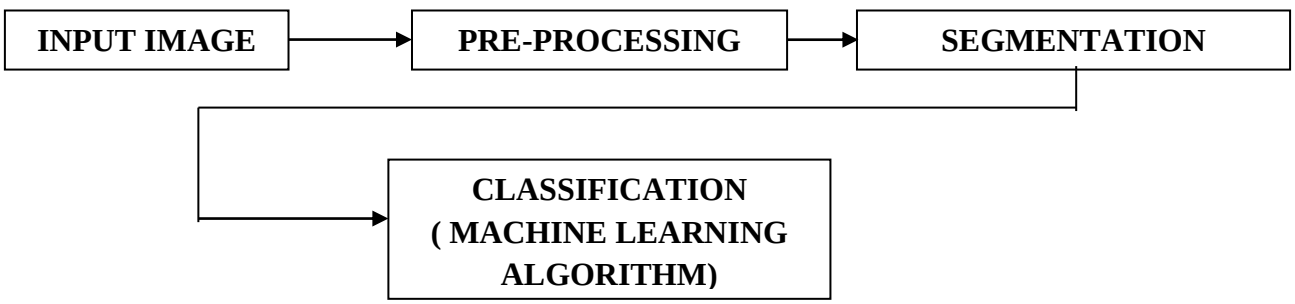
But due to the usage of SVM, it affects the classification results. To detect the tumors in Magnetic Resonance images, they implemented a One-class immune feature weighted SVM (IFWSVM). It works better than the conventional type SVM.[4]

In ASLIS from Magnetic Resonance Imaging utilizing Unbalanced Deep Discriminant Learning, the creator has been proposed therapeutic imaging utilizing profound learning. In this paper, they have effectively integrated the blood vessel turn labeling(ASL) images from the MR Imaging. The blood vessel turns to mark is a significant fMRI pointer utilized in the analysis of dementia malady. They have utilized novel unequal profound discriminant learning joined with the sub-structures of ResNet to blend from the MR images to create the ASL images. To improve diagnosing performance.[5]

METHODS

Overview:

In the proposed work, the input image is preprocessed to eliminate illumination and low contrast between follicles and background. Features are extracted using supervised ML and are classified based on pixels. The proposed work block diagram is shown in Fig.1.



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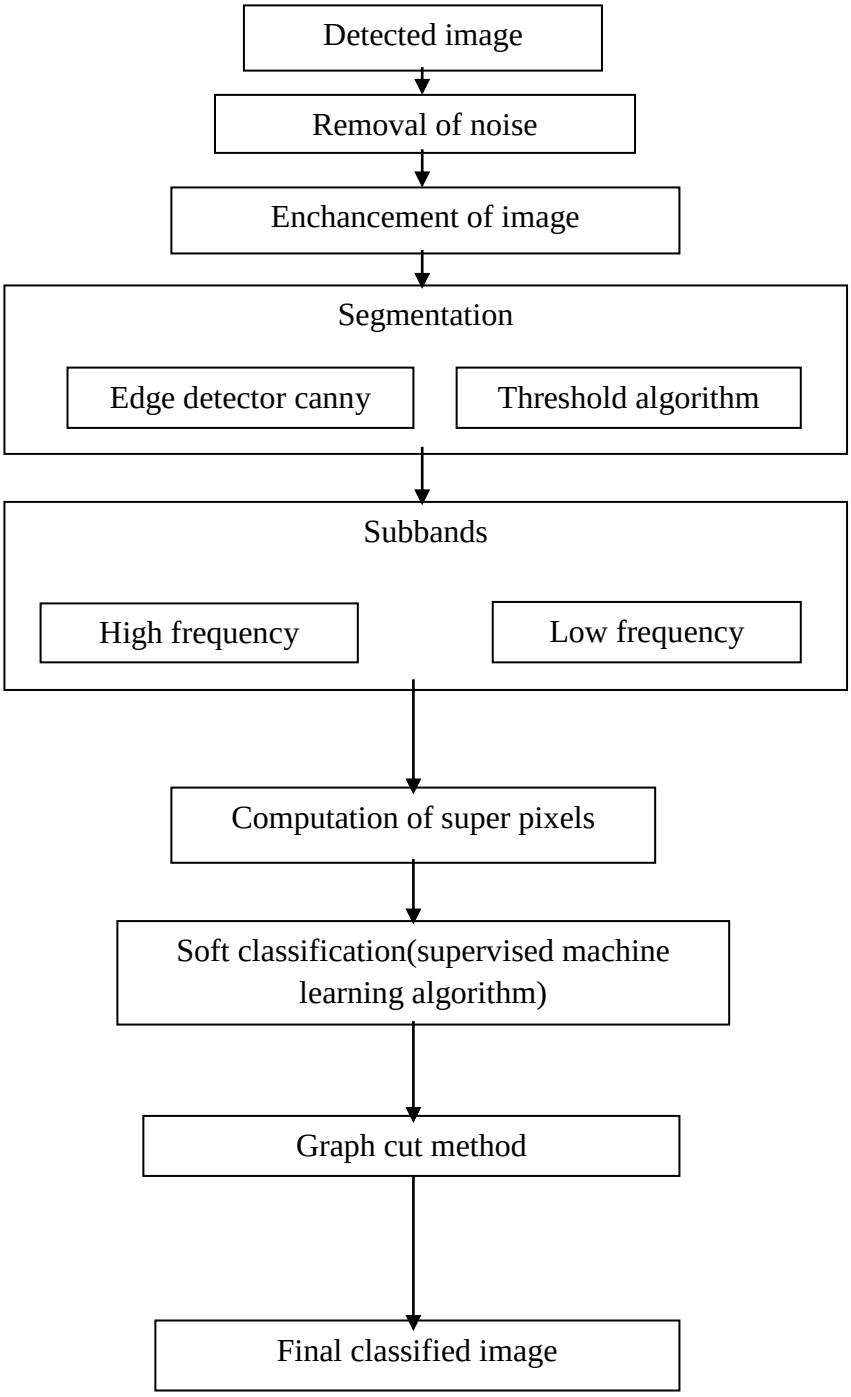
FLOW MODEL

The novel noise is removed from the ultrasound images, in order the improve the pixel quality enhancement process is done and it is followed by the segmentation process. In our project, we have used the canny edge detector for the segmentation process. The threshold algorithm is used to split the image into low and high-frequency sub-bands. For higher perception, the image is computed into superpixels. After computation, soft classification is performed by using a supervised machine learning algorithm. Finally, the Graph cut method is performed to obtain an image with the exact location of cysts in ovaries.



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TOOLS USED

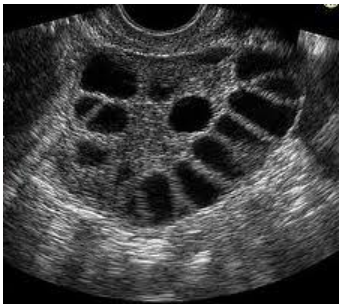
Python is a high level and interpreted language that can be used in many applications. Especially, in machine learning, it plays a vital role. Python has many library files to process the images. Sckikit is one of the libraries in python that provide lots of algorithms for image processing.

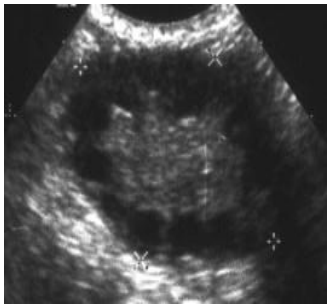
In python manipulations like cropping, flipping, rotating and image extraction, image restoration, image recognition is being done because it is a scientific programming language and it's free availability of many state of the art image processing tool.

Anaconda is a free and open-source platform. Anaconda does not have Integrated Development Environment on its own. It has a default Integrated Development Environment with anaconda tool and it is known as spyder and it is the python package and it can also be installed without the support of anaconda.

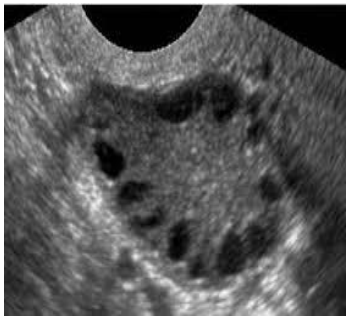
EXPECTED RESULT

SEVERAL INPUT IMAGES





ENHANCED INPUT IMAGE



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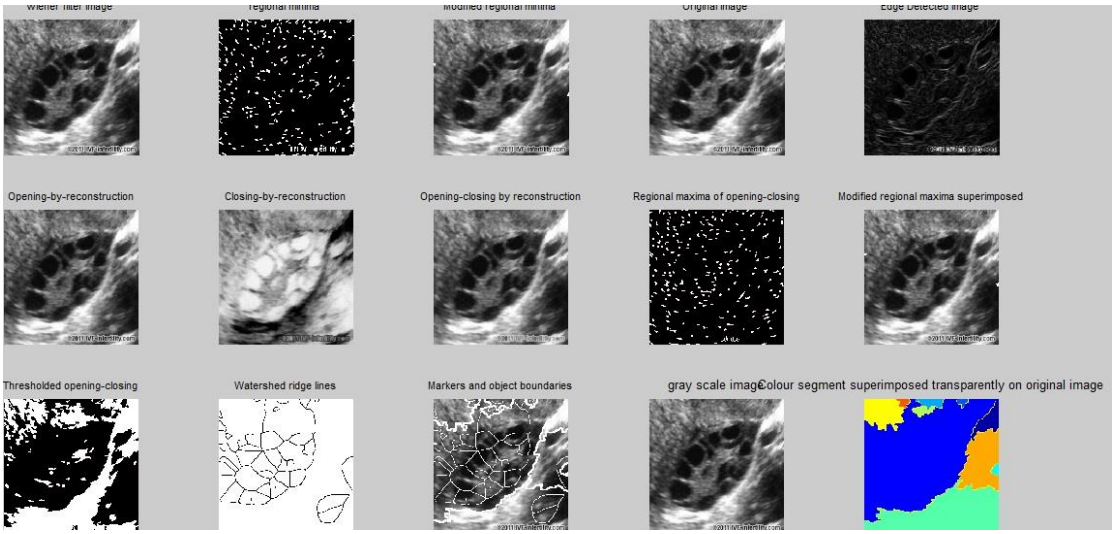
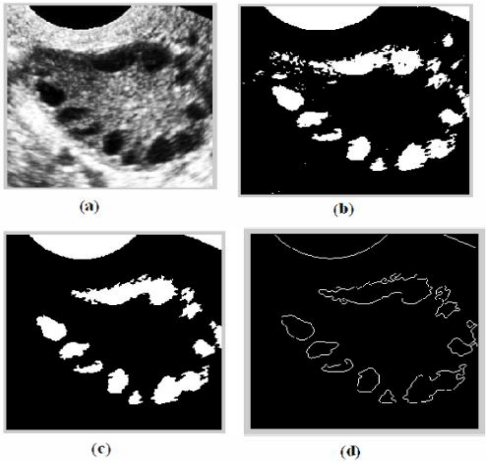
PRE-PROCESSED IMAGES



FINAL OUTPUT IMAGE



CONCLUSION

In our project, the Anaconda tool is used. In that tool, we coded in python language to process the ultrasound images. Python is useful for faster and accurate computation. It performs the segmentation and classification process and produces the result. The result shows the exact location of cysts in the image and assists the doctors to perform their further process. Using of Anaconda tool makes the coding more efficient. This technique is more efficient and reliable it helps the doctor to operate successfully.

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