Adaptive speckle reduction in ultrasound images using fuzzy logic

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The decrease in the speckle noise in the ultrasound images can be highly effective in improving the images and helping diagnose the disease. in this paper adaptive fuzzy filter is applied in ultrasound images to decrease the speckle noise. This method is based on fuzzy logic. The elimination of speckle by this filter incorporates in two stages of diagnosis and filtering. In the stage of diagnosis, the parameter of coefficient of variation is applied in order to classification of the images pixels. Hence the pixels with low coefficient of variation belong to homogenous zone, the pixels with high coefficient of variation belong to the edge zone and the pixels with medium coefficient of variation belong to the detail zone. In the filtration stage, in order to obtain better result, the best filter is used in each zone. In the homogenous zone the average filter , in detail zone the mean filter in edge zone the adaptive weighted average filter is used. By applying this method, the noise speckle is decreased in ultrasonic images without affecting the edge and main form of the image.

Keywords : speckle noise , ultrasound .fuzzy logic , coefficient of variation