

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

**COMPARATIVE PERFORMANCE EVALUATION OF
ENHANCEMENT TECHNIQUES IN BREAST ULTRASOUND
IMAGES**

P04S19

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IN THE NAME OF ALLAH, THE MOST GRACIOUS AND THE MOST MERCIFUL.

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ABSTRACT

Image enhancement has been widely used in medical field, particularly for the purpose of pre-processing technique of the images. Ultrasound image is the type of medical image that is usually applied in detecting breast cancer. However, ultrasound image suffers from speckle noise which is generated by the effect of environmental conditions on the image sensor during acquisition of the image. Thus, noise in images must be reduced before the image can be utilized. Therefore, image enhancement techniques namely Bilateral Filter (BF), Histogram Equalization (HE) and Contrast Limited Adaptive Histogram Equalization (CLAHE) were used in this research to enhance the breast ultrasound image. In order to measure the performance of these enhancement techniques, Image Quality Assessment Metric (IQM) and segmentation testing were applied on the enhanced images. IQM which consists of Mean Square Error (MSE) and Peak Signal-to-Noise Ratio (PSNR) of each image was calculated and compared, while Seed Base Region Growing method was chosen to perform segmentation testing. If the contrast of the entire image was taken into consideration, the best enhancement technique is Histogram Equalization. Otherwise, experimental result shows that Bilateral Filter method give high PSNR value which indicates good quality of image. Furthermore, it shows that the Bilateral Filter method improved the segmentation results. In short, if the quality of the image were taken into consideration, Bilateral Filter (BF) seems to be the best option.