

**UNIVERSITI TEKNOLOGI MARA**

**SEGMENTING  
MICROCALCIFICATION IN FULL-  
FIELD DIGITAL MAMMOGRAM  
USING SEED-BASED REGION  
GROWING AND MATHEMATICAL  
MORPHOLOGY**

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## ABSTRACT

Nowadays screening mammography is widely recognized as the only imaging modality that is useful for the early detection of breast abnormalities. This is due to the fact that mammography is able to detect abnormality (microcalcifications) in the breast two years ahead before the abnormalities become palpable. In order to detect these microcalcifications successfully, a good segmentation technique is required. Seed-Based Region Growing (SBRG) has been widely used as segmentation method for medical images. The first process in SBRG is to identify an initial seed point. Most of the SBRG methods identify the seed point manually which involve human interaction. In this study, the SBRG method is enhanced using Mathematical Morphology (MM) technique. Morphology involves a theory for the analysis of shape and spatial structures. The roles of MM are used in developing an automated initial seed point and for post processing to obtain a smooth shape and boundary of microcalcifications. These methods are tested on 50 region of interest (ROI) images confirmed by a radiologist to consist microcalcifications. The results were compared with manual seed point selection. The performance is evaluated using Receiving Operator Curve (ROC) based on level of detection and classification. Experimental results show that the level of detection and classification for automated seed point are 0.98 and 0.94, respectively. On the other hand, the level of detection and classification for manual seed point are both 0.93. Since the values for automated seed point are closer to 1 as compared to the values of manual seed point, it can be said that the use of automated seed point is better than manual seed point. Consequently, this implies that the automated seed point has successfully segmented the microcalcifications.

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