Differentiating malignant from benign microcalcifications based on mammographic findings is a difficult diagnostic task, resulting in more than 50% of breast biopsies performed on actually benign lesions. We have developed a computerized classification scheme that has the potential to classify malignant and benign microcalcifications more accurately than radiologists, and to help radiologists improve biopsy recommendations. The purpose of this study is to evaluate whether computerized detection of microcalcifications affects computer classification performance, in anticipation of fully automating the classification scheme. We used two independent databases of mammograms containing biopsy-proven microcalcifications. The first database consisted of 100 images (40 malignant, 60 benign), the second 201 images (92 malignant, 109 benign). We studied the effect on classification performance of true microcalcifications missed by computerized detection by excluding computer detected false-positive signals. We studied the effect on classification performance of computer detected false-positive signals by artificially keeping the number of computer detected true microcalcifications constant. We found on the first database that when properly trained, high classification performance was maintained at Az>=0.9, when 40% or more true microcalcifications were detected. Classification performance was not significantly degraded by computer-detected false-positive signals as long as they were less than half of the total detections. Similar results were obtained on the second database. Therefore, moderate numbers of missed true microcalcifications and moderate numbers of computer-detected false-positive signals do not degrade the classification of malignant and benign microcalcifications.

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