Purpose:To investigate the usefulness of the standard deviation of pixel values in a whole mammary glands region and the percentage of a high-density mammary glands region to a whole mammary glands region as features for classification of mammograms into four categories based on the ACR BI-RADS breast composition.

Methods:We used 36 digital mediolateral oblique view mammograms (18 patients) approved by our IRB. These images were classified into the four categories of breast compositions by an experienced breast radiologist and the results of the classification were regarded as a gold standard. First, a whole mammary region in a breast was divided into two regions such as a high-density mammary glands region and a low/iso-density mammary glands region by using a threshold value that was obtained from the pixel values corresponding to a pectoral muscle region. Then the percentage of a high-density mammary glands region to a whole mammary glands region was calculated. In addition, as a new method, the standard deviation of pixel values in a whole mammary glands region was calculated as an index based on the intermingling of mammary glands and fats. Finally, all mammograms were classified by using the combination of the percentage of a high-density mammary glands region and the standard deviation of each image.

Results:The agreement rates of the classification between our proposed method and gold standard was 86% (31/36). This result signified that our method has the potential to classify mammograms.

Conclusions:The combination of the standard deviation of pixel values in a whole mammary glands region and the percentage of a high-density mammary glands region to a whole mammary glands region was available as features to classify mammograms based on the ACR BI-RADS breast composition.