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# K-Means Clustering and Classification of Kinetic Curves on Malignancy in Dynamic Breast MRI

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Contrast-Enhanced magnetic resonance of the breast (CE-MRI) is a useful tool for the diagnosis of breast malignancy. Because of its great sensitivity to malignancy, CE-MRI of the breast finds lesions that may not be found on mammography or second-look ultrasound. However, a typical CE-MRI examination produces numerous images which need to be analyzed by ones. The complete analysis of a single dataset requires a long time for the radiologist to diagnose and is an error-prone process due to the errors caused by the fatigue and the habituation of the radiologist. Computer aided diagnosis (CAD) related to CE-MRI is able to help the clinicians in the analysis of big datasets and in the differentiation of kinetic curve patterns. In this study, we present an examination of K-means classifier for the classification of signal intensity curves on malignancy extracted from CE-MRI images. We used 13 examinations with diagnostically confirmed results. From this data, we extracted 1734 malignant patterns and used them to train. The signal patterns were divided into 10 classes through K-means clustering algorithm. The kinetic curves on the tumor region were computationally classified with the centroid signals acquired from the clustering, and the distribution of each class was mapped on the tumor region. The result shows visually the classified distributions of the kinetic curves corresponding to the malignant tumor region. Moreover, various malignant cases could be analyzed by the rank of the kinetic distributions. This technique will help the radiologist particularly in exactly diagnosing a malignant tumor with heterogeneous patterns.

Keywords : Dynamic Breast MRI, Malignancy, K-means Clustering