

## Least-Square Support Vector Machine for Characterization of Clusters of Microcalcifications

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**Abstract :** Clusters of Microcalcifications (MCCs) are most frequent symptoms of Ductal Carcinoma in Situ (DCIS) recognized by mammography. Least-Square Support Vector Machine (LS-SVM) is a variant of the standard SVM. In the paper, LS-SVM is proposed as a classifier for classifying MCCs as benign or malignant based on relevant extracted features from enhanced mammogram. To establish the credibility of LS-SVM classifier for classifying MCCs, a comparative evaluation of the relative performance of LS-SVM classifier for different kernel functions is made. For comparative evaluation, confusion matrix and ROC analysis are used. Experiments are performed on data extracted from mammogram images of DDSM database. A total of 380 suspicious areas are collected, which contain 235 malignant and 145 benign samples, from mammogram images of DDSM database. A set of 50 features is calculated for each suspicious area. After this, an optimal subset of 23 most suitable features is selected from 50 features by Particle Swarm Optimization (PSO). The results of proposed study are quite promising.

**Keywords :** clusters of microcalcifications, ductal carcinoma in situ, least-square support vector machine, particle swarm optimization

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