

AbstractID: 2861 Title: A Comparison of Two Genetic Algorithms for Feature Selection in the Detection of Breast Cancers

Purpose: Features are usually extracted for separating breast cancers from normal areas in computer-aided detection (CAD) on screening mammograms. Feature selection is an important step to select a best subset for achieving the best detection of breast cancers.

Method and Materials: The study is to evaluate two genetic algorithms for feature selection for breast cancer detection. Normal regions of 512×512 pixels were extracted from normal mammograms, and abnormal regions of 512×512 pixels depicting breast cancers were extracted from cancer cases. A total of 86 features were extracted from each region, including 18 features from curvilinear structure analysis, 16 from texture analysis, 32 from Gabor filtering, and 20 from wavelet decomposition. Two genetic algorithms (GA), simple GA (SGA) and CHC, were used to select a subset of features. A linear discriminant analysis (LDA) was used to classify cancer regions from normal regions with the selected feature subset. The performance was evaluated by using the Receiver Operating Characteristic (ROC) analysis.

We have tested these two feature selection methods on a dataset of 296 normal regions and 164 cancer regions (including 53 masses, 56 spiculated lesions and 55 microcalcifications) extracted from mammograms selected from DDSM database.

Results: The overall ROC performance of SGA and LDA is $A_z=0.90$, with comparison to $A_z=0.93$ of CHC and LDA.

Conclusion: We compared two genetic algorithms for feature selection. CHC performed better than SGA for the detection of breast cancers in the current study.