عنوان مقاله:

Accurate Detection of Breast Cancer Metastasis Using a Hybrid Model of Artificial Intelligence Algorithm

محل انتشار:

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خلاصه مقاله:

Background: Breast cancer (BC) is a prevalent disease and a major cause ofmortality among women worldwide. A substantial number of BC patientsexperience metastasis which in turn leads to treatment failure and death. Thesurvival rate has been significantly increased due to more rapid detection andsubstantial improvements in adjuvant therapies including newerchemotherapeutic and targeted agents, and better radiotherapy techniques. Methods: In this study, we cross-compared the application of advancedartificial intelligence algorithms such as Logistic Regression, K-NearestNeighbors, Discrete Cosine Transform, Random Forest Classifier, Support VectorMachines, Multilayer Perceptron, and Ensemble to diagnose BC metastasis. Wefurther combined MLP with genetic algorithm (GA) as a hybrid method ofintelligent analysis. The core data we used for comparison belonged to the imagesof both benign and malignant tumors collected from Wisconsin Breast Cancerdataset from the UCI repository.Results: The application of several different algorithms to the collection of BCdata indicated that these algorithms have comparable accuracy rate in detectingand predicting cancer. However, our hybrid algorithm showed superior accuracy,sensitivity and specificity compared to the individual algorithms. Two methods ofcomparison (Cross-Validation and Holdout) were applied to this study whichproduced consistent results. Conclusion: Our findings indicate that our MLP-GA hybrid algorithm can speedup diagnosis with higher accuracy rate than the individual patterns of algorithm.

کلمات کلیدی:

Breast cancer, metastasis, machine learning, specificity selection, classification algorithms, hybrid algorithm.