**نویسندگان:**

Jue Zhang - *Scholl of Information and Technology, Northwest University, Xi&#o۳۹;an,China*

Li Chen - *shool of Information and Technology, Northwest Nniversity, Xi&#o۳۹;an, Chian*

**خلاصه مقاله:**

Introduction: Breast cancer is the second cause of mortality among women. Early detection is the only rescue to reduce the risk of breast cancer mortality. Traditional methods cannot effectively diagnose tumor since they are based on the assumption of well-balanced dataset.. However, a hybrid method can help to alleviate the two-class imbalance problem existing in the diagnosis of breast cancer and establish a more accurate diagnosis. Material and Methods: The proposed hybrid approach was based on improved Laplacian score (LS) andK-nearest neighbor (KNN) algorithms called LS-KNN. An improved LS algorithm was used for obtaining the optimal feature subset. The KNN with automatic K was utilized for classifying the data which guaranteed the effectiveness of the proposed method by reducing the computational effort and making the classification more faster. The effectiveness of LS-KNN was also examined on two biased-representative breast cancer datasets using classification accuracy, sensitivity, specificity, G-mean, and Matthews correlation coefficient. Results: Applying the proposed algorithm on two breast cancer datasets indicated that the efficiency of the new method was higher than the previously introduced methods. The obtained values of accuracy, sensitivity, specificity, G-mean, and Matthews correlation coefficient were ۹۹.۲۷%, ۹۹.۱۲%, ۹۹.۵۱%, ۹۹.۴۲%, respectively. Conclusion: Experimental results showed that the proposed approach worked well with breast cancer datasets and could be a good alternative to the well-known machine learning methods

**کلمات کلیدی:**

Breast Cancer, classification, imbalance, Computer aided diagnosis