عنوان مقاله:

The Potential of Machine Learning Algorithms in Discriminating Chronic Obstructive Pulmonary Disease and Healthy Saliva Samples

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خلاصه مقاله:

Background: Today, with the spread of tobacco use and increased environmental pollutions, respiratory diseases are considered important factors threatening human life. Chronic obstructive pulmonary disease (COPD) is a kind of inflammatory lung disease. Clinically, COPD is currently diagnosed and monitored by spirometry as the gold-standard technique although spirometry systems encounter some limitations. Thanks to the economical handling and sampling, practicality, and non-invasiveness of saliva biomarkers, it is promising for the testing environment. Accordingly, the current analytic observational study aimed to propose an intelligent system for COPD detection.Materials and Methods: To this end, ۴۰ COPD (۸ females and ۳۲ males in the age range of ۷۱.۶۷ ± ۸.۲۷ years) and ۴۰ controls (۱۷ females and ۲۳ males within the age range of ۳۸.۲۳ ± ۱۴.۰۵ years) were considered in this study. The samples were characterized by absolute minimum value and the average value of the real and imaginary parts of saliva permittivity. Additionally, the age, gender, and smoking status of the participants were determined, and then the performance of various classifiers was evaluated by adjusting k in k-fold cross-validation (CV) and classifier parameterization.Results: The results showed that the k-nearest neighbor outperformed other classifiers. Using both ۸- and ۱۰-fold CV, the maximum classification rates of ۱۰۰% were achieved for all k values. On the other hand, increasing the k in k-fold CV improved classification performances. The positive role of parameterization was revealed as well.Conclusions: Overall, these findings authenticated the potential of machine learning (ML) algorithms in the diagnosis of COPD using subjects' saliva features and demographic information.

کلمات کلیدی:

Chronic obstructive pulmonary disease, Saliva, Machine learning, Diagnosis