A performance comparison of wheeze feature extraction methods for asthma severity levels classification

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ABSTRACT

Asthma is a chronic disease that requires monitoring and treatment throughout the patient's lifetime. The common adventitious sounds related to asthma are wheezes. A study that has classified the severity of asthma using wheezes are still lacking in the field, therefore, the purpose of this work is to compare feature extraction methods for the classification of asthma severity level. Three types of features opted are mel frequency cepstral coefficients (MFCC); short time energy (STE); auto-regressive model and k-nearest neighbor (KNN) classifier is used in representing the performance of the feature used. Based on the overall performance between the features, MFCC features and KNN classifier shows the best and the highest performance with 95.92%, 96.33% and 98.42% average accuracy, sensitivity and specificity value obtained compared to STE that only obtained the highest average accuracy, sensitivity and specificity value of 84.94%, 87.33% and 95% respectively while AR features only obtained the highest average accuracy, sensitivity and specificity value of 49.43%, 52.17%, and 82.79% respectively.

KEYWORDS

Respiratory sounds; Wheeze; Asthma; Feature extraction; Mel frequency cepstral coefficients; Short time energy; Auto-regressive model