Computerized lung sound based classification of asthma and chronic obstructive pulmonary disease (COPD)

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Abstract

Diagnostic ambiguity between chronic pulmonary diseases like asthma and Chronic Obstructive Pulmonary Disease (COPD) is very high, as they exhibit similar symptoms, which is the factor responsible for misdiagnosis, leading to heavy deaths every year. To prevent misdiagnosis, some useful work is highly required. This article presents the implementation of a computerized lung sound (LS) based method to classify asthma and COPD cases. The study is conducted on 80 asthma, 80 COPD and 80 healthy LSs. The LS denoising is carried out using empirical mode decomposition (EMD), Hurst analysis and spectral subtraction method. Wavelet entropy (WE) and wavelet packet energy (WPE) features of LS's are extracted. Various classifiers like support vector machine (SVM), decision tree (DT), k-nearest neighbor (KNN) and discriminant analysis (DA) are accessed to classify healthy, COPD and asthma using WE and WPE features of LS to produce better outcomes. Using the proposed algorithm, the study discriminates between healthy, asthma and COPD cases based on LS with a considerable classification accuracy of 99.3% using the decision tree (DT) classifier. Thus, the study confirms the successful differentiation of asthma and COPD based on LS. Future endeavours will be based on the validation of this algorithm to distinguish the real-time LS data acquired from asthmatic and COPD patients.

Biography

Mache Tsadik has completed his PhD at the age of 45 years from Mekelle University. Currently, he is the working as a director of kilte-Awlaelo Health and demographic surveillance System and senior academician and researcher In school of public health. He published more than 20 papers related to STIs/HIV in reputed journals and serving as an editorial board member of African demographic journal.