عنوان مقاله:

A Hybrid Method for the Diagnosis and Classifying Parkinson's Patients based on Time–frequency Domain Properties and K-nearest Neighbor

محل انتشار:

مجله سیگنالها و سنسورهای پزشکی, دوره 10, شماره 1 (سال: 1399)

تعداد صفحات اصل مقاله: 7

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خلاصه مقاله:

The vibrations of hands and arms are the main symptoms of Parkinson's ailment. Nevertheless, the affection of the vocal cords leads to troubles and defects in the speech, which is another accurate symptom of the disease. This article presents a diagnostic model of Parkinson's disease (PD) and proposes the time–frequency transform (wavelet WT) and Mel-frequency cepstral coefficients (MFCC) treatment for this disease. The proposed treatment is centered on the vocal signal transformation by a method based on the WT and to extract the coefficients of the MFCC and eventually the categorization of the sick and healthy patients by the use of the classifier K-nearest neighbor (KNN). The analysis used in this article uses a database that contains ۱۸ healthy patients and twenty patients. The Daubechies mother WT is used in treatments to compress the vocal signal and extract the MFCC cepstral coefficients. As far as, the diagnosis of Parkinson's ailment is concerned the KNN classifying performance gives ۸۹% accuracy when applied to ۵۲% of the database as training data, whereas when we increase this percentage from ۵۲% to ۷۳%, we reach ۹۸.۶۸% accuracy which is higher than using the support-vector machine classifier. The KNN is conclusive in the determination of the PD. Moreover, the higher the training data is, the more precise the results are.

کلمات کلیدی:

K-nearest neighbor, Mel-frequency cepstral coefficient, Parkinson's disease, wavelet