عنوان مقاله:

A Novel Intelligent Fault Diagnosis Approach for Critical Rotating Machinery in the Time-frequency Domain

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نویسندگان:

B. Attaran - *Mechanical Engineering Department, Shahid Chamran University of Ahvaz, Iran*

A. Ghanbarzadeh - *Mechanical Engineering Department, Shahid Chamran University of Ahvaz, Iran*

S. Moradi - *Mechanical Engineering Department, Shahid Chamran University of Ahvaz, Iran*

خلاصه مقاله:

The rotating machinery is a common class of machinery in the industry. The root cause of faults in the rotating machinery is often faulty rolling element bearings. This paper presents a novel technique using artificial neural network learning for automated diagnosis of localized faults in rolling element bearings. The inputs of this technique are a number of features (harmmean and median), which are extracted from the vibration signals of the test data. Effectiveness and novelty of this proposed method are illustrated by using the experimentally obtained the bearing vibration data based on laboratory application. In this research, based on the fast kurtogram method in the time-frequency domain, a technique for the first time is presented using other types of statistical features instead of the kurtosis. For this study, the problem of four classes for bearing fault detection is studied using various statistical features. This study is conducted in four stages. At first, the stability of each feature for each fault mode is investigated, then resistance to load change as well as failure growth is studied. At the end, the resolution and fault detection for each feature using the comparison with a determined pattern and the coherence rate is calculated. From the above results, the best feature that is both resistant and repeatable to different variations, as well as the suitable accuracy of detection and resolution, is selected and with comparing to the kurtosis feature, it is found that this feature is not in a good condition in compared with other statistical features such as harmmean and median. The results show that the accuracy of the proposed approach is 100% by using the proposed neural network, even though it uses only two features.

کلمات کلیدی:

Fast Kurtogram, Bearing Fault Detection, Statistical Features, Time-frequency Domain