
Vibration signal analysis using histogram features and support vector machine for gear box fault diagnosis

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Abstract: This paper discusses about the extraction of histogram features from the vibration signal of the different conditions of the gear box under investigation, and the application of machine learning method, support vector machine in machine condition monitoring and diagnostics. This paper aims at using classification methods for fault diagnosis of the gear box under investigation. In this paper fault diagnostics of spur bevel gear box is treated as a pattern classification problem. The major steps in pattern classification are feature extraction, and classification. This work investigates the use histogram features and support vector machine for classification. The results show that the developed method can reliably diagnose different conditions of the gear box.

Keywords: fault diagnosis; histogram features; support vector machine; SVM; gear box; vibration signal processing.

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Biographical notes: Saravanan Natarajan has 17 years of experience of which 13 years are in teaching in engineering colleges in Sultanate of Oman and in India at post graduate and undergraduate level. He is an active researcher in field of condition monitoring of mechanical equipment. He has four years industrial experience in the field of CAD/CAE. He has carried out many projects for GEA, USA. He worked in General Electric Appliances in Louisville, Kentucky state, USA.

1 Introduction

Chen and Mo (2004) used wavelet transform techniques in combination with a function approximation approach to extract fault features which were used with a neural network, the development of transforms, such as the fast Fourier transform (FFT). Peng and Chu (2004) have allowed the conversion of the time domain data into frequency spectra with