

Unsupervised Fault Diagnosis of Journal Bearing Rotor System with Heterogeneous Data

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ABSTRACT

In general, it is extremely difficult to obtain failure data of real systems in the field such as power plant rotor systems. To accommodate the dearth of field failure data, conventional approaches employ data collected from a testbed that emulates the normal and faulty conditions of the real systems. Nevertheless, it is obvious that approaches developed with failure data solely collected from a testbed may not be ideal to diagnose the real systems. To this end, this paper proposes a unsupervised fault diagnostic approach for journal bearing systems that incorporates heterogeneous data from the testbed and real field systems. To demonstrate the validity of the proposed approach, a case study is conducted with the RK4 rotor kit and the power plant journal bearing system. The combination of vibration image generation with deep learning helps us use data from systems with an identical working principle but different scales. We anticipate that, by incorporating the heterogeneous data, the proposed approach can diagnose the conditions of actual journal bearing systems in the field more accurately.