Data Availability Statement (Data Collected from the Multi-Sensor Fault Testing Platform for Gearboxes)

1. Overview of the Experimental Platform

The experimental platform consists of the following modules: three-phase asynchronous motor, variable frequency drive, parallel gearbox, magnetic powder brake, double-support bearing housing unit

Data is collected through four vibration sensors and one acoustic sensor installed on the gearbox and bearing support platform.

2. Data Collection Process

During the signal acquisition phase, the motor operates at a constant speed of 1800 rpm, collecting both vibration and acoustic signals. The data encompasses both normal operating conditions and various fault conditions, ensuring the diversity and representativeness of the dataset. The sampling frequency is set at 20,000 Hz, allowing for high precision and detail in the signal capture.

3. Classification of Operating Conditions

The entire dataset includes eight different operating conditions, listed in the following order:

0. Gear tooth breakage
1. Gear cracking
2. Gear tooth missing
3. Bearing rolling element fault
4. Inner race fault
5. Outer race fault
6. Normal operating condition
7. Compound bearing fault (inner and outer race)

This diverse range of conditions enables comprehensive fault analysis and feature extraction within the dataset.

4. Data Applicability

This dataset is suitable for various research and application scenarios, including but not limited to:

Fault diagnosis and prediction for gearboxes
Multi-sensor data fusion and analysis
Mechanical fault mode identification

Training and validation of machine learning models

Due to the diversity and high quality of the data, researchers can leverage this dataset for in-depth analysis and modeling, advancing the development of fault detection algorithms and predictive maintenance models.