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# MULTIVIZ VIBRATION

Early detection of  
gearbox failure

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## MODE IDENTIFICATION

# DETECTING FAILURE 2 MONTHS IN ADVANCE

Based on historic vibration data collected by sensors in a gearbox shaft, **MultiViz Vibration** detected asset failure two months before it happened. Automatic Mode Identification found a new operational mode in the equipment, caused by inner raceway failure in the high-speed shaft bearing, which ultimately led to the replacement of the entire gearbox.

### BACKGROUND

Data was collected from an accelerometer located in the axial direction of a shaft connecting a gearbox to a power generator. The vibration signals were recorded every 12 hours for 50 months since the machine began operation. Each segment was 1.28 seconds long with a sampling rate of 12.8 kHz.

### IDENTIFICATION OF OPERATIONAL MODES

The Mode Identification feature is powered by our AMI unsupervised algorithm for multivariate time series. It performs multidimensional time series data segmentation and clustering in vibration data, detecting time periods in which the data exhibits a similar structure and reflecting them into operational modes.

Operational modes often correctly capture typical states of an asset, like on/off, different

production settings or developing failures. The emerging of a new, previously not seen mode, can point towards either an asset being used in a new way or a failure.

To perform Mode Identification with MultiViz Vibration, the user simply needs to upload vibration time series data and the asset. Then, via our API or Python package, request an analysis for the population of sources.

### RESULTS

MultiViz Vibration first detected an operational mode at the beginning of the life of the machine, identified as a normal operational mode. However, after 11 months, a new operational mode emerged, lasting for three months. The new mode was caused by a high-speed shaft bearing fault, which had only been caught by

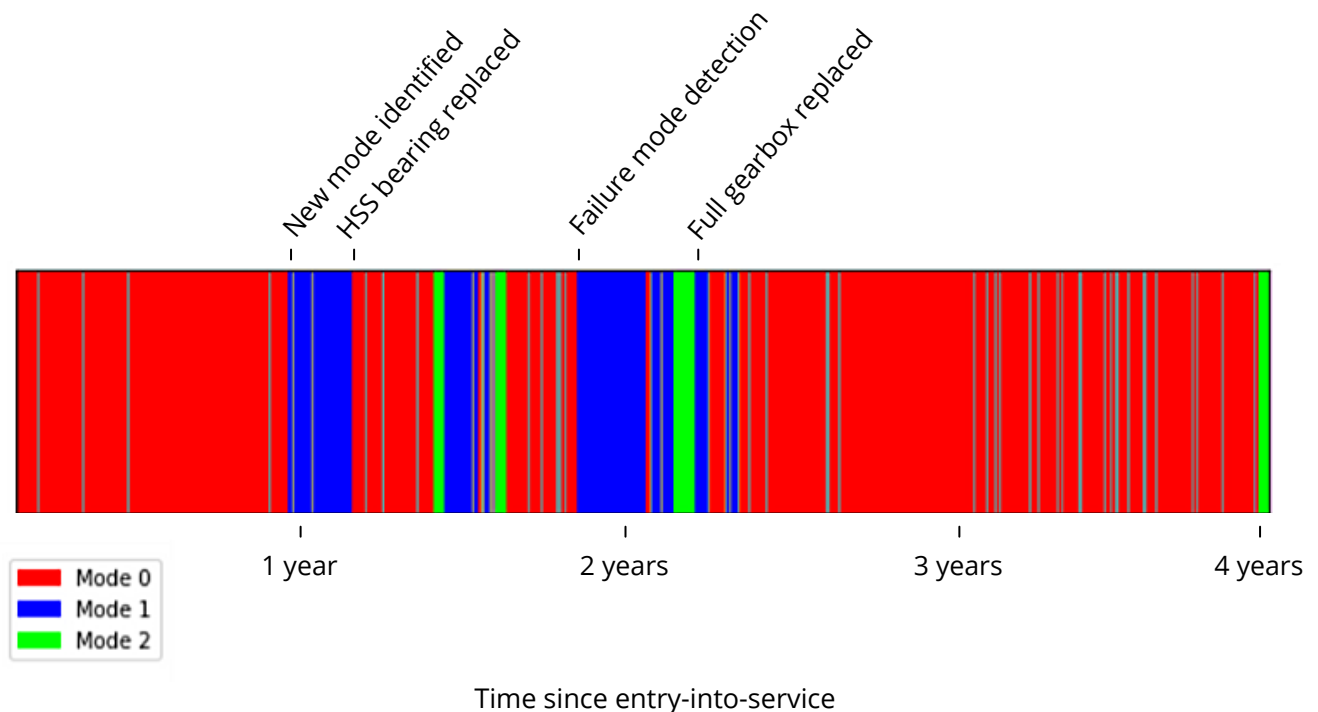


traditional maintenance techniques two months after the data first identified it.

The bearing was replaced, and the machine immediately went back to the initial normal operating mode. Some months later, the same failure mode is again identified, as the problem from the high-speed shaft bearing extended to

the other components of the gearbox, affecting its operations and demanding the replacement of the entire equipment.

The image shows all the modes identified in the gearbox, the blue one being the failure mode. Grey represent areas with uncertainty around its mode assignment.



**MULTIVIZ VIBRATION** enables OEMs and maintenance companies to add value to their offer through analytics features powered by Machine Learning algorithms. Available as an API and Python Package, it allows large-scale unsupervised analysis of the history of an asset or a population of assets. Scan the QR code to learn more.

