

ABSTRACT

The present application relates to anomaly detection methods and systems for rotating equipment. The method includes the steps of collecting tri-axial acceleration raw data from sensors attached to the rotating equipment; pre-processing the raw data through alignment and averaging over one rotation period of the rotating equipment to obtain pre-processed data; extracting and combining features from the pre-processed data; training a transformer-based autoencoder model by utilising the features to generate embeddings representing normal operational behaviour; and detecting an anomaly by reconstructing input data with the transformer-based autoencoder model; a deviation between the input data and reconstructed data beyond a preset range indicates the anomaly. Accurate and timely anomaly detection is vital for predictive maintenance, allowing issues to be identified before they escalate into failures, thereby reducing downtime and associated costs.

Fig. 1 for publication