Article

Title

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Abstract: A single paragraph of about 200 words maximum. For research articles, abstracts should give a pertinent overview of the work. We strongly encourage authors to use the following style of structured abstracts, but without headings: (1) Background: place the question addressed in a broad context and highlight the purpose of the study; (2) Methods: describe briefly the main methods or treatments applied; (3) Results: summarize the article's main findings; (4) Conclusions: indicate the main conclusions or interpretations. The abstract should be an objective representation of the article, it must not contain results which are not presented and substantiated in the main text and should not exaggerate the main conclusions.

Keywords: keyword 1; keyword 2; keyword 3 (List three to ten pertinent keywords specific to the article; yet reasonably common within the subject discipline.)

1. State-of-Art andRelated Works

The K-means algorithm is used in [1,2] to label the degradation states of bearings. In [1], the labelled timeseries are than used to train a CNN recognition model. Traditional statistical features (TSF) and MFCC are used to form the hyperspace in which to cluster the data. When evaluating the state of the system, the raw data are fede to CNN model withowt the need to extract features. The authors validated this algorithm on the IMS bearing dataset [3]. In [2], the TSF are used toghether with the Shannon's as features to perform the clustering. The authors then converted the timeseries into images and used a CNN (Alexnet) to classify the degradation states. This method was validated on the IMS and the CWRU datasets.

A computer vision method to detect anomalies in mechanical systems is proposed in [4]. Thi has the advantage of evaluating vibrations in multiple points of interest without phisical contact with the observed component.

Abbreviations

The following abbreviations are used in this manuscript:

IMS	Intelligent Maintenance Systems
MFCC	Mel-frequency cepstral coefficients
TSF	Traditional Statistical Features
CWRU	Case Western Reserve University

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2. Pinedo-Sánchez, L.A.; Mercado-Ravell, D.A.; Carballo-Monsivais, C.A. Vibration analysis in bearings for failure prevention using CNN. *Journal of the Brazilian Society of Mechanical Sciences and Engineering* **2020**, *42*, 628. https://doi.org/10.1007/s40430-020-02711-w.

3. Lee, J.; Qiu, H.; Yu, G.; Lin, J.; Services, R.T. Bearing Data Set. IMS, University of Cincinnati, NASA Prognostics Data Repository, NASA Ames Research Center, Moffett Field, CA, 2007. Accessed on [Insert date of access].

4. Spytek, J.; Machynia, A.; Dziedziech, K.; Dworakowski, Z.; Holak, K. Novelty detection approach for the monitoring of structural vibrations using vision-based mean frequency maps. *Mechanical Systems and Signal Processing* **2023**, *185*, 109823. https://doi.org/https://doi.org/10.1016/j.ymssp.2022.109823.