Condition Based Predictive Maintenance System.

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INTRODUCTION

- Modern revolution in the industry has brought some complex technologies into the market. Thus there is a need for a sophisticated and robust maintenance system to avoid unplanned breakdown.
- This study proposes a new approach for predictive maintenance and verifies the same; this approach can used to design cost-efficient and off-the-shelf solution to prevent unplanned breakdowns.

RESEARCH OBJECTIVE

- To design a predictive maintenance solution that can be used off the shelf for a wide range of assets (Machines)
- A hybrid approach to use the system as a condition-based monitor at the initial stage and using batch learning to improve the signature library and predict upcoming faults. Moreover, increase the accuracy and list of faults prognosed over the period. A hybrid approach will reduce both time and cost in implementing the solution.

LITERATURE REVIEW

- Reducing the noise in the captured vibration signal. Moreover, using FeedForward Neural Network with Artificial Neural Network to predict the RUL of bearing. [1]
- The Robustness and accuracy of fault detection module can be achieved by using Augmented Deep Sparce Encoder. [2]

METHODOLOGY

- Creating an efficient data storage ecosystem to handle large datasets.
- Using statistical modeling to monitor condition of the asset.
- Once the fault has been identified clustering the dataset in two groups. First group of data when the asset is not faulty, and second of the data when asset is faulty.
- Use Deep Learning to predict the fault before it occurs.
- Automate fault detection and learning cycle to learn new faults and improve fault signature library.

DATA SETS

- *Nasa's Bearing Data set*: This dataset has been captured using four accelerometers, each installed on an individual bearing. The dataset is a matrix of 7588 x 20480. [3]
- *CWRU bearing dataset*: The data files are in MATLAB format; Faults such as ball fault, outer race, inner race are included in the data set. [4]

NEXT STEPS

- Completing Literature review to find the most suitable approach for monitoring and predicting faults in an asset.
- Setting up NVDIA CUDA environment for Rapids and TensorFlow.
- Creating an cloud Database to store data.
- Develop an engine to predict faults of an asset and add new faults to the signature library.

TECHNOLOGIES USED

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4. Download a Data File | Bearing Data Center [WWW Document], n.d. URL https://csegroups.case.edu/bearingdatacenter/pages/download-data-file (accessed 4.9.21).