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IITD-AIA Foundation of Smart Manufacturing

Subject: **Weekly Progress Report**

**INTP23-ML-05: Equipment Failure Prediction for Predictive Maintenance**

What is happening this week:

- Continued Learning more about Deep Learning
- Practicing on NASA Turbofan Jet Engine Dataset
- Practicing on CNC Mill ware Dataset
- Implementing CNN, ANN and LSTM models and trying to improve the accuracy
- Implementing hybrid models
- Read research paper to learn about techniques/ algorithms implemented and how to improve their accuracy
- Comparing results of implemented models

## **Week 7**

17<sup>th</sup> July:

- Learning from the shared resources of Deep Learning
- Practicing on Nasa turbofan engine dataset
- Practicing on CNC mill ware dataset, reviewing all implemented models
- Applying k fold cross validation to test performance of implemented models
- Reading research paper to gain more insight about techniques to handle real world dataset
- Exploring Lazy predict library
- Revising the concept of time series analysis

18<sup>th</sup> July:

- Learning from the shared resources of Deep Learning
- Practicing on Nasa turbofan engine dataset
- Practicing on CNC mill ware dataset, reviewing all implemented models
- Implementing hybrid models to increase accuracy
- Getting training and test accuracy and comparing results (the model which have 100% training accuracy will have problem like overfitting etc.)
- Reading research paper to gain more insight about techniques for predictive maintenance

- Exploring Lazy predict library
- Revising the concept of time series analysis
- implementing CNN, LSTM models

#### 19<sup>th</sup> July:

- Learning from the shared resources of Deep Learning
- Practicing on Nasa turbofan engine dataset
- Practicing on CNC mill ware dataset, summarizing the performance of implemented models
- Implementing hybrid models to increase accuracy on both the datasets
- Getting training and test accuracy (training accuracy: 100% == problem/ error) so gives more understanding about model and feature selection
- Learning from research paper to gain more insight about techniques for predictive maintenance

#### 20<sup>th</sup> July:

- Learning from the shared resources of Deep Learning
- Practicing on Nasa turbofan engine dataset
- Practicing on CNC mill ware dataset
- Reading research paper to learn about techniques used by researchers till now and which of the techniques performs well

#### 21<sup>st</sup> July:

- Learning from the shared resources of Deep Learning
- Practicing on Nasa turbofan engine dataset
- Practicing on CNC mill ware dataset
- Doing comparative analysis of implemented models
- Trying to improve accuracy of implemented models
- Going through research papers in the same domain

#### 22<sup>nd</sup> July:

- Learning from the shared resources of Deep Learning
- Practicing on Nasa turbofan engine dataset
- Practicing on CNC mill ware dataset
- Trying to improve accuracy of implemented models on both the datasets
- Reading research papers.

#### 23<sup>rd</sup> July:

- Learning from the shared resources of Deep Learning
- Practicing on Nasa turbofan engine dataset

- Practicing on CNC mill ware dataset to improve the accuracy
- Trying to improve accuracy by best feature selecting and tuning
- Going through research papers about the similar techniques and trying to learn how can I improve the models
- Trying to implementing hybrid models and increasing their accuracy

## REFERENCES:

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2. [A hybrid predictive maintenance approach for CNC machine tool driven by Digital Twin -ScienceDirect](#)
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4. [LSTM for Predictive Maintenance on Pump Sensor Data | by Jan Werth | TowardsDataScience](#)
5. [Understanding Long Short-Term Memory Recurrent Neural Networks – a tutorial-like introduction \(arxiv.org\)](#)
6. [Lazy Predict: fit and evaluate all the models from scikit-learn with a single line of code | by Eryk Lewinson | Towards Data Science](#)
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