To,
IITD-AIA Foundation of Smart Manufacturing

Subject: **Weekly Progress Report**

Dear sir,
      Following is the required progress report to the best of my knowledge considering relevant topics to be covered.

What happened last week:

- Exploration of data.
- Data pre-processing
- Fourier-Transformation
- Time-frequency analysis

What's happening this week:

Weekly Progress:

Following are the topics I've brushed upon and intend to learn deeper with upcoming days.

July 3:

- Deep dived into learning about Morlet wavelets.
- Power Spectral Density plot and its study
- Feature Extraction from the data.

July 4:

- Convolution, Operations, Theorem
- Convolution in frequency domain.
- CNN model implementation

July 5 and July 6:
      On leave

July 7, July 8 and July 9:

- Worked on CNN model.
    - o   CNN optimization.
    - o   Gradient descent momentum
    - o   Adam optimizer
- Feature selection changes
  and further optimizations.

Weekly Progress:

This week, I focused on building a model and then proceeded to optimize it.
I have chosen CNN model which is really powerful and often used for image processing and signal processing.

In our use-case, we are required to process the frequencies of vibrations, hence CNN is what came to mind first even if it is generally used on the unlabeled and unstructured data.

However, it is no easy task optimizing it, may need to search for even more meaningful features from the data which can then be processed by the model.