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:

- Random-Forest
- CNN
- Troubleshooting issues
- Dashboard

What's happening this week:

Weekly Progress:

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

July 17:

- Keras-Tuner:
  Keras-Tuner is a powerful library specifically designed for hyperparameter tuning in machine learning models built with Keras. It provides a flexible and user-friendly interface for efficiently searching and selecting optimal hyperparameters for your model.
  - Integrated Keras-Tuner into the CNN model training pipeline.
  - Defined a search space for hyperparameters, specifying their range and distribution.
  - Conducted automated hyperparameter tuning using different search algorithms provided by Keras-Tuner.

July 18:

Continuing from the progress made in optimizing the CNN model with Keras-Tuner, I dedicated today's efforts to analyzing and interpreting the results obtained from the automated hyperparameter tuning process.

July 19:

- Building upon the insights gained from the analysis of hyperparameter tuning results, today's focus was on implementing the identified best-performing configuration for the CNN model and conducting further experiments to enhance its performance.
- Conducted experiments to evaluate the performance of the CNN model with the optimized configuration.
- Employed appropriate evaluation metrics to measure accuracy, precision, recall, and other relevant performance indicators.

July 20:

- Continuing from the progress made in implementing the optimized CNN configuration, today's focus was on analyzing the results of the performance evaluation experiments and identifying areas for further improvement.
- Conducted error analysis:
    - Investigated misclassified samples to gain insights into model failures.
    - Identified challenging cases that may require further attention and improvement.

July 21:

- Building upon the insights gained from the performance evaluation and error analysis of the CNN model, today's focus was on making targeted improvements to enhance the model's accuracy and predictive capabilities.
- Model Refinement:
    - Explored techniques for refining machine learning models to improve their performance.
    - Investigated methods for adjusting hyperparameters, tweaking model architecture, and incorporating additional features.
    - Explored transfer learning, which involves leveraging pre-trained models to boost performance on similar tasks.

July 22:

- Continuing from the efforts made in model refinement and data augmentation, today's focus was on conducting further experiments to evaluate the impact of these improvements on the CNN model's performance.

July 23:

- Today's focus shifted towards creating a web dashboard using the Dash Plotly framework to provide a user-friendly interface for visualizing and interacting with the machine learning model's predictions and results.
    - Web Dashboard Creation with Dash Plotly:
    - Explored the Dash Plotly framework for building interactive web applications with Python.
    - Investigated the various components and layout options available in Dash to design the dashboard.
    - Explored methods for integrating the trained CNN model into the dashboard to make real-time predictions.

Weekly Progress:

This week, I focused on building a model and then proceeded to optimize it.
Issues were arisen and dealt-with.
Resolving the issues also turned out to be a learning experience.

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.