# Practical Task

1. Loaded the data and performed some data exploration, exploring the data type of the columns and their format.
2. Processed the data by:
    a. Changing the “Datum/Zeit” feature from an Object to DateTime
    b. Setting the “Datum/Zeit” column as index.
    c. Changing the comma decimal point to a dot decimal point.
    d. Changing the data type of the columns used as features for training the model (from Object to Float).
3. Split the data into features (Wind) and target (Power)
4. Split the data into training set and test set.
5. Reshaped the X_train and the X_test as only 1 feature will be trained, and RF Model expects a 2D array.
6. Scaled the feature (Wind) using standard scaler.
7. Trained a random forest regressor with the scaled training data.
8. Made prediction using X_test scaled data.
9. Evaluated the performance of the model using Mean Squared Error (MSE)
10. Visualized the results using a scatter plot to plot the actual power vs predicted power of the test data.
11. Trained additional features by repeating the steps (3 to 9), using features:
    a. Wind and Rotor
    b. Wind, Rotor and Azimuth
12. Calculated residuals to check for anomalies.
13. Added the residuals to the data frame.
14. Plotted a histogram of the distribution of residuals and a time series of the residuals to determine a threshold for the Anomalies.
15. After checking both plots, the threshold for anomalies was set to 200.
16. Printed the Timestamps of those anomalies and their respective residuals.

*These steps were applied for both Turbine 1 and Turbine 2.