Important information

1. Work with data + code provided in ‘Notebooks_old_data.zip’
2. This has limited amount of data to work in colab
3. Preliminary code already implemented - benchmark
4. Shap analysis (force plots) can be time-consuming - better work with limited data for fast turnaround

To - Dos

1. EDA - Data Exploration (**Priority - 3**)
    a. There is already some provided in the notebook
    b. You need to understand the relationship between the current excitation in the stator poles, rotor position and generated torque.
2. Improve on the NN trained (**Priority - 2**)
    a. There is a benchmark model already in the notebook shared.
    b. Find a better architecture with improved predictive performance
        i. Use AutoML (keras-tuner, TPOT, HyperOpt)
        ii. Also search for models in ensemble modeling
            1. Random Forest
            2. Gradient Boosted trees
                a. LightGBM
                b. CatBoost
3. Perform shap analysis and create Control function (**Priority - 1**)
    a. Train a shap analyzer
    b. Generate a function which takes in 3 inputs
        i. Current Rotor position
        ii. Present Stator excitation
        iii. Target Torque
    c. Returns output
        i. Optimal Stator current sequence - to achieve ‘Target Torque’.
    d. Find ways to reduce the computation time to train shap analyzer
        i. SHAP trains faster on Tree based model, if you use TreeKernel
        ii. Is it necessary to train shap analyzer on the whole data? Can we find a data efficient way of training shap analyzer
4. Progress tracking
    a. Excel sheet to track the experiments you perform
        i. Link - Excel sheet
    b. Code track
        i. Github repo - Use this to save all your work
        ii. Useful for version control - when you write your report

iii. Allows me to check on any code without asking your code