# **Machine Predictive Maintenance Classification**

This project aimed to predict machine failures using a dataset containing information about machine failures and maintenance logs. The dataset included features such as machine type, air temperature, process temperature, rotational speed, torque, tool wear time, and failure type.

## Data analysis

* Loaded data into a panda DataFrame.
* Calculated basic statistical measures for each column.
* Handled missing values.
* Grouped data by machine type and calculated average air temperature.
* Determined the most common failure type.
* Calculated the range of tool wear time.
* Found the mode of the air temperature distribution.
* Counted the unique number of each failure type.
* Calculated the 75th percentile of the air temperature.

## Data visualization

* Visualized the proportion of each failure type using a pie chart.
* Used a histogram and KDE plot to visualize tool wear time across machine types.
* Used a scatterplot to visualize the correlation between rotational speed and torque.
* Created a heatmap to visualize the correlation between all numeric features.
* Visualized the distribution of unique values in the 'Type' column using a bar chart and a pie chart.
* Used a scatterplot to visualize the relationship between air temperature and process temperature.
* Used a countplot to visualize the number of occurrences of each failure type.
* Used a histogram and KDE plot to visualize the distribution of air temperature.
* Used a displot to visualize the distribution of rotational speed across different machine types.

## Data manipulation

* Converted 'Tool wear [min]' column from integer to float for more precise measurements.
* Rearranged columns in the DataFrame to bring 'Tool wear [min]' next to 'Type' for easier comparison and analysis.