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.