Cambridge University Engineering Society
Predictive and Uncertainty Analytics

DATE: February 2021

Digitisation of Technical Benchmarking

Description

Gathering and analysing technical benchmarking data is essential to drive more accurate development evaluation for projects in the early phases. Understanding key building blocks and the confidence level of the results can drive competitiveness and better decision quality.

For offshore wind projects, you are challenged to use the technical benchmarking test data provided and:

- Develop predictive formulae for two key building blocks: **Nacelle weight and single blade weight**. You need to identify the independent variables (tip: use random forest) then use multivariable linear regression.
- Provide range of uncertainty associated with the estimate. (need a starting point? See below):
  - Confidence interval for E ($\hat{y} \mid x^*$), the expected value of $\hat{y}$ for a given x^*, is

$$\hat{y} \pm t^*_{(n-2)} s_y \sqrt{\frac{1}{n} + \frac{(x^* - \bar{x})}{(n-1)s_x^2}}$$

$\hat{y}$ is the output weight

x^* input weight

$\bar{x}$ weights mean

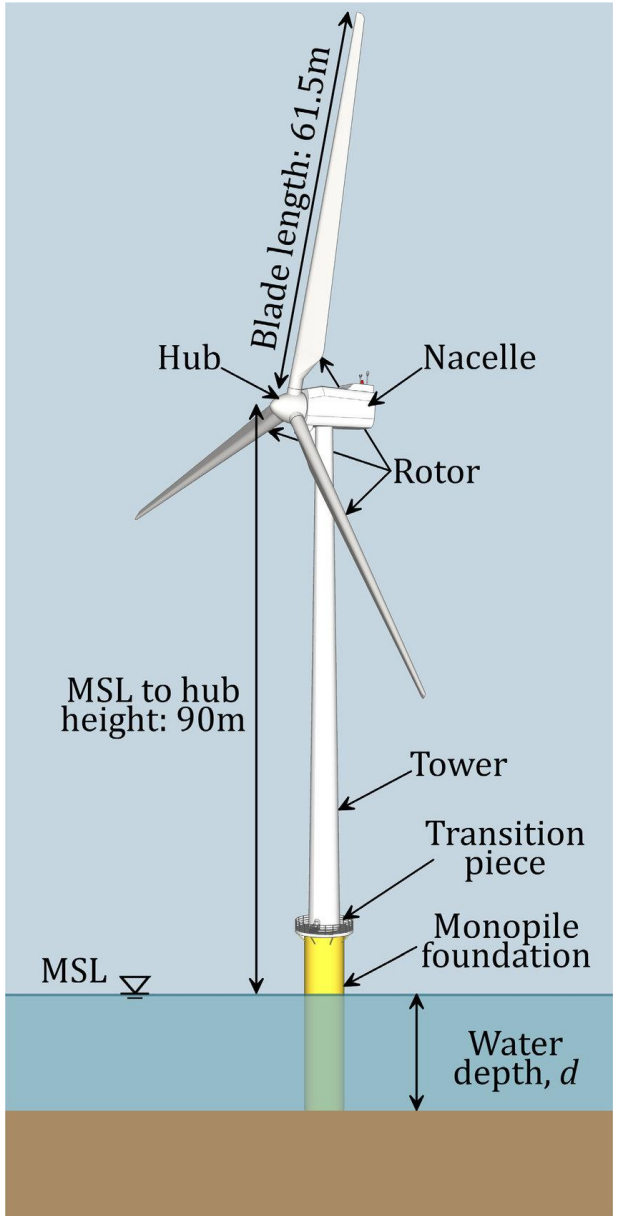
s_x weights standard deviation

$t^*_{(n-2)}$ student's t test with n-2 degrees of freedom

s_y standard deviation of residuals

n number of samples

- Bonus – collect more data (web scraping) or generate more test data to use for the analytics!



Example – offshore wind key components
Source: Research Gate HERE