

Data and Codes for “A Case Study of Space-time Performance Comparison of Wind Turbines on a Wind Farm”

1. Computer and software environment

Hardware and Operating System: Any operating system capable of installing R software (Windows/MacOS/Ubuntu etc.) with a recommended RAM of 4 GB or above.

Software used: R (<https://www.R-project.org/>)

Required R package: DSWE version 1.2 or above available at: <https://github.com/TAMU-AML/DSWE-Package>

2. Explanation of the header of the data files

Header name	Meaning
time_stamp	Time stamp.
wind_speed	10-min average wind speed, in unit of m/s
wind_direction	10-min average wind direction, in unit of degree
ambient_temp	10-min average ambient temperature, in unit of °C.
terrain	Terrain complexity classification. An integer. Not used.
active_power	10-min normalized power output, between 0 and 1.
sd_wd	10-min standard deviation of wind direction, in degrees.
turbulence_intensity	10-min turbulence intensity.
X-coordinate*	The anonymized horizontal coordinate value of a turbine
Y-coordinate*	The anonymized vertical coordinate value of a turbine

* Note: These values maintain the relative positional accuracy between turbines.

The datasets used in Section 4.1 are from <https://aml.engr.tamu.edu/book-dswe/dswe-datasets/>, the Turbine Upgrade Dataset. The data files are explained in the Datasets Description file on the same website.

3. Reproducing the results in the paper

[Dataset4 comprises a total of 66 files. The Dataset4 is not yet approved by the data owner for public release. We are sorry for the inconvenience.]

Which results to reproduce	Data File	Code File	Output
Table 2	Dataset1.csv	Code_Table2.r	The two column values in Table 2

Table 3	Turbine Upgrade Dataset(Pitch Angle Pair, Table7.3).csv	Code_Table3.r	The two rows of “Our estimate” and “Our estimate/ r' ” in Table 3.
Figure 3	Dataset2.csv	Code_Figure3.r	The six plots, in one PDF file
Figure 4	Dataset3_1.csv, Dataset3_2.csv	Code_Figure4.r	The two plots, in one PDF file
Figure 5	Dataset4.csv	Code_Figure5.r	The boxplots, in one PDF file
Figure 6	Dataset4.csv	Code_Figure6.r	The boxplots, in one PDF file
Figure 7	Dataset4.csv, Dataset_location.csv	Code_Figure7.r	Four PDF figure files, corresponding to Figure 7a, 7b, 7c, 7d, respectively
Figure 8	Dataset4.csv, Dataset_location.csv	Code_Figure8.r	Four PDF figure files, corresponding to Figure 8a, 8b, 8c, 8d, respectively.
Figure 9	Dataset4.csv, Dataset_location.csv	Code_Figure9.r	Four PDF figure files, corresponding to Figure 9a, 9b, 9c, 9d, respectively.