

## **Review: Wind turbine wake detection and characterisation utilising blade loads and SCADA data: a generalised approach: Revision 1**

### **General Comments**

The authors have re-structured their manuscript, resulting in a more concise paper that is easy to follow and reads well. They have addressed the majority of comments raised, and there are only a few further points I recommend addressing as listed below.

### **Specific Comments**

1. Wake classifications: It would be useful to have a clear statement on how the training (and testing) datasets for different wake impingement categories were labelled. There are occasional references to different wind directions (5 degrees on line 122) or “manual review” on line 238 – if the wake impingements for training were all classified manually / by eye, then this should be stated.
2. Section 2.4: The removal of all ambiguous training data (~line 242) invites the question of how the final model would classify such cases. Given the model outputs probabilities of different impingement classes, it should be able to handle a wake that is a “edge case” between e.g. fully and right-impinged by predicting ~50% probability of both. Some additional text around this could help to clarify why training on these data would be an issue as presumably they could be given labels of equal probability between the two potential classes?
3. Figs 16 & 17: Compared to the previous version of the manuscript, Figures 16 and 17 are paired with different  $U_{amb}$  values in the current version. Switching these wind fields / speed values would also make more sense with the discussions on these figures in Section 4.2.

### **Technical Corrections**

1. Abstract: I recommend not using acronyms in the abstract as they have not been defined; however RMSE and DWM are probably known to readers of this journal.
2. Lines 118, 321, 404: Suggest writing out “approximately” rather than “approx.”
3. Lines 196, 204, 231: Italicise “ $U$ ” for consistency with first use on line 154.
4. Line 199: Capitalise “Discrete Cosine Transform” in DCT acronym definition.
5. Line 248: Suggest “monotonically” rather than “iteratively”, or delete the word “iteratively”.
6. Equation 7: Given “ $t$ ” is part of the limits, it shouldn’t be a variable in the integral – suggest changing the instances of “ $t$ ” within the integral to something else e.g.  $\theta$
7. Line 310: Suggest re-wording title of Section 3.1 to e.g. “Performance evaluation”
8. Table 5: For ease of comparison, could the two types of RMSE be presented in the same way e.g. percentages for both?
9. Equation 11: Variable “ $i$ ” has been used in previous equations to represent timestep, please use a different variable for wind direction.
10. Lines 380, 453: It reads as though full impingements are under (high or) low  $I_{amb}$  and partial are under the other  $I_{amb}$ .
11. Line 386: Suggest removing “raw” before simulated, or re-wording to e.g. “simulated (rather than estimated)”
12. Line 450: Suggested re-word: “with a few gaps”
13. Line 465: Suggest removing “the” from “after the consideration”

14. Line 471: Suggested re-word: "Wake steering control brings **the** largest benefits"
15. Line 483: Suggested re-word: "post-processing analysis which accounts**s** for"
16. Line 493: Is the acronym "LSTM" ever used? If not, no need to define.
17. Line 507: The sentence beginning "Wake detection" could be worded more clearly, and context given to the RMSE e.g. writing as a % of times the correct type of impingement is identified.
18. Line 515: Suggested re-word: "accounting **for** more"