Internship report

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Abstract

For day-ahead forecasts, the combination of Numerical Weather Prediction (NWP) models and post-processing algorithms is the most effective method.
However, it is hard to extract from all the literature on the subject the best algorithm to use because of the lack of consistency in the different approaches.

During my Internship, my mission was to investigate the best algorithms according to the literature so as to improve the day-ahead irradiance forecasts.
My final results demonstrated improved metrics in comparison to the current algorithm used by Reuniwatt.

1 Introduction

1.1 Background and motivation of the intership project

This report is the result of my 6-month internship that took place in Reuniwatt, a leader in cloud observation and forecasting. My internship extended from March 1st to August 31st, taking place during the second semester of my academic gap. The main subject of the intership was the post-processing of the day ahead NWP irradiance forecasts. Despite their proven utility for day-ahead irradiance forecasting, NWP models predictions can still be improved thanks to post-processing. As i will show in **??**, many models have been investigated in the literature, and it's thus important to draw a clear benchmark of all the available state-of-the-art models.

1.2 Objectives of the internship

Hereafter the main objectives of the internship:

- Benchmark several models on the post-processing of a single NWP model.
- Sensitivity study of the models.
- Comparison of the results with the current model used by Reuniwatt for day-ahead forecasting.

2 Methodology

2.1 Data source

Verbois et al. demonstrated that using a large set of predictors can significantly improve the performances of post-processing models, while Suksamosorn et al. selected WRF forecasts of irradiance, temperature, relative humidity and the solar zenith angleas relevant inputs of the models.
Our initial data source for the forecasts was GFS, and we opted for the following set of predictors, easily available for any location:

ghi_{GFS}	T^{2m}_{GFS}	θ	ϕ	ghi_{cs}
Irradiance forecasted	Temperature forecasted 2 meters above the ground	Zenith angle	Azimuth angle	Clear-sky irradiance

Table 1: Set of predictors.

2.2 Metrics

2.3 Models investigated

2.4 Model performances evaluation strategy

3 Results and discussion

3.1 Post-processing a single forecasting NWP model

3.2 Showcase of the hybrid model

4 Conclusions and perspectives

4.1 Results summary

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References

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