

LITERATURE SURVEY

Predicting the energy output of wind turbine based on weather condition

1) Predicting the Energy Output of Wind Turbine Based on Weather Condition

P. R. Anisha, C. Kishor Kumar Reddy & Nuzhat Yasmeen –

Springer - 2021

The energy output is directly proportional to the wind/climate in that site. In this paper, they have connected a relationship with different parameters to the energy output. To deal with the interaction of the different parameters, we use random forest regression of machine learning algorithms. The model obtained for energy prediction gives a very reliable prediction of the energy output for supplied weather data.

2) Energy Modelling Output of Wind System based on Wind Speed

Abdelkader Harrouz, Ilhami Colak, Korhan Kayisli

IEEE, 2019

Wind energy plays an increasing role thanks to its feasibility and efficiency in its energy generation. Due to the source of wind energy, efficiency of wind farm is highly depending on the weather conditions. The main problem is that it become quite difficult to predict the power output exactly and this hinders the accuracy. This situation provides collaborative production of different energy sources more efficiently with avoiding over-cost and overproduction. In this paper, there are three different wind models are modelled and simulated with choosing the complete and correct models.

3) A review of wind power and wind speed forecasting methods with different time horizons

Saurabh S. Soman, Hamidreza Zareipour , Om Malik

IEEE , 2010

It becomes tricky in detecting the wind power as it is not constant throughout, so it becomes necessary to predict the future trends to exactly predict the output at each instant of the year. This paper provides insight on the foremost forecasting techniques, associated with wind power and speed, based on numeric weather prediction (NWP), statistical approaches, artificial neural network (ANN) and hybrid techniques over different time-scales. An overview of comparative analysis of various available forecasting techniques is discussed as well. In addition, this paper further gives emphasis on the major challenges and problems associated with wind power prediction.

4) Day-Ahead Wind Power Forecasting in Poland Based on Numerical Weather Prediction

Bogdan Bochenek 1,* , Jakub Jurasz 2 , Adam Jaczewski 1 , Gabriel Stachura 1 , Piotr Sekuła 1,3 , Tomasz Strzyzewski 1 , Marcin Wdowikowski 1 and Mariusz Figurski 1.

MDPI, year - 2021

This paper examines the possibility to predict day-ahead wind power based on different machine learning methods not for a specific wind farm but at national level. A numerical weather prediction model used operationally in the Institute of Meteorology and Water Management–National Research Institute in Poland and hourly data of recorded wind power generation in Poland were used for forecasting models creation and testing. With the best method, the Extreme Gradient Boosting, and two years of training (2018–2019), the day-ahead, hourly wind power generation in Poland in 2020 was predicted with 26.7% mean absolute percentage error and 4.5% root mean square error accuracy. Seasonal and daily differences in predicted error were found, showing high mean absolute percentage error in summer and during daytime.

5) Predicting the Wind Turbine Power Generation based on Weather Conditions

S Preethi; H Prithika; M Pramila; S Birundha

IEEE - 2021

A precise forecast is required to overcome the difficulties initiated by the fluctuating weather conditions. In this paper, an end-to-end web application has been developed to predict and forecast the wind turbine's power generation based on the weather conditions. The prediction model has been developed using Bidirectional Long Short-Term Memory which is a unique kind of RNN (Recurrent Neural Network). It performs admirably in terms of capturing long-term dependencies along with the time steps and is hence ideal for wind power forecasting.

6) The Use of Machine Learning and Performance Concept to Monitor and Predict Wind Power Output

Kelvin Palhares Bastos Sathler; Athanasios Kolios

IEEE – 2022

The production forecast is still based mainly on the manufacturing power curve and wind speed. Despite considering the wind speed there is a lot more parameters to take into account. The model analyses the performance through Meteorological Mast Data (Met Mast Data) and then uses it as an input to monitor and predict power output. As a result, the model proposed achieves high accuracy and can be key to understanding the wind turbine asset's behaviour throughout its lifespan, assisting operators in decision making to increase overall power production.

7) The Intelligent Methods Used in Prediction the Wind Speed and Output Power of Wind Farm

Xinyan Zhang; Chongchong Chen; Weiqing Wang; Yi Dai

IEEE, 2012

Because the stochastic and intermittent property of wind speed, the prediction problem is very difficult to solve. The prediction method using BP neural network, wavelet BP neural network. The simulation results shows that the method used in this paper can give a better prediction, but there is still more other algorithm need to be studied to enhance the prediction precision.

8) Forecasting of Wind Turbine Output Power Using Machine learning

Haroon Rashid; Waqar Haider; Canras Batunlu

IEEE, 2020

In this paper, they have predicted the output power of the wind turbines using the random forest regressor algorithm. The model is trained using the data from 2017. The wind direction, wind speed and outdoor temperature are used as input parameters to predict output power. The proposed model in this study offers an efficient method to predict the output power of wind turbine with preferably low error.