Data Mining with Wavelet Analysis are Used to Create a Combined Renewable Energy Prediction Models

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Abstract

In large distribution networks and distributed energy, wind energy is critical. Grid power balance relies heavily on accurate wind farm predictions. For effectively extraction characteristics using wind time series analysis, this poster offers a time - series data fuzzy c-means grouping technique and also a clusters selection algorithm. Clustering analysis is an effective approach for data processing which is often utilised. Cluster analysis is used to partition large datasets in subgroups based on similarity as differences. A wavelet decomposition is being used to split down wind energy output and to provide the MLNARx with more appropriate inputs. A comparison with well-known estimation methods reveals that the suggested estimation method outperforms them.

Methodology

The flow diagram of the suggested prediction models is depicted in the study regarding approach's schematic diagram.

-In fuzzy clustering if x_n be the set of data point & v_n be the set of centers

(1) Randomly select 'c' cluster centers

(2) Calculate the fuzzy membership u_{ij}

(3) Compare the fuzzy centers v_j

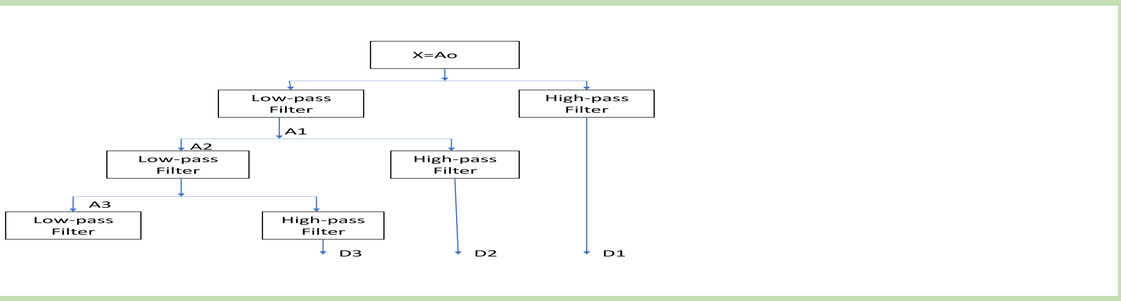
(4) Repeat steps 2 and 3 until the minimum j value is achieved

For each iteration j($0 \le j \le k_{max}$), calculate the $KMDL_j$ as:

$$KMDL_j = -\sum_{j=1}^{j} n_j \log^{n_j^2} \Big/ _{s_j^d} + J(D^2+3D+2)\log(I)/2$$

-The wavelet transform can provide both time and frequency information at the same time.

In Fig. shows decomposition of the signal

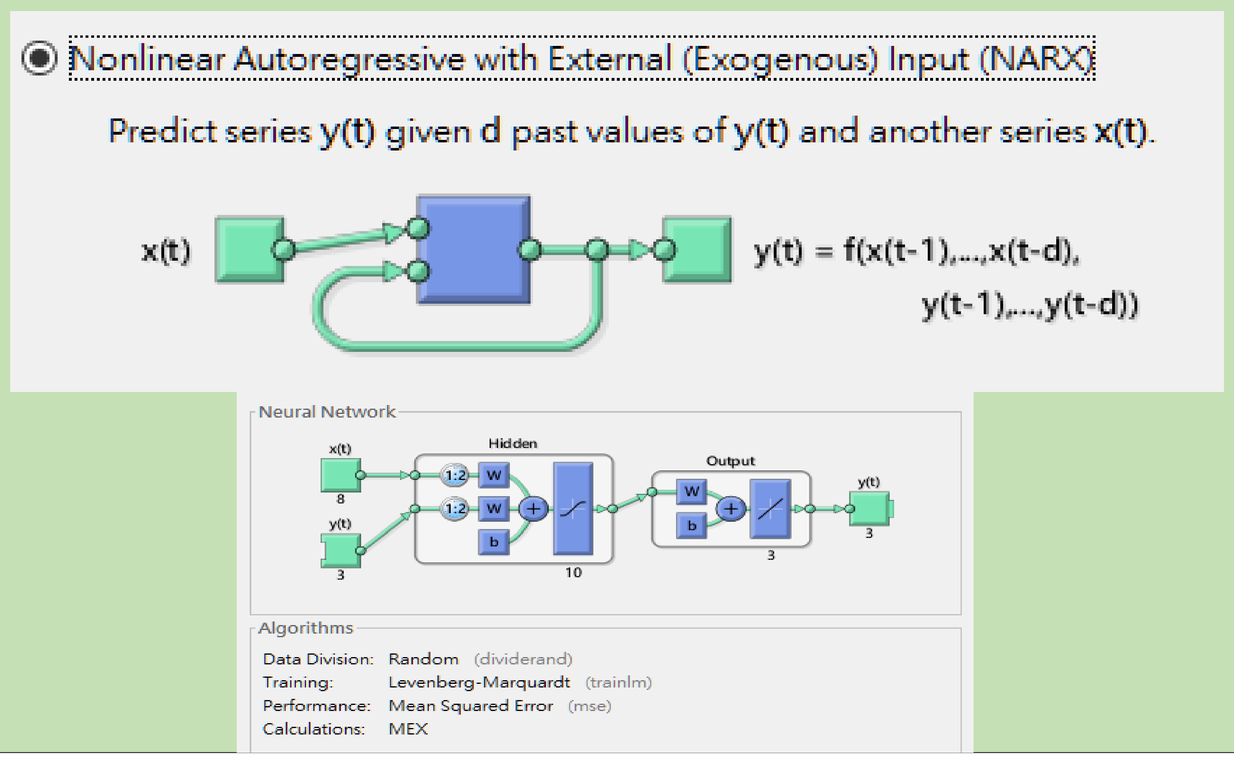


-Time series analysis is required to handle the historical wind data sets utilized as input to the MLNARx.

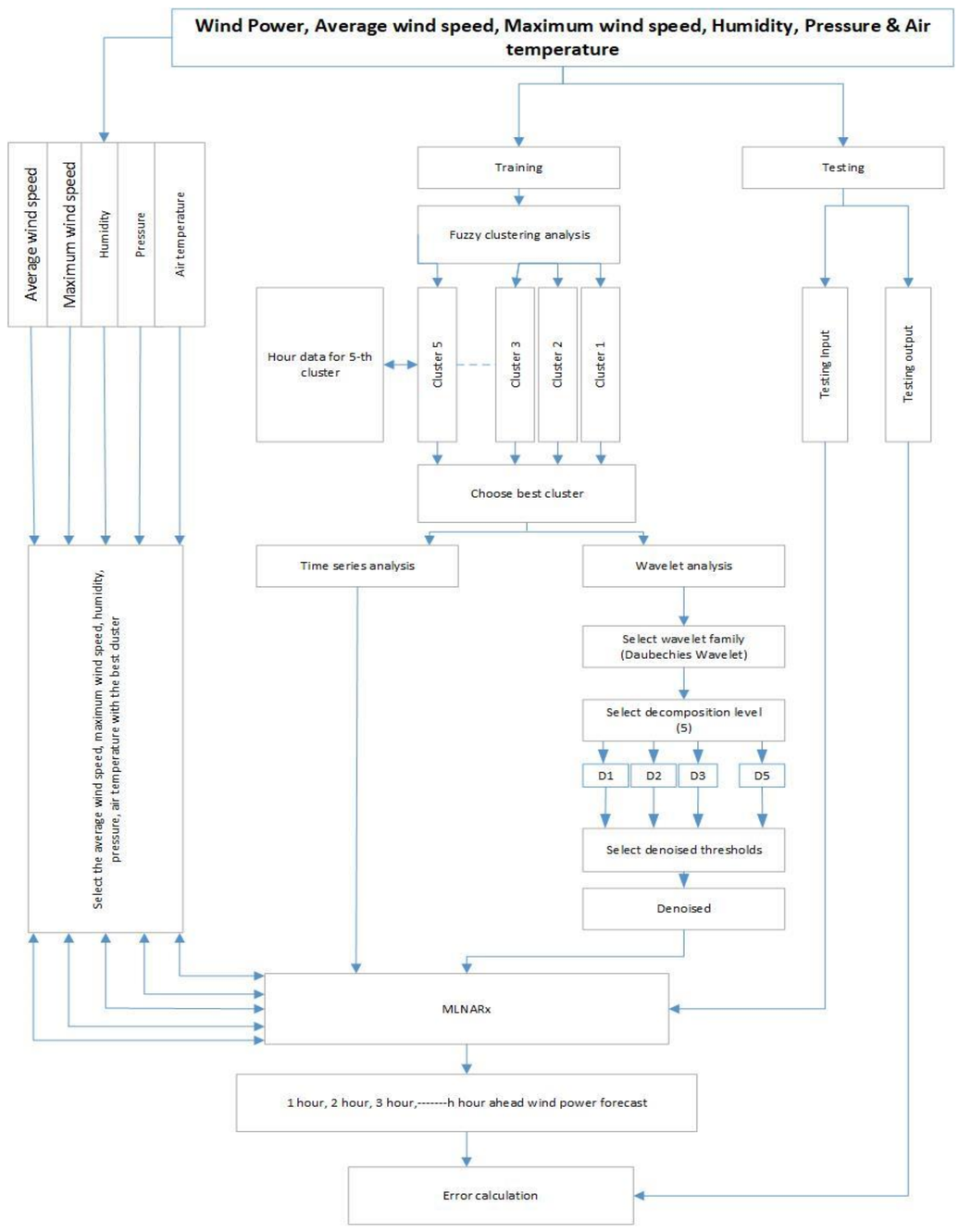
(1)When the data spans a long time period, the time series approach of forecasting is the most reliable.

-MLNARx.

(1)In this part, the proposed method's performance in terms of forecasting accuracy and time is compared to the original NN model.



The proposed forecasting method is depicted as a block diagram



Discussion

-The importance of data consistency and reliability.

-How then can inadequate information filtering system be fixed when a significant quantity of data is lost?

-Grid-connected regulations need not govern prediction parameters.

-Although Taiwan has still yet to create huge wind energy, the test mode's assessment will need to be refined.

-Therefore, updating current models and studying new ones to increase the accuracy of wind energy predictions remains a top priority.

Conclusion

-The above poster provides a new time series clustering method, a new cluster selection algorithm, wavelet, time series analysis, with MLNARx to predict wind power. Using inputs to an MLNARx, the proposed fuzzy clustering creates the best resolution cluster.

-To provide the most relationship between intrinsic for MLNARx, a combination of wavelet transform and time series analysis is being used in the pre-processing step.

-Several wind data sets were used to assess the efficacy of the proposed clustering as well as the correctness of the resulting mixed prediction model.

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