Abstract

The vast weather changes effect on human activities. Dealing with weather data manually is very difficult job and time consuming operation. The process of data entry requires a precise method suits different weather parameters. Artificial intelligent [AI] especially, hybrid systems improve the performance of either pure neural network based or pure fuzzy logic based forecasting. In this study, a Neuro-fuzzy approach will be proposed to predict weather in Sadat region, western desert, Egypt. A combination of monthly mean meteorology measurements for temperature, relative humidity, wind speed, and rainfall will be used during the period [2008-2017]. Many methods were applied over the years for weather prediction such as classical and intelligent techniques. The proposed model uses a Neuro-fuzzy model at different types of fuzzy member ship functions. The flexibility of the proposed model increase the prediction accuracy. The effectiveness of the proposed model is demonstrated at different operating conditions. The classification of data is divided into 12 sets; each set consists of 4 mean values of observations. A transposing process applied on these sets for training and
Developing a Neuro-Fuzzy Model for Weather Prediction

testing at different number of rules 10, 11, 15, 20, 25, 30, 35, and 40. Eight choices for
membership functions "triangular" and another for "Gaussian" performed. The accuracy of the
output forecasting measured using MAPE and MAE. A comparison applied among different
cases obtained from Neuro-fuzzy model and observed meteorological data for year 2017. The
results show that the performance of the Neuro-fuzzy model at TCWB is better than TLWB.
Also, the model at GCWB and GCWN are better than GCCB and GCCN. The results show that
Neuro-fuzzy model seemed to be promising method for weather prediction.

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Index Terms

Computer Science  Fuzzy Systems

Keywords

Weather predication, Neuro-fuzzy,