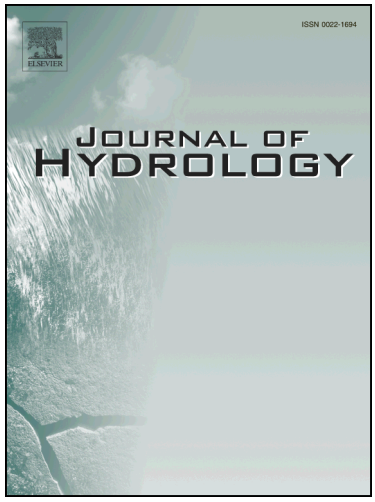
Accepted Manuscript



Research papers

Markov chain-incorporated and synthetic data-supported conditional artificial neural network models for forecasting monthly precipitation in arid regions

Hafzullah Aksoy, Ahmad Dahamsheh

PII: S0022-1694(18)30358-5
DOI: https://doi.org/10.1016/j.jhydrol.2018.05.030
Reference: HYDROL 22807

To appear in: *Journal of Hydrology*

Received Date: 21 May 2017
Revised Date: 4 April 2018
Accepted Date: 11 May 2018

Please cite this article as: Aksoy, H., Dahamsheh, A., Markov chain-incorporated and synthetic data-supported conditional artificial neural network models for forecasting monthly precipitation in arid regions, *Journal of Hydrology* (2018), doi: https://doi.org/10.1016/j.jhydrol.2018.05.030

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Markov chain-incorporated and synthetic data-supported conditional artificial neural network models for forecasting monthly precipitation in arid regions

Hafzullah Aksoy[a], Ahmad Dahamsheh[b]

[a]*Istanbul Technical University, Department of Civil Engineering 34469 Maslak, Istanbul, Turkey*

[b]*Al-Hussein Bin Talal University, Department of Civil Engineering, Ma'an, Jordan*

Abstract: For forecasting monthly precipitation in an arid region, the feed forward back-propagation, radial basis function and generalized regression artificial neural networks (ANNs) are used in this study. The ANN models are improved after incorporation of a Markov chain-based algorithm (MC-ANNs) with which the percentage of dry months is forecasted perfectly, thus generation of any non-physical negative precipitation is eliminated. Due to the fact that recorded precipitation time series are usually shorter than the length needed for a proper calibration of ANN models, synthetic monthly precipitation data are generated by Thomas-Fiering model to further improve the performance of forecasting. For case studies from Jordan, it is seen that only a slightly better performance is achieved with the use of MC and synthetic data. A conditional statement is, therefore, established and imbedded into the ANN models after the incorporation of MC and support of synthetic data, to substantially improve the ability of the models for forecasting monthly precipitation in arid regions.

Download English Version:

https://daneshyari.com/en/article/8894700

Download Persian Version:

https://daneshyari.com/article/8894700

Daneshyari.com