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Using artificial neural network(ANN) for seasonal rainfall forecasting based on tele-connection patterns

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Abstract

Long-term rainfall prediction is very important to counteies thriving on agro-based economy. In general, climate and rainfall are highly non-linear phenomena in nature giving rise to what is known as "butterfly effect". The parameters that are required to predicted rainfall are enormous even for a short period. artificial neural network is an innovative approach to construct computationally intelligent systems that are supposed to possess humanlike expertise within a specific domain, adapt themselves and learn to do better in changing environments, and explain how they make decisions. Unlike conventional artificial intelligence techniques the guiding principle of soft computing is to exploit tolerance for imprecision, uncertainty, robustness, partial truth ot achieve tractability, and better rapport with reality. rain is one of the nature's greatest gifts and in third world countries like Iran; the entire agriculture depends upon rain. It is thus a major concern to identify any trends for rainfall to deviate from its periodicity, which would disrupt the economy of the country. This fear has been aggravated due to threat by the global warming and green house effect. The geographical configuration of Iran with the three sea, namely the Persian Gulf and Oman Sea, Caspian Sea and the Mediteranian Sea gives her a climate system with hot and cold weather seasons. The parameters that are required to predict the rainfall are enormously complex and subtle so that

the uncertainty in a prediction using all these parameters even for a short period.in this paper, we analysed 33 years of rainfall datd in khorasan state, the northeastern part of Iran situated at latitude-logitude pairs (31˚-38˚N , 74˚- 80˚E). We attempted to train artificial neural network based on prediction models and tele-connection patterns with 33 years of rainfall data. For performance evaluation, network predicted outputs were compared with the actual rainfall data. Simulation results reveal that artificial neural network techniques are promising and efficient.

Keywords

artificial neural network, Seasonal Rainfall forecast, tele-connection patterns