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Regionalization of River Basins Using Cluster Ensemble

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ABSTRACT

In the wake of global water scarcity, forecasting of water quantity and quality, regionalization of river basins has attracted serious attention of the hydrology researchers. It has become an important area of research to enhance the quality of prediction of yield in river basins. In this paper, we analyzed the data of Godavari basin, and regionalize it using a cluster ensemble method. Cluster Ensemble methods are commonly used to enhance the quality of clustering by combining multiple clustering schemes to produce a more robust scheme delivering similar homogeneous basins. The goal is to identify, analyse and describe hydrologically similar catchments using cluster analysis. Clustering has been done using RCDA cluster ensemble algorithm, which is based on discriminant analysis. The algorithm takes H base clustering schemes each with K clusters, obtained by any clustering method, as input and constructs discriminant function for each one of them. Subsequently, all the data tuples are predicted using H discriminant functions for cluster membership. Tuples with consistent predictions are assigned to the clusters, while tuples with inconsistent predictions are analyzed further and either assigned to clusters or declared as noise. Clustering results of RCDA algorithm have been compared with Best of k-means and Clue cluster ensemble of R software using traditional clustering quality measures. Further, domain knowledge based comparison has also been performed. All the results are encouraging and indicate better regionalization of the Godavari basin data.

KEYWORDS

K-means; Cluster Ensemble; Hydrology; Runoff; Cultivation Area; Precipitation; Field Capacity

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