
Bayesian Stochastic Rainfall Generator (BSRG): Rainfall Forecasting through Bayesian Causal Modelling

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Abstract

The most unpredictable natural variable is most likely rainfall. The primary goal of this research is to develop the Bayesian Stochastic Rainfall Generator (BSRG), an intelligent data-driven tool for enhancing rainfall forecasting. Several stochastic generators have been used in the past to generate rainfall data, but none of them were created using a Bayesian stochastic technique. This paper discusses the use of rainfall data from the Muñogalindo rain gauge in Ávila, Spain, which provides information about the Mediterranean continental climate of the area. The groundwork for the BSRG's further development is the novel approach known as Hyetoclust. Results show that rainfall patterns, represented as probabilistic distributions, in both normal and exceptional regimes are strongly influenced by cluster-specific features. This highlights the complexity of hydrological responses, which are represented as probabilistic distributions, and highlights the value of cluster-specific analysis in strategy optimization during extreme regimes.

Keywords: Stochastic Rainfall Generator · Bayesian Causal Modelling · Rainfall Forecasting · Artificial Intelligence

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