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# Advantages of the Simultaneous Use of the Hydrologic and Stochastic Flow Generators

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In the water resources management, it is important to evaluate the effects of the variability of climatic and hydrological variables on the design parameters of various protective structures or management measures. If simulation models are used for such a task, it is required to have a time series of climatic and hydrological variables, which will be used as inputs. If they are not available in a sufficient length and variability, so-called generators of these variables can be used to obtain them. This is usual approach particularly in the case of investigation of climate change studies. This work discusses the creation of a river flow generator, which uses as an inputs temperature and precipitation data.

For the purpose of flow generation, which is one variant of simulation, hydrological models, machine learning models, and various statistical and hybrid models can be used. This work points out the differences between two types of simulation: flow generation and flow forecasting. In the case of the flow generation, flows from the days before the prediction cannot be used as the input data. This fact is in contrast to prediction in which previous flows are almost always used as inputs. The consequence of this difference is that the accuracy of the generation of flows relatively poorer then flow prediction.

In order to increase the accuracy of the flow generation, the authors have designed and tested a various variants of statistical models, which will be described in paper. The proposed model is compared with the hydrological model and other variants of machine learning models. Comparison is made on stream flows in Slovakia.

Proposed approach which will be described in paper, allows for a significant increase in the accuracy of the flow generation in comparison to hydrological and machine learning models in their standard application. As will be demonstrated in the case study, improvement in the precision of the modelling is significantly affected by hydrology-inspired feature engineering, hydrology-inspired feature selection, and the appropriate architecture of the entire modelling.

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