Flood Behaviour for the bridge collapse sites

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1 Overview

In this paper we read about floods and other hydro logical factors which occurred in the U.S causing bridge collapse or damage. Several hydraulic effects were discussed which could have been the cause of the bridge collapse. In response to increase in collapse risk due to floods our aim is at determining the magnitude and frequency of design floods. Method used for estimating the return period of a flood event include block maxima approaches, in which a series of annual peak flows is used to define an extreme value distribution. The generalized extreme value distribution is a widely used model for extreme events. The major benefit of the GEV model is its ability to fit highly skewed data since it combines three distributions: Gumbel, Frechet, and Weibull. The GEV distribution has three parameters, namely, the location and scale parameters which are mostly related to the magnitude of flow, and the shape parameter that determines the behavior (or shape) of the tail of the distribution. Now this floods will depend on different attributes according to different places so we use *random forest mechanism* to derive physiography-based important levels. The random forests algorithm is used for regression, and the estimation of the importance levels of different predictor variables, that is, the contribution of each input variable in predicting the response within a regional context. A negative importance level means that inclusion of the predictor variable results in a decrease in the performance of the algorithm. Positive values indicate a positive contribution to the prediction of the algorithm. Now we also have predict the frequency of the return of the flood so for that we use Jiang's classification scheme and categorize annual peak flows into heavy tail and light tail flows. Heavy tail flow implies that flows in the heavy tail increase more than the exponential order as compared to the flows in the light tail, and such high flows are expected to be with higher return periods. Using GEV and Random forest algorithm we get which predictor variables are important in which places and also find a estimate of return periods in different regions and plot graphs showing the same.