**Highlights**

* Four Gaussian Processes Regression (GPR) models were used to model the daily discharge
* Models' precision was optimized by considering five different scenarios based on various input combinations of time-lags of stage and discharge values up to 5-day
* GPR-PUK kernel Model was more accurate and stable than the other developed models
* Performance of GPR models was evaluated by r, RMSE, RAE, RRSE and visual inspection like line diagram and scatter plot