

Bayesian Additive Quantile Regression

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Quantile regression provides a convenient framework for analyzing the impact of covariates on the complete conditional distribution of a response variable instead of only the mean. While frequentist treatments of quantile regression are typically completely nonparametric, a Bayesian formulation relies on assuming the asymmetric Laplace distribution as auxiliary error distribution that yields posterior modes equivalent to frequentist estimates. In this paper, we utilize a location-scale-mixture of normals representation of the asymmetric Laplace distribution to transfer different flexible modeling concepts from Gaussian mean regression to Bayesian semiparametric quantile regression and to develop Bayesian inferential schemes based on Markov chain Monte Carlo simulation techniques as well as variational Bayes approximations.