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Bayesian Inference and Variable Selection for Quantile Regression
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Quantile regression has become a widely used technique to describe the distribution of a response variable given a set of explanatory variables. In the last few years, Bayesian inference for quantile regression has attracted much attention in literature. Although the Metropolis-Hastings algorithm has been employed in Bayesian quantile regression, including median regression, this talks explores a new blocked Gibbs sampler to perform Bayesian inference on quantile regression models. Using the Gibbs sampler avoids the difficulty of specifying a candidate distribution necessary for Metropolis Hastings. For modelling extreme quantiles, using a symmetric proposal distribution may be inefficient. Besides Bayesian inference quantile regression, variable selection is also important for quantile regression. For example, there is typically uncertainty in which of the many candidate predictors should be included in modelling underlying conditional quantiles. In order to identify important predictors and to build accurate predictive models, Bayesian methods for variable selection and model averaging are very useful. However, such methods are currently not available for quantile regression. This talk presents a Bayesian variable selection method for quantile regression based on a simple and efficient stochastic search variable selection (SSVS) algorithm proposed for posterior computation. This approach can be used for moderately high-dimensional variable selection and can accommodate uncertainty in basis function selection in non-linear and additive quantile regression models. Eventually, this talk demonstrates two new R functions *MCMCquantreg* and *SSVSquantreg* in the R package MCMCpack for Bayesian inference and variable selection of quantile regression.