

ROBUST BAYESIAN CREDIBILITY USING SEMIPARAMETRIC MODELS

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Abstract

In performing Bayesian analysis of insurance losses, one usually chooses a parametric conditional loss distribution for each risk and a parametric prior distribution to describe how the conditional distributions vary across the risks. Young (1997) applies techniques from nonparametric density estimation to estimate the prior and uses the estimated model to calculate the predictive mean of future claims given past claims. A shortcoming of this method is that, in estimating the prior, one assumes the average claim amount equals the conditional mean. In this paper, we consider a class of priors obtained by perturbing the one determined nonparametrically, as in Young (1997). We thereby reflect the uncertainty in the prior that arises from the randomness in the claim data. We, then, calculate intervals for the corresponding predictive means. We illustrate our method with data from Dannenburg et al. (1996) and compare the intervals of the predictive means with nonparametric confidence intervals.

Keywords: kernel density estimation, claim estimation, robust Bayesian estimation, Dempster-Shafer belief functions, upper and lower expectations.

