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TITLE: Nonparametric estimation of mixture cure model when cure status is partially known

ABSTRACT BODY:

Abstract Body: The standard survival model assumes that, if there is no censoring, at a future time point, all individuals will experience the event of interest. However, cure models have been developed because there might be situations where this assumption is not appropriate. For example, in clinical settings, it is very unlikely to have any recurrence of some tumors later than a certain period after radiation treatment. In sociology, there are many examples of this kind of events: marriage, birth of second child, career shift, etc. In most literature, the subjects whose events will not occur are referred to as cured subjects.

Mixture cure models assume that the population is a mixture of cured and susceptible individuals. The common assumption of traditional cure models is that cured and uncured subjects cannot be distinguished within the censored observations. Hence, the cure indicator is usually modelled as a latent variable. However, there might be situations when extra information about cure status is available. For instance, an individual is assumed to be cured or a long-term survivor if the observed survival time is greater than the cure threshold or based on diagnostic tests.

This aim of this paper is twofold: first, we propose a novel nonparametric estimator of the conditional survival function in the mixture cure model when cure status is partially known. The second goal is to propose a nonparametric estimator of the cure probability when cure status is partially known. The asymptotic representations are obtained, from which strong consistency and asymptotic normality of the estimators are derived. Using simulation studies, we have shown that, if a bandwidth parameter is suitably chosen, our estimators perform better than others in an ample range of covariate values. For this reason, a bootstrap bandwidth selector is proposed. The practical performance of these estimators is shown using a dataset of cancer patients with sarcoma.

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