Gene selection for survival data under dependent censoring, a copula-based approach

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Abstract

Dependent censoring arises in biomedical studies where the survival outcome of interest is censored by competing causes. In survival data with microarray gene expressions, a gene selection or gene ranking based on the Cox regression analyses has been used extensively, which however are valid under the independent censoring assumption. In this talk, the first objective is to study the effect of dependent censoring on the gene selection procedure. Here, we model the joint distribution of survival outcome and the competing cause via "copulas" to study the potential bias due to dependent censoring. The second objective is to utilize the copula model to develop an alternative gene selection procedure. The proposed procedure adjusts for the dependent censoring and outperforms the existing method when the dependent censoring indeed exists. Simulations and data analyses demonstrate the usefulness of our proposal.

Keywords: competing risk, copula, Cox regression, dependent censoring, high-dimensional data, microarray