Variance component estimation on Competing risk analysis with masked causes and gaussian random components: A simulation study.

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The problem of competing risks arises in time-to-event analysis when the subjects observed may experience one among a set of possible competing events. For instance, in longevity studies often the interest lies in modelling the time until death of a group of individuals that might die of different specific causes. The time to death of an individual is said to be *cause-masked*, or simply *masked*, when the time to death of this individual is observed but it is not known which of the possible causes of death occurred. This work will study some techniques, based on suitable variants of the EM-algorithm, to perform statistical inference in a competing risk scenario in the present day nce of partial masking and right censoring. We present an implementation of the EM-algorithm for treating the partial mixture induced by the masking of the causes of death. The goal is to extent a class of multivariate proportional hazard models for competing risks containing suitably defined gaussian random components to characterize the quantitative genetic determination of longevity in large scale animal production systems. Moreover, it is provided a simulation study evaluating the performance of the proposed inferente procedures with respect the estimation of variance-covariance components. In this study we simulate a range of data of competing risks with three specific causes of death based on a proportional hazard model with a binary fixed effect and a multivariate gaussian random component for each cause of death. Four scenarios were simulated representing different choices of the masked probabilities and the covariance structure of the random component. In genera, we concluded that the inference procedure based on the EM algorithm is able to detect part of variance of the random components but tended to under estimate the variances,I specially when the probability of masking were high.
Keywords: discrete time, cause-specific hazard function, multivariate model, EM algorithm.