Selection of Effects in Cox Frailty Models by Regularization Methods

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In all sorts of regression problems it has become more and more important to deal with high dimensional data with lots of potentially influential covariates. A possible solution is to apply estimation methods that aim at the detection of the relevant effect structure by using penalization methods. In this talk, the effect structure in the Cox frailty model, which is the most widely used model that accounts for heterogeneity in survival data, is investigated. Since in survival models one has to account for possible variation of the effect strength over time the selection of the relevant features has to distinguish between several cases, covariates can have time-varying effects, can have time-constant effects or be irrelevant. A penalization approach is proposed that is able to distinguish between these types of effects to obtain a sparse representation that includes the relevant effects in a proper form. The method is applied to model the time until pregnancy, illustrating that the complexity of the influence structure can be strongly reduced by using the proposed penalty approach.