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Variable Selection under Cumulative Exposure Model for Time-to-Event Data with Time-Varying Covariates

In various industrial applications, sensors are widely used to collect the signals for predicting the lifetime of product units or systems.
From a modeling perspective, the signal from each sensor can be considered as a time-varying covariate and the lifetime of units can be considered as the response.In the literature, cumulative exposure models are used to link the lifetime response with time-varying covariates. It is important to identify the useful sensors and estimate their effect for predicting the lifetime of units, which leads to a variable selection and estimation problem. In this work, we consider variable selection under the cumulative exposure model for time-to-event data with time-varying covariates. Specifically, we propose to use a penalized likelihood method to select informative covariates and handle collinearity and redundancy among the sensor data, such that the model estimation and prediction accuracy can be greatly improved.
The proposed approach is demonstrated using both simulations and the NASA jet engine dataset.

Special/ Invited session

Classification

Mainly application

Keywords

Adaptive Elastic-net; Dynamic Covariate; Lifetime Regression; Reliability; Sensor Data

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