



Joint models for longitudinal and survival data

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Joint models for longitudinal and survival data

[Yang, Lili](#)



Name: dissertation_Lili ...

Size: 826.4Kb

Format: PDF

Description: dissertation

[View/Open](#)

Permanent Link: <http://hdl.handle.net/1805/4666>

Date: 2014-07-11

Committee Chair: [Gao, Sujuan](#)

Committee: Yu, Menggang

Members: Tu, Wanzhu

Callahan, Christopher M.

Zollinger, Terrell

Degree: Ph.D.

Degree Year: 2013

Department: Department of Biostatistics

Grantor: Indiana University

Keywords: [joint models](#); [longitudinal data](#); [survival data](#); [bivariate change point models](#); [prediction](#); [Bayesian method](#); [EM algorithm](#)

LC Subjects: [Medical sciences -- Statistical methods -- Computer programs](#); [Bayesian statistical decision theory -- Research](#); [Medicine -- Research -- Statistical methods](#); [Survival analysis \(Biometry\) -- Data processing](#); [Biologically-inspired computing](#); [Longitudinal method -- Research -- Statistical methods](#); [Medicine -- Study and teaching -- Simulation methods](#); [Probability measures](#); [Expectation-maximization algorithms](#); [Estimation theory -- Research -- Statistical methods](#); [Structural bioinformatics -- Statistical methods](#); [Failure time data analysis](#); [Numerical analysis -- Data processing](#); [Clinical trials -- Statistical methods](#)

Sponsorship: National Institutes of Health (NIH) Grants R01 AG019181, R24 MH080827, P30 AG10133, R01 AG09956.

Abstract:

Epidemiologic and clinical studies routinely collect longitudinal measures of multiple outcomes. These longitudinal outcomes can be used to establish the temporal order of relevant biological processes and their association with the onset of clinical symptoms. In the first part of this thesis, we proposed to use bivariate change point models for two longitudinal outcomes with a focus on estimating the correlation between the two change points. We adopted a Bayesian approach for parameter estimation and inference. In the second part, we considered the situation when time-to-event outcome is also collected along with multiple longitudinal biomarkers measured until the occurrence of the event or censoring. Joint models for longitudinal and time-to-event data can be used to estimate the association between the characteristics of the longitudinal measures over time and survival time. We developed a maximum-likelihood method to joint model multiple longitudinal biomarkers and a time-to-event outcome. In addition, we focused on predicting conditional survival probabilities and evaluating the predictive accuracy of multiple longitudinal biomarkers in the joint modeling framework. We assessed the performance of the proposed methods in simulation studies and applied the new methods to data sets from two cohort studies.

Description:

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