Post-Doc position in Statistics

- Potential start : September 2021
- Duration : up to 18 months
- Location : Angers, France
- Deadline : August 2021
- Gross monthly salary: $\sim$ 2650 euros/month

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Context and aims

Initially emerging from medical applications with time-to-event experiments, censoring issues are nowadays of growing importance among the various statistical areas, due to the intensified development of new approaches for partially recorded data. However, it turns out that most of those methods require the simple, but hardly realistic, assumption of the censoring independent from the outcome. In this regard, Zheng and Klein [1995] proposed a copula-graphic estimator which models the dependency between censoring and survival using a copula function, and later, Rivest and Wells [2001] further investigate this proposal by assuming an Archimedean copula. This approach has been extended for various regression models but generally imposes a known copula/archimedean generator function.

In this project, we aim to fill this gap by seeking sufficient characterisations for the dependence structure within a dependent censoring context, when the copula function is unknown. This will help us to develop novel statistical methods for estimating the different model specifications, and more specifically, the marginal distributions and the copula function. Both the mathematical and technical development will represent a challenging task, since it is known [Tsiatis, 1975] that the joint distribution between the outcome and the censoring is not identifiable.

Overall, the main goal of this project is thus to construct non-restrictive models in a dependent censoring framework with good inference properties. This will make use of results from the theory of empirical processes and recent machine learning advancements.

Required Profil

PhD with good skills in theoretical statistic/probability and programming language, preferably `R` or `Python` and/or `Pytorch`. Knowledge of statistical methods in survival analysis and development of prediction models will be appreciated. Aptitude to work in team, dynamism and autonomy. Fluent in English.

Funding

This post-doc is part of the project StatMiss for *Statistical Innovations for Missing Data Mechanisms in Survival Analysis* which is funded by the program "Étoile Montante" from Région Pays de la Loire.

Supervision and contact

Supervisor

Dr Mikael Escobar-Bach at LAREMA : Laboratoire Angevin de Recherche en Mathématiques, UMR 6093 CNRS at Univerity of Angers, France.

Contact informations

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Application

Please submit your application with CV (max. 2 pages) and supporting statement by email to mikael.escobar-bach@univ-angers.fr. The candidate should indicate the contact information of two persons who can provide references based on request.

References

L. P. Rivest and M. T. Wells. A martingale approach to the copula-graphic estimator for the survival function under dependent censoring. *Journal of multivariate analysis*, 79: 138–155, 2001.

A. Tsiatis. A nonidentifiability aspect of the problem of competing risks. *Proceedings of the National Academy of Sciences*, 72:20–22, 1975.

M. Zheng and J. P. Klein. Estimates of marginal survival for dependent competing risks based on an assumed copula. *Biometrika*, 82:127–138, 1995.