Reviewer’s report

Title: A comparison of the conditional inference survival forest model to random survival forests based on a simulation study as well as on two applications with time-to-event data

Version: 0 Date: 22 Mar 2017

Reviewer: Veronika Weyer

Reviewer's report:

I have many comments to the authors of this paper, which you will find in the following:

Title:

* I would better write: …random survival forests based on a simulation study as well as on two applications with time-to-event data."

Abstract:

* In the methods section, please explain what you mean with (RSF1 and RSF2) or delete this.

* Delete "that is, Dataset 1 and Dataset 2"

* Better "The first dataset is based"…”The second dataset is based…”

* In the results section, you say that you found out that the confidential inference forest model is superior to the random survival forest models. However, it is not clear what exactly is better. Please give a short statement what is your performance measure for comparing the models.

* Better, write time-to-event instead of time to event.
Introduction:

It is not really clear what you want: You say that you compare the different models, but what do you want to achieve? Why is this comparison so important?

* Page 1, line 58: Please write time-to-event instead of survival data.

* In the first section: What is your intention? Do you want to examine the prediction performance or the model stability when performing variable selection? Alternatively, is the model stability due to low dimensional data not the point of interest?

* Page 2, line 17: Please give a reference for this statement.

* Page 2, line 36/37: Due to what you compare the models?

* Page 2, line 38: "…in such a way (not away!)

* Page 2, line 25-33: I think this is rather methods than introduction.

Between Introduction and Methods:

* I would encourage you to give the two application examples at this point. Then the problem will be underlined, which would be better for understanding and the structure of this paper.

Methods:

* Before you introduce the four algorithms, please give a short explanation about the differences between them. At the moment, it seems that these algorithms are introduced without any background.

* Please give a detailed reference for the algorithms 1 and 2.

* Is RFS1 equal to algorithm 1 and RSF2 equal to algorithm 2? You use these shortcuts in the abstract but it is not clear what indeed these shortcuts stand for.
* Page 2, line 61 "…survival forests is the outlined…below_."

* The structure is confusing: In my opinion it would be clearer if you first introduce both log-rank split rules and after that the four algorithms.

* Page 3, line 10: Please say something about the impurity measure.

* Page 3, line 16: Please give a reference for both split rules.

* Page 3, line 33: j=t1,…Tn

* The formula i(x,s*) is the standard log-rank statistic. Why do you explain this in detail? I think a remark to a reference will be enough about this.

* Page 4, line 37: Are the log-rank split rules also used for algorithm 3? This is not clear.

* Page 4, line 50: In the other algorithms you say events, but here deaths. Please use consistent arguments.

* Page 4, line 52: I think you mean prediction error curves

* Page 4, line 61: Please, give a reference for the linear association test.

* Page 5, line 15: What do you mean with "strongest association"? Which measure do you use exactly?

Model Evaluation:

* Page 5, line 27/28: Which comparisons based on the Brier score do you make? Algorithm 3 and 4 each with algorithm 1 and 2?

* Page 5, line 27-56: Do you use the normal Brier score for time-to-event endpoints instead of using the 0.632+ estimate? If yes, I encourage you to use 0.632+ estimate error of the Brier score

* The heading writes either all with capital letters (e.g. Model Evaluation) or not (simulation study). Please remain uniform.

Simulation study:

* Page 6, line 33-35: This is a repetition from page 5, line 53-56. Please delete this repetition.

* Which statistical program do you use for performing the simulation study and calculating all results? Please indicate which program and which function you use.

* Page 6, line 55-59: I see only marginally differences between all three models and conditions. Real data application:

* You give the limitation of high frequency of missing values in both application datasets, but you do not give any information how do you handle with this missing values. Do you perform a complete case analysis? If yes, are the data missing completely at random? If not, a complete case analysis can be biased. Please show the frequency of missingness and give information about the missingness pattern, which justifies your analysis.

Figures:

* To both Kaplan-Meier curves: These figures do not look so nice, especially the number of risks. Perhaps, you delete the Kaplan-Meier curves, especially if you indicate the median survival times.

* The Figures are not of chronologic order. Please change figure 3 in 1, figure 4 in 2, and so on.

* Figure 6 to 9: You use the variable importance measure but do not explain it or give a reference for this.

* Figure 10: Why do you show the integrated prediction error for the simulated data and the prediction error curves for the application examples?
Discussion:

* Page 10, line 39-41: Why do you give a reference here? This is the result of your paper.

References:

* Reference 8: The year of publishing and the journal/publisher is missing

* Reference 29: What about ???

Globally: Please make it even clearer, why your work is so important to publish. Is this theme really a present theme? Has no one else compared these methods?

Many of the references are older than 10 years.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Unable to assess

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics
Quality of written English
Please indicate the quality of language in the manuscript:

Acceptable

Declaration of competing interests
Please complete a declaration of competing interests, considering the following questions:

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