Reviewer’s report

Title: Clinical Risk Prediction with Random Forests for Survival, Longitudinal, and Multivariate (RF-SLAM) Data Analysis

Version: 1 Date: 18 Jul 2019

Reviewer: Yuedong Wang

Reviewer's report:

The manuscript proposes a new statistical method for clinical risk prediction using survival, longitudinal, and multivariate data. The research is timely, the approach is cutting edge, and the application is impressive. The paper is well-written. I think the paper can be accepted with minor revision.

Detailed Comments:
1. Some notations in equation (4) is only defined in the Supplemental Materials.

The following comments are pertinent to the Supplemental Materials.
2. Page 1, line 8, subscripts of d and Y are inconsistent with the rest.

3. x_i in equation 3 should be italic.

4. Page 2, line 10, the subscript of t should depend on i. Otherwise t_{ij}=t_{ij}-t_{ij-1} does not depend on i.

5. Page 2, it is stated that "Within each CPIU for the same subject, the covariates are constant but between CPIUs for the same subject, the covariate values can vary for time-dependent covariates." It is possible to have none or multiple observations of a covariate in the same interval. Please discuss how to deal with these situations.

6. Page 2, line 16, z_{ij} is used to denote the covariates while the symbol x was used in the main text.

7. Page 2, the statement "Y_{ij} is the event indicator for subject i during time interval j that is 1 if subject i experiences an event during time interval j and is 0 otherwise" seems incorrect. I guess Y_{ij} represents the number of events.

8. j_i should be j_i in equations (7) and (8).
9. The maximum $j_i$, $J$, is used in equation (9). However, $y_{ij}$ and $\mu_{ij}$ are not defined for all $J$ intervals.

10. It is stated that equation (11) is an "estimate of the event rate for individual $i$ in time interval $j$". It seems to be an estimate of $\lambda_j$ assuming the same rate for all individuals in interval $j$. This estimate may be removed to avoid confusion since it is not used in the following arguments.

11. Define $t^L$ and $t^R$ in equation (12).

12. Provide some details about the calculation of the best split.

13. Some notations in Figure 1 are inconsistent. For example, "pHF" and "iHF" are used in the figure and "phf" and "ihf" are used in the caption.

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

Yes

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
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