Reviewer's report

Title: Exploration of a diversity of computational and statistical measures of association for genome-wide genetic studies

Version: 0 Date: 10 May 2019

Reviewer: Ting Hu

Reviewer's report:

In this manuscript, the authors performed a very comprehensive empirical analysis of 29 main-effect identification algorithms, applied to two GWAS datasets. The 29 algorithms cover the most commonly used statistical and machine learning approaches in the literature, as well as some less explored ones. Similarity of the approaches was assessed based on the derived rankings of SNPs and a set of representative approaches was identified for each of the two GWAS datasets.

Overall, the manuscript is very well written, a pleasure to read, and very easy to follow. The structure is clear and the use of tables and figures is effective.

I think the research is interesting and adds very important values to the field on the following aspects:

1) It shows that various approaches capture different aspects of a GWAS dataset;

2) It suggests a preferred GWAS analysis strategy by using multiple approaches and comparing their results.

The minor things I would suggest to revise/add are:

1) Perhaps add more discussion on the biology of the different identified SNPs using various methods for T2D and breast cancer. This helps translate the results to knowledge that may interest a wider audience, especially health experts;

2) It would be helpful for researchers facing the same questions by adding a flowchart that shows the design and steps of employing multiple approaches, comparing the results, and deriving the final findings;

3) Maybe a software tool that could automate the process in point 2). This seems a stretch to realize in the current study, but might be something very useful for the research community and worth considering in the future.
Level of interest
Please indicate how interesting you found the manuscript:

An article of importance in its field

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:

1. Have you in the past five years received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

2. Do you hold any stocks or shares in an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

3. Do you hold or are you currently applying for any patents relating to the content of the manuscript?

4. Have you received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript?

5. Do you have any other financial competing interests?

6. Do you have any non-financial competing interests in relation to this paper?
If you can answer no to all of the above, write 'I declare that I have no competing interests' below. If your reply is yes to any, please give details below.

I declare that I have no competing interests.

I agree to the open peer review policy of the journal. I understand that my name will be included on my report to the authors and, if the manuscript is accepted for publication, my named report including any attachments I upload will be posted on the website along with the authors' responses. I agree for my report to be made available under an Open Access Creative Commons CC-BY license (http://creativecommons.org/licenses/by/4.0/). I understand that any comments which I do not wish to be included in my named report can be included as confidential comments to the editors, which will not be published.

I agree to the open peer review policy of the journal

Do you want to get recognition for reviewing this manuscript? Add a record of this review to Publons to track and showcase your reviewing expertise across the world's journals. Signing up is quick, easy and free!

Yes