Reviewer's report

Title: Rule based classifier for the analysis of gene-gene and gene-environment interactions in genetic association studies

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Reviewer: Lang Li

Reviewer's report:

1. Is the question posed by the authors new and well defined?
   Although the rule based classifiers are not new, their applications to gene/gene interactions are limited. These approaches have the advantage of good interpretation, and are very convenient for decision making in the clinical setting.

2. Are the methods appropriate and well described, and are sufficient details provided to replicate the work?
   Yes, all of the model and simulations are very well documented.

3. Are the data sound and well controlled?
   The simulations studies are very well performed for two case/control models. However, I would like to see more controlled environment when comparing different approaches. For example, I would like to see when the model is a null model for all SNPs, whether three rule based partition approaches provided us equal numbers of false positive numbers of models, attributes, or rules. This analysis will somehow help to justify the proper thresholds for different rule based approaches, or explain why one approach performs better than the others when the simulation model is not a null-model.

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?
   Yes, it does.

5. Are the discussion and conclusions well balanced and adequately supported by the data?
   I like what the authors discuss the performances of rule based approaches. I would also like to see some more simulation under the null (see the previous comments).

6. Do the title and abstract accurately convey what has been found?
   Yes.

7. Is the writing acceptable?
   It needs some work before acceptable.