

Review of: "Variable selection in generalized extreme value regression model using Bootstrap method"

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Potential competing interests: No potential competing interests to declare.

The idea of using extreme value regression as an underlying model for backward selection in unbalanced setups is interesting. A combination with bootstrapping is highly relevant for real-world scenarios where datasets are often affected by low sample sizes, as in the presented case study.

I have a few suggestions to improve the paper:

- There are typos and grammar errors in the paper. I suggest the authors to perform a thorough proof-reading and/or the usage of some spell checker.
- To support the claim and validity of your method, a simulation study should be performed where the ground truth feature importance is known. Then, one can identify whether the correct features have been found.
- Since the proposed method builds on sampling procedures, the stability of the obtained feature sets should be investigated (is there any change to the feature set if minor changes are performed on the input data?). A stability criterion like [1] and a corresponding study could be helpful.
- Are thresholds such as alpha (0.5) or the number of bootstrap samples (1000) justified? It would help if you could elaborate on the hyperparameter selection.
- The experiments supporting the proposed methodology should be extended. As mentioned above, a simulation study would provide deeper insights.
- Furthermore, a comparison with baseline and state-of-the-art feature selectors, such as mRMR [2] or feature selectors that include bootstrapping (you mention quite a few in the background chapter), would be helpful to assess the performance of the proposed method.
- The presented dataset is rather small in terms of the number of features (only 12); since real-world use cases often include a higher number of features, experiments on larger datasets would be required.
- As you consider only one real-world dataset in the experiment section, you should give more information about the dataset, such as a correlation matrix or some information about colinearity in the data, as this may have a high impact on feature selection. It would help if you also informed the reader about class balance in the dataset, as this is one of your main foundations of the extreme-value distribution.
- In order to support reproducibility, I recommend sharing the code, e.g., on GitHub.

Finally, the discussion section should be more detailed and discuss the pros and cons of your work.

[1] Nogueira, Sarah, Konstantinos Sechidis, and Gavin Brown. "On the stability of feature selection algorithms." *The*

Journal of Machine Learning Research 18.1 (2017): 6345-6398.

[2] Peng, Hanchuan, Fuhui Long, and Chris Ding. "Feature selection based on mutual information criteria of max-dependency, max-relevance, and min-redundancy." *IEEE Transactions on pattern analysis and machine intelligence* 27.8 (2005): 1226-1238.