Geoscientific Model Development Discussions

Geosci. Model Dev. Discuss., author comment AC2
https://doi.org/10.5194/gmd-2021-317-AC2, 2022

Reply on CC2

Licheng Liu et al.

Author comment on "KGML-ag: a modeling framework of knowledge-guided machine learning to simulate agroecosystems: a case study of estimating N_2O emission using data from mesocosm experiments" by Licheng Liu et al., Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2021-317-AC2, 2022

Hi Ather Abbas,

We really appreciate your comments on the feature importance method.

The perturbation importance methods are defined and conducted by adding or replacing input features with gaussian noise ($\mu = 0$, $\sigma = 0.01$) and then using the depreciation on model performance to measure the feature importance. The permutation method is defined and conducted by permuting features and then using the depreciation on model performance to measure the feature importance. Since both perturbation and permutation feature important methods work independently to models, they belong to model-agnostic methods.

As you mentioned, “the permutation importance is considered to be not stable i.e. different (random) seeds give different results (Molnar, 2019).” Basically, both the permutation method or perturbation method work by introducing noises (uncertainty) in models. Hence, this unstable issue should exist in both methods. We recognized that many other feature importance methods were not tested in this study. We anticipate to test them in our future study.

It is great to discuss with you Ather. If you have any questions, please always feel free to contact me or any other authors.

Best regards,

Shaoming Xu