A Python Package for Better Model Interpretation

Model interpretation is always playing an important role in the modeling workflow for data scientists. It helps to understand how user behaviors and product features impact the central metrics that we care about. A proper model interpretation is necessary to unleash the power of modeling for right insights and recommendations to improve our services and products. Nonetheless, two issues may ruin model interpretation by providing misleading insights and recommendations. Firstly, if highly correlated features enter the model, multicollinearity happens and it would be difficult to determine the true relationship between the features and the central. Secondly, predictive models usually don't provide causal information directly and it is not uncommon to mistake correlation as causation.

There already exists solutions to the two issues, but both solutions have some limitations. Variance Inflation Factor (VIF) can identify highly correlated features and excludes them from the model, but the process could be time-consuming for large datasets. Further causal inference analysis can identify causation relationship, but it requires extra work and efforts besides building the original model.

We addressed the limitations by developing a python package, aiming for a better and easier model interpretation. The library applied an innovated fast computational algorithm for VIF via inverse correlation matrix (shorten running time from hours to seconds). Meanwhile, the package integrated Accumulated Local Effects (ALE) Plot, a visualization tool reflecting causal information directly from the original model. In the future, the package will also incorporates other frequently used visualization tools for model interpretation, making itself a comprehensive package for data scientists to refer to.

Innovation: 1. A fast VIF computation algorithm; 2. A newly developed python package.
Relevance: All DS can use it for better model interpretation and better insights to product improvement.
Impact: 1. Shorten running time from hours to seconds for VIF computation;
2. Already been applied to modeling works for multiple apps.