

## Model Interpretation

We will train and interpret model on wine-quality dataset. You can access the data from following link. There are two csv files available on the link, but **you only need to work on white-wine dataset**. Treat this dataset as a regression problem where 1 is poor and 10 is excellent quality. Use R-squared metrics for model evaluation.

<https://archive.ics.uci.edu/ml/machine-learning-databases/wine-quality/>

1. Train a Random Forest Regressor for the dataset. Find the best model based on R-squared value using RandomizedSearchCV.
2. Use the best model from question 1 for model interpretation and rank the features based on drop feature importance.
3. Use the best model from question 1 for model interpretation and rank the features based on permutation importance.
4. Use the best model from question 1 for model interpretation and rank the features based on SHAP algorithm. Install SHAP using pip.
5. Visualize partial dependence plot for each feature in the dataset using Sklearn.
6. Visualize ICE plot for each feature using following library. <http://austinrochford.github.io/PyCEbox/>
7. Analyze outputs from each technique and comment that which technique you found most useful and why.