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Batch-39

To predict a customer subscribes to a term deposit, we trained a GradientBoostingClassifier on the Bank dataset.
We used Permutation Importance (PI) to rank global features, SHAP to provide both global and local explanations, and LIME to provide local case-specific explanations.
Lastly, we compared the three methods to seek similarities and differences on their explanations.

Consistencies & Differences

1. PermutationImportance(PI)describesthemostpredictiveglobal features but fails to tell whether their effect is positive or negative.

2. SHAPsummaryplotconfirmstherankingofPIand,inaddition, indicates whether the effect is positive or negative (e.g., longer call duration makes it more likely to subscribe).

3. SHAPlocalforceplotaddspersonalizedlogictoindicatehowspecific characteristics attracted a customer to, or turned them off to, subscribing.

4. LIMEexplanationsofferhuman-readable,intuitiverulesastowhy certain predictions were made to individual customers.

5. PIandSHAPagreeontheimportantfeatures,suchaslengthoftime, age, and prior results.

6. TherearesomeslightdifferencesinSHAPandLIMEatthelocallevel, in the methods of their approximation.

7. PIisconstantandinternationalwhereasLIMEmaychangeamong runs because it uses sampling.

8. SHAPismoremathematicallysoundbutacostlyprocess;LIMEis neither computationally cheap nor difficult to interpret in practice.

9. Collectivelytheseapproachesarecomplementary:PIprovidesglobal ranking, SHAP provides global + local balance, LIME a simple local reasoning.

10. This multi means approach guarantees reliable and clear explanations of both the world trends and personal forecasts.