1)How does bagging reduce overfitting in decision trees?

Ans- Bagging attempts to reduce the chance of overfitting complex models. It trains a large number of “strong” learners in parallel. A strong learner is a model that's relatively unconstrained. Bagging then combines all the strong learners together in order to “smooth out” their predictions.

2) What are the advantages and disadvantages of using different types of base learners in bagging?

Ans- Bagging offers the advantage of allowing many weak learners to combine efforts to outdo a single strong learner. It also helps in the reduction of variance, hence eliminating the overfitting of models in the procedure. One disadvantage of bagging is that it introduces a loss of interpretability of a model.

3) How does the choice of base learner affect the bias-variance tradeoff in bagging?

Ans- “Bias and variance are complements of each other” The increase of one will result in the decrease of the other and vice versa. Hence, finding the right balance of values is known as the Bias-Variance Tradeoff. An ideal algorithm should neither underfit nor overfit the data.

Bagging reduces the variance without making the predictions biased. This technique acts as a base to many ensemble techniques so understanding the intuition behind it is crucial.

4) Can bagging be used for both classification and regression tasks? How does it differ in each case?

Ans- Bagging avoids overfitting of data and is used for both regression and classification models, specifically for decision tree algorithms.

5) What is the role of ensemble size in bagging? How many models should be included in the ensemble?

Ans- Bagging, also known as Bootstrap aggregating, is an ensemble learning technique that helps to improve the performance and accuracy of machine learning algorithms. It is used to deal with bias-variance trade-offs and reduces the variance of a prediction model.

There are no restrictions/guidelines on the number of models. You can start even from 3 models. You can keep the number of models as a hyperparameter if the training cost is less.

6) Can you provide an example of a real-world application of bagging in machine learning?

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