Om Shete

Experiment No: 7

Aim: Implement ensemble methods to combine different models.

Theory:

- Ensemble methods are machine learning techniques that combine the predictions of multiple models to produce a more robust, accurate prediction.
- The idea is that by combining models, the weaknesses of one model can be compensated by the strengths of others.
- Below are the most common ensembles methods used to combine different models:

1) **Bagging** (Bootstrap Aggregating)

- Bagging involves training multiple instances of the same model on different random subsets of the training data.
- Each model is trained independently, and their predictions are combined, typically by averaging or majority voting.
- For eg.,

Random Forest is a bagging method that builds multiple decision trees and combines them to produce more accurate and stable predictions.

2) Boosting

⇒ Boosting sequentially trains models, where each subsequent model tries to correct the errors of the previous one.

- Models are not trained independently, and the errors made by previous models are given more importance in each new model.
- For eg., Gradient Boosting, AdaBoost, and XGBoost are common boosting algorithms that combine weak learners to form a strong prediction model.

3) Stacking

⇒ Stacking involves training multiple different models and then using another model to combine the predictions of these base models.

- The meta-model takes the predictions of the base models as input and learns how to best combine them to make the final prediction.

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27/9/24