



Boosting Algorithm

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Ensemble Methods in Machine Learning

Ensemble Methods

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graph TD; A[Ensemble Methods] --> B[Bagging]; A --> C[Boosting]; A --> D[Stacking];
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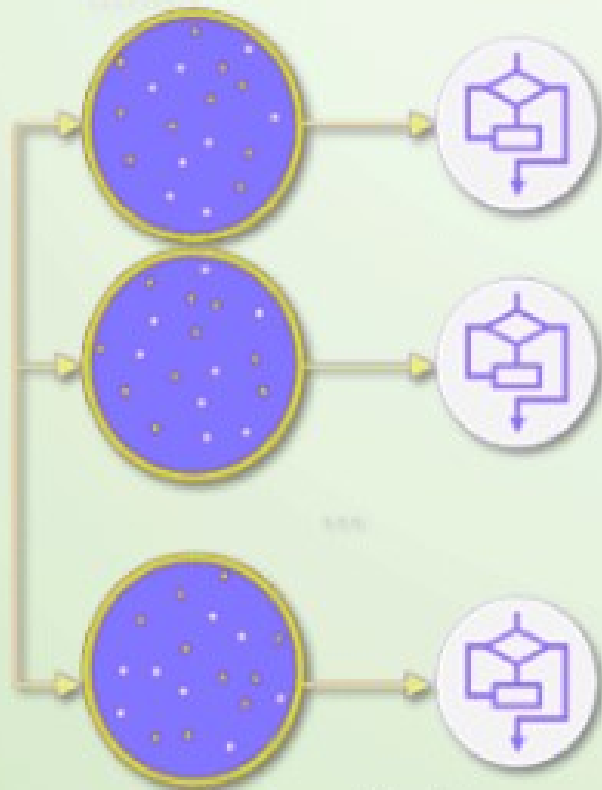
Bagging

Boosting

Stacking

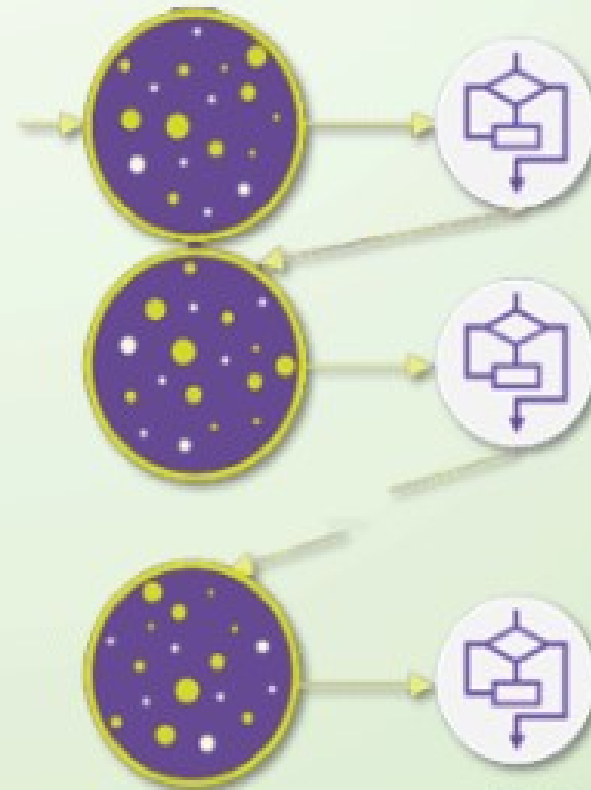
Bagging and Boosting

Bagging



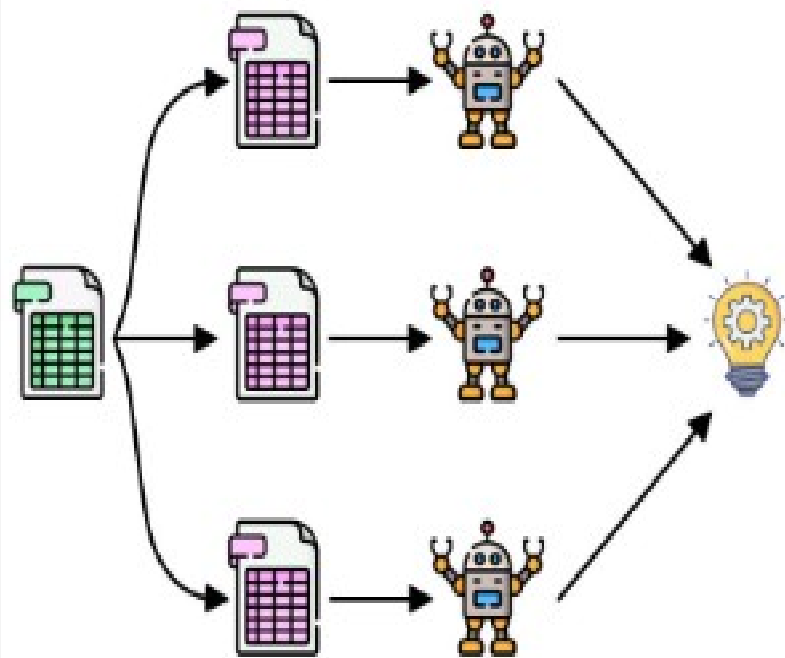
Parallel

Boosting



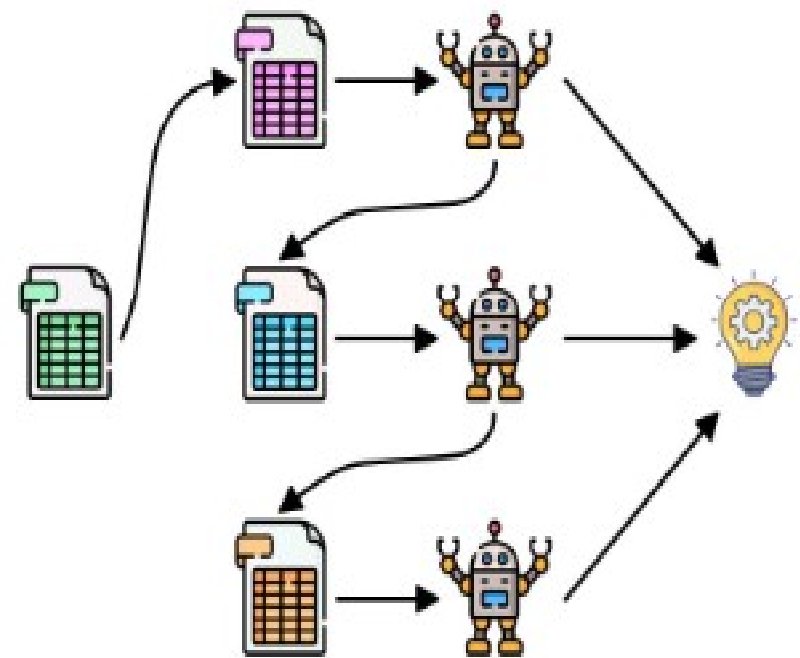
Sequential

Bagging



Parallel

Boosting



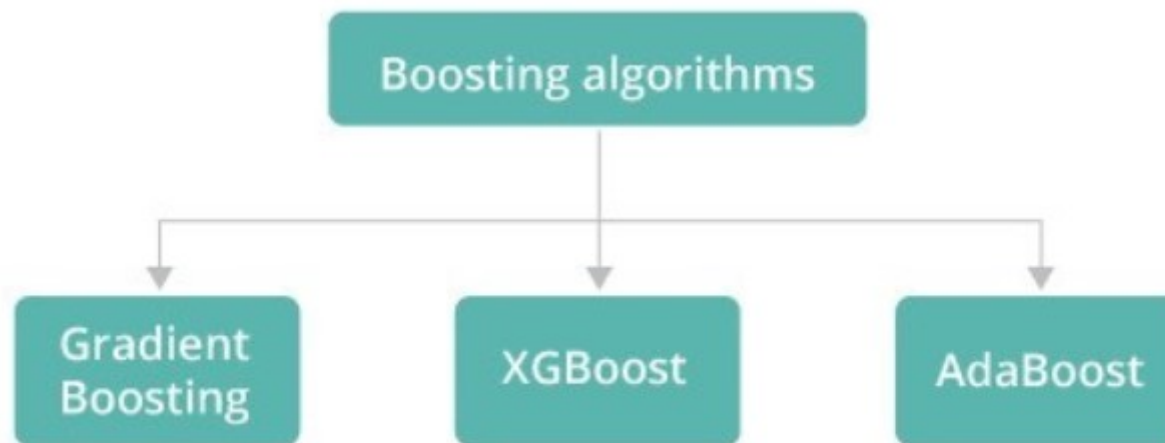
Sequential

Differences Between Bagging and Boosting

S.NO	Bagging	Boosting
1.	The simplest way of combining predictions that belong to the same type.	A way of combining predictions that belong to the different types.
2.	Aim to decrease variance, not bias.	Aim to decrease bias, not variance.
3.	Each model receives equal weight.	Models are weighted according to their performance.
4.	Each model is built independently.	New models are influenced by the performance of previously built models.
5.	Different training data subsets are randomly drawn with replacement from the entire training dataset.	Every new subset contains the elements that were misclassified by previous models.
6.	Bagging tries to solve the over-fitting problem.	Boosting tries to reduce bias.
7.	If the classifier is unstable (high variance), then apply bagging.	If the classifier is stable and simple (high bias) the apply boosting.
8.	Example: The Random Forest model uses Bagging.	Example: The AdaBoost uses Boosting techniques

Types of Boosting:

There are three types of Boosting Algorithms which are as follows:



Adaboost



"Anything worth having takes time."

But.....

Adaboost makes it simpler.

ADA BOOSTING

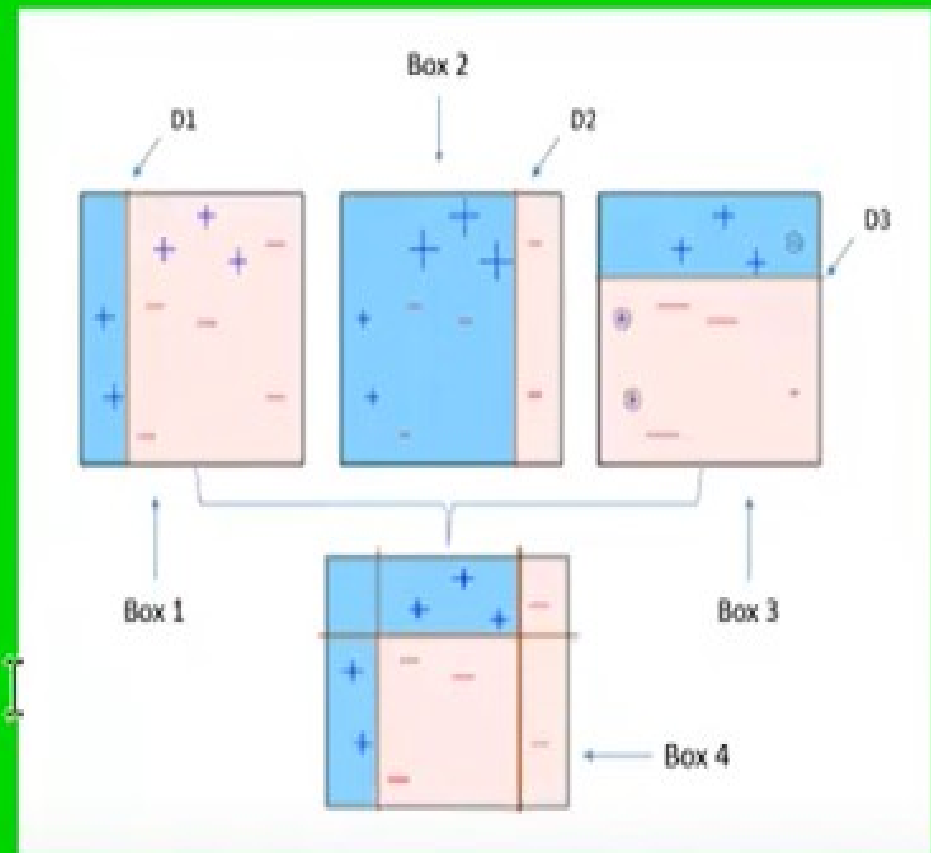
✓ IT IS CALLED ADAPTIVE BOOSTING

✓ TRANSFORMING WEAK

LEARNERS INTO STRONG LEARNER

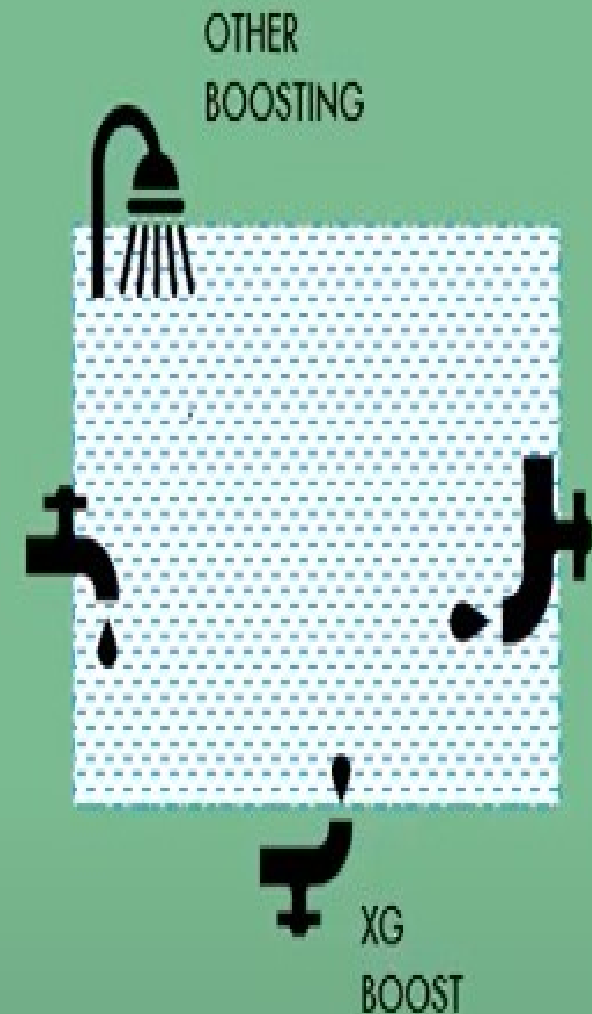
✓ BOTH REGRESSION AND CLASSIFICATION

PROBLEM SOLVED IN THIS ALGORITHM



XG BOOSTING

- IT IS CALLED EXTREME GRADIENT BOOSTING
- DISTRIBUTE MACHINE LEARNING PROCESS
- XG BOOSTING IS FASTING AND GIVE ACCURATE
- VALUE WITH GOOD MODEL.



LG BOOSTING

- IT IS CALLED BY LIGHT GRADIENT BOOSTING
- LARGE AMOUNT OF DATA IS EASY HANDLED
- SMALLEST DATASET IS GIVE POOR MODEL
- LG BOOSTING IS LEAF WISE GROWTH
- HISTOGRAM BASE METHOD
- CONTINUOUS VALUES SPLITS UPTO BIN

