Ensembles can give you a boost in accuracy on your dataset.

Combine Model Predictions Into Ensemble Predictions:

The three most popular methods for combining the predictions from different models are:

* **Bagging**. Building multiple models (typically of the same type) from different subsamples of the training dataset.
* **Boosting**. Building multiple models (typically of the same type) each of which learns to fix the prediction errors of a prior model in the chain.
* **Voting**. Building multiple models (typically of differing types) and simple statistics (like calculating the mean) are used to combine predictions.

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# Bagging Algorithms:

Bootstrap Aggregation or bagging involves taking multiple samples from your training dataset (with replacement) and training a model for each sample.

The final output prediction is averaged across the predictions of all of the sub-models.

BOOSTING ALGORITHM:

Boosting ensemble algorithms creates a sequence of models that attempt to correct the mistakes of the models before them in the sequence.

Once created, the models make predictions which may be weighted by their demonstrated accuracy and the results are combined to create a final output prediction.

The two most common boosting ensemble machine learning algorithms are:

1. AdaBoost
2. Stochastic Gradient Boosting

## AdaBoost:

AdaBoost was perhaps the first successful boosting ensemble algorithm. It generally works by weighting instances in the dataset by how easy or difficult they are to classify, allowing the algorithm to pay or less attention to them in the construction of subsequent models.

You can construct an AdaBoost model for classification using the AdaBoostClassifier class.

AdaBoostClassifier:

An AdaBoost classifier is a meta-estimator that begins by fitting a classifier on the original dataset and then fits additional copies of the classifier on the same dataset but where the weights of incorrectly classified instances are adjusted such that subsequent classifiers focus more on difficult cases.

## Stochastic Gradient Boosting

Stochastic Gradient Boosting (also called Gradient Boosting Machines) are one of the most sophisticated ensemble techniques. It is also a technique that is proving to be perhaps of the the best techniques available for improving performance via ensembles.

# Voting Ensemble:

Voting is one of the simplest ways of combining the predictions from multiple machine learning algorithms.

It works by first creating two or more standalone models from your training dataset. A Voting Classifier can then be used to wrap your models and average the predictions of the sub-models when asked to make predictions for new data.

=>Do pre-processing for the given datasets and remove the unnecessary columns in the datasets.

=>Divide the data into source and target variables.

=>Divide the data into train and test datasets using train\_test\_split method.

=>create the model and check for the accuracy for each model.

=>perform using all the required classifiers.