

# Boosting

In machine learning, boosting is an ensemble meta-algorithm for primarily reducing bias and also variance in supervised learning and a family of machine learning algorithms that convert weak learners to strong ones.

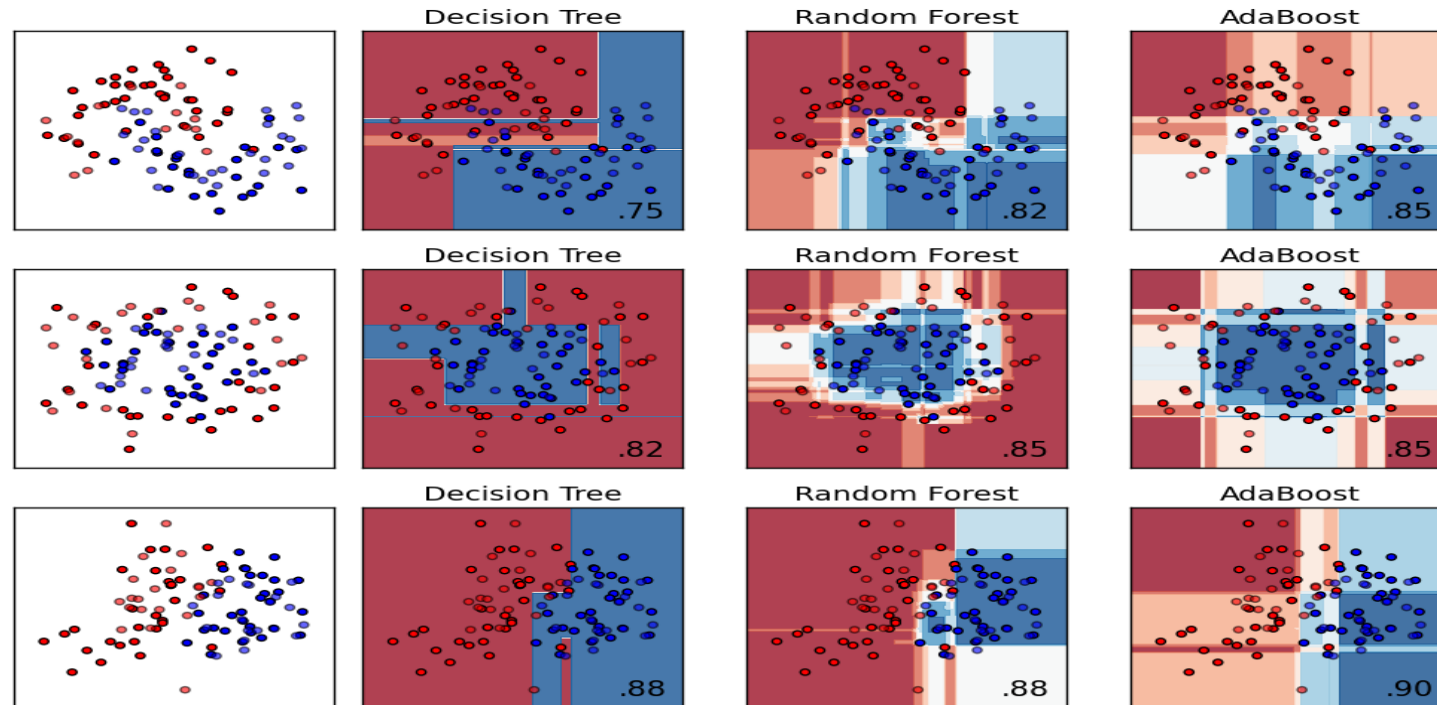
Boosting can be used for:

- Binary Categorisation
- Multiclass Categorisation

Different types of famous Boosting algorithms in Machine Learning:

- Adaptive Boosting (also known as AdaBoost)
- Gradient Boosting (GBM)
- Extreme Gradient Boosting Machine (XGBM)
- LightGBM
- CatBoost

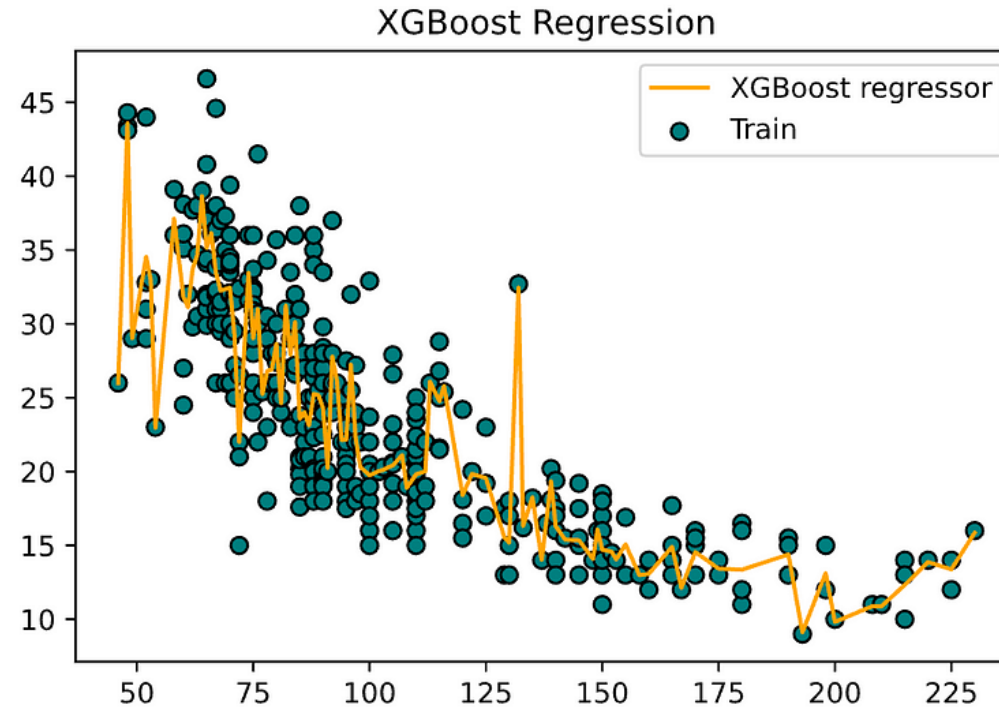
# Ada Boosting-Regressor



AdaBoost, short for Adaptive Boosting, is a machine learning meta-algorithm. It first predicts by using the original data and assigns equal weight to every point. Then it attaches higher importance to the observations the first learner fails to predict correctly. It repeats the process until it reaches a limit in the accuracy of the model.

AdaBoost can be best used with a decision tree.

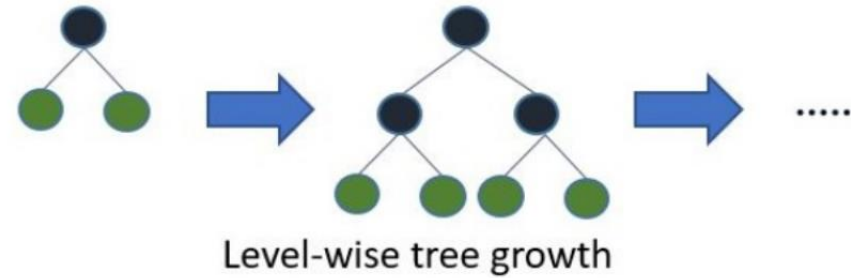
# XG Boosting-Regressor



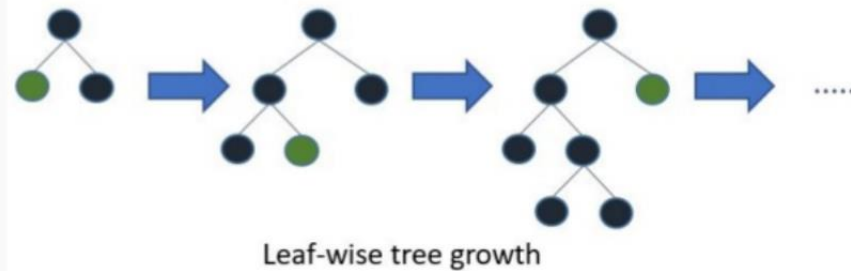
XG boost is one of the implementations of the gradient boosting concept, but what makes XG boost unique is that it uses a more regularized model formalisation to control over-fitting, which gives it better performance. It provides A scalable, portable and accurate library to provide you with the best of the machine. Therefore, it helps to reduce overfitting.

# LG Boosting-Regressor

XGBoost:



LightGBM:



LightGBM is a relatively new algorithm. It uses a tree-based learning algorithm. Light GBM grows tree leaf-wise while another algorithm grows level-wise, thus it grows the tree vertically. It will choose the leaf with max delta loss to grow. When growing the same leaf, Leaf-wise algorithm can reduce more loss than a level-wise algorithm. It can run on GPU and also consumes less memory to run and is fast in handling larger datasets. Thus, it is not advised to use LightGBM for smaller datasets. It has such a huge number of parameters but this algorithm is easy to implement.