BOOSTING ALGORITHM

Ensemble Technique

- Adaboost
- Extreme Gradient boost (XGBoost)
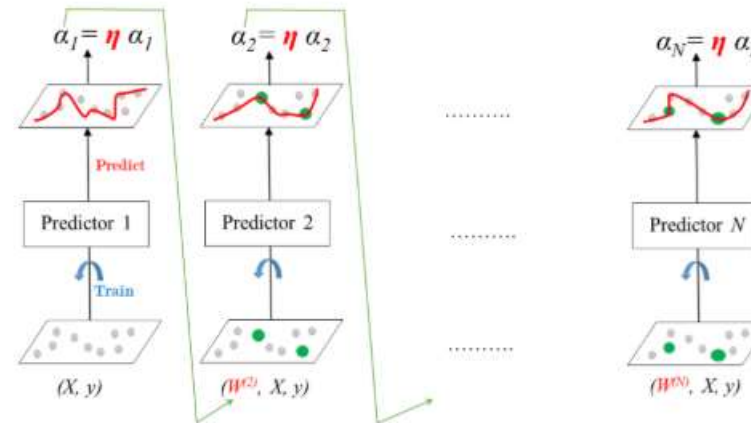- Light Gradient Boosting (LGBoost)

ADABOOST

- Combines **multiple weak learners** to make into **strong learner**

- It applicable for both **regressor and classifier**

- It **updates the weight** of incorrectly classified samples

- **Sequentially tree growing** considering past mistakes

- It makes tree as **stumps**

AdaBoost: Training
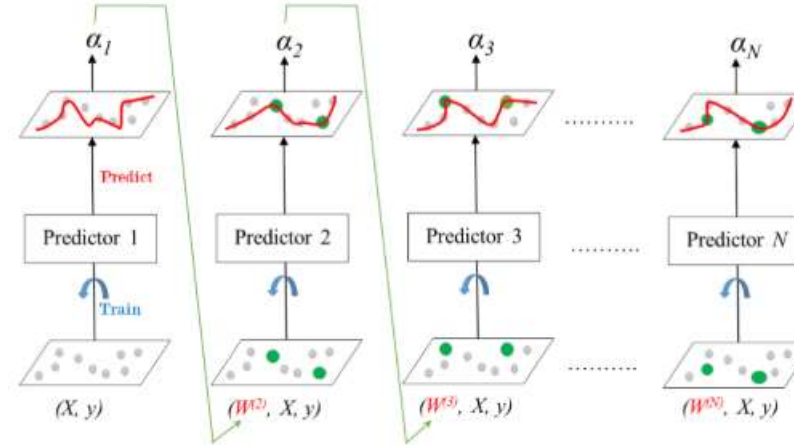

Learning rate: $0 < \eta \leq 1$

Gradient Boost

- **Minimize a loss function** using **gradient descent**
- Create a new model based on previous model **residuals(error)**
- It works for both classification and regression tasks
- It uses decision tree

XG Boost

- It is optimized gradient boosting algorithm
- **Speed and performance are higher** compared to gradient based algorithm
- It improves traditional gradient boosting by using below:
  - Regularization(L1 and L2)
  - Parallel processing
  - Handling missing values
  - Tree pruning
  - Efficient memory usage
- Uses for regression and classification
- **Level wise tree growth**
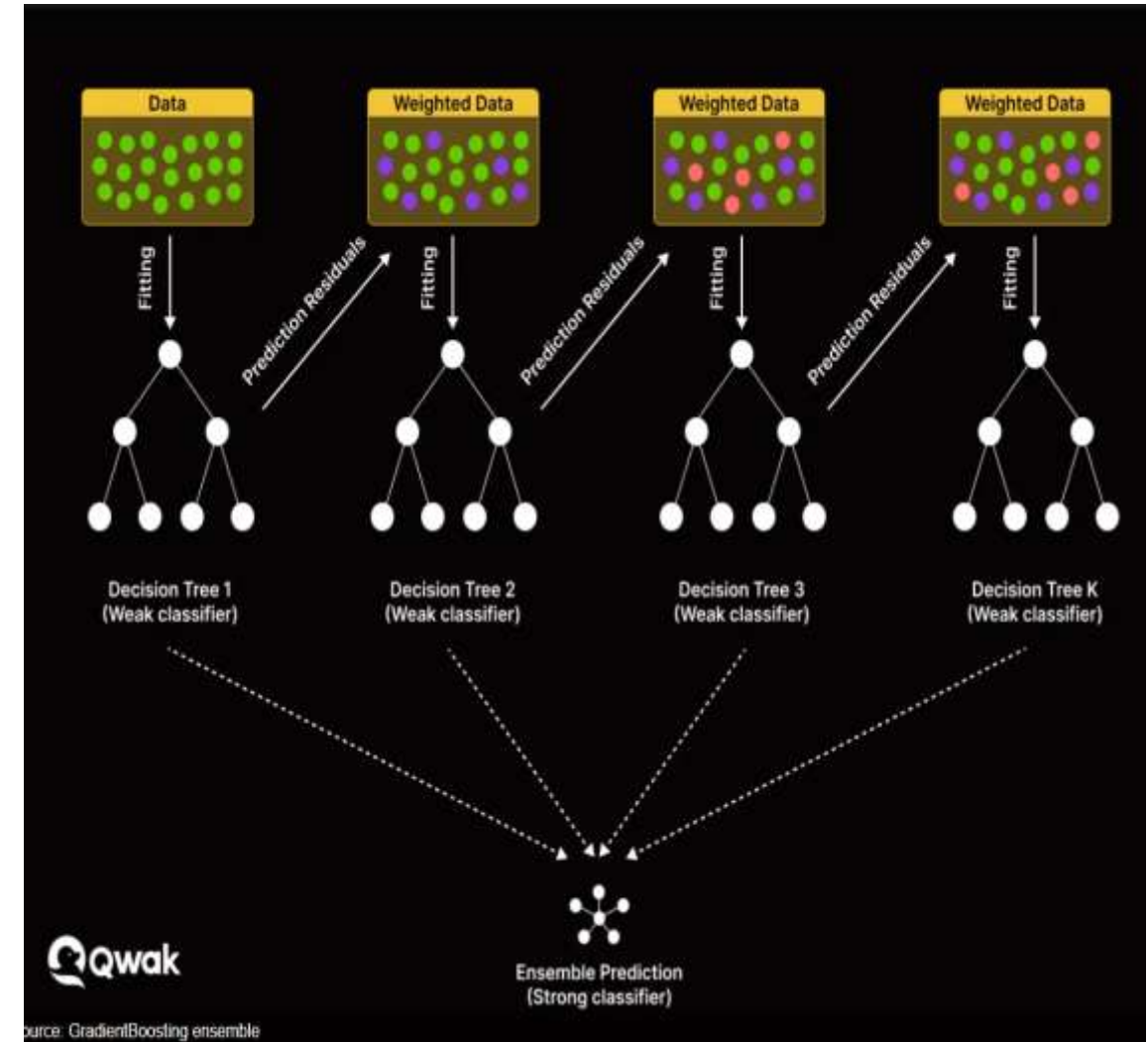
Light Gradient Boosting

- **Leaf wise tree growth**

- Uses **Histogram** based decision trees to select best fit

- Works **well** for **large** dataset

- It fast the training and low memory usage

- Techniques:
  - Gradient based one side sampling(GOSS)
  - Exclusive feature bundling

Leaf-wise tree growth