

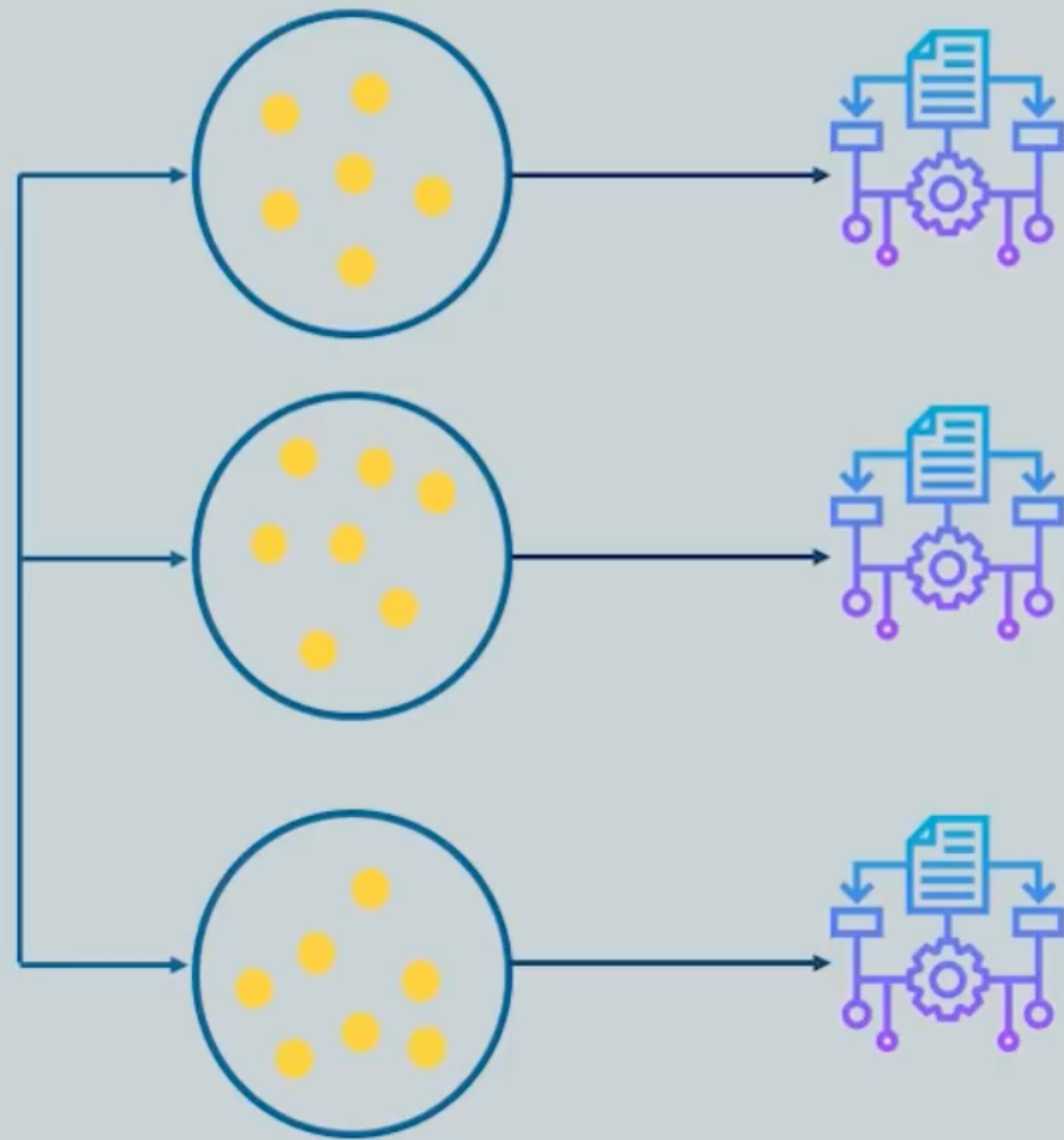
Boosting Algorithm

AdaBoosting | XG Boosting | LG Boosting

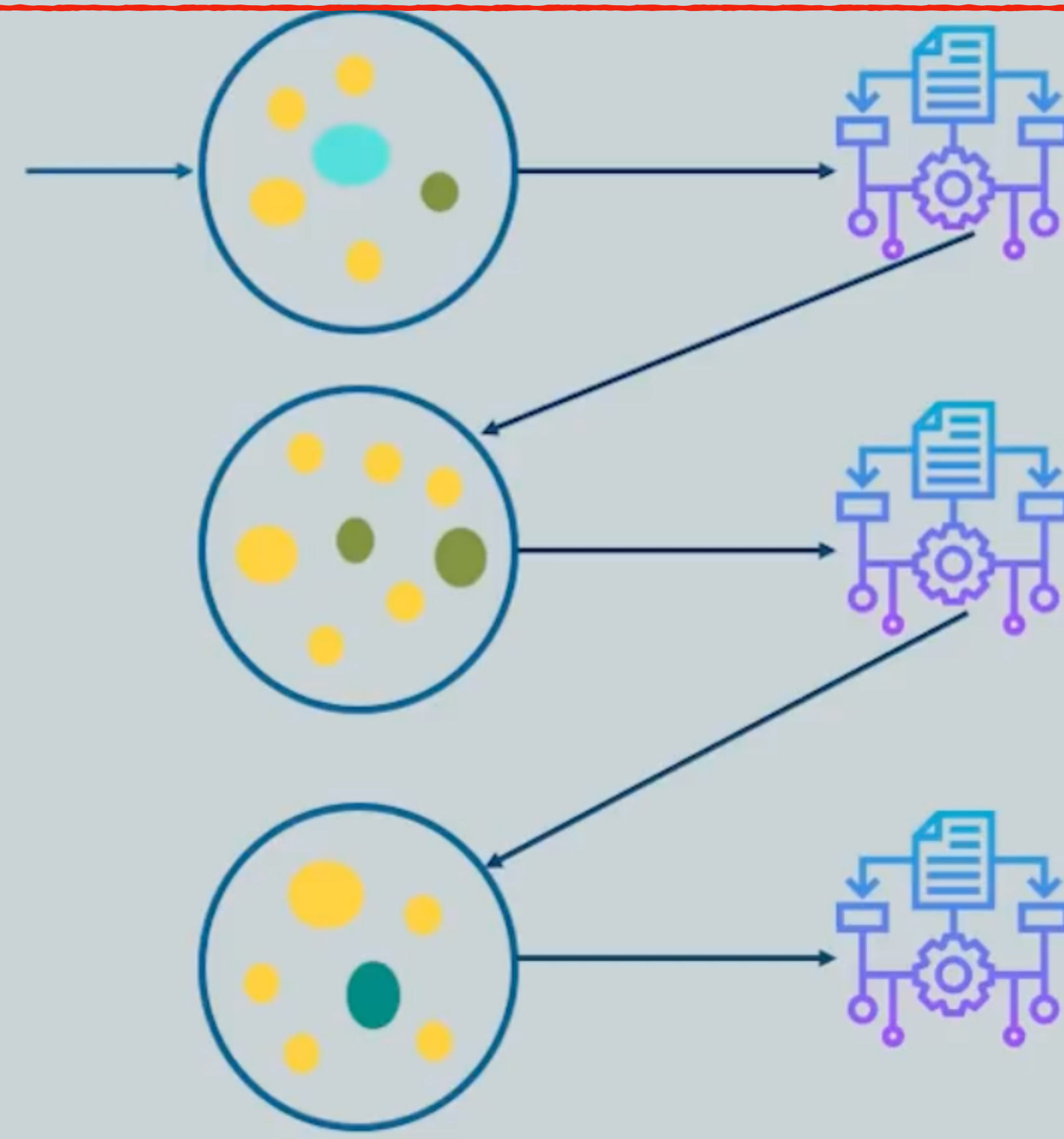
Baskar Ramachandran (25-Dec-25)

What is Boosting Algorithm?

Boosting is a type of Ensemble Learning. Boosting builds models sequentially, where each new weak learner focuses on correcting errors from previous ones by assigning higher weights to misclassified data points.



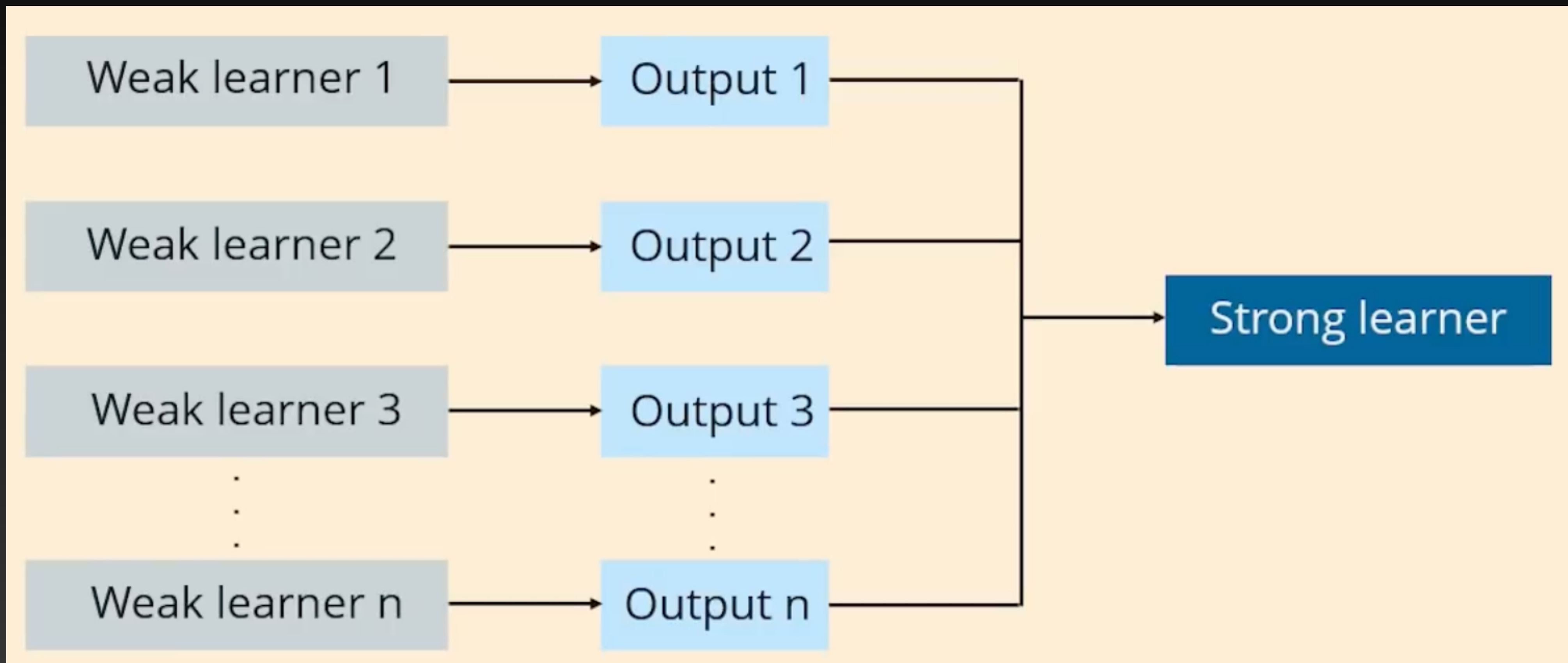
Bagging - Parallel



Boosting - Sequential

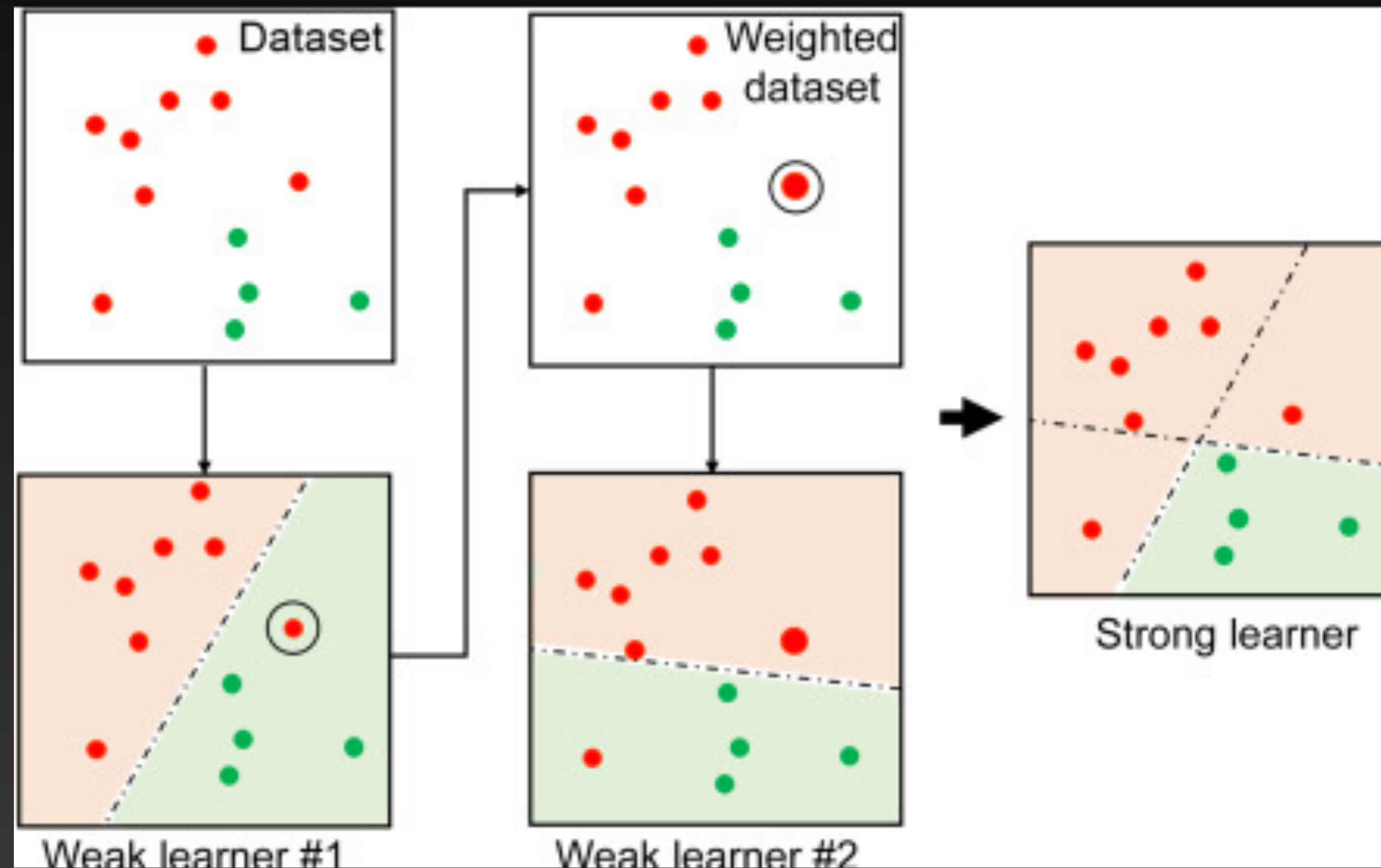
What is Boosting Algorithm?

It combines multiple weak learners into a strong, accurate predictor.



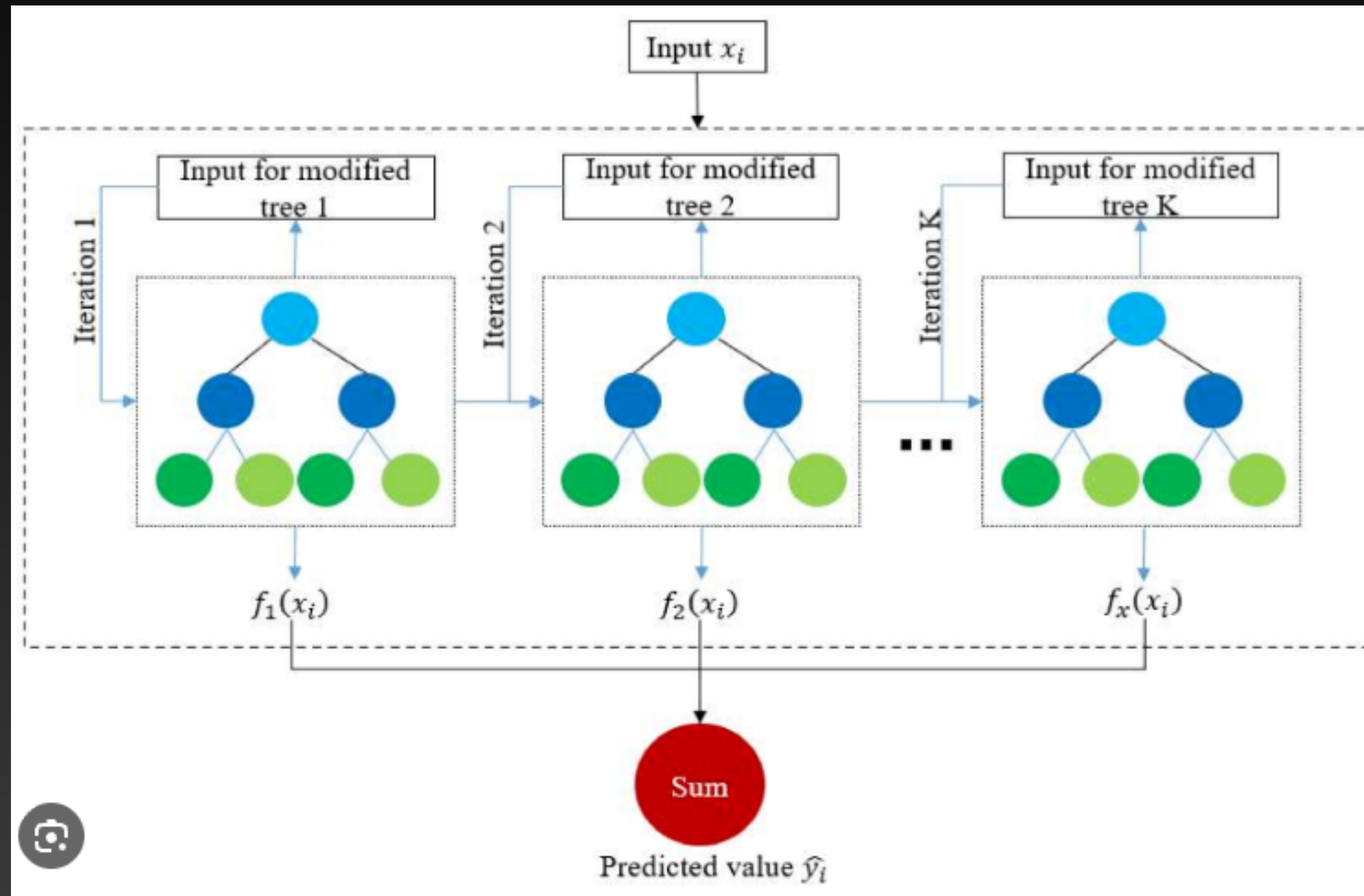
AdaBoosting

This method uses weak learners" to create one "strong" and highly accurate model. AdaBoost typically uses **Decision Stumps**—tiny decision trees with only one split (one node and two leaves). A single stump is only slightly better than a random guess.



XGBoost

XGBoost (eXtreme Gradient Boosting) is Like other boosting methods, it builds models one after another. Each new decision tree is specifically trained to fix the errors (residuals) of the previous trees.



LGBoost

Unlike other algorithms that grow trees level-by-level (horizontally), LightGBM grows trees leaf-wise (vertically). It identifies the leaf that will most reduce the loss function and splits only that one, leading to deeper, more accurate trees with fewer total nodes

