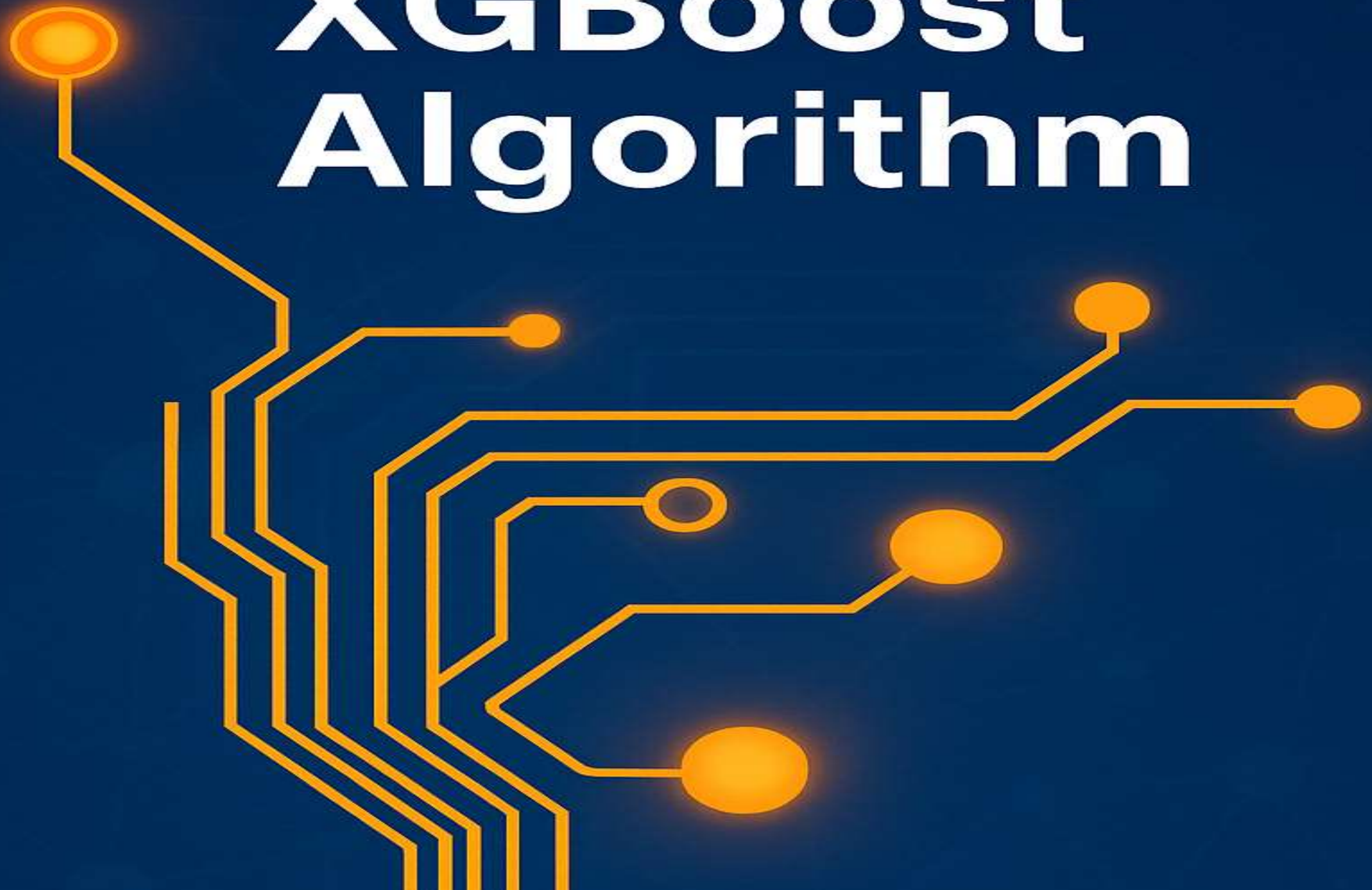
XGBoost Algorithm



XG Boost Algorithm

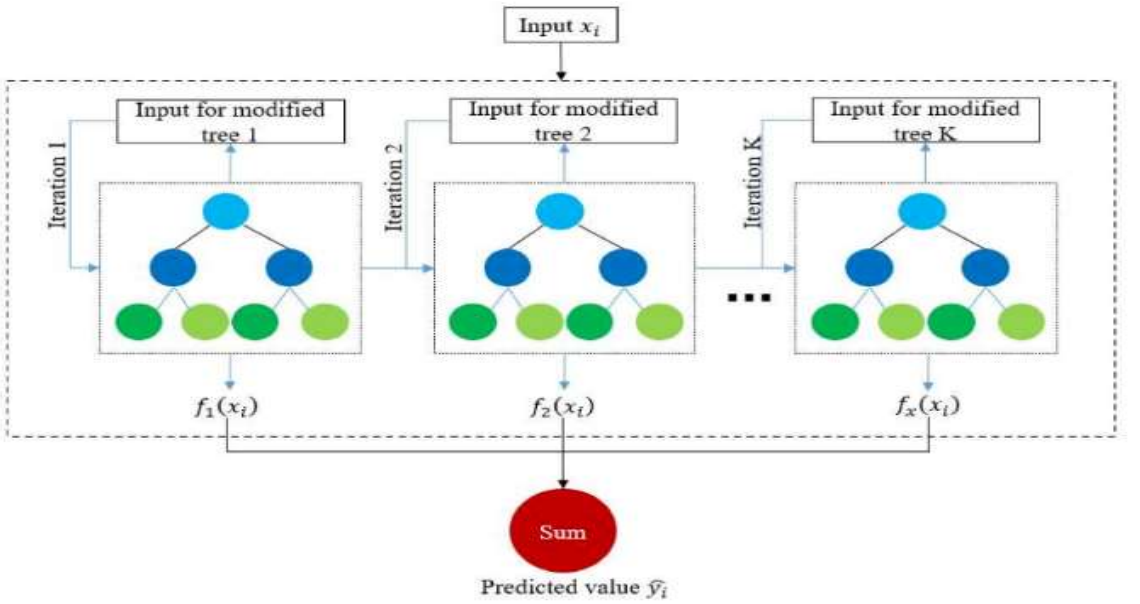
- **XGBoost** (**Extreme Gradient Boosting**) is an advanced machine learning algorithm based on gradient boosting.

- XGBoost uses **decision trees** as its base learners combining them sequentially to improve the model's performance.

- Each **new tree** is trained to correct the **errors** made by the previous tree

- XGBoost is used for both classification and regression tasks

How Does XG Boost Work?



- XG Boost algorithm starts with a simple decision tree and makes **initial predictions.**
- **Errors** (residuals) are calculated by comparing predictions with actual values.
- A new **decision tree** is trained to **correct** the previous **tree's mistakes.**
- This process repeats, with each tree **improving** upon the last.
- Final model **aggregates** all trees to make **accurate predictions.**

XG Boost and its Unique Features

- **Regularization :** It's a **technique** used in machine learning to **prevent** overfitting.
- **Handling Missing Values :** XGBoost automatically detects and processes missing values
- **Parallel Processing for Faster Training :** reducing training time
- **Built-in cross-validation:** Algorithm has the ability to **cross-validate** models while developing.

Advantages of XG Boost

- ❑ High Performance and Accuracy
- ❑ Wide **Language Support** (Available in Python, R, Java, Scala, Julia)
- ❑ Handles **large datasets** efficiently

Disadvantages of XG Boost

- Computational cost
- Complex tuning
- Memory usage
- Harder to deploy