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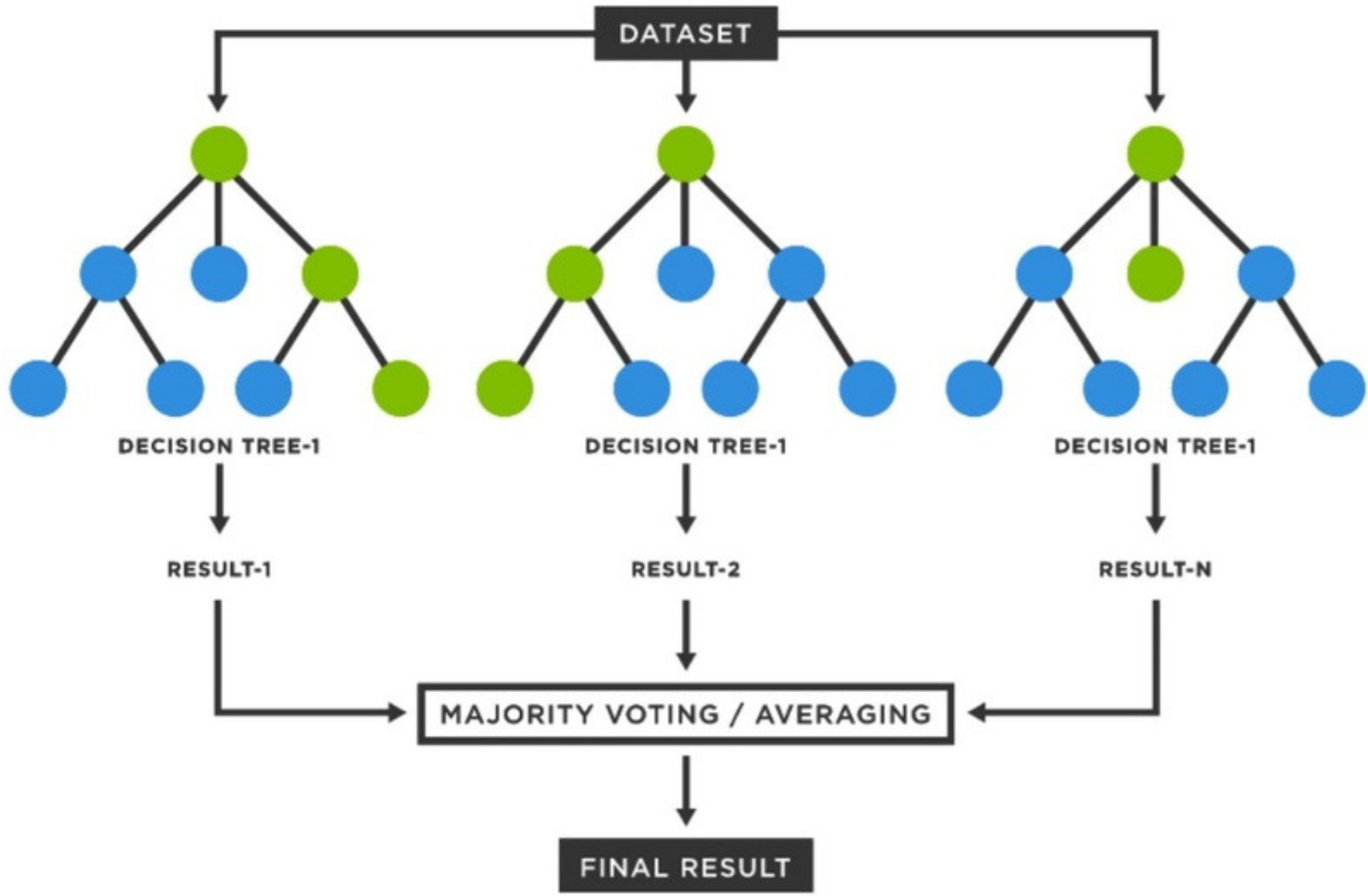
Understanding all about Random Forest!

-letthedataconfess

What is a Random Forest?

Random forest uses multiple decision trees inside it to make the predictions. It is an ensemble learning technique which averages a lot of decision trees and hence, reduces the variance and improves prediction accuracy on the test dataset.


DATASET
DECISION TREE-1
DECISION TREE-1
DECISION TREE-1
RESULT-1
RESULT-2
RESULT-N
MAJORITY VOTING / AVERAGING
FINAL RESULT

How does it work?

- Random forest uses the concept of bagging, which is a procedure where we construct B individual trees using B bootstrapped training sets and then aggregate the resulting predictions.
- It also decorrelates the multiple decision trees by choosing a random sample of m predictors out of the total p predictors as split candidates.
- The prediction for the test dataset is thus improved but at the cost of interpretability of the model.

Advantages of Random Forest

- Low bias and low variance model, hence improved predictions
- Robust to outliers and missing data
- Handles both categorical and numerical data
- Handles high nonlinearity between independent variables
- No feature scaling is required as it is not a distance-based approach

Ddvantages of Random Forest

- Less interpretability and complex to visualize and understand
- Computation time is high if dataset is large
- Biased in multiclass classification problems towards more frequent classes.

Where might a Random forest fail?

When we less number of features in our dataset and our dataset is not too large, then a decision tree might perform well. But random forest model might fail in this case because it will learn all the patterns and noise in the data and will cause overfitting in this case

Use cases of Random Forest

It is used for both classification and regression problems. It is used most extensively in -

1. Fraud Detection
2. Stock Markets
3. Healthcare domain

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