Random Forest

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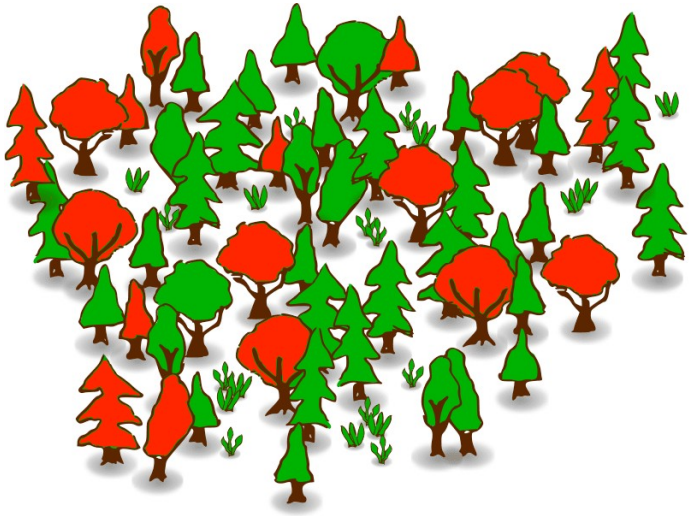


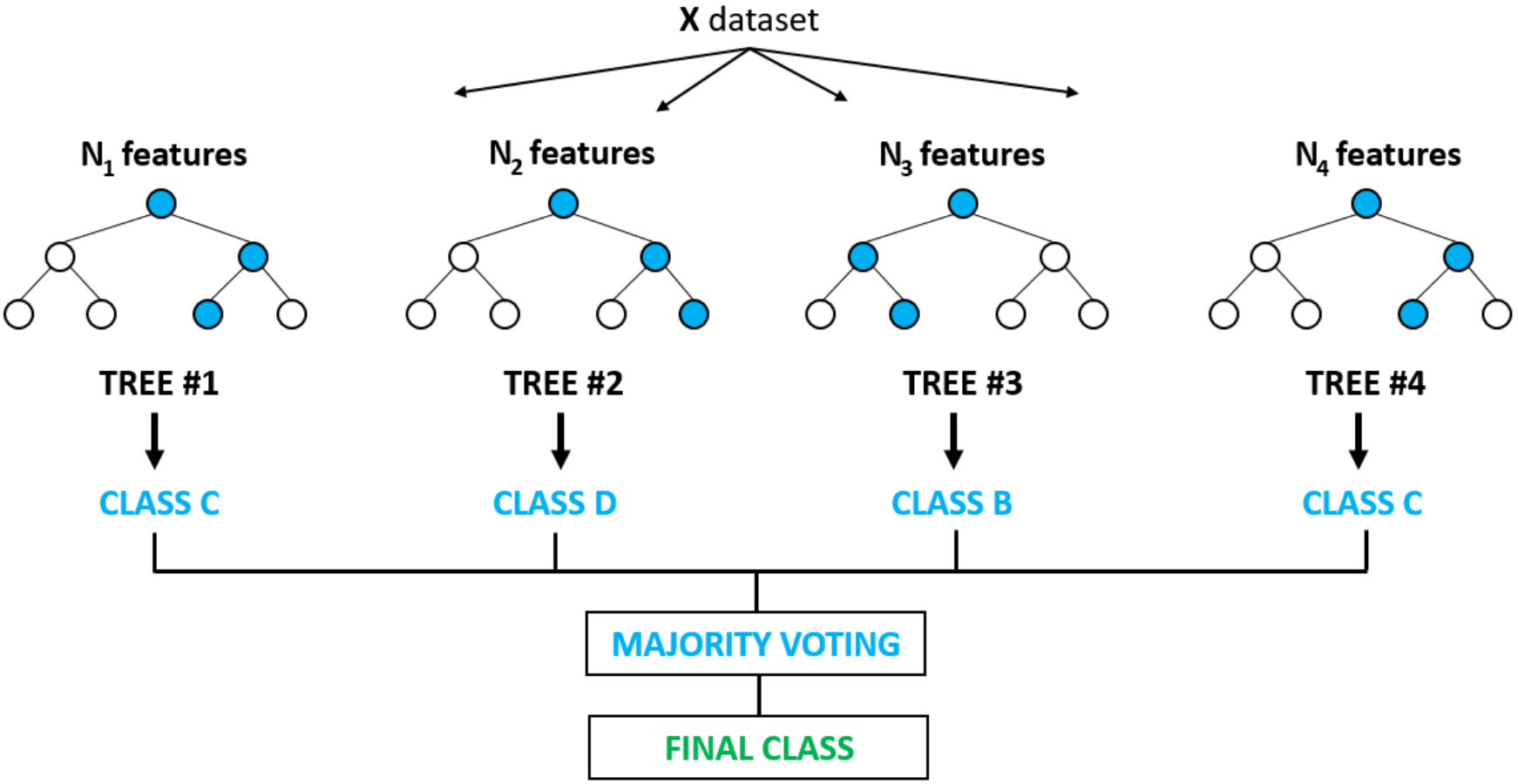
Random Forest

- Random forest is a type of supervised machine learning algorithm based on ensemble learning.
- Ensemble learning is a type of learning where you join different types of algorithms or same algorithm multiple times to form a more powerful prediction model.
- The random forest algorithm combines multiple algorithm of the same type i.e. multiple decision trees, resulting in a forest of trees, hence the name "Random Forest".
- The random forest algorithm can be used for both regression and classification tasks.

How it works ?

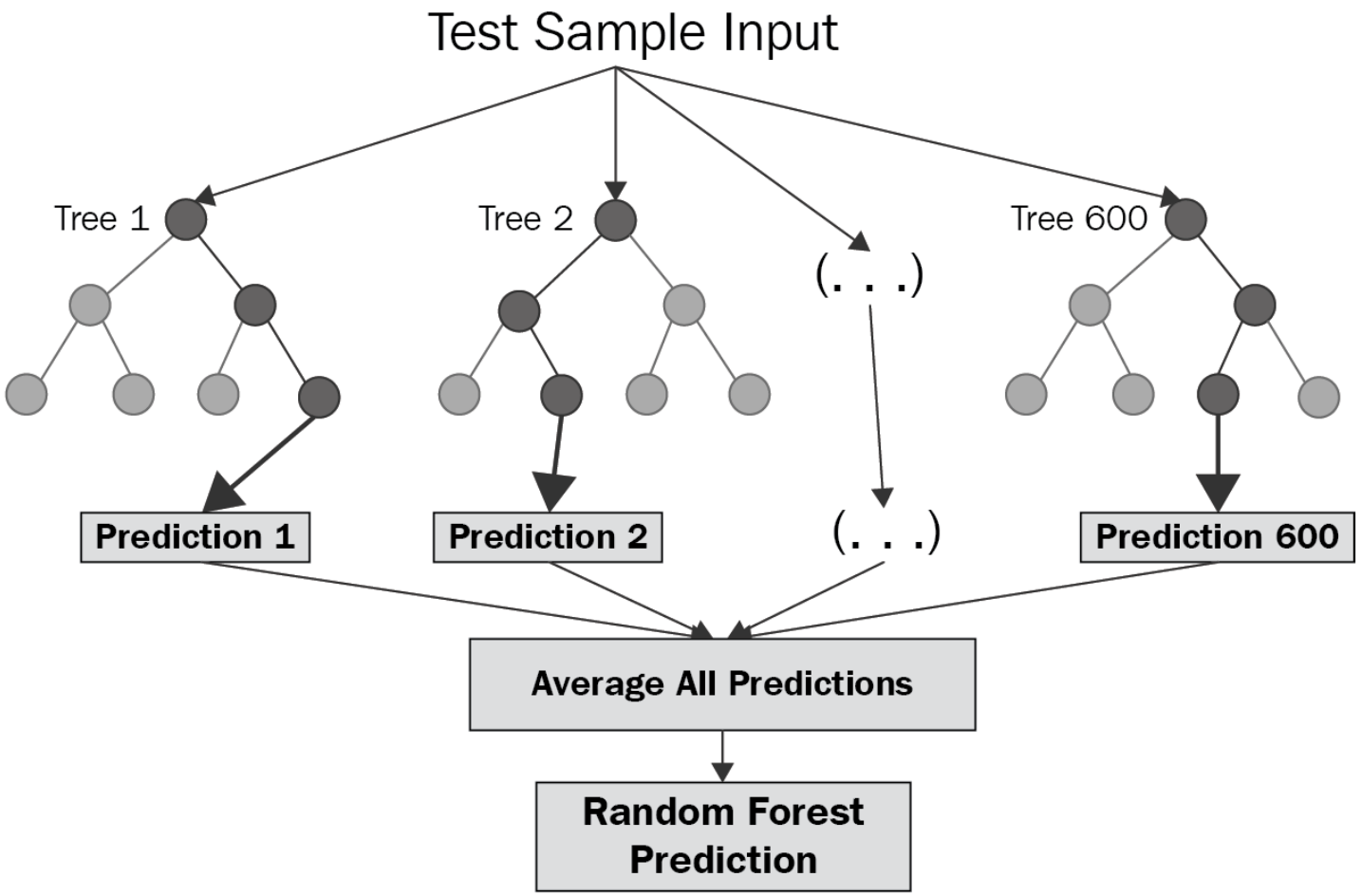
- Pick N random records from the dataset.
- Build a decision tree based on these N records.
- Choose the number of trees you want in your algorithm and repeat steps 1 and 2.
- In case of a regression problem, for a new record, each tree in the forest predicts a value for Y (output). The final value can be calculated by taking the average of all the values predicted by all the trees in forest. Or, in case of a classification problem, each tree in the forest predicts the category to which the new record belongs. Finally, the new record is assigned to the category that wins the majority vote.

Majority Voting



Source: medium.com

Regressor Output



Source: medium.com

Advantages

- The random forest algorithm is not biased, since, there are multiple trees and each tree is trained on a subset of data. Basically, the random forest algorithm relies on the power of "the crowd"; therefore the overall biasedness of the algorithm is reduced.
- This algorithm is very stable. Even if a new data point is introduced in the dataset the overall algorithm is not affected much since new data may impact one tree, but it is very hard for it to impact all the trees.
- The random forest algorithm works well when you have both categorical and numerical features.
- The random forest algorithm also works well when data has missing values or it has not been scaled well

Disadvantages

- A major disadvantage of random forests lies in their complexity. They required much more computational resources, owing to the large number of decision trees joined together.
- Due to their complexity, they require much more time to train than other comparable algorithms.

Useful resources

- www.pythonprogramminglanguage.com
- www.scikit-learn.org
- www.towardsdatascience.com
- www.medium.com
- www.analyticsvidhya.com
- www.kaggle.com
- www.stephacking.com
- www.github.com

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