

[https://scikit-learn.org/stable/auto\\_examples/classification/plot\\_classifier\\_comparison.html](https://scikit-learn.org/stable/auto_examples/classification/plot_classifier_comparison.html)

Decision Boundary intuition for different classifiers.

### **Kaggle**

[http://manishbarnwal.com/blog/2017/02/08/the\\_curse\\_of\\_bias\\_and\\_variance/](http://manishbarnwal.com/blog/2017/02/08/the_curse_of_bias_and_variance/) very good for bias and variance

- More complex model leads to less bias, high variance
- High variance is a problem as the distribution of the test and train set do not come from the same distribution.
- Bias are the simplifying assumptions taken by the model.

<https://towardsdatascience.com/understanding-the-bias-variance-tradeoff-165e6942b229> for intuition again

Ensemble - Bagging , Boosting

Bagging - implement simple learners on small populations and then take a mean (reduces variance error). Ex - Random Forest

Boosting - Iterative technique to convert weak learners to strong learners(reduces bias error). Ex - Ada Boost , Gradient boost, XGboost.

A single decision tree model has low bias(complex) and high variance, but random forest, since it is an ensemble of d.t. It reduces the variance problem, and the bias remains fixed. In random forest - both rows and columns are randomly generated, whereas in bagging only rows are randomly generated...bagging considers all features for next best split.

Bias has a relation b/w both pred and target but variance only on pred..one of the major differences.

More assumptions we put on the data - more is the bias.

<https://mlcourse.ai/articles/topic5-part2-rf/> - ye ek baar pakka dekhna

<https://www.datasciencecentral.com/profiles/blogs/random-forests-explained-intuitively> - pros and cons.

For random forest ideal input data - low bias, high variance

For boosting ideal input data - high bias, low variance.

<https://heartbeat.fritz.ai/how-to-make-your-machine-learning-models-robust-to-outliers-44d404067d07>