Logistic Regression vs Decision Tree vs Random Forest

Notes for SHS | Data Science | Topic 87 | 25 November 2026

Algorithm comparison

Characteristic	Logistic Regression	Decision Tree	Random Forest
Principle	Linear class scores / softmax	Recursive splits	Randomized-tree ensemble
Scaling	Often helpful	Not usually necessary	Not usually necessary
Interpretability	Coefficients with caveats	Individual rules	More complex ensemble
Main risk	Underfit nonlinear data	Overfit if unrestricted	Still can overfit

Real verified Iris run

Training-only CV macro F1: Logistic Regression .9580; Decision Tree .9414; Random Forest .9496. Selected Logistic Regression achieved 28/30 accuracy on the held-out sample (93.33%). Do not generalize this ranking beyond this exact experiment.