

# Nonparametrically consistent depth-based classifiers

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We introduce a class of depth-based classification procedures that are of a nearest-neighbor nature. Depth, after symmetrization, indeed provides the center-outward ordering that is necessary and sufficient to define nearest neighbors. The resulting classifiers are affine-invariant and inherit the nonparametric validity from nearest-neighbor classifiers. In particular, we prove that the proposed depth-based classifiers are consistent under very mild conditions. We investigate their finite-sample performances through simulations and show that they outperform affine-invariant nearest-neighbor classifiers obtained through an obvious standardization construction. We illustrate the practical value of our classifiers on two real data examples. Finally, we shortly discuss the possible uses of our depth-based neighbors in other inference problems.

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