

NEAREST NEIGHBOR METHODS

by

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ABSTRACT

Nearest neighbor methods are a diverse group of statistical methods united by the idea that the similarity between a point and its nearest neighbor can be used for statistical inference. This review article summarizes two common environmental applications: nearest neighbor methods for spatial point processes and nearest neighbor designs and analyses for field experiments.

In spatial point processes, the appropriate similarity is the distance between a point and its nearest neighbor. Given a realization of a spatial point process, the mean nearest neighbor distance or the distribution of distances can be used for inference about the spatial process. One common application is to test whether the process is a homogeneous Poisson process. These methods can be extended to describe relationships between two or more spatial point processes. These methods are illustrated using data on the locations of trees in a swamp hardwood forest.

In field experiments, neighboring plots often have similar characteristics before treatments are imposed. This similarity can be estimated and used to remove bias and increase the precision of treatment comparisons. Some of the commonly used nearest neighbor methods are briefly described.