Package ‘RANN’

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Title Fast Nearest Neighbour Search (Wraps Arya and Mount's ANN Library)

Version 2.5

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Description Finds the k nearest neighbours for every point in a given dataset in O(N log N) time using Arya and Mount's ANN library (v1.1.3). There is support for approximate as well as exact searches, fixed radius searches and bd as well as kd trees.

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URL https://github.com/jefferis/RANN

Suggests testthat

NeedsCompilation yes

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### Description

Wrapper for Arya and Mount's Approximate Nearest Neighbours (ANN) C++ library

### See Also

nn2

### nn2

**Nearest Neighbour Search**

#### Description

Uses a kd-tree to find the p number of near neighbours for each point in an input/output dataset. The advantage of the kd-tree is that it runs in O(M log M) time.

#### Usage

```r
nn2(data, query = data, k = min(10, nrow(data)), treetype = c("kd", "bd"), searchtype = c("standard", "priority", "radius"), radius = 0, eps = 0)
```

#### Arguments

- **data**: An M x d data frame or matrix, where each of the M rows is a point or a (column) vector (where d=1).
- **query**: A set of N x d points that will be queried against data. d, the number of columns, must be the same as data. If missing, defaults to data.
- **k**: The maximum number of nearest neighbours to compute. The default value is set to the smaller of the number of columns in data
- **treetype**: Character vector specifying the standard 'kd' tree or a 'bd' (box-decomposition, AMNSW98) tree which may perform better for larger point sets
- **searchtype**: See details
- **radius**: Radius of search for searchtype='radius'
- **eps**: Error bound: default of 0.0 implies exact nearest neighbour search
Details

The RANN package utilizes the Approximate Near Neighbor (ANN) C++ library, which can give the exact near neighbours or (as the name suggests) approximate near neighbours to within a specified error bound. For more information on the ANN library please visit http://www.cs.umd.edu/~mount/ANN/.

Search types: priority visits cells in increasing order of distance from the query point, and hence, should converge more rapidly on the true nearest neighbour, but standard is usually faster for exact searches. radius only searches for neighbours within a specified radius of the point. If there are no neighbours then nn.idx will contain 0 and nn.dists will contain 1.340781e+154 for that point.

Value

A list of length 2 with elements:

- **nn.idx** A `N x k` integer matrix returning the near neighbour indices.
- **nn.dists** A `N x k` matrix returning the near neighbour Euclidean distances.

Author(s)

Gregory Jefferis based on earlier code by Samuel E. Kemp (knnFinder package)

References


Examples

```r
x1 <- runif(100, 0, 2*pi)
X2 <- runif(100, 0, 3)
DATA <- data.frame(x1, x2)
nearest <- nn2(DATA,DATA)
```
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