Package ‘RANN.L1’

August 29, 2016

Encoding UTF-8

Title Fast Nearest Neighbour Search (Wraps ANN Library) Using L1 Metric

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. The distance is computed using the L1 (Manhattan, taxicab) metric. Please see package 'RANN' for the same functionality using the L2 (Euclidean) metric.

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URL https://github.com/jefferis/RANN/tree/master-L1

Suggests testthat

NeedsCompilation yes

Repository CRAN

Date/Publication 2015-05-04 11:54:30

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Description

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

See Also

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

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.L1 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 $N \times k$ integer matrix returning the near neighbour indices.
- **nn.dists**: A $N \times k$ matrix returning the near neighbour Manhattan 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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